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ANNUAL STATISTICAL NUMBER

ELECTRIC RAILWAY JOURNAL

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

PUBLISHED EVERY SATURDAY

Vol. XLI NEW YORK, JANUARY 4, 1913 No. 1

TABLE OF CONTENTS:

Electric Railway Rolling Stock Ordered in 1912 - - - - - - - - - 11

Statistics covering the number, type, length and builders of new cars ordered during the year, compiled from official returns.

Receiverships and Foreclosures During 1912 - - - - - - - - - 14

A tabulated list is presented of the electric railway companies for which receivers were appointed during 1912, with a list of the foreclosure sales. The statistics include the capitalization of the companies concerned.

New Electric Railway Track Built in 1912 - - - - - - - - - - 15

Statistics of new track completed during the year. They show a smaller total than in 1911, although the extensions are evenly distributed over the country.

Steam Road Electrifications. By A. H. Armstrong - - - - - - - - 17

The author discusses the application of electric locomotives to mountain-grade service, makes a number of detailed comparisons of fuel consumption, service capacity, etc., with steam locomotives, and argues in favor of electric locomotives for this service, from the standpoint of economy.

The Development of the Electric Railway Motor. By N. W. Storer - - - - 21

A discussion of the present trend in design of electric railway motors and control systems, in which the author compares weight reduction and other methods for securing higher efficiency and greater output.

Developments During 1912 in Power Plant Design. By Prof. Henry H. Norris - 26

An account of the progress of the year in the field of power generation, including brief descriptions of typical plants.

Progress in Electric Power Transmission Practice. By Louis Bell, Ph. D. - - 31

A review of the features entering into power distribution problems of the present day with special reference to those of conversion to direct current.

Heavy Electric Traction on the Continent of Europe - - - - - - - - 33

An article summarizing the recent electrification work of the various Continental governments and their plans for the immediate future.

Gas Rate Decision in New Jersey - - - - - - - - - - - - 35

An abstract of an important decision recently rendered by the New Jersey Public Utilities Commission in which the commission gives its reasons for adopting a lower valuation for the intangible property than that claimed by the company and discusses the rate of return on this valuation.

Editorials 1
The Trend of Public Utility Regulation...... 25
Progress Toward General Merger of Chicago Traction Interests 32
Electric Vehicles for Street Railway Service Discussed in New England.......... 37
Indianapolis Traction & Terminal Company's Experience with Oxy-Acetylene Welding. 38
Committee of National Association of Railway Commissioners 39
Fort Dodge, Des Moines & Southern Oiling Record 40
Steam Railroad Statistics.......... 40
An Improved Rail Grinder.......... 40
London Letter.......... 41
News of Electric Railways.......... 42
Financial and Corporate.......... 45
Traffic and Transportation.......... 47
Personals 50
Construction News.......... 51

Index to the Advertisements on the Fourth Page Following Last Reading Page

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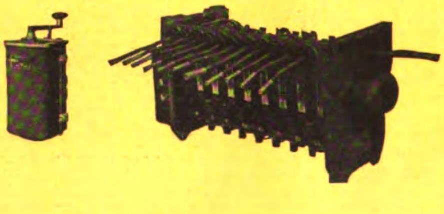

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INDEX TO VOLUME XLI.

January to June, 1913

UNIV. OF CALIFORNIA

McGraw Publishing Company, Inc.
239 West 39th Street
New York

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INDEX TO VOLUME XLI

JANUARY TO JUNE, 1913

PAGES BY WEEKS.

Jan. 4	pages	1	to	54
Jan. 11	"	55	to	94
Jan. 18	"	95	to	138
Jan. 25	"	139	to	178
Feb. 1	"	179	to	238
Feb. 8	"	239	to	278
Feb. 15	"	279	to	316
Feb. 22	"	317	to	352
Mar. 1	"	353	to	404
Mar. 8	"	405	to	448
Mar. 15	"	449	to	530
Mar. 22	"	531	to	570
Mar. 29	"	571	to	612
April 5	"	613	to	664
April 12	"	665	to	704
April 19	"	705	to	746
April 26	"	747	to	786
May 3	"	787	to	836
May 10	"	837	to	876
May 17	"	877	to	918
May 24	"	919	to	954
May 31	"	955	to	992
June 7	"	993	to	1046
June 14	"	1047	to	1098
June 21	"	1099	to	1132
June 28	"	1133	to	1188

A

Aberdeen Corporation Tramways, Double-deck prepayment cars, *385
Acceleration of trains, Berlin, Germany, 707
Accident claim department:
——Forestalling suits by photographs, 919
——Graphical record of car accidents, Portland Railway, Light & Power Co., 885
——Prevention of accidents:
  Atlanta, Ga., 397
  Aurora, Elgin & Chicago R. R., 273, 740
  Baltimore, Safety talks to children, 871
  Boston Elevated Ry., Campaign [Dana], *58
  Brooklyn Rapid Transit Co., Campaign in schools, 442, 564
  Chicago Rys., Moving-picture film used, 898
  East Liverpool, Ohio, 526
  Fort Wayne & Northern Indiana Traction Co., 432, 588
  Importance of safety [Shonts], 985
  Joliet, Ill., 948
  Michigan United Traction Co., 398
  Middle West Utilities Co., Bureau of safety, 368, 419, 665
  New York school campaign, 526
  Oklahoma Ry. [Knox], 885
  Pennsylvania R. R., Book of instructions, 1047
  Philadelphia, 1091
  Principal measures taken by railway companies [Knox], 884
  Rockford, Ill., 739
  Seattle, Wash., Safety work in, 216
  Successful methods [Rippey], 760; Discussion, 812
  Toledo Railways & Light Co., 658
  York, Pa., 740
——Publicity in, 56
Accidents:
——Chicago & Oak Park Elevated R. R., 88 253
——Comparison of elevated roads in New York City with steam roads of the country, 183
——Human fallibility in railway operation, 182
——Interstate electric railways, Statistics, 47, 1180
——Lockport, N. Y., International Ry., 698
——New York City, 48, 172
——New York Elevated Ry., Comment, 182
——New York, New Haven & Hartford R. R., Stamford wreck, 1099
——San Francisco, Napa & Calistoga Ry., *1162
——Shop accidents, 139
——Steam railway, Analysis of causes, 1908-1913, 551
Accountants' Association:
——Committees:
  Collecting and accounting for variable rates of fare, Meeting, 200

Accountants' Association:
——Committees: (Continued)
  Education, Meeting, 200
  Engineering accounting, Meeting, 200
  Executive, Meeting, 204
  Express and freight accounting, Meeting, 201
  Interline accounting, Meeting, 200
  Life of railway physical property, Meeting, 200
  Statistical unit for car operation, Meeting, 201
Accounting:
——Bond coupons, Handling of [Kehl], 1015; Discussion, 1059
——Costs of electric railway operation [Sparks], 1061
——Depreciation [Birch], 1015; Discussion, 1015; [Rifenberick] 1163
——Freight bill handling [Scott], 1015; Discussion, 1059
——Lighting accounts, Report of National Electric Light Association committee, 1058
——Power station accounts [Ayers], 803; [Wilson], c859
——Prepaid and accrued accounts [Heydecke], 1015; Discussion, 1059
——Questions and answers under uniform system of accounts, 907, 1036
——Small and medium-sized public utilities [Gordon], 964
——Standard classification, Questions and answers, 907, 1036
——Tabulating shop accounts by machinery, *853
——Voucher indexing simplified [Ford], 1167
——Work order system, Milwaukee Electric Railway & Light Co. [Kalweit], 113
Accounting school for employees, New York Edison Co. [Holme], 1015, 1059
Accumulator cars. (See Storage battery cars)
Advertising:
——Courtesy card for street cars, Federal Light & Traction Co., *596
——Hand-strap with advertising feature [Newton], *259
——London Underground Rys., *105
Agriculture, Electricity in. (See Rural communities)
Air brakes. (See Brakes, Air)
Akron, Ohio, Northern Ohio Traction & Light Co.:
——Annual report, 269
——Express car for automobile shipments, *721
——Extensions, 223, 823, 1117
——Franchise extension, 518
——Franchise suit, 691
——Improvements, 1117
——Tower wagon, *1080
——Wage increase, 698, 871
Albany, N. Y., United Traction Co., Power distribution problems [Childs], 421
Alexandria Bay, N. Y., St. Lawrence International Electric R. R. & Land Co., Winter service suspended, 88
Alexandria (La.) Electric Ry., Acquisition, 439
Allentown, Pa., Lehigh Valley Transit Co.:
——Earnings for 1911 and 1912, 343
——Improvements, 398
——Purchase of stock of Easton Consolidated Electric Co., 696, 738
——Wage increase, 273
Altoona, Pa., Penn Central Light & Power Co., Bond sale, 345
Amalgamated Association of Street and Electric Railway Employees, Annual report, 279
American Cities Co. (See New York)
American Electric Railway Accountants' Association. (See Accountants' Association)
American Electric Railway Association:
——Activities increased. Larger number of committees, 665
——Committees:
  Company membership, Meeting, 200
  Company sections, Meeting, 201
  Determining the proper basis of rates and fares, Report, 184; Discussion [Stearns], 189; [Clark], 192
  Education, Meeting, 199
  Electrolysis, Meeting, 198
  Executive, Meetings, 201, 892
  Federal relations, Meeting, 201
  Insurance, Meeting, 201
  Joint use of poles, Meeting, 200
  Mail transportation, Report, 380
  Public policy, Meeting with National Electric Light Association, 325; Comment, 317
  Public relations, Meeting, 201
  Relations with sectional associations, Meeting, 198
  Subjects, Meeting, 858
  Uniform definitions, Meeting, 201
  Welfare of employees, Meeting, 201

American Electric Railway Association: (Continued)
——Convention of 1913:
  Applications for space, 1018
  Atlantic City selected, 787
  Location committee at Washington, 496
  Program, 1077
——Convention of 1915:
  Location committee at San Francisco, 582
  Request for reservations, 384
——Membership campaign and results, 353, 1047
——Membership in territorial associations, 616
——Midyear meeting:
  Banquet at Hotel Astor, 116, 206
  Notes, 95, 116, 179, 180
  Proceedings, 184
——Railroad Securities Commission, Report, Discussions [Warren], 185; [Crosby], [Brady], [Henry], 187; [Richey], 189; [Strauss], 190
American Electric Railway Claim Agents' Association. (See Claims Association)
American Electric Railway Engineering Association:
——Committees:
  Block signal, Meetings, 204, 550, 1111
  Buildings and structures, Meeting, 197
  Electrolysis, Meeting, 198
  Equipment, Meetings, 258, 1076
  Heavy electric traction, Meeting, 203
  Interurban train operation, Meeting, 199
  Life of railway physical property, Meeting, 200
  Power distribution, Meeting, 1060
  Power generation, Meeting, 202
  Standards, Meeting, 203
  Train operation for city service, Meeting, 197
  Way matters, Meeting, 203
American Electric Railway Manufacturers' Association:
——Committee, Executive, Meetings, 205, 802
American Electric Railway Transportation & Traffic Association:
——Committees:
  Block signal, Meetings, 204, 550, 1111
  Collecting and accounting for variable rates of fare, Meeting, 200
  Construction of schedules and timetables, Meeting, 199
  Executive, Meeting, 203
  Express and freight accounting, Meeting, 201
  Express and freight traffic, Meetings, 204, 892
  Fares and transfers, Meeting, 199
  Interurban train operation, Meeting, 199
  Passenger traffic, Meetings, 197, 892
  Rules for city and interurban lines, Meetings, 198, 858
  Schedules and timetables, Meeting, 975
  Statistical unit for car operation, Meeting, 201
  Train operation for city service, Meeting, 197
  Training of employees, Meeting, 200
  United States mail, Meeting, 199
American Institute of Electrical Engineers:
——Annual meeting, Papers, 932
——Midwinter convention, 431
American Railway Association, Committee on electrical working, Report, *935
American Railway Engineering Association:
——Annual convention:
  Exhibits, 553
  Proceedings, 547
  Reports of committees, 543
——Committee on electricity, 935
American Railway Master Mechanics' Association:
——Convention proceedings, 1065
——Exhibit, 1065
American Rys. (See Philadelphia)
American Water Works & Guarantee Co. (See Pittsburgh)
American Wood Preservers' Association, Annual convention, 150, 220; Comment, 182
Anderson, Ind., Indiana Union Traction Co.;
——Annual report, 522
——Block signals, 496, 843
——Rail inspection at mill, Plan for, 253
——Repair shop notes, 510
Appraisal of railway property.
——Cleveland Ry., Arbitration with city:
  Members of Board, 863, 901
  Proceedings before Board, 925, 971, 1070, 1112, 1159; Comment, 957, 1134
——Depreciation [Rifenberick], 1163
——Detroit United Ry., City lines, *897
——Going value, Proper recognition of, 533
——Interstate Commerce Commission, Work of, 391, 449; [Clark], 558; 667, 936, 955, 977
——Kansas City, Metropolitan Street Ry., Report [Arnold], 389, 716

(Abbreviations: * Illustrated. c Correspondence.)

245968

Appraisal of railway property: (Continued)
——Minnesota rate case, 1064; Comment, 1049, 1101
——New Jersey, Public Service Gas Co., Passaic district, 35; Comment, 55
——Physical and intangible valuation as covered by recent legislation [Rifenberick], 1163
——St. Louis, Mo. Report of Public Service Commission [Allison], 248; Comment, 239
——Seattle, Renton & Southern Ry., 304
——Toronto, Unified management recommended. Estimates of future traffic. Subway and motor buses considered [Arnold], 968
——Value of valuation, 667
——Westchester Street R. R., 381
Apprentices, Education, Plans for, 179, 199
Arbitration. (See Employees; Cleveland Ry.)
Archbald, Robert W., Impeachment case, 165
Ardmore (Okla.) Traction Co., Sale, 695
Arkansas Association of Public Utility Operators, Convention papers, 888
Arkansas Valley Railway, Light & Power Co. (See Pueblo, Col.)
Asheville, N. C., Strikes, 863, 1084
Asphalt cars. (See Work cars)
Associated Manufacturers of Tramway and Railway Material, England, 651
Association efficiency, Higher, 1134
Atchison (Kan.) Railway, Light & Power Co., Experience with one-man prepayment cars, 578
Athol, Mass.:
——Athol & Orange Street Ry.:
  Change of name, 869
  Consolidation, 270
——Northern Massachusetts Street Ry., 869
Atlanta, Ga., Georgia Railway & Power Co.:
——Accident prevention campaign, 397
——Annual report, 654
——Wage increase, 48
Auburn, N. Y., New York, Auburn & Lansing R. R., Reorganization, 696
Aurora, Elgin & Chicago R. R. (See Chicago)
Australia:
——Melbourne electrification:
  Approved by the government, 71
  Contract awarded to General Electric Co., 255
——Queensland Government Rys., Narrow-gage gasoline cars, *158
Austria:
——Electric railway statistics, 414
——Heavy electric traction conditions, 33; Comment, 9
Automatic stop and train speed control [Horne & Crane], 1115
Automobiles. (See Commercial vehicles; Motor buses)

B

Baggage:
——Aurora, Elgin & Chicago R. R., Checking plans, 697
——Regulations restricting dimensions, Interstate Commerce Commission, 564
Baggage cars. (See Cars, Baggage and express)
Baked enamel. (See Paints and painting)
Ballast, Depth, Test for determination of proper, 545
Baltimore:
——United Railways & Electric Co.:
  Annual report, 776
  Carhouses. Distinctive style, 970
  Fare rates, Low, versus efficiency of service, 779
  Maintenance notes, *293
  Paving suit decision, 692
  Safety talks to children, 871
——Washington, Baltimore & Annapolis Electric Ry.:
  Acquires stock of Annapolis Gas & Electric Co., 345
  Annual report, 828
  Decision of Interstate Commerce Commission, 697
Baltimore & Ohio R. R., Electrification progress, 1006
Bangor (Me.) Railway & Electric Co., Franchise renewal, 771
Beaumont (Tex.) Traction Co.:
——Merger, 983, 1178
——Strike, 1033
Belvidere (Ill.) City Ry., Experience with one-man prepayment cars, 581
Benefit plans. (See Employees)
Berlin, Germany:
——Electrification of the Stadtbahn, 965
——Locomotive and motor car accelerations, 707
——Rapid transit line proposed between Gesundbrunnen and Rixdorf, 887
Bernese Alps Ry., Opening, 1112
Binghamton (N. Y.) Ry., Insurance and wage increase for employees, 272
Birmingham, Ala.:
——Birmingham, Ensley & Bessemer Ry.:
  Car for white and colored passengers, *766
  Financial conditions, 908
Birmingham, Ala.: (Continued)
——Birmingham Railway, Light & Power Co.:
  Concrete paving between car tracks, *514
  Owl service unprofitable, 606
——Strikes, 1174
Bitumen cars. (See Work cars)
Blanks and forms. (See Record forms)
Block Signal and Train Control Board, Report to Interstate Commerce Commission, 303
Block signals. (See Signals; American Electric Railway Engineering Association, Committee on block signals)
Boiler-feed water, Scale troubles [Scott], 963
Boiler plant of Washington & Old Dominion Ry. [Smith], 537.
Boise, Idaho, Idaho-Oregon Power & Light Co., Refinancing, 946
Bolt, Split, for inaccessible places (Kling), *300
Bonner Springs, Kan., Kansas City & Bonner Springs Street Ry., Extensions, 604
Boone, Ia., Ft. Dodge, Des Moines & Southern R. R.:
——Cross pit truck transfer table, *61
——Locomotives with insulated roof, *512
——Oiling record, 40
Boston, Mass.:
——Boston & Albany R. R., Electrification problem, 390
——Boston & Eastern Electric R. R., Charter granted, 264
——Boston Elevated Ry.:
  Accident prevention campaign [Dana], 58
  Articulated car, Improved design. Data on operation, *583; Comment, 613
  Car delays, Causes and remedies, 763
  "Car full" signs, 443
  East Boston tunnel toll reduction, 346
  East Cambridge viaduct, track and drawbridge, *362
  Executive organization, Changes in, 43; Comment, 240
  Express service, 870
  Extensions of rapid transit routes and benefits of, 358
  Hand-strap with advertising feature (Newton), *259
  Improvements, *358, *408; Comment, 357
  Mail transportation costs, 292
  Nine-hour day, 49
  Service improvements, 607
  Service recommendations for Cambridge, 740
  Situation discussed by Mayor Fitzgerald, 770; Comment, 878
  Subway referendum, *856
  Sullivan Square terminal and station, *361
  Traffic diversion in Back Bay, 606
  Traffic statistics [Sergeant], 287
  Wage increase, 49
  Work-car locomotive, *295
——Boston Transit Commission, Annual report, 72, 287
——Boylston Street subway extension, Report, 901
——Terminal electrification, Bill reported to Legislature, 264, 941
Bowling Green (Ky.) Ry., Receivership, 440
Brackets:
——Cable (Barnes & Hobert), *976
——Fire extinguisher (Pyrene), *938
Brake hanger, Light weight, Rochester, N. Y., *752
Brake rigging pins, Syracuse, Lake Shore & Northern Ry., *593
Brake-shoe costs, Brooklyn, Graphical record, 102
Brakes, Air:
——Failures as excuses, Stamford wreck of New Haven Road, 1099
——Freight car equipment, 1113
——Hose specifications, M. C. B., 1113
——Massachusetts Railroad Commission hearings, 819
——San Francisco. Report on equipment [Arnold), 257
——Standard triple valves recommended by Master Car Builders' Association, 1113
——Swinging brackets for train pipe, 1113
Brazil, Railway enterprises in, 118
Bridges:
——East Cambridge extension, *362
——Inspection of, 706
——Oregon Electric Ry., *1052
Brill Co., J. G., Annual report, 307
British Columbia Electric Ry. (See Vancouver, B. C.)
Brooklyn:
——Marginal railway plans, 1118
——Subway construction, 1175
Brooklyn Rapid Transit Co.:
——Brake order, 1119.
——Capital stock increase, 85
——Center-entrance, low-step cars, Construction and equipment, *708; Comment, 707
——Educating the office employee, 355
——Improvements in motors, trucks and brakeshoes, *98
Brooklyn Rapid Transit Co.: (Continued)
——Maintenance of electrical equipment of cars, *480; Comment, 450
——Purchase of Coney Island & Brooklyn R. R. proposed, 656
——Safety campaign in public schools, 442, 564
——Sound to ocean line, Vote on, 163
——Transfers, Hearing on, 1181
——Wage increase, 1040
Bucks County Interurban Ry. (See Philadelphia).
Buffalo, N. Y.
——Buffalo & Fort Erie Ferry Ry., Stock increase, 1118
——Buffalo & Lake Erie Traction Co., Agreement with employees, 979
——International Ry.:
  Accident near Lockport, N. Y., 698
  Commutation ticket, What it implies, 397
  Interlocking plant, 226
  One-man near-side cars, Experience with, *504, *580
  Rolling stock maintenance. Complete system of records, *922
  Snow scraper for limited clearance space, 1171
  Strike, 665, *674, 730, 771, 825, 941, 978, 994, 1030
  Strike damages claimed, 994, 1030
  Substations, Design and construction of new. Arrangement of equipment, *840
——International Traction Co., Financial reorganization, 46, 84
——Terminal electrification, 225, 864
——Through cars to Rochester, 948
Buildings, Decorative treatment of, 96
Bureau of safety. (See Chicago, Middle West Utilities Co.)
Butte, Anaconda & Pacific R. R.:
——Electrification progress, 1010
——Locomotives, Electric, 20, *1010

C

Cab, Motorman's, Brooklyn center-entrance car, *713
Cab window cleaner, Brooklyn center-entrance car, *712
Cable line of Puget Sound Traction, Light & Power Co., Improvements, *1108
Cables:
——Aluminum underground, in Europe, 924,
——Aluminum vs. copper, 1115
——Current rating of electric, Discussion by American Institute of Electrical Engineers, 431
——High-tension underground. Report of National Electric Light Association, 1013
California Railroad Commission:
——Clearance rules, 103
——Hearing on United Railroads, application to refund issues of subsidiaries, 45, 344
——Order affecting evidences of indebtedness, 1037
——Policy in regard to rates, 740
——Reports of joint committee on inductive disturbances, 512, 531
California Railway & Power Co. (See San Francisco)
Calling the streets, Portland, Ore., 1125
Cambridge, Ohio, New Midland Power & Traction Co., Sale, 231
Canadian electric railways, Statistics, 224
Canadian Northern Pacific Ry., Electrification of branch lines, 733, 825
Cape Girardeau-Jackson (Mo.) Interurban Ry., Experience with one-man prepayment cars, 579
Capital Traction Co. (See Washington, D. C.)
Car delays, Boston Elevated Ry., Causes and remedies, 763
Car design:
——[Birney], 964; Discussion, 1019
——Center-entrance car, Brooklyn Rapid Transit, *709
——Center-entrance interurban car, Kansas City, Clay County & St. Joseph Ry., *121
——Center-sill, steel, 1113
——Changes to effect economy, 407
——Doorways of prepayment cars, 139
——[Doyle, Gove and McWhirter], 1148
——Progress during 1912, 4
——San Francisco, Report [Arnold], 256
——Steps, Height of, New York City, 414; Comment, 405
Car replacer (Columbia), *596
Car steps, Height of:
——Discussion in Report of Chicago Board of Supervising Engineers, 893
——New Jersey hearing, 780
——New York, Opinion and order of Public Service Commission, 414; Comment, 405
——(See also Tread)
Car straps. (See Straps)
Car trust certificates:
——Philadelphia Equipment Securities Co., 229, 293
——Philadelphia Rapid Transit Co., 266, 389, 435
Car weights, Reduction, to increase efficiency, 407

(Abbreviations: * Illustrated. c Correspondence.)

Carhouses:
——Baltimore, Distinctive style, 970
——Car-washing facilities, Milwaukee Electric Railway & Light Co., *499
——Costs, Virginia Railway & Power Co. [Neff and Thompson], 495
——Derby, Conn., *320
——Design, Scientific [Neff and Thompson], *490
——Hamburg Elevated & Underground Ry., *468
——Milwaukee Electric Railway & Light Co., Fond du Lac Avenue, *497
——Omaha, Neb., Double-deck reinforced concrete, *242
——Philadelphia Rapid Transit Co., at Luzerne street, Reinforced concrete, *1136; Comment, 1133
——Pit construction:
  Hamburg Elevated & Underground Ry., *469
  Milwaukee Electric Railway & Light Co., *499
  Philadelphia Rapid Transit Co., *1139
——Pit lighting, El Paso, Texas, *426
——Trainmen's quarters. (See Employees)
——Virginia Railway & Power Co. [Neff and Thompson], *490
——(See also Yards)
Cars:
——Accumulator. (See Storage battery cars)
——Articulated, Boston Elevated Ry. Improved design. Stepless. Data on operation, *583; Comment, 613
——Baggage and express for automobiles, Northern Ohio Traction & Light Co., *721
——California type, San Francisco, *896
——Center-entrance:
  Brooklyn Rapid Transit, *708; Comment, 707
  South Fork-Portage Ry., *768
——Center entrance, Interurban, Kansas City, Clay County & St. Joseph Ry., *120
——Double-deck:
  Aberdeen Corporation Tramways, *385, *722
  Liverpool, Eng., *591
  Pittsburgh Rys., *958; Comment, 996
  Washington Railway & Electric Co., *430; Comment, 405
——Emergency. (See Work cars; Tower cars)
——Fire engine, Chicago elevated railways, 757
——Milwaukee Electric Railway & Light Co., *386
——Narow-gage combination, Pacific Coast Ry., *899
——Oil delivery, Chicago Rys., *548
——One-man prepayment:
  International Ry., Buffalo, 504
  Letters from railway officials describing results of use, 578; Comment, 572
——Pay-within, Michigan United Traction Co., *122
——Rochester, New York State Rys., *644
——Sleeping, Oregon Electric Ry., *119
——Storage battery. (See Storage battery cars)
——Trail:
  Center-entrance, Memphis, Tenn., *299
  Operation, in connection with peak load city service [Radcliffe], 422
——Two compartment, for white and colored passengers, Birmingham, Ala., *766
——Washington & Old Dominion Ry., *539
Cars ordered in 1912, 11; Comment, 1, 57
Catenary construction:
——Leyden-Katwyk-Noordwyk Ry., Holland, *142
——Midi Ry., France, *793
——Oregon Electric Ry., 1055
——Pacific Electric Ry., *755
——Verona-Caldiero Ry., Italy, *1001
Cedar Rapids, Iowa:
——Cedar Rapids & Iowa City Ry.:
  Selection and instruction of trainmen [Bell], 815; Discussion, 812
  Vestibule trains on sharp curves, 623
——Cedar Rapids & Marion City Ry., Safety tread for car steps, *548
Census of electric railways, Schedules for 1912, 384 [Steuart], c818
Central Arkansas Railway & Light Corporation. (See Hot Springs, Ark.)
Central Electric Railway Accountants' Association, Questions and answers [Elklns, Young and Pantel], 1169
Central Electric Railway Association:
——Annual meeting, Papers, reports and discussions, 370
——Committees for 1913, 594
——June convention on the Great Lakes, 993
——Papers at June convention, 1163
——President's address [Whitney], 377
——Secretary-Treasurer's annual report [Neereamer], 377
Central Electric Traffic Association:
——Annual report of the chairman [Neereamer], 37
——Committees for 1913, 594
Central Park, North & East River R. R. (See New York City)

Central Electric Traffic Association (Continued)
Champaign, Ill., Western Railways & Light Co., Annual report, 906
Charleston (S. C.) Consolidated Railway & Lighting Co., Sale of Seashore Division, 395, 695
Chicago:
——Aurora, Elgin & Chicago R. R.:
  Accident prevention campaign, 273, 740
  Baggage checking, 697
——Board of Supervising Engineers, Report:
  Financial statistics, welding of rail joints, location of carhouses and fire insurance, 809
  Height of car steps, schedule speed, time of loading, street occupation and motor testing, 893
——Chicago City Ry.:
  Arbitration with employees, 615, 732, 749
  Income account for 1912, 655
  Venner suit, Decision, 908
——Chicago City & Connecting Rys., Income account, 308
——Chicago Information Bureau, 163
——Chicago & Joliet Electric Ry. (See Joliet, Ill.)
——Chicago, Lake Shore & South Bend Ry. (See Michigan City, Ind.)
——Chicago & Milwaukee Electric Ry., Sale and resale, 83, 130, 1088
——Chicago, Milwaukee & Puget Sound Ry.:
  Contract for electric power, 290; Comment, 280
  Electrification of mountain division, 57, 70, 225, 280, 290, 919, 1009
  Gas-electric motor cars, *295
——Chicago & Oak Park Elevated R. R., Accident in loop, 88, 253
——Chicago, Ottawa & Peoria Ry. (See Ottawa, Ill.)
——Chicago Rys.:
  Accident campaign, Use of moving-picture film, 898
  Annual report, 775, 829
  Answer to Chicago Railways Protective Association, 1088
  Oil house and oil delivery car, *548
  Safety committee organized, 892
  Transfer suit, 398
——Chicago Railways Protective Association, Questions of, answered by the Chicago Rys., 1088
——Chicago, South Bend & Northern Indiana Ry. (See South Bend, Ind.)
——County Traction Co., Transfer suit, 398
——Electrolysis ordinance, 771
——Elevated lines attacked by State's Attorney Hoyne, 1122
——Elevated relief plan, 1173
——Fire-engine cars on elevated railways, *757
——Loop platform extension, 1085
——Loop removal proposed, 942
——Merger of traction interests:
  Abandonment of plan, 877
  Advocated by railway officials [Busby], [Gurley], 157
  Estimates, 1032
  Inadequacy of 1907 ordinances [Arnold]; Comment, 354
  Negotiations, 868, 979
  Preliminary draft of ordinance, 338
  Progress in preparation of ordinance, 390, 395
  Report of City Council, 32, 85
  Results to city and companies under 1907 ordinances [Arnold], 515
  Value of railways discussed, 168
——Metropolitan West Side Elevated Ry., Income statements, 521
——Middle West Utilities Co., Bureau of safety, 368, 419, 665
——Northwestern Elevated R. R.:
  Derrick car, *115
  Income statements, 521
——Operating agreements, 877, 947
——Partnership receipts from surface railway operation, 734
——Passenger handling records, Comparison with San Francisco, 257
——Public Service Company of Northern Illinois, Purchases, 396
——South Side Elevated R. R., Income statements, 521
——Terminal Electrification of steam roads:
  Investigation and report by Association of Commerce, 254, 883
  Letter of Chicago Association of Commerce, 1117
  Ordinance recommended, 1030
  Suggested conversion of Illinois & Michigan canal to subway, 904
  Union station plans, 1116
——Through-routing of surface and elevated trains, 871, 911
——Transfer case, 311
Chico, Cal., Northern Electric Ry.:
——Extensions proposed, *623
——Purchase of Vallejo & Northern R. R., 396, 656
Choctaw Railway & Lighting Co. (See McAlester, Okla.)
Choke coils (E. S. S. Co.), *552

Cincinnati, Ohio:
——Bigelow Bill discussed, 301
——Cincinnati & Columbus Traction Co.:
  Flood damage, 725
  Receivership, 778
——Cincinnati, Lawrenceburg & Aurora Street R.R., Receivership, 1178
——Cincinnati Traction Co.:
  Address to trainmen, 272
  Indeterminate grant suggested, 225 263
  Negotiations, 434, 516, 600, 648
  Strike of platform men. Efforts at arbitration, *890, 921, 939, 979
  Transfer ordinance, 1182
——Ohio Electric Ry.:
  Block signals, 843
  Bond issue, 869
  Flood damage, *724
  Insurance of employees, 525
  Light signal system, Suggested (Thompson), *117
——Snyder bill passed by the Legislature, 862
——Terminal question:
  Controversy over use of canal land, 164
  Report on possibilities [Arnold], 330
Circuit-breakers [Mahoney], 1014; Discussion, 1059
Cities Service Co. (See New York City)
City planning [McAneny], 390; Comment, 353
——Relation between city development and transportation facilities [Maltbie], 1106; Comment, 1100
City planning conference in Chicago, 902
Claim agent, Successful [Hyland], 420
Claim department (See Accident claim department)
Claims Association, Executive committee meeting, 198
Clamps, Guy:
——Boltless, Peoria Ry., *860
——Singlebolt (Barnes & Kobert), *976
Clamps, Line crossing (Clark), *1079
Clearances.
——California rules, 103
——Illinois Railroad & Warehouse Commission hearing, 1060
——Report of American Railway Association, *935
Cleveland, Ohio:
——Cleveland, Alliance & Mahoning Valley R. R., Opened between Ravenna and Alliance, Ohio, 81
——Cleveland, Painesville & Eastern R. R. (See Willoughby, Ohio)
——Cleveland, Ry.:
  Alternate-stop plan, 141
  Annual report, 438
  Arbitration with city:
    Decision of Board, 1159, 1172; Comment, 1134
    Members of Board, 863, 901
    Operating and maintenance funds 162, 302
    Proceedings before Board, 925, 971, 1070, 1112, 1159; Comment, 957, 1134
    Request for increase in ordinance allowances, 731, 769
  Electric power supply, *618
  Euclid Avenue question, 264
  Fare reduction opposed, 822
  Fares, Percentage of 5-cent, collected in Cleveland, 762
  Smoking, Protest against dead cigars, 525
  Subway question, 124
  Surplus and deficit, 531
  Tickets, Folding of, *258
  Track construction, *104, *886
  Trailer operation, 652
  Trailer operation in connection with peak load service [Radcliffe], 422
  Wages of trainmen, 927
——Cleveland, Southwestern & Columbus Ry., Bond issue, 983
——Cleveland & Youngstown Electric R. R., Work begun, 978
——Lake Shore Electric Ry., Annual report, 342
——Public utilities department suggested, 978
——Re-routing plan, 79
——Transportation problem [Witt] [Hopkins], 223
Coal:
——Inspection of government purchases, 116
——Losses from moisture in, 255
Coasting rules, Denver City Tramways, 501
Coffin, C. A. Retirement as president of General Electric Co. Becomes chairman of Board, 1099, 1110
Colon (Panama) Electric Tramway, 1174
Colorado, Legislation, 226, 692
Colorado Springs (Col.) & Interurban Ry.:
——Cars with fifty-seven volt tungsten lamps, 678
——Strike, 903
Columbus, Ohio:
——Columbus, Marion & Bucyrus R. R. (See Marion, Ohio)
——Columbus, New Albany & Johnstown Traction Co., Order of Public Service Commission, 233

(Abbreviations: * Illustrated. c Correspondence.)

Columbus, Ohio: (Continued)
——Columbus Railway & Light Co.:
Annual report, 394
Consolidation plans, 440, 830, 1178
Finances, 945
Reorganization, 230
——Columbus Railway, Power & Light Co., Financing plans, 1121
Columbus, Ind., Indianapolis, Columbus & Southern Traction Co., Block signals, 843
Commerce Court:
——Disposition of, 1084, 1175
——Utility of, 525
Commercial vehicles, Discussion by New England Street Railway Club, 37
Commutator slotting [Rushton], 1024
Compensation laws. (See Workmen's compensation laws)
Concrete, Electrolytic action on reinforced, 593
Concrete handling in wagon loads, Detroit United Ry., *898
Concrete mixer, Hand-operated (Smith), *729
Connecticut, Legislation, 304, 734, 826, 1085
Connecticut Co. (See New Haven, Conn.)
Connecticut Public Utilities Commission:
——Annual report, 125
——Statistics of railways, 982
——Work of [Hale and Olmsted], 555; Comment, 532
Contracts, Power. (See Purchased power)
Controller handles, Padlocking, Lincoln, Neb., *66
Controllers:
——Crane motor, Double-drum (Westinghouse), 387
——Multiple-unit circuits, Changes in, Brooklyn, 488
——Storage battery cars, 748
——Wiring diagram for Midi Railway locomotives, 795
Convention success, Responsibility for, 995
Converters:
——Cleveland Ry., 60-cycle, 1500-kw., 622; Comment, 615
——Non-commutating-pole, 1,000-kw., 60-cycle, Waterbury, Conn., *221
——Rotary converter operation from single-phase power station, Stamford, Conn., *298
Co-operative stores. (See Employees, Co-operative stores)
Corporation tax. (See Taxation)
Corporations, Creditors not parties to reorganization, 825
——(See also Public service corporations)
Cost of living. (See Employees)
County Traction Co. (See Chicago)
Couplers:
——Mounting of radial [Price], 372; Discussion, 380
——Strength of, 1114
Courtesy card for street cars, Federal Light & Traction Co., *596
Crane trolley with inclosed gearing (Whiting), *645
Creosoting. (See Timber preservation)
Cross-ties. (See Ties)
Crossing signals. (See Signals)

D

Dallas, Tex.:
——Dallas Electric Corporation:
Checking crews reporting for duty, 1076
Franchise and terminal questions, 42
——Fare case, 1173
——Paris Transit Co., Experience with one-man prepayment cars, 579
——Terminal station, 1033
Danbury (Conn.) & Bethel Street Ry., Petition for fare reduction denied, 910
Davenport, Ia., Tri-City Ry.:
——Near-side stops, 398
——Service restored in Rock Island, 1090
——Wage increase, 986, 1040
Dayton, Ohio, Wage increase, 1040
Delaware, Legislation, 601
Delaware & Hudson Co., Annual report, 737
Delta Electric Light, Power & Manufacturing Co. (See Greenville, Miss.)
Denver, Colo.:
——Bus ordinance vetoed, 691
——Denver City Tramways:
Coasting rules, 501
Express service all day, 658
Fare collection, Ohmer system, 374
Heating of car vestibules vetoed, 233
High School boys as conductors, 975
Skip-stop plan, 837
Trail car, *118
——Denver & Northwestern Ry., Change in control, 563
——Denver, Rio Grande & Western Ry., Electrification progress, 1010
Derrick cars. (See Work cars)
Des Moines (Ia.) City Ry., Franchise case, 650, 941, 978
Dessau-Bitterfeld Ry., Transmission cables, Experience with 60,000-volt, 369
Detectives, Free transportation, Indiana, 1126
Detroit, Mich.:
——Charter commission, 769
——Commission, Street railway, proposed, 822
——Motor bus line, 557
Detroit, Mich.: (Continued)
——Municipal ownership ordinance, 339, 557, 690, 731, 903, 940, 977, 1082, 1116, 1172
——United Ry.:
Annual report, 307
Appraisal of city lines, *897
Concrete aggregate handled in wagon loads, *898
Fort Street case, Decision, 1030
Franchise case, 434, 651
Multiple-unit train operation, 442
Paint shop, Construction and equipment, *668
Willing to sell to city, 265
——Verdier act constitutional, 977
Dipping vat for trucks, Hamburg Elevated & Underground Ry., *473
Dispatching of cars:
——Committee appointed by Wisconsin Electrical Association, 435
——[Hammett], 108
District of Columbia public utility law, 518
Dixon, Ill., Illinois Northern Utilities Co., Experience with one-man prepayment car, 581
Dominion Power & Transmission Co. (See Hamilton, Ont.)
Doors, End, for freight cars, 1113
Double-deck cars. (See Cars, Double-deck)
Drafting room, Efficiency in, 790
Dubuque, Ia., Near-side stops, 1181
Duluth, Minn.:
——Duluth Street Ry., Forfeiture suit proposed, 127
——Duluth-Superior Traction Co.:
Annual report, 655; Comment, 877
Dividend, 1178
Strike losses, Effect of, 877
Dump cars:
——Motor-operated, Cleveland, *887
——Santa Barbara, Cal., *857

E

Earnings of railways. (See Financial)
East Liverpool, Ohio, Tri-State Electric Co., Safety compaign, 526
East St. Louis (Ill.) & Suburban Co., Annual statement, 269
Eastern Power & Light Corporation, Organization, 522
Economies. (See Financial)
Edmonton, Alberta, Municipal line unprofitable, 266
Education. (See Employees)
Efficiency Society in New York, Annual meeting, 205
Electric arc welding. (See Welding)
Electric Railway Journal:
——First published in 1884, 1
——Maintenance issue, 449
——Statistical issue, 1
——Table of contents on front cover, 1
Electric railway situation in 1912, 8, 57
Electric vehicles. (See Commercial vehicles; Motor buses; Tower wagons; Service wagons)
Electrical apparatus, Report of National Electrical Light Association, 1012; Discussion, 1059
Electrified steam railroads. (See Heavy electric traction)
Electrolysis, National committee on, 934; Meeting, 1025
El Paso (Tex.) Electric Railway, Lighting of carhouse pit, *426
Emergency cars. (See Tower cars; Work cars)
Emergency wagons. (See Service wagons)
Empire United Rys. (See Syracuse)
Employees:
——Apprentices, Primers for, 179, 199
——Arbitration:
Chicago City Ry., 615, 732, 749
Cincinnati strike conditions, *890
Compulsory. Report and discussion before the Société d'Etudes Législatives of Paris, 791
Erdman law and a needed amendment, 318
Government mediation in labor disputes [Low], 212, [Marks], 214
——Benefit Association of Milwaukee Electric Railway & Light Co., Annual report, 739
——Benefit plan of Amalgamated Association of Street and Electric Railway Employees, Annual report, 279
——Bonuses and merit marks [Hammett], 109
——Changing relations between employer and employee [Shonts], 125
——Checking crews reporting for duty, Dallas, Tex., 1076
——Co-operative stores:
Advantages of the Berlin and the Philadelphia scheme, 838
Comment, 279
Milwaukee, Wis., 730
New York City, 219, 517, 653
Philadelphia Rapid Transit Co., 254, 855; Comment, 838
——Cost of living, Inquiry by Philadelphia Rapid Transit Co., 510
Employees: (Continued)
——Education:
Brooklyn Rapid Transit Co., 355
Electrical correspondence school, 435; Comment, 405
National Association of Corporation Schools, 165, 205; Comment, 183
New York State Railways, Co-operation with Mechanics' Institute, 461
(See also below, Training)
——Grievance committees in Providence, R. I., 87
——Handling of trainmen [Hammett], 108
——High School boys as conductors, Denver, 975
——Honesty and courtesy as essentials to success [Lee], 272
——Hours of labor [Bancroft], 986
Boston, Nine-hour day, 49
Illinois bill, Hearing on, 854
Massachusetts nine-hours-in-eleven bills, Testimony of C. S. Sergeant, R. S. Goff, A. S. Richey, 640, 687
——Instruction of workmen in inspection and maintenance of equipment, Brooklyn, 425
——Insurance:
Binghamton, N. Y., 272
Liability insurance [Ellis], 884
Ohio Electric Railway, 525
Pittsburgh, 48
——Merit system, Washington, D. C., 88
——New York Railways Association, Annual report, 164
——Pensions:
New Haven Road, 287
San Francisco-Oakland Terminal Rys., 47
——Primers for apprentices, 179, 199
——Profit sharing, Washington Railway & Electric Co., 87
——Relations that should exist with the supervisory force [Bolen], 1153; Discussion, 1144
——Safety committee, Chicago Rys., 892
——Selection and instruction of trainmen [Bell], 815; Discussion, 812
——Selection and retention of transportation employees [Hitchcock], 1022
——Seniority rights in the choice of runs, 747
——Stock purchase plan, Public Service Corporation of New Jersey, 441, 449
——Strikes. (See Strikes)
——Tornado damage fund, Omaha, Neb., 903
——Training of transportation employees, 200; Comment, 179; [Bell], 815; Discussion, 812; [Irwin], 973
——Trainmen's quarters:
Boston Elevated Ry., Division No. 7, *409
Milwaukee Electric Railway & Light Co., *501
Omaha, Neb., *246
——Wages. (See Wages)
——Welfare work, Serving coffee, Portland, Ore., 317
——Workmen's compensation laws [McMillin], 210; [Belmont], 214
Employers' liability act constitutional in Indiana, 903
Engineers. Graduates and their problems, 955
English, Good, in rules and announcements, 837
Equipment troubles with long trains, 616
Equipment trust securities, List of, 541
Erdman law, Needed amendment to, 318, 1084
Erie R. R.:
——Electrification progress, 1009
——Electrified section, Maintenance of. Outline of present condition. Repair shop practice, *998; Comment, 993
——Train detentions, 1000
Europe, Heavy electric traction in, 788
Evansville, (Ind.) Ry.:
——Flood damages, 758
——Purchase, 983
Exhauster systems, Planing mill, 617
Exit from cars, Use of front, 317
Express. (See Freight and express)
Express cars. (See Cars, Baggage and express)

F

Fairmont, W. Va., Monongahela Traction Co., Four-car train, 565
Fare collection:
——Helena, Mont., Rooke system, 698
——Human factor in collection service [Ohmer], 373; Discussion, 379
——Providence, R. I., Rooke system, *643
Fares:
——Cleveland Ry., Reduction opposed, 822
——Dallas case, 1173
——Determining proper basis of, Report of American Electric Railway Association, 184; Discussion [Stearns], 189; [Clark], 192
——Great Britain, Comparison with American [Clark], 193
——Hull Electric Ry., Increase, 304
——Low rates versus efficiency of service [House], 779
——Milwaukee Electric Railway & Light Co. [Mack], 110; Comment, 181; Supreme Court decision, 1081; Comment, 1101.
——Multi-class fare service, Losses in, 239

(Abbreviations: * Illustrated. c Correspondence.)

Fares: (Continued)
——New Jersey & Pennsylvania Traction Co., Increase between Trenton and Princeton, 172, 324; Comment, 318
——New York suburban fares reduced, 309, 398, 443, 571; Comment, 319
——Omaha, Neb., Fare reduction ordinance, 273; Supreme Court decision, 1083
——Pennsylvania, Change from zone to mileage basis recommended, 132
——Penny fare, Distance at which passengers paying, cease to be renumerative, Great Britain, 195
——Portland Railway, Light & Power Co.'s case before United States Supreme Court, 986, 1124
——Puget Sound Electric Ry., Legal difficulties, 310
——Reduced rate, When it should not be made, 532
——Three-cent, in Toledo, 127
——Zone system and the prepayment car, Leicester Corporation Tramways, England, *720; Comment, 747
——(See also Tickets)
Farm, Electricity on (See Rural communities)
Federal Light & Traction Co. (See New York City)
Feeders (See Power distribution)
Fence posts:
——Concrete, Design and manufacture, 544
——Wood, Average life and costs, 544
Fence wire, Non-corrosive, Means for obtaining, 545
Fenders:
——Disappearing (Fonger), *77
——Portland Railway, Light & Power Co., 525
Field control (See Motors)
Financial:
——Comparative earnings of public utilities, 118
——Cost of operation of electrified steam roads [Sparks], 1061
——Cost of passenger service, Effect of load factor [Duffy], 195
——Cost of power, Worcester, Mass., 1078
——Cost of self-propelled cars [Dodd and Arnold], 934, 965
——Decapitalization of intangible values in San Francisco, 845
——Dividends, New York state railways, 229
——Equipment trust securities, List of, 531
——Going value, Proper recognition for, 533
——Hudson & Manhattan R. R., Refinancing, 241
——London tramways, 365
——Mail transportation, Boston Elevated Ry., 292
——Merger of Chicago interests, 32
——Operating economies [Doyle, Gore and McWhirter], 1148; Discussion, 1143
——Operating expense charges in Cleveland, 925
——Operating expenses, Tendency of [Burleigh], 187
——Operating records, Boston articulated car, 585
——Operating records, San Francisco, Arnold reports, 847
——Profit sharing plans for San Francisco, 844
——Receipts with prepayment and ordinary cars compared, 1150
——Revenues and expenses of steam railways, Summary of, 426
——St. Louis, United Rys., Report of Public Service Commission [Allison], 248
——San Francisco, Plans for distribution of receipts, 844
——Wage cost part of cost of operation, 878
Fire engine cars (See Cars)
Fire extinguisher bracket (Pyrene) *938
Fire protection and insurance, Carhouses and shops [Neff and Thompson], 494
——Chicago, Report of Board of Supervising Engineers, 811
——Cleveland Ry., Insurance reserve, 928
——Milwaukee Electric Railway & Light Co., 500
——Philadelphia, Luzerne Street station, 1140
——Sprinkling system, Omaha, Neb., *245
Flood damage, Capitalization of, in Ohio, 732
Flood service, Cars for, Fort Wayne & Northern Indiana Traction Co., *461
Floods in Indiana, Ohio, Pennsylvania and New York, 597, *624, *679, *724, 725, 758; Comment, 614, 705
Floors:
——Car, relative merits of concrete and composition, 425
——Freight house, 546
Fort Dodge, Des Moines & Southern R. R. (See Boone, Ia.)
Fort Wayne (Ind.) & Northern Indiana Traction Co.:
——Block signals, 496, 843
——Cars for flood service, *461
——Safety campaign, 432, 588
——Schedule boards, *72
——Wage increase, 606
France:
——Heavy electric traction conditions, 33; Comment, 9
——Midi Ry.:
D. c. and a. c. electrifications, *792; [Jullian], 1067
Locomotive, Jeumont 1500-hp, single-phase, *288
Locomotive competition results, 157
France: (Continued)
——Western State Ry., Paris surburban system [Mazen], 1068
Frederick (Md.) R. R., Consolidation plans, 230, 270
Freeport (Ill.) Railway & Light Co., Experience with one-man prepayment cars, 589
Freight and express:
——Boston Elevated Ry., 870
——Denver City Tramway, All-day service, 658
——Illinois Traction System:.
Freight house at Springfield, Ill., *930
St. Louis terminal, *282
——Interline business [Sullivan], 374; Discussion, 379
——Louisville-Indianapolis case, 173
——Methods of different roads [Walsh], 1154; Discussion, 1143
——Oklahoma City, 1091
——Providence, R. I., Rhode Island Co., *574
——Relation of interurban service to the high cost of living [Spring], 171
——Salt Lake City, Proposed transportation, 780
——Worcester, Mass., 347
Freight and express stations:
——Design, 748
——Floors, 546
——Illinois Traction System, Springfield, Ill., *930
——Lighting of stations, 748
——Oregon Electric Ry., *1055
——Providence, R. I., *574
Freight rates:
——Minnesota rate case, 1064; Comment, 1049
——Rhode Island Co., 576

G

Gardner (Mass.), Westminster & Fitchburg Street Ry., Consolidation, 440
Gary (Ind.) & Interurban Ry., Incorporation, 230
Gas rate decision in New Jersey, Passaic Division, 35, 80; Comment, 55
Gasoline cars:
——Chicago, Milwaukee & Puget Sound Ry., *295
——India, in Karachi, *427
——Narrow-gage, Queensland Government Rys, *158
——Operating records [Dodd and Arnold], 934, 965
——Pittsburgh & Lake Erie, R. R., *387
Gears, Influence of, on power consumption, 955
Geary Street Municipal R. R. (See San Francisco)
General Electric Co.:
——Annual report, 828
——Changes in personnel, 1110; Comment, 1099
Generator. (See Turbo-generators)
Geneva & Auburn Ry. (See Seneca Falls, N. Y.)
Georgia electric railways, Earnings of 1912, 778
Georgia Railway & Power Co. (See Atlanta, Ga.)
Germany:
——Berlin:
Electrification of the Stadtbahn proposed, 707, 965
Rapid transit line proposed between Gesundbrunnen and Rixdorf, 887
——Fare service, Losses in multi class, 239
——Hamburg Subway & Elevated Ry., *415, *468
——Heavy electric traction conditions, 33; Comment, 9
——Narrow-gage railway in the Prussian Riesengebirge, 805
——New interurban railway from Mercerburg to Müchlen, 758
Glass, Car window, Replacement costs during a year's test, 78
Glens Falls, N. Y., Hudson Valley Ry., Interurban railway versus city railway [M'Phillips], 423
Going value, Proper recognition for, 533
Gong ringer, Pneumatic, Kansas City, *596
Governor's messages. (See Legislation)
Governors of New England, Conference of, 165, 224, 391
Grade crossing elimination, Long Island R. R., 1119
Grand Rapids, Mich., Michigan & Chicago Ry., Finances, 867, 946
Great Britain:
——Electrification of railways, Past and present work on lines in and out of London, with data on 18-mile freight line between Shildon and Newport, *797; Comment 787
——Prepayment zone system at Leicester, *720
——Rates and fares [Clark], 193
——Statistics of tramways and light railways, 258
——Stockport trackless trolley service, *805
——Wages, Lower [Clark], 193
——(See also Liverpool; London)
Great Northern Ry.:
——Chelan River power site, 652
——Electrification in Montana, [Burch], 117
Great Northern Ry.: (Continued)
——Electrification progress, 1009
Greenfield, Mass., Massachusetts Consolidated Rys., 869
Greenville, Miss., Delta Electric Light, Power & Manufacturing Co., Experience with one-man prepayment cars, 582
Greenville (Tex.) Railway & Light Co., Experience with one-man prepayment cars, 582
Grinders (See Rail grinders)
Guard rails for wooden bridges and trestles, 544

H

Hagerstown (Md.) & Frederick Ry., Consolidation, 1037
Halifax (N. S.) Electric Tramway:
——Directors, 344
——Strike, 941, 1083
Hamburg Subway & Elevated Ry.:
——History of project, way construction and stations *415
——Shops and carhouses, *468
Hamilton, Ont., Dominion Power & Transmission Co., Annual report, 520
Harrisburg (Pa.) Rys., Organization 131
Hartford & Springfield Street Ry, (See Warehouse Point, Conn.)
Headlight, Fog-penetrating, with parabolic glass reflector (Esterline), *552
Heating cars, Report of Chicago Board of Supervising Engineers, 894
Heating vestibules, Massachusetts Railroad Commission on hearings, 819
Heavy electric traction:
——Austria, 33; Comment, 9
——Baltimore & Ohio R. R., Progress, 1006
——Berlin, Germany, Locomotive and motor car accelerations, 707, 965
——Boston & Albany R. R., 390
——British railways, Past and present electrification in and out of London, with data on 18-mile freight line between Shildon and Newport, *797; Comment, 787
——Butte, Anaconda & Pacific R. R., Progress, 1010
——Canadian Northern Pacific Ry., Branch lines, 733, 825
——Chicago, Milwaukee & Puget Sound R. R., 57, 70, 225, 280, 290, 919, 1009
Contract for purchased power, 290; Comment, 280
——Chicago terminals:
Investigation and report of Association of Commerce, 254, 883
Letter of Chicago Association of Commerce, 1117
Ordinance recommended, 1030
Suggested conversion of Illinois & Michigan canal to subway, 904
Union station plans, 1116
——Choice of electric systems, 993
——Commission for steam railroad electrification proposed by F. J. Sprague, 586; Comment, 573
——Comparison of American and European conditions [Parodi], 1068
——Denver, Rio Grande & Western Ry., Progress, 1010
——Discussion by British and French electrical engineers in Paris, 1067; Comment, 1048
——Discussion by New York Railroad Club, 586
——Economics of electrification under conditions of light traffic [Kahler], [Hobart], 932; Comment, 956; [Sparks], 1061
——Erie R. R., Maintenance of electrified section. Outline of present conditions *998; Comment, 993; 1009
——European conditions, 33, 788, 1147; Comment, 9; c383; [Parodi], 1068
——Great Northern Ry., [Burch], 117; 1009
——India, Considered for, 551
——Leyden-Katwyk-Noorwyk Ry., Holland, 1200-volt D. C. line, *142
——Long Island and Pennsylvania Railroads, Progress, 1008
——Maintenance of electric locomotives [Quereau], 1065
——Melbourne, Australia, 71, 255
——Midi Ry., France, D. c. and a. c. electrifications, *792; [Jullian], 1067
——Mountain-grade service, Locomotive performance [Armstrong], 17; Comment, 2
——New York Central & Hudson River R. R., Progress, 1008
——New York, New Haven & Hartford R. R., Electrification progress, 1006
——Norfolk & Western Ry., Electrification of mountain division, 772, 800; Comment, 787; 1010
——Norway, Christiania to Drammen, 1107
——Pennsylvania R. R., between Philadelphia and Paoli, 515, 642, 1116
——Power consumption, Spiez-Frutigen Ry., 509
——Progress in the United States, *1006; Comment, 993, 996; Correction, 1060
——Southern Pacific R. R., Progress, 1009
——Sweden, 34, 818; Comment, 9

(Abbreviations: * Illustrated. c Correspondence.)

Heavy electric traction: (Continued)
——Troubles with long trains, 616
——Washington & Old Dominion Ry., Electrical equipment and the reasons for its selection [Smith], *534
Helena, Mont., Interurban Ry., Fare collecting system, 698
High-tension direct-current railways:
——Butte, Anaconda & Pacific Ry., 1010
——Cost of operation, Estimated [Hobart], 932
——Cost of power in different systems [Sparks], 1062
——Discussion [Gratzmuller], 1067
——Europe, 1147
——Leyden-Katawyk-Noordwyk Ry., Holland, System, *142
——Midi Ry., France, *792
——Oakland, Antioch & Eastern Ry., California, *726
——Oregon Electric Ry., Change from 600 volts to 1200 volts., 1052
——Verona-Caldiero Ry., Italy, *1001
High tension direct current transmission:
——Discussion at National Electric Light Association, 1059
——Thury system [Highfield], 1069
Highland Park & Lake Burien Ry. (See Seattle, Wash.)
Holland:
——Leyden-Katwyk-Noordwyk Ry., 1200-volt d.c. line, *142
——Statistics, 1169
Hose, Air-brake, Specifications, 1113
Hot Springs, Ark., Central Arkansas Railway & Light Corporation, Incorporation, 395, 523
Hours of labor. (See Employees, Hours)
Houston, Tex., T-rails discarded, 1118
Hudson Valley Ry. See Glens Falls, N. Y.
Hull (Que.) Electric Ry., Fare increase, 304
Hungary, Statistics, 860

I

Idaho, Legislation, 560, 826
Idaho Cedarmen's Association. (See Western Red Cedar Association)
Idaho-Oregon Power & Light Co. (See Boise, Idaho.)
Idaho public utilities act, 940
Illinois:
——Hours of labor, Bill limiting, 854
——Legislation, 267, 341, 436, 560, 601, 692, 734, 773, 826, 864, 904, 942, 979, 1034, 1085, 1119, 1176
——Statistics of electric railways for 1912, 690
Illinois Electric Railways Association, Annual meeting, 508
Illinois Northern Utilities Co. (See Dixon, Ill.)
Illinois Railroad & Warehouse Commission, Hearing on clearances, 1060
Illinois Traction System. (See Peoria, Ill.)
Incandescent lamps. (See Lamps, Electric.)
Independence, Kan., United Traction Co., Through service between Coffeyville and Parsons, 346
India:
——Gasoline cars in Karachi, *427
——Suburban electrification for Bombay and Calcutta, 551
Indiana Legislation, 128, 166, 226, 267, 304, 391, 601
Indiana Public Service Commission, 515, 617, 772, 1126
Indiana Railroad Commission:
——Signal installation order, 127, 304, 380, 496, 343, 877, 1079
——Stop signal order, 88
Indiana Railways & Light Co. (See Kokomo, Ind.)
Indiana Union Traction Co. (See Anderson, Ind.)
Indianapolis, Ind.:
——Indianapolis & Cincinnati Traction Co.:
  Block signals, 843
  Purchase, 868
——Indianapolis, Columbus & Southern Traction Co. (See Columbus, Ind.)
——Indianapolis, New Castle & Eastern Traction Co., Terms of lease, 131
——Indianapolis Traction & Terminal Co., Oxy-acetylene welding, *38
Inductive disturbances. (See Transmission lines.)
Inspection of bridges and culverts, 706
Inspection of cars, Providence, R. I., 831
Institution of Electrical Engineers, Meeting with French Engineers in Paris, 1067; Comment, 1048
Instruction of trainmen. (See Employees)
Instruments, Portable electrical (Weston), *728
Insulation:
——Progress in, 788
——Temperature and electrical insulations: Report of American Institute of Electrical Engineers, 431
Insulators, Design of suspension [Austin], 1014; Discussion, 1059
Insurance. (See Fire protection and insurance; Liability insurance)
Interlocking plants. (See Signals)
International Railway. (See Buffalo)
International Traction Co. (See Buffalo)
Interstate Commerce Commission:
——Accidents on interstate railways, 47, 1180
——Appraisal of railway property, 391, 449; [Clark], 558; 667, 823, 936, 955, 977
——Baggage, Regulations restricting dimensions, 564
——Casualties, Report on, 47
——Decision affecting Washington, Baltimore & Annapolis Electric Ry., 697
——Decision in favor of Illinois Traction System, 442, 531
Interurban railways:
——Construction in the Far West, 156, 572, 599
——Development of community, Indiana, 565
——Elevated terminals in cities, 705
——Indiana, classed as public utilities by new law, 565, 617
——Terminals [Hanlon], 814; Discussion, 813
——Versus the city railway [M'Phillips], 423
Iowa, Legislation, 734
Iowa Electric Railway Association, Convention, 759, 812
Italy:
——Heavy electric traction conditions, 34; Comment, 9; c. 383
——Verona-Caldiero Ry., 1300-volt d. c. line, *1001

J

Jack, Pit (Watson-Stillman), *646
Jack-shaft bearings, Pennsylvania R. R. Electric locomotives, *455
Jackson, Mich., Michigan United Traction Co.:
——Accident prevention, 398
——Pay-within car, *122
——Standardization in track and roadway, *475
——Trip from Kalamazoo to Indianapolis, 831
——Trip from Michigan to St. Louis, 740
Jackson (Miss.) Railway & Light Co., Experience with one-man prepayment cars, 582
Jamestown (N. Y.) Street Ry.:
——Fare reduction, 698
——Strike, 825, 901, 1081
——Wage increase, 740
Japan:
——Railway statistics, 196
——Yokohama-Tokio Line, Material for, 863
Johnstown, Pa., South Fork-Portage Ry., Center-entrance combination cars, *768
Joliet, Ill., Chicago & Joliet Electric Ry., Safety campaign, 948, 1181
Journals, Maintenance improvements, Brooklyn Rapid Transit, 101

K

Kankakee (Ill.) & Urbana Traction Co., Opening, 165
Kansas, Legislation, 227
Kansas City, Mo.:
——Kansas City & Bonner Springs Street Ry. (See Bonner Springs, Kan.)
——Kansas City, Clay County & St. Joseph Ry.:
  Center-entrance interurban cars, *120
  Service on Excelsior Springs line, 166
——Kansas City Railway & Light Co., Gong ringer, Pneumatic, *596
——Metropolitan Street Ry.:
  Asphalt car, *479
  Franchise negotiations, 127, 264, 517, 555, 648, 861, 1031, 1119
  Report on valuation [Arnold], 389, 716
——Smoking on cars not allowed, 870
——Viaduct, Sale proposed, 1173
Kendallville, Ind., Toledo & Chicago Interurban Ry., Sale, 441, 738
Kentucky Traction & Terminal Co. (See Lexington, N. Y.)
Kewanee, Ill., Galesburg & Kewanee Electric Ry.:
——Near-side stop, 1181
——Wage increase, 985
Keystone Railway Club, Meetings, 504, 1022
Kokomo, Ind.:
——Indiana Railways & Light Co., Bond issue, 230, 396
——Kokomo, Marion & Western Traction Co., Block signals, 496, 843

L

Labeling equipment, 790
Labor. (See Employees, Hours of labor)
Labor disputes. (See Employees, Arbitration)
Lackawanna & Wyoming Valley Rapid Transit Co. (See Scranton, Pa.)
La Crosse (Wis.) City Ry., Merger, 230
Ladder shoe, Non-slipping (Mason), *514
Lake Shore Electric Ry. (See Cleveland, Ohio)
Lake View Traction Co. (See Memphis, Tenn.)
Lamps, Electric:
——Breakage due to feather duster, 196
——Selective cut-out for damaged incandescent lamps (Nichols-Lintern), *899
Lawrence (Kan.) Railway & Light Co., Experience with one-man prepayment cars, 581
Lebanon (Pa.) & Campbellstown Street Ry., Opening, 304
Legal notes:
——Charters, ordinances, franchises, 261, 1027
——Corporation tax, Minehill case, 878
——Gas rate decision in New Jersey, Passaic Division, 35, 80; Comment, 55
——Milwaukee fare case, 1081, 1101
——Milwaukee paving case, 124
——Minnesota rate cases, 1064; Comment, 1049, 1101
——Negligence, Liability for, 262, 1027
——Omaha bridge case, 1083
——Strike losses, Municipal responsibility for, Decision of U. S. District Court, Newark, N. J., 879
Legislation affecting public utilities:
——Basic principles [Bozell], 884
——Conditions in various states [Griffith], 888
——Governor's messages, 74, 160; Comment, 139
——New York, "Seven sisters" bill signed by Governor Wilson, 340
——Notes, 128, 166, 226, 267, 304, 341, 391, 436, 519, 560, 601, 653, 692, 734, 773, 826, 864, 904, 942, 979, 1034, 1085, 1119, 1176
——(See also National Civic Federation)
Lehigh Valley Transit Co. (See Allentown, Pa.)
Lexington, Ky.:
——History of traction companies, 391
——Kentucky Traction & Terminal Co., T-rail construction in paved streets [MacLeod], c.*335
Liability insurance [Ellis], 884
——Wisconsin Electrical Association Committee report, 111
Lighting cars:
——Indirect systems, 706
——Selective cut-out for damaged lamps, *899
——Tungsten lamps of 57-volt, Colorado Springs & Interurban Ry., 678
Lighting freight and express stations, 748
Lightning arresters [Clayton], 884; [Creighton], 1013; [Mahoney], 1014, Discussion, 1059
Lightning protection. Methods of insulating and arranging high tension apparatus in power house and on transmission lines [Nelson], 963
Lincoln (Neb.) Traction Co., Sand-drying plant, *159
Line cars. (See Tower cars; Work cars)
Little Rock (Ark.) Railway & Electric Co., Axle straightener, 1158
Liverpool (Eng.) Corporation Tramways:
——Annual report, 737
——Double-deck, drop platform and center-entrance cars with separate stairways for entrance and exit, *591
Loading time. (See Passenger handling records)
Loads for central stations [Dillon], 1015
——Load curve during rush hour. Electrified section of Erie R. R., *1000
——Load factor, Effect of, on cost of passenger service [Duffy], 195
Locomotives, Electric:
——Butte, Anaconda & Pacific Ry., Qualifications for mountain-grade service [Armstrong], 20, *1010
——Comparison with steam locomotives for mountain-grade service [Armstrong], 17; Comment, 2
——Curves showing drawbar pull, 1068
——Division points for, 919
——Freight, Rhode Island Co., *576
——Gasoline freight and switching [McKeen], 1171
——Industrial, 40-ton, Timber Butte Milling Co., Butte, Mont., *937
——Maintenance cost, Pennsylvania R. R., 461
——Midi Ry., France:
  Comparison of Thompson-Houston, Westinghouse & Jeumont locomotives, *794
  Jeumont, 1500-h.p. single-phase, *288
  Result of competition, 157, *288
——New York Central R. R.:
  Novel form, *684
  Operating records, 587
  Ratings [Burch], c818; Comment, 789
——Obsolescence and depreciation, 997
——Pennsylvania R. R. Inspection and repair of side-rod type. Jack-shaft bearings. Operating results. Maintenance cost, *452; Comment, 450
——Repair shops of N. Y., N. H. & H. R. R., at Van Nest, 976
——Roof, Insulated, Fort Dodge, Des Moines & Southern R. R., *512
——Type designations used by foreign builders, 95
London, England:
——Electrification of London, Brighton & South Coast Ry., London & North Western Ry., London & South Western Ry., *797; Comment, 787
——Financial condition of tramways, 365

(Abbreviations: * Illustrated. c Correspondence.)

London, England: (Continued)
——Motor buses, Competition with street cars, 920
——Underground Electric Railways:
    Advertising Christmas traffic, *105
    Annual report, 562
London letters, 41, 222, 388, 647, 820, 1029
London (Ont.) & Port Stanley Ry., Electrification, 225, 698, 940
Long Island Ry. (See New York City)
Los Angeles, Cal.:
——Charter conference, 734
——Los Angeles & San Diego Beach Ry. (See San Diego, Cal.)
——Los Angeles Ry., Additional cars recommended, 48, 79, 164
——Ordinance concerning condition of cars and standing vehicles, *765
——Pacific Electric Ry.:
    Bond issue, 229
    Cars, Additional, recommended, 48, 79
    Catenary construction, *755
    Elevated railway plans, 903
    Elevated terminals proposed, 705
    Passenger stations, Mission style, *966
    Rail section, New-grooved, *938
    Weed burner, *1169
——Skip-stop idea suggested, 346
Louisville, Ky.:
——Louisville & Nashville R. R., Replacing overturned track, *729
——Louisville & Northern Railway & Lighting Co. (See New Albany, Ind.)
——Louisville Ry.:
    Annual report, 170, 394
    Parades, Recommendation covering, 346
    Report in depreciation and maintenance charges, 982
    Wage increase, 978
Lubrication. Oiling card of Fort Dodge, Des Moines & Southern R. R. 40

M

McAlester, Okla., Choctaw Railway & Lighting Co., Control passed to other interests, 45
McKeesport, Pa., Pittsburg, McKeesport & Westmoreland Ry., Sale, 308, 524
Mail transportation:
——Congressional hearing of railway representatives, 291; Comment, 279
——Cost to Government, 1125
Maine, Legislation, 601
Maine public utility commission proposed, 209, 652, 688
Maintenance records:
——Brooklyn Rapid Transit Co., 480
——Car maintenance costs in San Francisco, 849
——Car remodeling, International Ry., Buffalo, *922
——Costs of electric welding in San Francisco shops, 881
——New York Central, Electric locomotives [Quereau], 1065
——New York State Rys., Mileage maintenance system, 542
Mansfield (Ohio) Railway, Light & Power Co., Receivership, 86
Manufacturing, Requirements upon modern [Bope], 207
Maps:
——Boston Elevated Ry., 358
——Boston & Maine, Electrified lines, 1006
—— Butte, Anaconda & Pacific Ry., Electrified section, 1010
——Chicago, Milwaukee & Puget Sound Ry., Electrified lines, 1009
——Cincinnati, Ohio, 330
——Cleveland, Ohio, 618
——Denver & Rio Grande & Western Ry., Electrified division, 1009
——Erie R. R., in Central New York, 1007
——Hamburg Subway & Elevated Ry., 415
——Indiana Electric Ry., Block signal protection, 843
——Leyden-Katwyk-Noordwyk Ry., Holland, 142
——London, Brighton & South Coast Ry., 797
——London & North Western Ry., 798
——London & South Western Ry., 799
——Long Island and Pennsylvania R. R. terminals, 1007
——Melbourne suburban system, 255
——New York Central, Electrified lines, 1006
——New York, New Haven & Hartford, Electrified lines, 1006
——Norfolk & Western Ry., Electrified Section, 1010
——North Eastern Ry., England, 799
——Northern Electric Ry., Cal., 623
——Oakland, Antioch & Eastern Ry., 728
——Oregon Electric Ry., 1051
——Pennsylvania R. R.
——Paoli suburban line, 1007
——West Jersey & Seashore division, 1007
——Seattle, Wash., 753
——Southern Pacific Ry., Suburban lines at Berkeley, Oakland and Alameda, Cal., 1008
——Washington & Old Dominion Ry., 535
——Waterbury-New Britain system, 367
——West Shore R. R., in Central New York, 1007
Maps: (Continued)
——Williamette Valley, Oregon, 156
Marion, Ohio, Columbus, Marion & Bucyrus R. R., Sale and reorganization, 908, 983
Maryland Public Service Commission, Train schedule held to be a contract, 698
Massachusetts:
——Development of railways stifled by legislation, 266
——Investigation of electric railway service in rural communities, by the Legislature, 406
——Legislation, 128, 227, 304, 436, 601, 653, 734, 773, 904, 942, 980, 1034, 1085, 1119
——Nine-hours-in-eleven bills, Testimony of C. S. Sergeant, R. S. Goff, A. S. Richey, 640, 687
Massachusetts Consolidated Rys. (See Greenfield, Mass.)
Massachusetts Railroad Commission:
——Annual report, 162
——Hearings on heating vestibules and air-brake equipment, 819
——Service recommendation for Worcester, 870
Massachusetts Utilities Commission, 340, 1172
Master Car Builders' Association, Convention, 1113
Mediation laws. (See Employees, Arbitration)
Melbourne, Australia, Electrification of suburban railways:
——Approved by the Government, 71
——Contract awarded to General Electric Co., 255
Membership in territorial associations, 616
Memphis, Tenn.:
——Lake View Traction Co., Sale, 604, 869
——Memphis Street Ry., Center-entrance trail cars, *299
Merrill, Wis., Trackless trolley bus, *1080
Metropolitan Street Ry. (See Kansas City)
Mexico, Hydroelectric development on the Conchos River, 218
Mexico City, Mexico Tramways, Annual report, 981
Mexico (Mo.), Santa Fé & Perry Traction Co., Sale, 984
Michigan, Legislation, 436, 519, 601
Michigan & Chicago Ry. (See Grand Rapids, Mich.)
Michigan and Ohio merger proposed, 830
Michigan City, Ind., Chicago, Lake Shore & South Bend Ry., Block signals, 843
Michigan United Traction Co. (See Jackson, Mich.)
Middle West Utilities Co. (See Chicago)
Middletown, N. Y., Wallkill Transit Co., Milk service, 133
Midi Ry. (See France)
Mileage maintenance system on Syracuse lines, New York State Railways, 542
Mileage statistics for 1912, 15; Comment, 57
Milk service, Wallkill Transit Co., 133
Milwaukee (Wis.) Electric Railway & Light Co.:
——Broom filling machine, *513
——Carhouse, Fond du Lac Avenue, *497
——Cars, *386
——Destination signs, 526
——Emergency line car ,*642
——Employees' Mutual Benefit Association, Annual report, 739
——Employees' stores, 730
——Fare case [Mack], 110; Comment, 181
    Decision, 1081; Comment, 1101
    Recommendation of Wisconsin commission, 272
——Monthly report forms, 1021
——Paving case decision, 124
——Publication by employees, 1090
——Service, Investigation by Wisconsin Railroad Commission, 232
——Work-order system [Kalweit], 113
Minneapolis, Minn., Twin City Rapid Transit Co.:
——Annual report, 231, 268
——Extension agreement, 1174
——Progress program, 824
Minnesota, Legislation, 166, 436, 519, 734, 826
Minnesota rate case, 1064; Comment, 1049, 1101
Missoula (Mont.) Street Ry., Experience with one-man prepayment cars, 580
Missouri, Legislation, 128, 436, 601
Missouri Public Service Commission, 556, 770, 902
Monmouth County Electric Co. (See Redbank, N. J.)
Monongahela Traction Co. (See Fairmont, W. Va.)
Montreal:
——Autobus line, 941
——City planning, 653
——Investigation of transit problems, 435, 560, 771, 901, 1175
——Montreal Tramways, Wage increase, 985
Morristown, N. J., Morris County Traction Co., Bond issue, 396
Motor buses:
——Detroit municipal line, 557
——London, Competition with street cars, 920
——Montreal 941
——New York City, Proposed competition with street lines, 614, 864
Motor buses: (Continued)
——Philadelphia, Proposed, 1033
——Toronto, Proposed in Arnold report, 970
Motors:
——Changes in design to effect economy, 407
——Commutating-pole, Full value from, 837
——Connections for electric braking [Crane], *1114
——Crane motor, Double-drum controller for (Westinghouse), 387
——Development of motors, Methods for securing higher efficiency [Storer], 21; Comment, 2
——Economies in maintenance [Thirlwall], 370; Discussion, 378
——Field control [Storer], 23
——Gear ratio and power consumption, 955
——Latour single-phase type in Spain, 801
——Maintenance costs, Baltimore, 293, 294
——Rehabilitation of old, 482
——Rejuvenation, by means of electric welding, Third Avenue R. R., *1104
——Series and repulsion [Latour], 1067
——Single-phase railway [Bell], *1003; Comment, 993
——Testing polarity of fields, 1114
——Tests, Report of Chicago Board of Supervising Engineers, 895
Multiple-unit train operation:
——Detroit United Railway, 442
——New type under Thury patents, 973
Municipal ownership:
——Detroit ordinance, 339, 557, 690, 731, 903, 940, 977, 1082
——Toledo, Ohio, 389
Muskogee (Okla.) Electric Traction Co., Rooke system of fare collection, 780
Myriawatt recommended as a power unit by A. I. E. E. and A. S. M. E., 105; Comment, 96

N

Nashville-Gallatin (Tenn.) Interurban Ry., Opening, 652
Nashville Railway & Light Co.:
——Exhauster for commutator slotter to save copper dust, 1169
——Painting illuminated signs, 1158
National Association of Corporation Schools, Organization, 165, 205; Comment, 183
National Association of Railway Commissioners, Committee appointments for 1913, 39
National Civic Federation:
——Annual meeting, 210; Comment, 179
——Model utilities law, 571
——Report of department on regulation of interstate and municipal utilities [McMillin], 210
——Sub-committees on model public utility bill, 155
National Electric Light Association:
——Convention papers and reports, 1012, 1057; Comment, 1048
——Public policy committee, Meeting with National Electric Light Association, 325; Comment, 317
National Railway Appliances Association, Annual meeting, 548
New Albany, Ind. Louisville, & Northern Railway & Lighting Co., Block Signals, 843
New Bedford, Mass., Union Street Ry., Sale of metal tickets, 877
New England Railroad Conference, Work of, 1034
New England railroad situation, Report of Boston Chamber of Commerce, 650, 691
New England Street Railway Club:
——Annual banquet, 590
——Meetings, 37, 369, 973
New Haven, Conn., Connecticut Co.:
——Accident at Cheshire, Conn., Report to Public Utilities Commission, 607
——Carhouse at Derby, *320
——Carhouse employees, Statement of company, 942
——Lease of railways from New London to East Thompson, 396
——Turbo-generators with reduction gear, *328
New Jersey:
——Bill in Legislature concerning the surprise test on railways, 613
——Legislation, 692, 773
New Jersey & Pennsylvania Traction Co. (See Trenton, N. J.)
New Jersey Public Utilities Commission:
——Annual report, 82
——Fare increase ordered, New Jersey & Pennsylvania Traction Co., 172, 324; Comment, 318
——Gas rate decision, Passaic Division, 35, 80; Comment, 55
——Reorganization, 863
New Midland Power & Traction Co. (See Cambridge, O.)
New Orleans, La.:
——Assessment increase, 824
——Assessment reduction, 942
——New Orleans Railway & Light Co.:
    Annual report, 737, 944
    Cars, to build its own, 82
    Wage scale, 1091

(Abbreviations: * Illustrated. c Correspondence.)

New York, Auburn & Lansing R. R. (See Auburn, N. Y.
New York Central & Hudson River R. R.:
——Electrification, Maintenance costs [Quereau], 1065
——Electrification progress, 1008
——Fare reductions, New York suburban, 309, 398, 443, 571; Comment, 319
——Grand Central terminal opening, An example of private efficiency, 241
——Locomotive ratings [Burch], c818; Comment, 789
——Locomotives, Electric, Novel form, *684
——Train-minute detention due to electrical operation for 1912, 587
——Waterfront line along Hudson River in New York City, 941
New York City:
——Accidents:
Elevated railway; Comment, 182
November, 1912, 48
December, 1912, 172
——American Cities Co., Directors, 439
——Bond limit case, 266
——Car steps, Opinion and order of Public Service Commission, 414; Comment, 405
——Central Park, North & East River R. R., Foreclosure matters, 45
——Cities Service Co., Acquisition of property and exchange of securities, 440
——Fare concession to Staten Island residents, 443, 613
——Federal Light & Traction Co.:
Annual report, 736
Courtesy card for street cars, *596
——Horse car lines, Conversion of, 941
——Hudson & Manhattan R. R.:
Annual report, 736
Bond issue proposed, 909, 1122
Changes in personnel and scheme of organization, 265
Painting of cars, Use of baking enamel, *146; Comment, 141
Refinancing plans, 129, 241, 396
Tunnel system, Refinancing, 241
——Interborough Rapid Transit:
Bond issue proposed, 85
Co-operative stores for employees, 219, 517
Financing of new subway construction, 868
Pickpockets arrested, 740
Piece work, Increased earnings due to, 1143
Subway, Service order modified, 133
——Long Island R. R.:
Annual report, 562
Electrification progress, 1008
Grade crossing elimination, 1119
——Manhattan & Queens Traction Corp., Opening, 225
——Motor buses, Proposed competition with street lines, 614, 864
——New York Municipal Railway Corporation:
Organization, 732
Stock issue, 271
——New York Rys.:
Co-operative stores for employees, 219, 517
Difficulties of surface operation, and value of newspaper publicity, 281
Employees association, Annual report, 164
Heating order, 116
Piece work, Increased earnings due to, 1143
Protest against order concerning depreciation, 777
Storage battery cars, 825, 863
——North American Co.:
Annual report, 694
Report forms, 1021
——Population and subways. Estimates by D. F. Wilcox of Public Service Commission, 920
——Public Service Commission:
Amendment to law proposed, 44
Annual report, 124
Car step, Opinion and order, 414; Comment, 405
Changes in personnel, 266
Depreciation order, 777
Hearing on smoking in cars, 1111; Comment, 1099
Hearings on subway contracts, 16, 163, 223, 339
Heating order to New York Rys., 116
Photographic practice and the forestalling of damage suits, 919
Safety appliance order, 821
Storage battery cars in New York, 863
Subway contracts approved, 433
——Rapid transit progress, 596, 732
——Safety campaign in schools, 526
——Smoking on cars, Hearing, 111; Comment, 1099
——Steinway tunnel, Temporary operation, 651
——Stores, Employees' co-operative, 219, 517, 653
——Subways, New:
Application to issue bonds, 130
Board of Estimate acts on contracts, 516
Construction payments, 823
Construction under dual contracts, First, 692
Contracts and political influences, 140

New York City—Subways, New: (Continued)
Contracts approved by Public Service Commission, 433
Contracts executed, 558
Delay. Public and private efficiency, 241
Estimates concerning population by D. F. Wilcox, 920
Financing of Interborough Rapid Transit Co., 868
Hearings on contracts, 16, 163, 223, 339
Injunction to prevent execution of contracts, 265, 302
Photographs in damage suits, 919
——Taxation, Whitridge letter to State Board of Tax Commissioners, 42
——Third Avenue Ry.:
Annual report, 86, 168, 405
Motor rejuvenation by means of electric welding process, *1104
Stock and bond purchase, Belt Line Ry., 170
Wage increase, 171
Welding, Electric, *1102
——Thirty-fourth Street rapid transit plan abandoned, 904
——Tunnels to New Jersey suggested instead of bridge, 772
New York Edison Co., Accounting school for employees [Holme], 1015, 1059
New York Electric Railway Association:
——Executive committee meeting, 325
——March meeting, 420
——June convention:
Papers, 1148; Comment, 1133
Picture of delegates, *1146
Proceedings and banquet, 1142
Program, 1077
New York, New Haven & Hartford R. R.:
——Accident at Stamford, 1099
——Automatic train stop and speed control (Horne & Crane), 1115
——Automatic train stops, Tests, 560
——Changes in personnel, 772
——Cost of electric properties, 778
——Electrification [McHenry], 272; 558, 1006
——Fare reduction, New York suburban,, 309, 398, 443, 571; Comment, 319
——Lighting on limited trains, Indirect system, 706
——Pension plan, 287
——Purchase of New York, Westchester & Boston Ry., Mr. Mellen's opinion, 861
——Repair shops for electric locomotives at Van Nest, 976
——Rules and regulations for employees, 831
New York Public Service Commission, First District (See New York City)
New York Public Service Commission, Second District (See New York State Public Service Commission)
New York Railroad Club, Annual electrical night, 586
New York State:
——Full-crew measure signed by Governor Sulzer, 613
——Legislation, 166, 227, 392, 436, 519, 601, 692, 734, 773, 826, 864, 942, 980, 1034, 1086, 1176
——Power bills vetoed by Governor Sulzer, 1032
——Purchased power, Extracts from reports of railway companies. Prices paid for power, 1016
New York State Public Service Commission:
——Annual report, 125
——Changes in personnel, 266
——Continuous ride order for New York State Railways, 526
——Fare reductions:
New York suburban lines, 309, 398, 443; Comment, 319
Syracuse, Lake Shore & Northern R. R., 49
——Milk service order for Wallkill Transit Co., 133
——Westchester Street R. R., Value of property, 381
New York State Rys. (See Rochester, N. Y.)
Newark, N. J., Public Service Corporation:
——Annual report, 603
——Fare complaint dismissed, 740
——"Newarker" and the transportation problem, 560
——Publicity work, Methods and results of a 4-year experiment, 806
——Stock purchase plan for employees, 441, 449
——Terminal building, *246
——Terminal improvements, 223, 771, 904, 1173
——Traffic congestion, Report on, 658
Norfolk & Western Ry.'s Electrification of branch line, 772, 800; Comment, 787; 1010, 1079
North American Co. (See New York City)
Northern Electric Ry (See Chico, Cal.)
Northern Illinois Light & Traction Co. (See Ottawa, Ill.)
Northern Massachusetts Street Ry. (See Athol, Mass.)
Northern Ohio Traction & Light Co. (See Akron, Ohio)
Northwestern Cedarmen's Association, Annual meeting, 155

Norway, Christiania-Drammen line, change of gage and electrification, 1107

O

Oakland, Cal.:
——Oakland, Antioch & Eastern Ry., System. 1200-volt line reaching San Francisco by ferry. Coast Range pierced by tunnel 3458 ft. long, *726
——Terminal plans, 226
——United Properties Co., Trusteeship, 946, 984
Ohio, Legislation, 128, 166, 227, 305, 341, 436, 519, 560 601, 653, 735, 774, 826, 904, 1034
Ohio and Michigan merger proposed, 830, 867
Ohio Electric Ry. (See Cincinnati, Ohio)
Ohio Public Service Commission:
——Order concerning Columbus, New Albany & Johnstown Traction Co., 233
——Transmission case of Cleveland, Painesville & Eastern R. R., Re-hearing, 723
Oil drier and purifier (Hunt),*641
Oil engines:
——Best kind of fuel for, *675
——Small power plants [Chase], 963
Oil house and oil delivery car, Chicago Rys., *548
Oklahoma, Legislation, 865
Oklahoma Gas, Electric & Street Railway Association, Convention papers, 884
Oklahoma Ry.:
——Accident prevention campaign [Knox], 884
——Freight handling, 1091
——Progress, 831
Omaha, Neb.:
——Omaha & Council Bluffs Street Ry.:
Carhouse, Reinforced concrete, *242
Fare reduction ordinance, 273; Decision, 1083
Portable rail grinders, *149
Repair shop practice, *513
Tornado damage fund for employees, 903
Woodworking shop, equipment and arrangement, *750
——Omaha, Lincoln & Beatrice Ry., Stock and bond issue, 440
——Omaha Traction & Power Co., Sale, 1179
One-man cars. (See Cars, One-man)
Oneonta, N. Y., Otsego & Herkimer R. R., Stock and bond issue, 524
Ontario, Legislation, 774
Operating economies [Doyle, Gove and McWhirter], 1148; Discussion, 1143
Oregon Electric Railway. (See Portland, Ore.)
Organization chart, Michigan United Traction Co., Track and roadway, *478
Oskaloosa (Ia.) Traction & Light Co., Officers and directors, 1123
Otsego & Herkimer R. R. (See Oneonta, N. Y.)
Ottawa, Ill.:
——Chicago, Ottawa & Peoria Ry., Appreciation by dairymen, 657
——Northern Illinois Light & Traction Co., One-man prepayment cars, Experience with, 581
Overhead construction:
——Clearance for overhead conductors on trunk lines, 103, 935, 1060
——Crossing clamps, *1079
——Guy clamps, *860, *976
——Michigan United Traction Co., *477
——Midi Ry., France, *793
——Oregon Electric Ry., *1055
——Trolley wire and overhead frog location on curves [Barnard], *1155
——Verona-Caldiero Ry., Italy, *1001
——Washington & Old Dominion Ry. [Smith], *538
——(See also Catenary construction)
Oxy-acetylene torch for cutting away wrecked bridge, *860

P

Pacific Coast Electric Railway Association, *593; Meeting, 641
Pacific Coast Ry. (See San Luis Obispo, Cal.)
Pacific Electric Ry. (See Los Angeles, Cal.)
Paint shops:
——Detroit United Rys., Construction and equipment, *668
——San Francisco, United R. R., *882
Paints and painting:
——Deterioration of paint, Unequal, 489
——Hudson & Manhattan Ry., Baked enamel process, *146; Comment, 141
——Pennsylvania R. R., Baked enamel process, *686
——Sign painting at Nashville, 1158
Panama City, Electric railway under construction, 518
Panama Exposition. (See San Francisco)
Panama R. R., Electric energy for, 764
Pantograph on draw span of Charles River bridge, *364
Parades, Recommendation governing, Louisville, Ky., 346
Paris, Meeting of British and French electrical engineers, 1067; Comment, 1048
Paris Transit Co. (See Dallas, Tex.)

(Abbreviations: * Illustrated. c Correspondence.)

Parkersburg (W. Va.), Marietta & Interurban Ry.:
——Stock sale, 231
——Wage increase, 870
Parks and pleasure resorts, Management and transportation problems [Crane], 507; Discussion, 505
Passenger handling records:
——Boston articulated car, 585
——Chicago, Report of Board of Supervising Engineers, 894
——Comparison of Chicago and San Francisco, 257
——Kansas City, Metropolitan Street Ry., 719
Passenger interchange, 666
Passenger service costs. (See Financial)
Passenger stations. (See Terminals and terminal stations; Waiting stations)
Patent reform, Oldfield bill [Montague], 1001
Pavements:
——Asphalt and block construction, San Francisco, *464
——Concrete, between car tracks, Birmingham, Ala., *514
——Granite concrete, Cleveland Ry., 886
——Milwaukee case, 124
——Timber for creosoting [Davis], 154
——Track construction at crossings, *545
Pawcatuck Valley Street Ry. (See Westerly, R. I.)
Pekin (Ill.) & Petersburg, Interurban Ry., Suit and foreclosure, 869
Penn Central Light & Power Co. (See Altoona, Pa.)
Pennsylvania, Legislation, 227, 267, 305, 341, 437, 519, 561, 601 692, 774, 865, 905, 1119, 1176
Pennsylvania public service commission proposed, 650, 821
Pennsylvania R. R.:
——Electrical correspondence school, 435; Comment, 405
——Electrification between Philadelphia and Paoli, 515, 642, 1116
——Locomotives, Electric, Inspection and repair of side-rod type. Jackshaft bearings. Operating results. Maintenance cost, *452; Comment, 450
——Painting steel cars, Baked enamel process, *686
——Safety campaign, Book of instructions, 1047
——Storage battery tractor for city switching service, Jersey City, *768
Pension systems. (See Employees)
Peoria, Ill.:
——Illinois Traction Co.:
    Annual report, 866
    Block signal maintenance notes, 501
    Block signal protection, Additional, 435
    Crossing controversy settled, 689
    Express and freight traffic methods at St. Louis, *282
    Freight house at Springfield, Ill., *930
    Statement to stockholders, 523
    T-rail pavement construction, *61; [Swartz], c209
    Terminal station at Peoria, 310
    Through routes and joint rates, Opinion of Interstate Commerce Commission, 442, 531
    Tower cars, Gasoline, *900
——Peoria, Ry.:
    Guy clamps, Boltless, *860
    Route signs, 1170
——Peoria Railway Terminal Co., Sale, 440
Philadelphia, Pa.:
——American Rys., Charter taken out in Delaware, 344
——Bucks County Interurban Ry., Stock and bond issue, 1038
——Interstate Rys., Financial history, 738
——Motor buses proposed, 1033
——Philadelphia Equipment Securities Co., 229, 293
——Philadelphia & Westchester Traction Co. (See Upper Darby, Pa.)
——Philadelphia & Western Ry. (See Upper Darby, Pa.)
——Rapid Transit Co.:
    Accident prevention campaign, 1091
    Car trust certificates advocated, 266, 389, 435
    Carhouse at Luzerne Street, *1136; Comment, 1133
    Changes in operation, 910
    Co-operative store for employees, 254, 855; Comment, 838, 1090
    Cost of living of trainmen, 510
    Rehabilitation, 226
    Re-routing, wages and co-operative buying, 1039, 1090
    Smoking, Campaign against, 172, 317
    Wages, 733
——Subway proposed, 770, 1116
——Transportation problem [Ford], 598
Phoenix (Ariz.) Ry., Strike, 1174
Physicians, Emergency railway duties of, 948
Pickpockets on New York railways, 740
Pipe union, Cold-drawn-steel (Mark), *1026
Pits. (See Carhouses)
Pittsburg, Pa.:
——American Water Works & Guarantee Co., Annual report, 1177
——Philadelphia Co., Annual report, 1035
Pittsburgh, Pa.: (Continued)
——Pittsburgh, Harmony, Butler & New Castle Ry., Insurance for employees, 48
——Pittsburgh & Lake Erie R. R., Two-unit, gas-electric train, *387
——Pittsburgh, McKeesport & Westmoreland Ry. (See McKeesport, Pa.)
——Pittsburgh Ry., Double-deck cars, *958; Comment, 996
——Pittsburgh, Steubenville & Wheeling Ry., Plans, 825
——Subway ordinance, 226, 340, 391
——West Penn Electric Co., Hydroelectric developments, 337
——West Penn Traction & Water Power Co., Annual report, 308, 981
Planing mill exhauster systems, 617
Planning for street railways for growing cities [Daly], 1020; [Maltbie], 1106
Plate bending machine, Track work, Cleveland, *887
Poles:
——Concrete, Manufacture and specifications, New York State Rys., *502
——Preservation. (See Timber preservation)
Policemen, Free transportation, Indiana, 1126
Port Arthur (Ont.) & Fort William Electric Ry., Strike, 903, 941
Portland, Ore.:
——Fare reduction ordinance, 780
——Oregon Electric Ry.:
    Description of system, *1050
    Extensions, 156, 572, 599
    Sleeping cars, *119
——Portland, Eugene & Eastern Ry., Extensions, 157, 572, 599, 904
——Portland Railway, Light & Power Co.:
    Accidents, Graphical record, 885
    Calling the streets, 1125
    Fare case, 986, 1124
    Fender equipment, 525, 691
    Skip-stop idea, 88, 172
    Tabulating statistics and accounts by machinery. Cards are perforated to show code numbers, *853
    Wage increase, 1091
    Welfare work for employees, 317
Power consumption and gear ratios, 955
Power distribution:
——Cleveland, Painesville & Eastern R. R. case before Ohio Public Service Commission, 723
——Dessau-Bitterfield 60,000-volt cable, 369
——Feeders, Keeping track of [M'Kelway], *217
——Feeding street intersections [M'Kelway], *504
——Pole-top disconnecting switches, *77
——Problems [Childs], 421
——Progress of 1912 [Bell], 31; Comment, 3
——Report of National Electric Light Association, 1013; Discussion, 1059
——Sixty-cycle current in Cleveland, 618
——Waterbury-New Britain system, *368
Power generation:
——Boston Elevated Ry., Output in 1912, *413
——Developments in, 994
——Direct-current turbo-generators with reduction gears, *326
——Intake channel reconstruction. Washington & Old Dominion Ry., *536
——Progress of 1912 [Norris], 26; Comment, 4
——Reducing costs, Modern methods [Lichter and Gilbert], 759; Discussion, 814
——Reports of National Electric Light Association committees, 1012
——Rotary converter operation from single-phase power station, Stamford, Conn., *298
——Rush hour load curve, Erie R. R., 1000
——Safety valve maintenance, 55
——Switzerland, High-head hydroelectric station in, 496
——Washington & Old Dominion Ry. [Smith], *536
Power stations:
——Developments of 1912. Brief descriptions of typical plants [Norris], 26; Comment, 4
——Louisville, Ky., Flood protection, 764
——Minneapolis development plans, 300
——Protection against flood, 764, 837
——Salt Lake City, Extension, *71
——Waterbury-New Britain system [Harte], *366; Comment, 356
Power unit, Myriawatt recommended as, by A. I. E. E. and A. S. M. E., 105; Comment, 96
Prime movers, Report of National Electric Light Association, 1012; Comment, 994; Discussion, 1058
Profit sharing. (See Employees; Financial)
Providence, R. I.:
——Car inspection, 831
——Providence, Warren & Bristol R. R., Service increased, 565
——Rhode Island Co.:
    Discharged men reinstated, 740
    Employees' organization, Attitude of company toward, 657
    Express and freight traffic, *574
    Fare collection, Rooke system, *643
    Fare reduction denied, 911
    Grievance committees, 87
    Tunnel progress, 825
Providence, R. I.: (Continued)
——Subway proposed, 734
Prussian State Railroads, Dessau-Bitterfeld line, Experience with 60,000-volt transmission cables, 369
Public policy, Report of National Electric Light Association committee, 1057
Public policy committees in conference, 325; Comment, 317
Public service commissions:
——Education of commissioners, 532, 555
——Regulation and not administration should be function of, 650
——(See also names of states)
Public Service Company of Northern Illinois. (See Chicago)
Public Service Company of Oklahoma. (See Tulsa, Okla.)
Public service corporation securities:
——Demand for [Chamberlain], 982
——Stability of, 868
Public service corporations:
——[Dunne], 303
——Government mediation in labor disputes [Low], 212, [Marks], 214
——Governors' messages, 74, 160; Comment, 139
——Legislation affecting [Bozell], 884; [Griffith], 888
——Mistaken popular notions concerning [Strauss], 190; Comment, 180
——National Civic Federation:
    Report [M'Millin], 210
    Work on model public utilities law, 571
——Personnel, Influence of, on organizations, 205
——Political influences, 140
——Regulation, Byllesby's statements, 25
——Regulation of, in Wisconsin [Erickson], 577
——Relations with the public [Gillette], 888
——Report of Railroad Securities Commission, Discussions at American Electric Railway Association [Warren], 185, [Crosby], [Brady], [Henry], 187, [Richey], 189
——Scientific management [Sullivan], 369
Public Service Ry. (See Newark, N. J.)
Publicity:
——Claim department methods, 56
——Discussion by Manufacturers' Association committee, 205
——Discussion by Society for Electrical Development, 428
——How not to be popular, 356
——Methods and results, Public Service Corporation of New Jersey, 806
——Newspaper, Value of, as used by railway company, 281
Pueblo, Col., Arkansas Valley Railway, Light & Power Co., Owl cars, 391
Puget Sound Electric Ry. (See Tacoma, Wash.)
Puget Sound Traction & Light Co. (See Seattle, Wash.)
Pujo committee findings and recommendations, 434
Purchase of railway equipment, "Car trust" plan of Philadelphia Equipment Securities Co., 293
Purchased power:
——Chicago, Milwaukee & Puget Sound Ry., for mountain division, 290; Comment, 280
——Contracts [Norris], 29
——New York State, Extracts from reports of railway companies. Prices paid for power, 1016

Q

Queensland Government Rys., Narrow-gage gasoline cars, *158

R

Rail bond (Ohio Brass), *260
Rail grinders:
——(Goldschmidt), *40
——Portable, Omaha & Council Bluffs Street Ry., *149
Rail inspection at mill, Indiana Union Traction Co., 253
Rail joints:
——Best kind for use in paved streets, 425
——Electric welded, Chicago, 1907-1911, 810
——Rivet-welded [Clark], c73
——(See also Welding, Electric)
Rail scraper, Two bladed (Consolidated Accessories Co.), *1026
Railroad Securities Commission, Report, Discussions at American Electric Railway Association [Warren], 185; [Crosby], [Brady], [Henry], 187; [Richey], 189 [Brady], [Henry], 187; [Richey], 189; [Strauss], 190
Rails:
——Grooved section, Pacific Electric Ry., *938
——Report of American Railway Engineering Association, 127
——T-rails in paved streets (See Track construction)
Railway Signal Association, Meetings, 551, 1056

(Abbreviations: * Illustrated. c Correspondence.)

Rates, Public utility. Bases used in the establishment of rates by different commissions [Norton], 964
Rates, Railway (See Fares; Freight rates; Through routes and joint rates)
Reading (Pa.) Transit & Light Co., Acquisitions, 656
Receiverships and foreclosure sales in 1912, 14
Record forms:
——Accident:
  Boston, 60
  Seattle, Wash, 216
——Controller, Brooklyn Rapid Transit Co., 481
——Graphical log at substations, Cleveland, *623
——Oiling card, Fort Dodge, Des Moines & Southern R. R., 40
——Safety report slips, Fort Wayne & Northern Indiana Traction Co., 432
Rectifier in electric railway practice [Bell], 1005; Comment, 993
Redbank, N. J., Monmouth County Electric Co., Fare reduction case, 780
Reinforced concrete (See Concrete)
Repair cars (See Work cars)
Repair shop equipment:
——Armature coil-taping machine (Columbia), *646
——Axle straightener, 1158
——Banding device, Rochester lines of New York State Rys., *674
——Broom filling machine, Milwaukee Electric Railway & Light Co., *513
——Cross pit transfer table, Fort Dodge, Des Moines & Southern R. R., *61
——Effective, for reducing maintenance of equipment [Mills], 816; Discussion, 814
——Engine lathe used with jig for boring armature bearings, *922
——Heater, Portable, San Francisco, *882
——Jig used for boring armature bearings in engine lathe, *924
——Lathe chuck for armature and axle bearings (Columbia), *646
——Painting illuminated signs, Nashville, 1158
——Tools and jigs for finishing trolley wheels, *924
——Transfer table, Flush, Detroit United Railways, *672
——Woodworking shop, Omaha, *750
Repair shop practice:
——Axle straightener, 1158
——Axle welding, *294
——Baltimore, United Railways & Electric Co., 293
——Bending wheelguard fingers, *293
——Brake rigging pins with tapered ends, *593
——Brooklyn Rapid Transit Co., Electrical equipment of cars, *480; Comment 450
——Cedar Falls & Northern Ry. [Mills], 816
——Erie R. R., Electrified section, *999
——Exhauster for commutator slotter to save copper dust, 1169
——Exhauster systems for planing mills, 617
——Hamburg Elevated & Underground Ry., *472
——International Ry., Buffalo, *922
——Journal brasses, Brooklyn, 101
——Labeling equipment, 790
——Manganese bronze axle check plates, Brooklyn, 102
——Michigan United Traction Co., *478
——Motor maintenance [Thirlwall], 370; Discussion, 378
——Notes [Goss], 329
——Omaha & Council Bluffs Ry., *513
——Organization in shops [Doyle, Gove and McWhirter], 1148
——Oxy-acetylene welding, Indianapolis Traction & Terminal Co., *38
——Pennsylvania R. R., Maintenance of electric locomotives. Jack-shaft bearings, *452; Comment, 450
——Piece work, Increased earnings in New York due to, 1143
——Planning shop production, 280
——Reboring motor shells and effect of on overhaul mileage, Brooklyn, *98
——San Francisco, United R. R., *880
——Scientific management, Scope of, Report of American Society of Mechanical Engineers, 451
——Split bolt for inaccessible places (Kling), *300
——Standard methods [Sibbald], 1151; Discussion, 1145
——Test of material, What constitutes a fair, 56
——Union Traction Co. of Indiana, 510
——Welding. (See Welding, Electric)
Repair shops:
——Design, Scientific [Neff and Thompson], *490
——Hamburg Elevated & Underground Ry., *468
——New Haven Road, for electric locomotives at Van Nest, 976
——Omaha woodworking shop, *750
——Paint shop of Detroit United Railways, Construction and equipment, *668
Resistors for street railway service [Harris], 756
Resuscitation from electric shock. Report at National Electric Light Association, 1057
Rheostat terminal [Dossert], *899
Rhode Island, Legislation, 519, 602, 826
Rhode Island Co. (See Providence, R. I.)
Rice, E. W., Jr., becomes president of General Electric Co., *1110
Richmond, Va., Virginia Railway & Power Co.:
——Carhouses and shops, Scientific design [Neff and Thompson], *490
——Operating proposal, 559
Right-of-way, Cultivation of unused, 747
Roanoke, Va., Strike, 861, 903, 941, 1118
Rochester, N. Y., New York State Rys.:
——Brake hanger, Light weight, *752
——Cars, New design, *644
——Conference concerning service, 233
——Continuous ride order, 526
——Educational experiment in co-operation with the Mechanics' Institute, 461
——Exhibit at Syracuse, *974
——Line inspection and repair, Utica, N. Y., 474
——Mileage maintenance system on Syracuse lines, 542
——Poles, Concrete, Manufacture and specifications, *502
——Recommendations in regard to service, by C. R. Barnes, 689
——Sanding device, *674
——Service, Reply of company to suggestions of Council Committee, 939
——Through cars to Buffalo, 948
Routing of cars, Chicago, Report of Board of Supervising Engineers, *895
Rules and announcements, Use of good language in, 837
Rural communities:
——Benefits of electric railway service, Investigation by the Legislature of Massachusetts, 406
——Possibilities in the East, Report of National Electric Light Association committee, 1058; Comment, 1047

S

Sacramento, Cal., Report on traffic [Arnold], 911
Safety appliance order of New York Public service Commission, 821
Safety campaigns. (See Accident claim department, Prevention of accidents)
Safety committees. (See Employees)
Saginaw, Mich., Franchise negotiations, 825, 903
St. Joseph (Mo.) Railway, Light, Heat & Power Co.:
——Annual statement, 270
——Stock sale, 231
St. Lawrence International Electric Railroad & Land Co. (See Alexandria Bay, N. Y.)
St. Louis, Mo.:
——Express and freight traffic methods of Illinois Traction System, *282
——St. Louis & Western Traction Co., Plans, 559
——Traffic conditions. Report of Public Service Commission. Recommendation of increases in service and trail-car service, 676
——United Rys.:
  Annual report, 393
  Car-washing plant, *722
  Protest against assessment, 1084
  Report of Public Service Commission [Allison], 248, 688; Comment, 239
  Statement concerning recommendations in the report of the Public Service Commission, 688
  Transfer compromise, 1182
St. Paul, Extension case, 1175
Salt Lake City:
——Extensions proposed, 599
——Salt Lake & Utah R. R., Progress on construction, 340
——Utah Light & Railway Co.:
  Freight transportation proposed, 780
  Power plant extension, *71
San Antonio (Tex.) Traction Co., Wage increase, 232
San Diego, Cal.:
——Los Angeles & San Diego Beach Ry., Storage battery cars, *938
——San Diego Electric Ry.:
  Center-entrance cars and new shops, 811
  Turbo-generators with reduction gear, *326
San Francisco, Cal.:
——California Railway & Power Co., Dividend, 440
——Franchises, Proposed terms, 850
——Geary Street Municipal R R.:
  Car, Standard type, *896
  Construction figures, 80, 127
  Extension proposed, 391, 435, 733, 862, 1083, 1175
  Financial results of operation, 226
  Financial statement by Mayor Rolph, 1082
  Joint use of tracks proposed, 691
  Opening of first section, 43, 80
  Traffic agreement, 1034

(Abbreviations: * Illustrated. c Correspondence.)

San Francisco, Cal.: (Continued)
——Panama Exposition:
  Machinery exhibits, 808
  Transportation problems, 281, 556
——Passenger handling records, Comparison with Chicago, 257
——San Francisco Development League, 165
——San Francisco-Oakland Terminal Rys.:
  Pension system, 47
  Refinancing plan, 1121
——Track agreement, 863
——Transportation conditions, Reports [Arnold], 62, 256, 733, 844; Comment, 839
——United R. R.:
  Application to refund issues of subsidiaries, 45, 344
  Repair shop practice, *880
  Track maintenance and reconstruction, *462
  Welding, Electric arc, *67, *880
——United Railways Investment Co., Finances, 396
San Luis Obispo, Cal., Pacific Coast Ry., Narrow-gage combination car, *899
Sand-drying plant, Lincoln, Neb., *159
Sand elevator car, United R. R. of San Francisco, *467
Santa Barbara (Cal.) & Suburban Ry., Notes, *857
Scales, Track, in San Francisco shop, *882
Schedule boards for city lines, Fort Wayne, Ind., *72
Schedules:
——Construction of crew and car schedules [Dempsey], 1151; Discussion, 1142
——Train schedule held to be a contract, Maryland decision, 698
Scientific management, Scope of, 451
Scotland, Aberdeen Corporation Tramways, Double-deck prepayment cars, *385
Scranton (Pa.) Ry.:
——Contracts for central station energy, 772
——Lackawanna & Wyoming Valley Rapid Transit Co., Reorganization, 1122
Seattle, Wash.:
——Highland Park & Lake Burien R. R., Sale, 563, 825, 946
——Municipal street railway, History and equipment of, 753
——Puget Sound Traction, Light & Power Co.:
  Cable road improvements, *1108
  Franchise case, 560
  Safety work, 216
——Seattle, Renton & Southern Ry.:
  Appraisal, 304
  Condemnation case to Supreme Court, 559
  Receivership and sale of property, 696
Selection of trainmen. (See Employees)
Self-propelled cars. (See Gasoline cars; Storage battery cars)
Seneca Falls, N. Y., Geneva & Auburn Ry., Financial plan proposed, 778
Service cars. (See Work cars)
Service wagons, Storage battery, 37
Shovel cars. (See Work cars)
Shreveport (La.) Traction Co., Franchise extension ordinance, 691
Signal department, Work of [Mann], 962
Signals:
——Block system:
  Discussion by joint committee of American Electric Railway Engineering and Transportation & Traffic Associations, 204, 550
  East Cambridge extension of Boston Elevated Ry., *365
  Illinois Traction System, 435
  Indiana situation, 127, 304, 380, 496, 843, 877, 1079
  Maintenance, Illinois Traction system, 501
  Oregon Electric Ry., 1055
  Progress in 1912, 7
——Crossing, Trolley contact:
  [Nachod], *298
  (U. S. Electric Signal), *259
——Indiana:
  Map of protected sections, 843
  Order for interurban railways, 127, 304, 380, 496, 843, 877, 1079
——Interlocking plants, Hearing on rules for, in Indiana, Illinois, Wisconsin and Minnesota, 541
——Operation, Effect of mental and treated ties on track circuits, 543
——Light:
  Performance record, Terre Haute, Indianapolis & Eastern Traction Co., 512
  Suggested system [Thompson], 117
——Maintenance of [Mann], 962
——Simmen system, Indianapolis & Cincinnati Traction Co., 266, 337
——Switch indicator (Union Switch & Signal Co.), *859
——Yonkers, N. Y., installation, *296
Signs on cars:
——"Car full" signs in Boston, 443
——Destination, Milwaukee Electric Railway & Light Co., 526
——Numbered signs in California, 666
——Peoria Ry., 1170
Simplon Tunnel, Maintenance experience, 802

Single-phase railway motors [Bell], *1003; Comment, 993; [Latour], 1067
Single-phase railways:
——Cost of operation, Estimated [Kahler], 932
——Cost of power on different systems [Sparks], 1062
——Erie R. R., Electrified section. Maintenance and present condition, *998; Comment, 993
——Midi Ry., France, 793, 1067
——Spain, between Pamplona and Sanguesa, *801
Sleeping cars. (See Cars).
Smoking on cars:
——Cleveland, Protest against dead cigars, 525
——Kansas City, Not allowed, 870
——New Jersey rules, 831
——New York City, Hearing, 1111; Comment, 1099
——Philadelphia, 172, 317
Snow scraper for limited clearance spaces, International Ry., Buffalo, 1171
Society for Electrical Development:
——Inaugural Conference in New York, 428
——Organization of, and officers, 119, 1118
South Bend, Ind., Chicago, South Bend & Northern Indiana Ry., Block signals, 843
South Carolina Light, Power & Railways Co. (See Spartanburg, S. C.)
South Fork-Portage Ry. (See Johnstown, Pa.)
Southern New England R. R. offered to Rhode Island, 692
Southern Pacific R. R.:
——Disposition of electric lines, 395
——Electrification progress, 1009
——Separate management for electric lines, 1034
Southwestern Electrical & Gas Association, Convention, 963, 1019
Spain, Single-phase railway between Pamplona and Sanguesa, *801
Spartanburg, S. C., South Carolina Light, Power & Railways Co., Control and financial condition, 131
Speed of cars, Report of Chicago Board of Supervising Engineers, 894
Speed of trains, Control device [Horne & Crane], 1115
Spokane, Wash., Near-side stops, 658, 831
Springfield, Ill.:
——Clear Lake & Rochester Interurban Ry., Sale, 909
——Freight house, Illinois Traction System, *930
Springfield (Mass.) Street Ry., Traffic problems, 132
Springfield (Mo.) Traction Co., Steel tie and concrete track construction, 208
Springfield (Ohio) Ry., Franchise, 825
Sprinkling systems. (See Fire protection)
Standards. Proposed changes by American Institute of Electrical Engineers, 431
Staten Island. (See New York City, Fare concession)
Statistics:
——Accidents on interstate electric railways, 47, 1180
——Accidents on steam railways, 1908-1913, 551
——Austrian electric railways, 414
——Canadian electric railways, 224
——Cars ordered in 1912, 11; Comment, 1, 57
——Chicago, Report of Board of Supervising Engineers, 809
——Cincinnati, Report on terminal possibilities [Arnold], 330
——Cleveland Ry., 1072
——Cost and other data of electrified steam roads [Sparks], 1062
——Great Britain and Ireland Railways, 258
——Hungary, 860
——Illinois Electric Rys., 1912, 690
——Italian railways, 196
——Mileage, for 1912, 15; Comment, 57
——Steam railroads, for 1912, 40
——Texas interurban railways, 339
——Track built in 1912, 15; Comment, 57
——Traffic, Boston Elevated Ry., 287
Steam railroad electrification. (See Heavy electric traction)
Steam railroad electrification and financial commission proposed by F. J. Sprague, 586; Comment, 573
Steam railroads:
——Revenues and expenses, Summary of, 426
——Statistics for 1912, 40
Stock car. (See Work cars)
Stockport, England, Trackless trolley service, *805
Stoker, Mechanical underfeed (Sanford Riley), *337
Stop and speed control, Automatic, for trains [Horne & Crane], 1115
Stopping of cars:
——Cleveland, Alternate-stop, 141
——Davenport, Ia., Near-side stops, 398
——Denver, Skip-stop plan, 857
——Dubuque, Ia., Near-side, 1181
——Indiana, "Stop signal" order, 88
——Kewanee, Ill., Near-side, 1181
——Los Angeles, Cal., Skip-stop idea, 346
——Portland, Ore, Skip-stop idea, 88, 172
——Spokane, Wash., Near-side stops, 658, 831
——Toledo, Near-side stop, 133
Storage batteries for stations at Cleveland, 618
Storage battery cars:
——Beach-Edison, Performance of, 767
——Combination passenger and baggage, Los Angeles & San Diego Beach Ry., *938
——Construction of American and Prussian [Büttner], c335; [Scott], c383
——Control circuits, 748
——New York, New Haven & Hartford R. R., Waterbury-Meriden Line, 518
——Operating records [Dodd and Arnold], 934, 965
——Run between New York and Boston, 429, 767
Storage battery tractor for city switching service, Pennsylvania R. R., Jersey City, *768
Storage yards. (See Yards)
Stores, Co-operative. (See Employees, Co-operative stores)
Straps, Car, Advertising feature [Newton], *259
Street lighting, Need of improved, 353
Strike losses, Municipal responsibility for, Decision of U. S. District Court, Newark, N. J., 879
Strikes:
——Asheville, N. C., 863, 1084
——Beaumont, Texas, 1033
——Birmingham, Ala., 1174
——Buffalo, International Ry., 665, *674, 730, 771, 825, 941, 978, 994, 1030
——Cincinnati. Arbitration efforts, *890, 921, 939, 979
——Colorado Springs, Col., 903
——Fort William, Ont., 903, 941
——Halifax, N. S., 941, 1083
——Jamestown, N. Y., 825, 901, 1081
——Phoenix, Ariz., 1174
——Receivers to end, 921
——Roanoke, Va., 861, 903, 941, 1118
——Yonkers, N. Y., 43, 81
Substations:
——Buffalo, International Railway Co. Design and construction of buildings. Arrangement of equipment, *840
——Cleveland Ry. with 60-cycle converters and storage batteries, *618
——Oakland, Antioch & Eastern Ry., *727
——Oregon Electric Ry., *1053
——Stamford, Conn., *298
——Washington & Old Dominion Ry. [Smith], *539
Sweden, Heavy electric traction conditions, 34, 818; Comment, 9
Switch indicator (Union Switch & Signal), *859
Switchboard instruments [MacGahan], 1013; Discussion, 1059
Switchboards:
——Buffalo substations, Details of low-tension boards, *840
——Cleveland Ry., *622
Switches, Electric:
——Disconnecting (E. S. S. Co.), *552
——Pole-top disconnecting (E. E. E. Co,), *77
Switzerland:
——Heavy electric traction conditions, 34; Comment, 9
——Spiez-Frutigen Ry. Comparative energy consumption, 509
——Street railway statistics, 1911, 765
Syracuse, N. Y.:
——Empire United Rys., Consolidation of Beebe, Syndicate lines, 228, 271, 344
——Syracuse, Lake Shore & Northern Ry.:
Brake rigging pins, *593
Fare reduction, 49
——Syracuse Rapid Transit, Fare collection, Ohmer system, 374

T

Tabulating machine (Hollerith) for tabulating statistics and accounts, Portland Railway, Light & Power Co., *853
Tacoma, Wash.:
——Municipal railway proposed, 435, 903
——Puget Sound Electric Ry., Fare question between Seattle and Tacoma, 173, 310
——Tacoma Railway & Power Co., Extensions [Shackleford], 948
Tax assessment in Wisconsin, 691
Taxation. Corporation tax for leased companies, Escape from, U. S. Supreme Court decision, 878
Terminals and terminal stations:
——Boston Elevated Ry. Improvements, *361 *408
——Buffalo, Electrification, 864
——Chicago, Electrification, 254, 883, 904, 1030, 1116, 1117
——Cincinnati:
Controversy over use of canal land, 164
Report on possibilities in [Arnold], 330
——Elevated, for interurban lines, 705
——Interurban railways [Hanlon], 814; Discussion, 813
——Newark, N. J., *246
——Peoria, Ill., Illinois Traction System, 310
——St. Louis freight terminal, Illinois Traction System, *282
——Terre Haute, Ind., Proposed, *336
Terre Haute (Ind.), Indianapolis & Eastern Traction Co.:
——Block signals, 496, 843
——Flood damage, 725
——Signals, Light, Performance record, 512
——Terminal at Terre Haute, *336
——Wage increase, 831, 1091
Tests of equipment, Brooklyn Rapid Transit Co., Electric car equipment, 484; Comment, 450
Texas:
——Interurban railway construction in 1912, 339
——Legislation, 735
Texas public utility commission proposed, 209
Thermit welding. (See Welding, Electric)
Third Avenue Ry. (See New York City)
Third rail and overhead clearances, Report of American Railway Association, *935
Through routes and joint rates:
——Illinois Traction System, Opinion of Interstate Commerce Commission, 442, 531
——Rochester-Buffalo, 948
——Union Traction Company of Kansas, 346
Ticket seller and the public [Van Zandt], 346
Tickets:
——Commutation, What it implies, Buffalo, 397
——Folding, New method in Cleveland, *258
——Metal, Sale of, in New Bedford, Mass., 877
——Prepayment cars, Use of tickets with, 239
——(See also Transfers)
Tie plates, Principles of design, 544
Ties:
——Effect of metal and treated, on track circuits, 543
——Prolonging mechanical life of ties, 355
——Steel, in concrete beams, Cleveland Ry., *886
——Treatment. (See Timber preservation)
Timber preservation:
——American Wood Preservers' Association, Annual meeting, 150, 220; Comment, 182
——Car lumber [Waterman], 153
——Combustibility of the preservative, 153
——Comparison of zinc chloride with coal-tar creosote for cross-ties [Weiss], 151
——Electrical resistance of ties, Effect of treatment, 152
——Financial saving due to use of preservatives, 152
——Oregon Electric Ry., *1051
——Pacific Electric Ry., 755
——Paving timber [Davis], 154
——Penetration of wood during treatment, Ability of preservative, 151
——Permanency of the preservation and effect of treatment on strength of ties, 152
——Requirements for successful treatment [Von Schrenk], 154
——Wood decay and preservation [Griffin], 1013; Discussion, 1059
Time tables for outlying lines, 665
——(See also Schedules)
Toledo, Ohio:
——Fare, Three-cent, 127
——Municipal ownership resolution, 389
——Toledo & Chicago Interurban Ry. (See Kendallville, Ind.)
——Toledo Railways & Light Co.;
Annual report, 867
Change of personnel, 696
Fare schedule, 263
Franchise negotiations, 730
Injunction case, 777, 830, 869
Near-side stops, 133
Safety campaign, 658
Wage increase, 780
——Toledo Traction, Light & Power Co.:
Bond sale, 345
Decision in control case, 945
Organization, 396
Tornadoes in Omaha and Terra Haute, *638
Toronto, Ont.:
——Civic line opened, 43
——Expropriation case, Award in, 824
——Municipal ownership, 825, 902, 941, 942, 1085; Reports [Arnold], 769, 968
——Reports on improvements and development of the metropolitan district. Estimates of future traffic. Subway and motor buses considered [Arnold], 769, 968
——Subway proposed in Arnold report, 970
——Toronto Ry. Annual report, 521
——Toronto, Uxbridge & Port Perry Ry., Subsidy for, 303
Tower cars:
——Erie R. R., Electrified section, *1001
——Gasoline:
Illinois Traction System, *900
Milwaukee Electric Railway & Light Co., *642
Tower wagons:
——Northern Ohio Traction & Light Co., *1080
——Storage battery, Trenton type, 37
Track construction:
——Ballast, Proper depth, 545
——Chicago, Report of Board of Supervising Engineers, 810
——Cleveland, Rehabilitation of track. Steel ties in concrete slab, Temporary track, *104, *886

(Abbreviations: * Illustrated. c Correspondence.)

Tracks construction: (Continued)
——Concrete, Proposed type, Houston, Tex. [Archibald], 964; Discussion, 1019
——Costs of, at Detroit, 897
——Crossings for steam railways at paved streets, *545
——East Cambridge viaduct, *362
——Laying track under traffic, Michigan United Traction Co., *476
——Michigan United Traction Co., Organization and methods, *475
——Oregon Electric Ry., 1054
——Progress in, 5
——San Francisco, United R. R., *462
——Sand cushion support for cross-ties, Vancouver, B. C., *511
——Special work [Angerer], 1020
——Springfield, Mo., Steel ties and concrete construction, 208
——Statistics for 1912, 15; Comment, 57
——Street crossings, *545
——T-rails in paved streets:
  Houston, Tex., No more T-rails, 1118
  Illinois Traction System, *61
  Lexington, Ky. [MacLeod], *335
  Toledo, Ohio [Swartz], c209
——Tie plate design, 544
——(See also Welding)
Track maintenance:
——Cultivation of right-of-way, 747
——Life of ties, Prolonging, 355
——Replacing overturned track, Louisville & Nashville R. R., *729
——Rules added to standard instructions, American Railway Engineering Association, 543
——San Francisco, United R. R., *462
——Special work [Angerer], 1022
——Temporary track laid on street surface for rerouting cars, 886
Trackless trolley, Stockport, England, *805
Trackless trolley bus, Merrill, Wis., *1080
Traffic charts, San Antonio, Tex. [King], 965; Discussion, 1019
Traffic departments, Relations of steam and electric railways [Landis], c765
Traffic investigations, Cities:
——Boston passenger referendum, *856
——Cincinnati suburban lines, 330
——Kansas City, Mo., Report [Arnold], 716
——Newark, N. J., Report to mayor, 658
——Philadelphia [Ford], 598
——Sacramento, Cal. [Arnold], 911
——St. Louis. Report of Public Service Commission. Recommendation of increases in service and trail-car service. 676
——San Francisco, Reports [Arnold], 62, 256, 733, 839, 844
——Toronto, Report on improvement and development of the metropolitan district. Estimates of future traffic [Arnold], 968
Traffic promotion, Sale of metal tickets, Convenience as an asset to railways, 877
Trail cars. (See Cars)
Train delays and detentions:
——Erie R. R., Electrical causes, 1000
——New York Central R. R., Electrical causes, 587
——New York State, Statement of Public Service Commission, 975
Train operation:
——Accident, New York Elevated Ry., 181
——Derailments on curves [Shurtleff], 253
Trainmen's quarters. (See Employees)
Transfer table, Flush, Detroit United Ry., *672
Transfers:
——Brooklyn Hearing, 1181
——Chicago suit, 311
——Cincinnati, Ordinance, 1182
——Color scheme, Lincoln, Neb., 1181
——Infection from, 95
——St. Louis, 1182
Transmission lines:
——Construction [Coombs], 1014
——Erection and protection of high-tension lines [Nelson], 1020
——Inductive interference, Reports of joint California committee, 512, 531
——New York State Rys., Inspection and repairs, 474
——Reports of National Electric Light Association committees, 1014
——Waterbury-New Britain system [Harte], *366
Transportation and city planning [Maltbie], 1106; Comment, 1100
Tread, Home-made safety for car steps, 548
Trenton, N. J.:
——New Jersey & Pennsylvania Traction Co., Fare increase between Trenton and Princeton, 172, 324; Comment 318
——Trenton & Mercer County Traction Corp.:
  Improvement plans for 1913, 901
  Turbo-generators with reduction gear, *327
Trespassers, Laws against, 55
Tri-City Ry. (See Davenport, Ia.)
Tri-State Railway & Electric Co. (See East Liverpool, O.)
Trolley guard, Automatic (E. S. S. Co.), *1026
Trolley harp with spring and knuckle joint for retaining wheel (Special Electric), *159
Trolley wheel, Roller-bearing (American), *900
Trolley wire and overhead frog location on curves [Barnard], *1155
Trucks:
——Changes of design and increased efficiency, 407
——Maximum-traction vs. M. C. R. [Benedict], 1157; Discussion, 1144
Tulsa, Okla., Public Service Company of Oklahoma, Incorporated, 1179
Tunnel, Oakland, Antioch & Eastern Ry., *726
Turbines, Hydraulic, Efficiency record, Appalachian Power Co., New River, Va., 720
Turbo-generators:
——Balancing of alternator rotors, 496
——Design and construction of turbo-alternators, Comment on paper by Lamme, 97
——Reduction gears:
  Cleveland, 158
  Design of, *327
  Two types, San Diego, Cal., Trenton, N. J., and Bridgeport, Conn., *327
——Report of National Electric Light Association, 1012
Twin City Rapid Transit Co. (See Minneapolis, Minn.)

U

Underground Electric Railways. (See London)
Union Street Ry. (See New Bedford, Mass.)
Union Traction Co. (See Independence, Kan.)
Union Traction Co. of Indiana. (See Anderson, Ind.)
United Properties Co. (See Oakland, Cal.)
United Railroads. (See San Francisco)
United Railways. (See St. Louis)
United Railways Investment Co. (See San Francisco)
United Traction Co. (See Albany, N. Y.)
University of Illinois, Dedication of buildings, 823, 883
Upper Darby, Pa.:
——Philadelphia & Westchester Traction Co.:
  Extension of Garrettford lines to Borough of Media, *589
  Wage increase, 658
——Philadelphia & Western Ry., Wage increase, 273
Utah, Legislation, 519, 561
Utah Light & Railway Co. (See Salt Lake City)

V

Valuations. (See Appraisal of railway property)
Vancouver, B. C., British Columbia Electric Ry:
——Power improvements, 652
——Ties supported on sand cushion, *511
Vancouver, Wash., Washington-Oregon Corporation, Car for city and light interurban service, *300
Ventilation of cars:
——Brooklyn Center-entrance car, *714
——Chicago near-side cars, 311
——[Lavelle], 1168
Vestibuled cars, Safety of, 1105
Vestibuled trains on sharp curves, 623
Virginia Railway & Power Co. (See Richmond, Va.)
Volt-ammeter, Portable [Weston], *728
Voucher system. (See Accounting)

W

Waco (Tex.) Street Ry., Experience with one-man prepayment cars, 578
Wage arbitration, Chicago, 615
Wage limits, Problem of ultimate, 571
Wages:
——Akron Ohio, Increase, 698, 871
——Atlanta, Ga., Increase, 48
——Binghamton, N. Y., Increase, 272
——Boston Elevated Ry., Increase, 49
——Brooklyn, Increase, 1040
——Chicago elevated railways, 615, 732, 749
——Cleveland Ry., 927
——Davenport, Ia., Increase, 986, 1040
——Dayton, Ohio, Increase, 1040
——Fort Wayne & Northern Indiana Traction Co., 606
——Governors' messages, 74, 160; Comment, 139
——Great Britain, Lower wages [Clark], 193
——Indianapolis, Increase, 1091
——Jamestown, N. Y., Increase, 740
——Kewanee, Ill., Increase, 985
——Lehigh Valley Transit Co., Increase, 273
——Louisville, Ky., Increase, 978
——Montreal, Increase, 985
——New Orleans, 1091
——Northern Ohio Traction & Light Co., 698
——Parkersburg, W. Va., Increase, 870
——Philadelphia Rapid Transit Co., Increase, 733
——Philadelphia & Westchester Traction Co., 658
——Philadelphia & Western Ry., Increase, 273
——Portland, Ore., Increase, 1091
——Richmond, Ind., Increase, 831
——San Antonio, Texas, 232
——Third Avenue Ry., Increase, 171
Wages: (Continued)
——Toledo, Increase, 780
——Windsor, Ont., 870
Waiting stations:
——Boston Elevated Ry., *408
——Hamburg Subway & Elevated Ry., *417
——Oregon Electric Ry., *1053
——Pacific Electric Ry., Mission style of architecture, *966
——Philadelphia suburban line, *589
Wallkill Transit Co. (See Middletown, N. Y.)
Warehouse Point, Conn., Hartford & Springfield Street Ry., Dividend, 868
Washing of cars, Plant at St. Louis, *722
Washington:
——Legislation, 437, 519, 602
——Tax Commission's assessment, 1175
Washington, D. C.:
——Capital Traction Co.:
  Annual report, 306
  Transfer difficulty with motor bus line, 356
——District Electric Railway Commission, Annual report, 301
——Merger proposed, 128
——Motor bus line transfer difficulties, 356
——Washington, Baltimore & Annapolis Electric Ry. (See Baltimore)
——Washington & Old Dominion Ry.:
  Electrical equipment [Smith], 534
  Rate hearing, 173
——Washington Railway & Electric Co.:
  Annual report, 1087
  Double-deck car, 304, *430; Comment, 405
  Earnings for 1912, 343
  Merit system, 88
  Profit sharing with employees, 87
  Service increased, 273
  Transfer difficulty with motor bus line, 356
——Washington Utilities Co. organized, 128
Washington-Oregon Corporation. (See Vancouver)
Way and buildings, Progress in 1912, 5
Weed killer, Los Angeles, *1169
Welding, Electric:
——Chicago, Improved methods, Report of Board of Supervising Engineers, 810
——Economies, 1133
——San Francisco and Los Angeles experience, *67
——San Francisco shops, List of savings, *880
——Thermit, Goldschmidt simplified method, *76
——Third Avenue R. R., New York, *1102
Welding, Oxy-acetylene, Indianapolis Traction & Terminal Co., *38
Welfare work. (See Employees)
West Penn Electric Co. (See Pittsburg)
West Penn Traction & Water Power Co. (See Pittsburgh)
West Virginia, Legislation, 305
West Virginia Public Service Commission, Members, 1084
West Virginia Public Utility Bill, 1082
Westchester Street R. R. (See White Plains, N. Y.)
Westerly, R. I., Pawcatuck Valley Street Ry., Sale, 46
Western Railways & Light Co. (See Champaign, Ill.)
Western State Ry. (See France)
Western Red Cedar Association, Annual meeting, 156
Westinghouse Electric & Manufacturing Co., Annual report, 944
Wheel-grinding machine, Michigan United Traction Co., *479
Wheel tread, Report of Chicago Board of Supervising Engineers, 894
Wheels, Transfer from interurban to city service, Michigan United Traction Co., 478
White, J. G., New companies organize, 84
White & Co., Inc., J. G., Annual report, 1036
White Plains, N. Y., Westchester Street R. R., Value of property, Decision of Public Service Commission, 381
Willoughby, Ohio, Cleveland, Painesville & Eastern R. R.:
——Annual report, 520
——Transmission case, Rehearing before Ohio Public Service Commission, 723
Wilmington (Del.) & Philadelphia Traction Co., Taken over by National Properties Co., 130
Windsor, Ont., Sandwich, Windsor & Amherstburg Ry., Wage increase, 870
Winnipeg (Man.) Electric Ry.:
——Annual report, 695
——Traffic report, 691
Wire, Fence, Non-corrosive, 545
Wire for overhead distribution circuits [Stevenson], 1014
Wisconsin:
——Legislation, 305, 341, 392, 437, 602, 653, 735, 774, 826, 865, 905, 943, 1034, 1086, 1176
——Tax assessment, 691
Wisconsin Electrical Association:
——Annual meeting, 106, 115
——Liability insurance committee, Report, 111
——Papers at annual meeting, 108
Wisconsin Railroad Commission:
——Investigation of service in Milwaukee, 232

(Abbreviations: * Illustrated. c Correspondence.)

Wisconsin Railroad Commission: (Continued)
——Milwaukee fare case, Decision [Mack], 110; Comment, 181, 1101; 272, 1081
——Regulation of public utilities [Erickson], 577
Woodworking shop. (See Repair shops)
Worcester (Mass.) Consolidated Street Ry.:
——Express service, 347
——Power costs, 1078
——Power situation, 340
——Service recommendation, 606, 870
Work cars:
——Boston Elevated Ry., 640-hp work-car locomotive, *295

Work Cars: (Continued)
——Derrick cars, Chicago Elevated Railway, *115
——Efficiency of service cars, Increasing, 181
——Kansas City, Mo., Asphalt car, *479
——San Francisco, Derrick, shovel and bitumen cars, *462
Work order system. (See Accounting)
Workmen's compensation laws:
——Governors' messages, 74, 160; Comment, 139
——National Civic Federation, Efforts of [McMillin], 210; [Belmont], 214

Y

Yards, Open storage, One objection to, 353
Yonkers (N. Y.) R. R.:
——Service resumed, 126
——Signal installation, *296
——Strike, 43, 81
York (Pa.) Ry.:
——Accident prevention campaign, 740
——A.c.-d.c. equipment [Greene], 1024
——Annual report, 167

Z

Zinc chloride. (See Timber preservation)

AUTHOR INDEX

A

Armstrong, A. H. Steam road electrifications, 17
Ayers, M. V. Accounting versus statistics, 803

B

Barnard, J. H., Jr. Location of trolley wire and overhead frogs on curves, *1155
Bell, D. C. Selection and instruction of trainmen, 815
Bell, Louis. Progress in electric power transmission practice, 31
——Single-phase railway motors, *1003
Belmont, August. Workmen's compensation laws, 214
Benedict, H. A. Maximum-traction trucks versus M. C. B. trucks, 1157
Bolen, N. W. Relations between employees and supervisory force, 1153
Burch, E. P. Great Northern Railway electrification in Montana, 117
——New York Central locomotive rating, c818
Burleigh, J. J. Present tendency of street railway operating expenses, 187
Büttner, A. Construction of American and Prussian accumulator cars, c335

C

Childs, H. J. Some power distribution problems, 421
Clark, C. H. Riveted-welded joints, c73
Clark, W. J. Discussion on rates and fares, 192
Conklin, G. H. A remarkable series of coincidences, c73
Crane, C. F. Park management and its transportation problems, 507
Crane, J. L. Railway motor connections, c*1114

D

Dana, Edward. Accident prevention in Boston, *58
Davis, H. G. Timber for creosoted block paving, 154
Dempsey, J. J. Construction of schedules, 1151
Doyle, J. S., W. G. Gore and J. S. McWhirter. Operating economies, 1148
Duffy, C. N. Effect of load factor on cost of electric railway passenger service, 195

E

Elkins, A. F., F. K. Young and F. Pantel. Central Electric Railway Accountants' Association, 1168

F

Ford, G. L. Voucher indexing simplified, 1167

G

Gilbert, D. W. Modern methods of reducing generating costs, 759
Gonzenbach, Ernest. Report of liability insurance committee, 111
Gore, W. G. (See Doyle, J. S.)
Goss, E. W. Notes along the line, 329

H

Hammett, Edward. Dispatching and handling street cars and train crews, 108
Hanlon, J. F., Interurban terminals, 814
Harris, F. W. Resistors for street railway service, 756
Harte, C. R. Modern power network—the Waterbury-New Britain system, *366
Heindle, W. A. Tale of two cities, 506
Henry, C. L. Conditions on the Indianapolis & Cincinnati Traction Co., 636
Hyland, W. H. Successful claim agent, 420

K

Kalweit, G. W. Work order system adaptable to public utilities, 113

L

Landis, L. H. Relations of Steam and electric railway traffic departments, c765
Lavelle, H. E. Ventilation of electric cars, 1168
Low, Seth. Government mediation in railroad labor disputes, 212

M

MacLeod, George. T-rail construction in paved streets, c*335
M'Kelway, G. H. Feeding steet intersections, *504
——Keeping track of feeders, *217
M'Millin, Emerson. Report of the Department of Regulation of Interstate and Municipal Utilities, 210
M'Phillips, James. Interurban railway versus the city railway, 423
McWhirter, J. S. (See Doyle, J. S.)
Maltbie, M. R. Transportation and city planning, 1106
Marks, M. E. Industrial mediation laws, 214
Mills, G. A. Effective shop equipment for reducing maintenance of equipment, 816

N

Neereamer, A. L. Report as chairman of the Central Electric Traffic Association, 378
——Report as secretary-treasurer of the Central Electric Railway Association, 377
Neff, C. A., and T. P. Thompson. Scientific design of carhouses and shops, *490
Norris, H. H. Developments during 1912 in power plant design, 26

O

Ohmer, J. F. Human factor in fare collection service, 373

P

Pantel, F. (See Elkins, A. F.)
Price, A. L. Mounting of radial couplers, 372

R

Radcliffe, G. L. Operation of trailers in connection with peak load city service, 422
Richey, A. S. Discussion of report of Railroad Securities Commission, 189
Rifenberick, R. B. Valuation as covered by recent legislation, 1163
Rippey, A. G. Successful methods of preventing accidents, 760

S

Scott, Leroy. Construction of American and Prussian accumulator cars, c383
Sibbald, John. Standard methods for mechanical department, 1151
Smith, W. N. Washington & Old Dominion Railway, *534
Sparks, J. B. Electric railway costs, 1061
Stearns, R. B. Discussion on rates and fares, 189
Steuart, W. M., Forthcoming Census report, c818
Storer, N. W. Development of the electric railway motor, 21
Strauss, Frederick. Some mistaken popular notions concerning public service corporations, 190
Sullivan, C. O. Interline freight business, 374
Swartz, A. T-rail pavement construction, c209

T

Thirlwall, J. C. Economies in motor maintenance, 370
Thompson, T. P. (See Neff, C. A.)

V

Von Schrenk, Hermann. Requirements for successful timber treatment, 154

W

Walsh, Frank. Freight and express on electric roads, 1154
Waterman, J. H. Preservation of lumber for car construction, 153
Weiss, H. F. Comparison of zinc chloride with coal-tar creosote for preserving cross-ties, 151
Whitney, W. S. Address as president of the Central Electric Railway Association, 377
Wilson, H. L. Accounting versus statistics, c859

Y

Young, F. K. (See Elkins, A. F.)

PERSONAL

Abbott, F. W., 134
Adams, H. H., 912
Aid, W. F., 832
Akarman, J. N., 741
Akens, Albert E., 400
Akers, Albert, 781
Allen, E. C., 1182
Allen, H. C., 347
Allison, James E., 872
Alston, T. P., 312
Anderson, A. A., 89, 699
Anderson, Alfred, 89
Anderson, George W., 1183
Antonisen, J., 987
Armstrong, Allen Gordon, 274
Artaud, T. P., 274
Astle, W. G., 399
Avery, C. W., 566
Ayers, J. R., *348

Bailey, C. O., 347
Baker, C. H., 1092
Baker, N. P., 234
Baker, W. C., 912
Balliet, Herbert S., 526
Bardo, Clinton L., 444
Barnes, James P., 312, 348
Barnes, S. W., 566, 699
Barrett, James M., 987
Bary, V. T., 89
Baukat, J. G., 1092
Bell, Harmon, 1092
Bell, Thomas K., 274
Benham, A., 1126
Bertrand, P. A., 872
Bidwell, J. N., 234
Bisbee, Chester L., 912
Bissell, J. H., 1092
Bissell, W. A., 1041
Block, Frank E., 872
Bogardus, Martin J., 443
Bouslog, H. P., 912
Bowman, F. E., *988
Boyd, O. T., 275
Bradley, L. C., 608
Brady, Arthur W., *400
Bramlette, J. M., 443
Branson, Henry, 1092
Bricker, James, 566, 660
Briggs, Frank O., 913
Bronson, Miles, 274
Brooks, Charles A., 741
Brooks, F. H., 1092
Brophy, George P., 782
Brosius, Frank R., 134
Brown, F. D., 832
Brown, Frank H., 444
Brown, G. M., *348
Brown, M. H., 312, 1126
Brown, Robert C., 1092
Browning, M. S., 443
Buffe, Fred G., 699
Burns, Joseph M., 443
Burrill, E. A., 134
Burritt, E. B., *1127
Burt, Horace G., 949
Butler, William W. S., 987

Cabaniss, E. W., 607
Cady, A. H., 1126
Caffrey, G. H., 274
Calder, C. E., 607
Calderwood, J. F., 173
Cameron, George S., 1092
Camp, Henri, 399
Case, J. R., 1092
Cash, John, 89
Cavanagh, M. A., 89
Choate, Joseph K., 234, *399
Chubbuck, H. E., 1126
Clark, Edgar E., 443
Clark, E. H., 912
Clark, Edward L., 349
Clark, Harlow C., 742
Clark, J. P. E., 174, 872
Clifford, George H., *1042
Coffin, C. A., 1110
Colby, Safford K., *349
Collins, J. C., *659
Conn, Charles F., 173
Connette, E. G., 90
Coolidge, C. A., 781
Coons, C. A., 1126
Cooper, George, 347
Cournyer, A. W., 312
Courtenay, James W., 1127
Coykendall, S. D., 134
Crafts, P. P., 312
Crocker, George Glover, 988
Crosby, Oscar T., 134, 174
Crozier, R. H., 741, 1092
Culberson, Alexander Craig, 872
Cummins, R. F., 234

Daly, David, 699, *742
Davis, A. J., 659
Davis, E. C., 234
Davis, Joseph, 566
Deal, E. C., 741
Deming, Clarence, 872
Denman, B. J., 949
Dewberry, J. M., 134
Disney, F. X., 912
Domby, H. R., 89
Donahue, Timothy J., 987
Donecker, H. C., *700
Draper, Walter A., 347
Duffy, C. N., 781
Dunbar, James W., 89
Dunlap, George W., 347
Durand, E. Dana, 1092
Dutton, Arthur N., 912
Dyer, D. B., 50

Earle, Warren C., 987
Eddy, H. C., 566, 659
Edmunds, V. L., 608
Ely, Van Horn, 134
Erdeman, George B., 607
Esslinger, George W., 699, 781
Evans, John, 173
Evans, Joseph D., 50, 90
Eversman, John C., 1041

Faber, George F., 741
Faut, H. P., 347
Fender, Leon, 1183
Field, Stephen D., 949
Fife, Charles E., 89
Finigan, Thomas, *1093
Fisher, Dan G., 348
Fisk, Wilbur C., 443, *566
Flahive, F. B., 1092
Fledderjohann, Edwin, 832
Ford, Whitfield, 399
Foster, Horatio A., 832
Fowle, Frank F., 234
Fowler, E. W., 1041
Francis, George B., 1183
Fraser, James D., 443, 607
Fraser, W. H., 912
Frazier, Rex, Dunbar, 741
Franch, Mansfield J., 741
Fravel, Howard, 50
Furlong, A. D., 89, 234

Gallaher, S. Miller, 872
Gardner, J. E., 443
Garrison, N. I., 173
Geiger, H. H., 234
Gerald, Amos F., 1127
Gillette, James Walter, *913
Glavin, Edward, 988
Glenn, Thomas K., 274
Gorenflo, W. N., 1092
Gothlin, O. P., 832
Graham, E. A., 872
Graham, James, 173
Grant, Hugh, 50
Graves, C. B., 1092
Graves, W. F., 949
Green, George H., 987
Greenland, S. W., 741, *781
Griffith, Franklin T., 699, *782
Griscom, Rodman, 89
Guyon, Alfred J., 949
Gwinn, G. W., 1041

Hamlin, R. N., 443
Hamprecht, Edward, 443
Handshy, C. F., 1126, 1183
Hannaford, R. M., 347
Haren, D. J., 1092
Harmon, James, 312
Harrsen, Harro, 1092
Harrington, A. C., 566
Harrington, Russell, 872
Harvie, W. J., 1042
Hatch, Charles M., 399
Healy, F. A., 173
Hearn, George A., 173
Hedley, Frank, 1183
Hengst, E., 832
Henry, David W., 1182
Heron, E. A., 1041
Higgins, W. E., 274
Hild, Frederic, *742
Hill, Charles H., 50
Hinman, F. L., *348
Hodson, Devoe P., 274
Hoeger, George, 1093
Holding, George G., 399
Holman, J. F., 1041
Holmes, Albert E., 742
Holstock, William E., 1093
Howley, John W., 987
Hubbard, Frederick L., 526
Hubbard, Henry de Forest, 134
Hubbell, Charles H., 781
Hueme, J. W., 399

Ingle, W. O., 659
Insull, F. W., 134
Irwin, Howard W., *274
Iwai, Kinichi, 832

Jackson, H. E., 234
James, C. H., 781
Joel, J. M., *741
Johnson, F. W., 781
Johnson, H. F., 741
Johnson, James W., 174
Jones, B. J., 1126
Josselyn, B. S., 659, 699

Kaercher, P. C., 347
Kavanaugh, W. M., 274
Keeney, Seth L., 566
Kehoe, M. J., 1182
Kehoe, S. J., 987
Kelker, R. F., Jr., 312
Kelley, William B., 781
Kellogg, C. W., 987
Kennedy, D. R., 912
Kennedy, John S., 234, 912
Kennedy, Roy, 912
Kerper, George B., 660
King, Clarence P., 444
King, G. A., 1092
Kline, P. D., 174, 912
Kuhn, William S., 607

Lake, Edward N., 912
Lane, Franklin K., 89, 444
Laney, Charles J., 312
Lamus, W. H., 174
Lasher, Frank B., *659, 781, 872, 1182
Launey, R. O., 89
Lawrence, George P., 1182
Lawton, I. Parker, 742
Lebkuecher, Julius A., 913
Lee, Ivy L., 89
Letens, Thies Jacob, 782
Lewis, E. L., 174
Linn, Arthur L., Jr., 608, 1182
Lott, A. L., 174
Lovett, Alfred H., 988
Lowry, Horace, 234
Lupfer, A. M., 134, 741
Lynch, Daniel F., 312
Lyne, George H., 173

McAdoo, William G., 444
MacAllister, W. H., 173
McCall, Edward E., 275
McCarter, Thomas N., 1093
McClellan, William, 347
McCorkindale, W. J., 400
McCoy, Frank, 89
McCrea, James, 660
McCulloch, Richard, 526
McDonald, Duncan, 949
McDonald, W. L., 347
McElroy, J. M., 399, 987
McGinty, George B., 608
McIlenry, E. H., 699
MacKenzie, D. C., 1182
McKinley, W. B., 912, 1182
McNamara, J. T., Jr., 89
McNamee, G. A., 89
McReynolds, T. C., 781
McVeigh, Lawrence A., 312
Mahaney, J. E., 134
Mann, A. H., 1041
Mann, Olaf A., 274
Marble, John H., 443
Masuda, Motosuke, 566
Maxwell, Fred J., 1041
Maxwell, J. D., 89
Maxwell, M. J., 949
Michaels, Chester, 1092
Miller, F. A., 234
Miller, Frank H., 234
Miller, J. H., 1041, 1093
Millson, F. M., 832, 949
Miser, W. B., 1041
Mitten, P. J., 347
Mock, Howard A., 1127
Moffitt, J. K., 1041
Moore, Anderson G., 1092
Moore, John P., 949
Morrison, R., Jr., 443
Munger, E. T., *275
Murray, C. L., 50
Murrin, W. G., 912
Myers, A. R., 1126

Nagle, George O., 274
Neal, W. V., 659, 912
Nettleton, Henry A., 89
Northcott, George A., 234

Ord, Joseph P., 134
Orme, Joseph T., 742
Ossoski, Sidney, 174

Palmer, E. A., 1092
Palmer, Russell, 50, 1041
Pardee, J. H., 134
Parker, James F., 349
Patten, A. W., 1041
Patterson, John, 312
Pearce, Henry G., 987
Peck, Edward F., 1041
Penney, Thomas, 90
Perkins, Robert W., 832, 988
Pevear, J. S., 1126
Pierce, J. Jackson, 912
Pinkerton, Clarence S., 274
Pitcher, T. A., 134
Plunkett, M., 1041
Pratt, Mason D., 699
Purvis, Allen, 607

Quain, Redmond, 912

Rabe, Theodore H., 89
Randall, G. L., 347
Raver, Edward M., 1093
Ravert, George W., 1182
Ray, Frederick L., 832
Read, J. M., 912, 987
Read, Norman, 173
Reed, Albert S., 987
Reed, John, 1126
Reed, William Belden, Jr., 700
Reichart, Howard L., *659
Reidel, Daniel, Jr., 89
Reinking, P. C., 781, 832
Rhett, E. Lowndes, 89
Rice, E. W., Jr., *1110
Rice, R. H., 312
Rickert, Van Dusen, 607
Riddle, Daniel, 443
Riddle, Samuel, 1092
Riggs, Edward G., 347
Robert, Edmund Arthur, 347
Robertson, A. M., 234
Robertson, C. H., 173
Rodenbaugh, L. H., 566
Roeber, Eugene F., 699
Rose, Harvey B., 134
Rose, W. E., 234
Rosenthal, George D., 949
Ross, J. P., 89
Ross, W. G., 173
Rugg, Julius E., 872

Sampsell, Marshall E., *526
Sampson, A. J., 566
Sawyer, H. B., 443
Schenck, D. D., 1182
Scheumann, Albert, 781
Schley, Julian L., 566
Schneider, Frank B., 699
Schoepf, W. Kesler, 174
Schuck, John Henry, 566
Schultz, O. G., 399
Scott, Charles B., 312
Sexton, P. D., 1127
Shankland, Edward C., 1126
Shane, Alexander, 234
Shaughnessy, T. H., 1041
Shaw, Alexander, 607
Silvus, Walter, 1041
Skinner, W. D., 134
Smith, E., 526
Smith, Frank P., 912
Smith, R. J., 659
Smith, R. R., 1092
Smith, W. N., 173
Somers, W. H., 566
Soules, E. E., 1041
Spragle, C. J., 949
Stephens, B. R., 1041
Stevens, Frank W., 912
Stoddard, George W., 90
Strong, Elmer E., 1092, 1182
Swain, George F., 1041
Sweeney, F. W., 699

Tabler, B. E., 1041
Taylor, A. Merritt, 987
Thompson, Gaylord, 659, 1041
Thompson, John C., 274
Thompson, Samuel B., 607
Throop, H. G., *348
Titzel, C. Edgar, 660
Toll, Roger W., 173
Treat, Dean, 50
Troxell, Charles Edward, 174
Tucker, Thomas J., 566
Tulley, H. G., 781
Turner, D. L., 742
Tuttle, W. B., 347

Valentine, George A., 1092
Vickery, W. O., 832
Vordermark, Harry E., 987
Vreeland, E. E., 89

Wakeman, J. M., 134
Walbridge, H. D., 235
Ward, Ralph, 1126
Warren, J. W., 134
Weidman, Claude O., 50, 399
Wendt, Edwin F., 608
Werth, M. F., 872
Westinghouse, George, 1182
Whaley, A. R., 235, 872
Wharff, E. M., 872
Wheeler, F. F., 347
Whitehouse, H. B., 699
Wickersham, L. B., 741, 832
Wilcox, Delos F., 1127
Wilde, Elton S., *608
Wilke, John E., 949, 1041
Willcox, W. R., 348, 781
Williams, J. G., 912
Williams, Timothy S., 699
Wilson, Chester P., 235
Wilson, T. W., 134
Winslow, Williams H., *174
Winter, Edwin W., 987
Wise, John S., 913
Wishart, W. C., 949
Wood, P. J., 741
Wood, W. J., 832
Woulfe, T. R., 1041

Yeatman, George F., 987
Yockey, F. C., 347
Young, Marcellus H., 349

Zimmerman, H. B., 872

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JANUARY 4, 1913 No. 1

PUBLISHED WEEKLY BY
McGraw Publishing Company, Inc.
James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.
Chicago Office.............................1570 Old Colony Building
Philadelphia Office.......................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

Notice to Advertisers

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

Copyright, 1913, by McGraw Publishing Company, Inc.
Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8500 *copies are printed.*

ELECTRIC RAILWAY JOURNAL IN 1913

With this number the Electric Railway Journal begins its forty-first volume as well as the thirtieth year of its existence, the first number having been published in 1884. The coming year promises to be as important in the development of the industry as any during the past three decades. Precedents will undoubtedly be set in a great many places and in various directions and will have an important bearing on the general economic condition of the industry. These changes will be in part political, in part financial and in part of an engineering character, modifying as they will the ideas current as to the best type of equipment to be used. A review of these several phases of the industry appears in the series of editorials and contributed articles which compose the major part of this issue. They show that the industry is face to face with many serious problems and that every endeavor must be made to solve them. This can be done only if each worker in the field knows what the others engaged in similar work are doing. It is in this weekly exchange of ideas that the Electric Railway Journal is able to serve the field, and it hopes and expects with its present facilities and long experience to be of even greater value to its readers than in the past.

THE TABLE OF CONTENTS

Beginning with this issue the Electric Railway Journal recommences the plan of publishing the table of contents of each issue on the front cover. Announcement that this would be done was made last November, and we believe that the change will be generally welcomed by our readers. Two advantages appear prominently as a result of this practice. One is that the reader can quickly obtain, after removing the wrapper from the paper, a summary of the principal articles contained in each issue. We do not expect that every article will prove of interest to every subscriber, but we do try to compile each issue so that every subscriber will find at least some articles in it of use to him, and we believe that most of the subscribers will find most of the articles of use and that a great many will read all of the contents of each issue. Another advantage to the reader from the publication of the table of contents on the front cover is that it renders much more easy the search for a desired article in a previous number before the numbers are permanently bound. It is no longer necessary to open each copy and turn to the table of contents which formerly was published on the first editorial page. A glance at the cover suffices. Finally, the greater space on the front cover allows us to print some explanatory text under the titles of the longer articles, a plan which could not be followed in the restricted space of the table of contents when it was published on the editorial page. As explained last month, the plan involves the financial sacrifice to the publishers of the most valuable space for advertising purposes in the paper, but we believe that the advantages to our readers, already cited, more than outweigh our loss.

OUR STATISTICAL ISSUE

The electric railway industry is growing so rapidly in the design and application of equipment that one actively engaged in the business does not often take time to realize the improvements and changes which are effected in the industry during the short space of one year. The laborers in the field are many, and as the result of their labor, operating conditions and construction conditions change, and we change with them, almost without thought. A breathing space is helpful in progress of this kind if it is utilized for a survey of work recently done, because thereby it is often possible to determine better than in any other way the direction in which improvements are tending. If one does this, he can set himself in the march of progress rather than work counter to it. The first of the year seems to be a particularly proper time for a survey of this kind. This has been the main reason for the publication by this paper of a Statistical Number during the first week of January. As the plan and purpose of our Statistical Number have become better understood it has been possible for us each year to compile more accurately the statistical portion of this number. When we first attempted, a number of years ago, to obtain records of the miles of track built and the number of cars ordered by the electric railways in the country, many companies did not realize the importance of supplying this information. But this year the returns have been from a very large percentage of all of the operating companies in the country, and we believe that the tables this year form the most nearly complete compilation of electric railway statistics ever made under private auspices. For their courteous and prompt attention to our inquiries we wish to thank the operating electric railway companies, for without their co-operation no such record of cars and track as that which we publish in this issue would have been possible.

ELECTRIFICATION ON MOUNTAIN-GRADE DIVISIONS

Following the statistical portion of this number is a series of four signed articles by well-known authorities in the field discussing various phases of electric railway engineering. Among these, Mr. Armstrong considers at length a phase of steam road electrification which is now attracting the serious attention which its importance deserves. We refer to the electrification of mountain-grade divisions of steam roads. This branch of the work, so far as actual installations are concerned, has lagged behind other applications of electric power to heavy traction work, but now it promises to be one of the most important, certainly within the near future. During the past year there has been little change in this country in the matter of steam railway electrification for purely passenger service, except so far as the extensions of existing lines are concerned, and most of these were originally installed because of peremptory factors, such as tunnel service. But in the field especially studied by Mr. Armstrong in this issue the advantages afforded by electrification are entirely different from those in suburban and tunnel service, and if electric power is to win it will do so purely on the merit of economy.

It is a familiar principle of railroading that the capacity of a line is limited by its severest grades. There has been for years a steady tendency to reduce these even at very large expense, yet on many mountain divisions any considerable reduction in grade is almost a physical impossibility. Now, as Mr. Armstrong points out, in many such cases the region traversed is already supplied with electric power from ample stations over a reliable distribution service. Even where such service is not now available, conditions generally permit its establishment in response to demand for electric traction. Second, the experience gained in tunnel and terminal work has actually put in our possession locomotives fully capable of doing mountain work efficiently and well. And, finally, it seems to be perfectly well demonstrated that the electric locomotive is considerably better adapted to meet the requirements of a mountain road than the steam locomotive.

The steam locomotive is undeniably a very remarkable machine, yet it always has to carry its power station upon its back, so to speak, and its capacity is limited by this fact, as well as its inability to produce an even torque at the rims of the driving wheels, so that it affords an opportunity for slipping to begin at certain points in each revolution. Its effective adhesion is therefore disproportionately small compared with the terrific strains due to its weight, and its power of climbing heavy grades with a long train behind it at fair speed is correspondingly diminished. The electric locomotive, with all or nearly all its weight on the drivers, can produce a considerably higher tractive effort with a greatly diminished weight on the track. For instance, Mr. Armstrong's table shows that for equal tractive effort the electric locomotive is likely to weigh something like 40 per cent less than the steam locomotive and is able to haul efficiently its loads at better speed. The capacity of the steam locomotive is, moreover, seriously limited in practice by the difficulty of firing, which, unless high-grade fuel is used, becomes a very serious matter when the output has to be forced. Of course, in mountain service two or even three steam locomotives are frequently used, at a considerably increased cost of operation. But, if convenience dictates, the electric locomotives can also be coupled on considerably easier terms inasmuch as they can divide the load more steadily and are troubled with no difficulties of firing. Further, the electric locomotive is sufficiently efficient to leave comparatively small margin for improvement, so that railroads need not hesitate in the hope that a delay will result in large increase of efficiency.

To offset this it is undeniably true that the steam locomotive is susceptible of considerable improvement. Very little has been done in this country with the use of high super-heat and the efficient application of compounding. The steam consumption of even the best locomotives in regular use is materially greater than one would reasonably expect in a stationary engine of even considerably smaller capacity. This failure in efficiency is due to a complicated set of causes, some of them perhaps unavoidable. The mere fact that, after many years of constant facing of these familiar difficulties and constant effort at improvement, nothing better has been evolved bears witness to the difficulty of the task. The waste of coal in the locomotive owing to its discontinuous use, and with consumption going on all the time, is also a formidable matter.

There seems to be no doubt that the electric locomotive in the mere task of hauling heavy trains over steep grades can beat out the steam locomotive in efficiency, steadiness of service and speed. These considerations ought to enforce its use as a mere matter of operative economy. Probably we shall never get the full advantages of electrification until we can deal with the whole system as a system, because discontinuities, so to speak, in the character of the motive power lead to increased expenses; but Mr. Armstrong has certainly made out a good case for the electric locomotive in mountain service irrespective of the rest of the system.

IMPROVEMENTS OF MOTOR DESIGN

Mr. Storer's account of the changes in motor design that have characterized the growth of electrical railroading is a very timely summary of improvements in practice, Such improvements have been spread over a period of a quarter of a century and have taken place in so irregular a manner that it requires just such a close knowledge of the art as Mr. Storer possesses to group the changes in any systematic manner. Those who remember the original Sprague motors and their immediate successors, to say nothing of the still earlier types, cannot help looking with something of wonderment at the changes which have taken place. Part of these have been due to the great increase in our knowledge of motor design, part of them to the concurrent growth of tramway practice involving great modifications in the rolling stock. The earlier Sprague motors, for example, with their double commutators, flat form and high-speed armatures, did not express the ultimate then existing knowledge so much as they indicated the current necessity for cutting one's coat according to one's cloth. It seemed to be necessary in that early period of exploitation, and doubtless was necessary, to adapt the motor drive to existing rolling stock construction, and many of the early roads were equipped with converted cars. In the attempt to force the motor into use on its merits the handicap of at once requiring radical changes in rolling stock design seemed too great.

One was, too, in the period of many inventions in the hands of many companies, so that good things could not be readily utilized, and important improvements in design were temporarily bottled up. For example, in the very early period of electric railway construction, when armatures hand-wound like a ball of twine with overlapping layers were the order of the day, the admirable Eichemeyer formed coil, designed so that each coil could be wound and inserted independently of any other, began a movement which led to modern electric railway motor design. Another most important improvement, made some twenty years ago, was the adaptation of multi-polar construction to railway practice, leading to types of single-reduction motors, different only in detail from those still commonly used. Many of the details, however, providing for ready access to the parts, suitable insulation and greater mechanical security were necessary before the electric road could settle down to safe and regular practice. The coming of the carbon brush at the beginning of this period was perhaps the most important single detail which made for the improvement of motor practice.

For nearly a decade these improvements went on working steadily toward modern conditions, although it must not be forgotten that sporadic efforts were very early made in the direction of single-reduction gear and even gearless motors. Meanwhile the unquestioned success of the electric railway had created a demand for and forced the manufacture of rolling stock more suitable for the powerful driving mechanism and with more room to accommodate the necessary motors. This of itself produced a steadily increasing improvement in motor design, at first so hampered for lack of space.

During the last decade the path of change has been mostly in the direction of still further refinement of electrical and mechanical design, particularly the latter. From the electrical standpoint motors did not change rapidly, but their reliability was enormously increased by judicious changes in details. The most important change in motor design in recent times has undoubtedly been the adoption of the interpole construction, the inception of which goes back considerably beyond the modern period. With this has come practical immunity from many of the commutator difficulties once most formidable, and, what is of vastly greater importance, it has made comparatively easy the production of motors for higher voltages than those which have heretofore been common.

This is not perhaps an important matter in general tramway progress, but it is of vital significance with respect to the development of heavy electric traction. Just why it should have taken so long to bring to fruition the commutating-pole idea it is very difficult to say, but its time has now come, bringing a new power of usefulness to the electric motor in large work. Incidentally the commutating pole has made easy a return to field commutation as an important auxiliary in variations of speed. Tried at the very beginning of electric traction, it passed completely out of use, to return again now, with added possibilities. What the future of traction motor design is to be now depends very largely on the general trend of electric railway practice. For existing circumstances it has settled down into somewhere nearly standard form, yet demands for greater power, or higher speed, or increased voltage, will inevitably result in still further changes, the data for which are fortunately already at hand.

PROGRESS IN POWER TRANSMISSION

Another review in the series of articles on technical developments during 1912 appearing in this issue is contributed by Dr. Louis Bell and relates to the progress in electric power transmission during the year. This is a subject of growing importance because of the increasing interest apparent in the distribution of electric power for all purposes in a district from one or a chain of central power stations. Another fact which imparts special interest to the subject is the close relation which has always existed between the kind of electrical energy employed for transmission, especially the frequency used, and the type of motor which could best utilize that energy when obtained from the trolley wire. But this correlation, according to Dr. Bell, is not so imperative as was formerly the case. The development of the interpole rotary converter, by which it is possible to produce direct current from a fifty-cycle and sixty-cycle transmission system without the use of motor generators, now permits a wider choice of systems of motive power, and Dr. Bell intimates that further improvements are probable by which the mercury converter will make conversion of alternating current to direct current for railway purposes still more easy and greatly extend the possibilities of direct-current railways.

In the problems directly concerned with long-distance power transmission there has been notable advance during the past year. The suspension type of insulator established a new era in this field of electrical endeavor, and transmission voltages are increasing as a direct consequence. The maximum so far reached in this country for commercial purposes is 140,000 volts, the potential employed on the lines of the Au Sable Electric Company in Michigan, but this year 150,000 volts will probably be used on the lines of the Pacific Light & Power Corporation now under construction. These figures represent double the voltage employed in commercial service less than five years ago, and with the improvements to be expected in insulators as regards their ability to withstand puncture, the limit may be still further increased.

Dr. Bell sounds a note of warning in regard to the character of pole transmission lines often erected and suggests that a modified form of "A" steel structure for intermediate supports, with anchor towers at intervals, would be more durable and in many cases no more expensive than many existing structures. Interruptions to the service of electric transmission lines are exasperating under all conditions, but are particularly so when the power is used for railway purposes, and they should be guarded against at all hazards. A few more dollars spent on insuring the continuity of supply by increasing the stability of the transmission line might often eliminate the necessity for reserve steam stations with their expensive charges for maintenance and upkeep.

THE DEVELOPMENT OF POWER PLANTS

Prof. Norris' discussion of recent movements in power plant design furnishes striking evidence of refinements of engineering design. Speaking broadly, recent changes have not been radical, but they betoken a steady movement forward, particularly in the direction of larger units and their more efficient utilization in following the load curve of the plant. Among the conspicuous recent tendencies may be found that toward the use of horizontal turbo-generators, a tendency largely due to the increasing difficulty of carrying the necessary weights for big units on a step-bearing. A considerable proportion of the recent large plants are utilizing the horizontal turbine, despite the loss in floor space. However, since it is commonly true that the theoretical gain in floor space by the use of vertical machines is seldom or never utilized to anything like its full extent, this loss is far from striking. Greater than this in importance, and marking perhaps the most notable line of improvement in power station practice, is the tendency toward using bigger boiler units under more efficient conditions of combustion.

In locations where good feed water is available, making the use of large units desirable, boilers of relatively trivial capacity have been obstinately continued in use long after the prime movers have been brought to suitable output. The ordinary big turbo-generator with its attendant army of boilers reminds one of nothing so much as of Gulliver being fed by the Liliputians. Not only is the plant of small boilers expensive to house and install, but it leads to needless complication in the piping and auxiliaries, and also to decreased economy in operation from almost every standpoint. The tests of the huge Detroit boilers last year showed the gain to be made in using large steam-producing units.

Just how far actual increase in dimensions may be advisable is a subject upon which engineers differ, but the advantage of units of greatly enlarged output admits of no dispute. All the arguments of the ultra-conservative in favor of small boiler units apply with equal force and very little change of wording to small engines and small dynamos. The main question just now is how far the demand for great evaporative power in a single unit should be met by increased ratings for the present units rather than by increased dimensions. The use of forced draft, as exemplified by some recent plants noted by Professor Norris, is one way out of the difficulty, and this line of advance will doubtless be pushed to its economical limit along with increase of size. Ultimately we shall certainly have very large boilers worked intensively during the period of heavy load, but the improvement will be one of gradual and tentative growth.

As regards the dynamo room the movement toward bigger units goes steadily on. With it has come the need for increased protective measures to gain greater security. Perhaps the most important of these is the use of reactance coils, exterior to the machines, to avert the danger of heavy short circuits. Such devices are in themselves undesirable and interfere with regulation, yet they serve a useful purpose in time of need. The thing most effective would be a coil of which the reactance would increase very rapidly as the current neared the danger point, and such a coil may perhaps be worked out in due season. The increase in underground distribution at high tension has brought added responsibilities, and Professor Norris has considered several interesting details of recent practice in the care of cables. With respect to the electrical generators for large stations, the effects of increased output on design are being keenly felt, and in particular the problem of disposing of the heat has been growing steadily more serious. When with high rotative speeds the output per unit of bulk increased, the limit of capacity came to be the heating, and the old battle of the squares and cubes was on again. Today the struggle is on the field of forced ventilation, and the designer may even be driven to refrigeration as the combat deepens.

PROGRESS IN CAR DESIGN DURING 1912

The development of car design during the past year has been marked by extreme radicalism on the part of designers of cars for city service. In fact, no period in the history of street railways has seen so many startling innovations. The modern stimulus in car design for city service may be said to have begun with the successful demonstration of the pay-as-you-enter car which was originated in Montreal and was shown first in the United States at the Columbus convention in 1906. The prepayment plan may now be considered as a permanent feature of city car design. The developments in 1912 have been in the extension of this principle to center entrances, with an increase in accessibility of the car, greater attention to safety features and renewed interest in one-man cars.

Early in the past year came first the New York "stepless" car with a body hanging near the ground between the trucks, and then in rapid succession the low center-entrance cars of Brooklyn and Washington and the center-entrance, end-exit car of San Diego. These were accompanied by the "low-floor" car of Pittsburgh, in which 24-in. wheels and small motors eliminated one step and reduced the weight to an unprecedented figure. As soon as the success of the low-level cars of New York and Pittsburgh was assured, the trial of double-deck cars based on these designs became almost obvious, and during August cars of this type were placed upon the street almost simultaneously in the two cities. In the meantime also the near-side principle, developed during 1911, had been applied to one-man cars, thus supplying a need for light traffic service which had existed since the bobtail horse car disappeared from our city streets with the dawn of the electrical era.

During 1912 also there has been under construction and trial the most extraordinary development of all, the "articulated" car of Boston, consisting of two old single-truck cars set end to end and flexibly connected by a low-hanging vestibule with center side doors giving access to the car from the street. Last among the radical designs of the year came the storage battery "stepless" type, a four-wheeled car without a truck frame and of extremely light weight.

With one exception, all of the center-entrance cars were developed primarily to provide easier access for passengers by a reduction in step heights, with the exceedingly important indirect benefit of decreasing the time of passenger interchange, thus permitting faster schedule lines. Most of the cars mentioned have received the practical indorsement of repeat orders, thus demonstrating the practicability of their obvious advantages—namely, increased seating capacity, greater accessibility of all seats and increased safety of operation.

The articulated car, of which there is yet but one in use, is primarily adapted to the rebuilding of old equipment. This, in fact, makes it of especial interest, as it provides an answer to the question arising many times during the year as to what disposition could be made of old rolling stock rendered obsolete by the introduction of the new types. For this reason it is to be hoped that the designers will make every effort to develop the idea thoroughly, as its practical success would be a boon to the industry. The double-deck designs of New York and Pittsburgh also have not apparently arrived at the stage where their designers are sufficiently certain of their future to duplicate them in considerable numbers. The Pittsburgh car, however, has been reported from that city to be a thorough success for handling crowds going to parks or games and caring for rush-hour traffic from factories, and a duplicate of the New York car has been ordered for trial in Columbus, Ohio. Both double-deck cars are, of course, of very recent construction, and the opportunity for trial has been limited. This, together with the revolutionary character of the designs, has undoubtedly influenced the designers of both cars in adopting an ultra-conservative policy. During the coming year, however, there is no doubt that the question of the practicability of the double-deck principle in this country will be finally settled.

After the wealth of new designs for city cars, the developments in the field of cars for interurban service and for heavy electric traction seem to be minor in character. The steel cars of the Cambridge Subway probably show a greater divergence from generally accepted standards than any of the other large cars of the year. They are equipped with three side doors, and the usual platforms, bulkheads and platform doors have been eliminated. One of the doors is located at the center of the car, and the other two are approximately over the trucks. This arrangement divides the car into four sections and gives, in the longer car, the same effect as that produced by the center entrance so prominent in the new designs for city service.

In general, the use of steel for car bodies has shown a marked increase. All except two of the new types of city cars have depended upon the girder effect of the side sheathing between belt rail and sills to support the load, the strains being carried around the doorway by heavy reinforcement, and it is manifest that this construction is to be perpetuated. In fact, with the existing demand for light-weight cars, such a form of steel construction seems to be obligatory, as the low records for weight established during the year were obtained through its use. For the same reason it would seem that the adoption of wheels of small diameter should soon become general in slow-speed service, as their practicability has been very thoroughly demonstrated.

Progress in the design of equipment has been signalized by the introduction on a large scale of multiple-unit control on the Public Service Railway, where for some months past train operation has been carried on during rush hours. The use of this means for reducing traffic congestion has resulted in the development of several new designs for trail cars with center entrances and small wheels, along the lines of the successful Pittsburgh trailers of 1910. In two cases the opportunity for single-end operation has permitted the trailer to be made with the novel arrangement of a door on one side only, the other side of the car containing an unbroken line of seats.

Summed up, the developments of the past year in city car design have been along the lines of improving the entrance and exit facilities and increasing the safety of operation, and in construction toward the greater use of steel. With the exception of the one-man prepayment car, the improvements have been largely for the benefit of the larger city systems, and in the smaller communities, especially where lack of street paving necessitates the stopping of cars with the entrance opposite the cross walk, it is not likely that the center-entrance types will find favor for their loading facilities alone, although they may be adopted in some such localities on account of other advantages such as light weight and freedom from accidents.

WAY AND BUILDINGS

A review of the progress made by departments of way and structures on electric railways during the past year shows that although improvements in the methods employed and the materials used have not been as marked as in the other departments of the industry, much has been done along the line of refining methods, testing materials and improving the design of different roadway appliances. The few extensions made to existing lines, as compared with former years, have permitted more exhaustive study of the characteristics of old track and roadway under operating conditions. The net result of this has been extensive rehabilitation along more scientific lines.

Various types of track construction in paved streets have been employed, but as a general rule permanency has been the ruling factor in the selection of materials used. In almost all new track work great care has been exercised to produce a permanent track surface. Some roads have employed a solid mass of concrete to do this, while others have used crushed stone ballast, either rolled in place with a road roller or else repeatedly tamped until a true, permanent surface is obtained, the track being left open while traffic passes over it. In one instance the usual practice did not obtain, but a combination of crushed stone and concrete was employed. This consisted of a concrete slab laid on the subgrade, a layer of crushed stone directly under the ties and a second layer of concrete over these two. In all cases the best results have been secured where drainage has received careful consideration.

In selecting ties similar precautions have been observed to obtain permanency. Steel and treated ties have been employed almost universally for both city and interurban railway track. Examination of track built in recent years in Chicago, where various kinds of treated ties were employed, developed the new and interesting fact from the electric railway standpoint that ties treated with zinc chloride would practically destroy a screw spike after three years' service. This destruction was attributed to a galvanic action taking place in the presence of moisture and the zinc chloride.

Rail and joint composition is receiving more and more attention. The specifications for recommended practice, as presented by the committee on way matters to the American Electric Railway Engineering Association, have been followed by engineers giving special attention to this subject. High-carbon rail with the addition of a small percentage of titanium to its composition appears to be most favored. Both girder-grooved and T-rail are being used with considerably more of the latter for track in paved streets than heretofore. The satisfactory results obtained by several large companies experimenting with T-rail have been largely responsible for its general adoption. In this connection the decision rendered during the year by the Connecticut Public Utility Commission is interesting. It was to the effect that T-rail is less objectionable in paved streets than formerly because automobiles, which constitute an increasingly larger proportion of the street traffic, have no difficulty in crossing the head of the T-rail. Hence the commission agreed to its continuance and the extension of its use in such a large city as New Haven.

Considerable progress has been made along the line of improved rail joints, the welded and riveted types being favored. The low percentage of failures reported by different companies demonstrates the practicability of these types. Welded joints are being installed by several processes, including the Goldschmidt thermit, the Lorain electric welds, oxy-acetylene and electric-arc welds. In several instances a combination of the riveted joint and the welded joint has given very satisfactory service.

With the more permanent types of track construction in streets, longer life is being obtained from all classes of pavement. The creosoted wood block and asphaltum are growing in favor, and a new method of combining brick and wooden keys for fillers is attracting considerable attention in the Eastern States. In some instances engineers have gone so far as to pave between the rails with asphalt or solid concrete, considering that the excellence of the present track construction warrants a pavement which requires a higher cost for renewal. The question of a proper filler for block paving has attracted considerable attention, but no definite conclusions have been reached, grout, asphaltum and sand being used largely.

Rail corrugation and the reasons for it have received much attention. Reports from abroad would indicate that this mysterious phenomenon may be solved by special rail design, such as one with a slotted web or a double web, as used in Gothenburg, Sweden. A tentative report by a British committee recommends that the composition of the rail be changed to include a relatively high percentage of manganese, carbon and silicon, which would make it hard and tough.

In this country the introduction of several types of rail grinders for removing corrugations economically has had considerable bearing on investigation of this subject. Engineers have satisfied themselves of the fact that corrugations exist and the best way to eliminate them, for the present at least, is to remove them by grinding. Recently a new method of increasing the life of rail, particularly on curves, has been considered by steam roads. This is by lubricating wheel flanges, which, while it does not reduce braking power as might be expected, increases the life of rail on curves from one to two and one-half years.

First-quality construction has not been confined wholly to the track in city streets but has governed the construction and renewals on interurban lines. Practically all roads are making tie renewals with treated timber, the creosoted oak ties being favored largely. In several instances long-leaf yellow pine has been employed with the addition of tie plates to prolong their mechanical life. Screw spikes have not been used extensively except in track in pavement, satisfactory results being obtained from ordinary spikes. We believe, however, that they will come into extensive use on interurban lines in a few years as will tie plates also, if the engineer hopes to secure a mechanical life of a tie equal to its physical life.

Drainage has received proper attention in the way of extensive ditching in preparing track for winter and the installation of farm drain tile in wet cuts. Both tend to lengthen the life of the ballast and improve track conditions generally. The narrow roadbed has been abandoned for one of sufficient width to give an ample ballast shoulder on embankments, as well as wide ditches in the cuts. Very little temporary construction has been employed in bridges and culverts on new interurban lines as its high maintenance cost on existing lines has been thoroughly established. This experience also has resulted in the replacement of old temporary structures with concrete and steel, which will ultimately mean that the engineers' attention may be turned entirely to that part of a roadbed above the track subgrade.

It is with considerable pride in the industry that we point to the progress in building construction during the past year. We believe that not a single carhouse, repair shop, substation or power station of any importance has been built which did not embrace every precaution and appliance for the reduction of fire hazard. When the building conformed to the principles of fireproof construction throughout, the addition of a sprinkler system, hose outlets and other fire-protective apparatus was included to reduce the risk on the contents, which cannot be made absolutely fireproof. The general shop layout has been receiving considerable attention with a view to reducing lost motion and at the same time meeting the requirements of insurance underwriters.

The year just passed represents an era of marked progress along economical lines so far as way and buildings are concerned. Greater efficiency in service will result without doubt, but the acme of improvement has not been reached. There is room still for great advancement in the selection of the materials going to make up the track and roadway, the buildings and structures. The introduction of motor-driven tools, concrete mixers and electric shovels and other labor-saving devices is doing much toward reducing the cost of new track as well as the rehabilitation of the old. Upon the head of the way and building department of any company depends to a large extent the safety and economy of operation, as well as the maintenance of the physical excellence of the property. He must, therefore, lend an ear to the profitable experiences of his colleagues in the industry, and all must work together for the benefit of the whole.

BLOCK SIGNALING ON ELECTRIC RAILWAYS

During the past year the practicability of block signaling for electric railways has become an established fact, and the problem which the subject presents is no longer that of durability or of commercial possibility, but is instead one of standardization and selection from among the numerous types of apparatus existing to-day. Considering the fact that the whole matter of block signals on electric railways is one to which serious attention has been devoted for only two years, it is not surprising that no immediate possibility exists for standard arrangement or even for standard details of construction. On the other hand, the serious attention which is being paid to this subject by many of the electric railways through the national association is certain to exert a strong tendency at least toward the development of standard aspects.

While the standardization of apparatus will unquestionably reduce costs, the necessity for uniform signal aspects is actually of greater importance, especially as uniformity in this respect can be accomplished with vastly greater ease at the present time, when the installation of automatic signals on electric railways is only just beginning, than at some later time when large and important roads are fully equipped with widely different types. This necessity is shown even to-day in cases where, through operating agreements, several interurban roads are using the same tracks. Each road may be using a different signal aspect on its own track so that motormen are hampered by the fact that they have to think in totally different terms at different portions of the route. In consequence of this demand for standardization the upper-left-hand quadrant, three-position arrangement for semaphores has already been approved by the electric railway associations.

The year has been characterized by a remarkable growth of sentiment in favor of light signals in which the semaphore arm, practically standard upon steam railroads, is replaced by colored lenses so illuminated as to be visible even in the brightest sunlight. A number of such installations have been made during the year, and although the semaphore arm still appears to be considered as the most reliable indication from the standpoint of arrestive effect, the decreased first cost of the light signal, estimated to be in some cases as much as 30 per cent lower than the semaphore, together with the decreased maintenance due to the absence of moving parts, is a good indication that it will be subject to a still wider adoption during the next few years.

Of the different methods of control for signals, the continuous track circuit has maintained its leading position among the installations on high-speed lines. This may be partly due to conservatism in following a method so universally used by the steam railroads, although one of the advantages claimed for it, namely, that it indicates broken rails, can hardly be said to apply with much force to electric railways. It has, however, a somewhat similar advantage in this case in that it indicates defective bonding by the failure of the signals to clear. The thoroughly demonstrated reliability of the track circuit through many years of experience naturally cannot be denied, and it was undoubtedly this feature which influenced the joint committee on block signals of the Engineering and Transportation & Traffic associations at the Chicago convention in recommending for high-speed interurban service the use of continuous track circuit control. The fact that this recommendation was not accepted by the association in convention was an interesting occurrence indicative of the desire of the delegates to be left free either to accept new devices or else to await the development of systems not then sufficiently tried out.

Of the comparatively recent innovations, a great deal of attention has been paid to dispatchers' systems, although the number of such installations is hardly comparable with the older track circuit types. On the Piedmont Traction Company's lines a selector system controlling semapore blades has been installed to enable the dispatcher to stop trains for orders which are transmitted by telephone boxes attached to each signal mast. The Indianapolis & Cincinnati Traction Company has installed, as the other extreme, an exceedingly complete type in which connection between the dispatcher and the train is made at short sections of third-rail through a shoe on the car. By means of this connection the dispatcher can illuminate either a red or a green lamp in the cab of the train in accordance with his desire to stop the train or let it proceed, although an ingenious interlocking system prevents him from letting two trains proceed against each other. As it is reported that this system can be installed at a moderate cost, its action has been watched with considerable interest.

Various forms of the trolley contact system have been installed on a number of railways throughout the year, as their very greatly reduced cost offers a strong incentive to their installation. In addition, the possibility for introducing a car-counting device by giving the contactor a directional sense makes this system of unusual advantage where permissive signals, allowing cars to follow each other into the same block, are desired. Permissive blocking, however, except for very low speeds, seems to have been regarded with decreasing favor during the past year.

Little has been done with automatic stops in addition to that discussed in these columns a year ago. On the Illinois Traction System a device has been developed by which the air brakes are applied in case a car runs past a home signal set at stop. Such a device is of undoubted value as it stands. On the New York, Westchester & Boston Railway the future necessity for automatic stops was considered to be such a certainty that the signal system was laid out in a manner which would permit them to be installed at any time, the overlaps to be effected by additional signals being interpolated where necessary along the line.

The important legislative action of the year in regard to block signaling developed through an enactment of the General Assembly of Indiana. This law became effective on Jan. 1, 1912, and placed with the State Railroad Commission power to compel the introduction of approved block signals on the railways of Indiana which had sufficient traffic or were surrounded by such conditions as to make block signals necessary. The results of this action seem to have been remarkably satisfactory. The Railroad Commission has been working in perfect accord with the electric railways of the State, and a very marked increase in mileage of interurban lines protected by signals has resulted during the year. It is estimated that 18 per cent of the total electric railway mileage is now being equipped, and it is expected that all lines coming within the scope of the enactment will be equipped within three years.

Of the large single-track installations made during the year, that of the Washington, Baltimore & Annapolis is probably the most interesting. On this road the customary preliminary sections are omitted and each block is made self-contained, extending the full distance between sidings. Light signals set about 1000 ft. inside of the home semaphores take the place of the preliminaries, and all home signals are approached under control. The home signals at each end of the block are controlled by the whole block, but the light signals are controlled only by two-thirds of the block length at the opposite end of the block. As each block is a unit, the movements of a car in one block do not affect those in the next one, and cars need be spaced no more than one block apart. In case two opposing trains pass home semaphore signals at the same time, they will be stopped by the light signals, which will not clear until one train has backed out of the block. As this installation is the first of its kind, the results of its operation should be watched with interest.

Judging from the interest displayed in the matter during the past year, there is no doubt that the subject of signals will remain a leading one during 1913. In fact, it is likely that wherever funds are available for signals some one of the many forms now available will be installed, not only for the additional safety which they afford, but also to accelerate operation on lines of dense traffic.

THE ELECTRIC RAILWAY SITUATION

So far as the gross volume of business is concerned, the electric railways of the country generally enjoyed a satisfactory year in 1912. The well-known characteristic of these properties is that, as a rule, unless extraordinary conditions interfere, they show a fair rate of increase in gross revenue from year to year. The degree in which this characteristic is manifested is affected of course by fluctuations in the population and volume of business in each locality; but the normal changes in population and business are increases, and to the street railway this means a larger total of possible riders and a larger amount of work to which employees must travel each day. The exceptions among the electric railway companies to the conditions thus set forth are found in districts which are highly sensitive to changes in the general business situation, such as mining localities and some of the iron and steel districts, and also in those occasional instances where strikes among the employees of the railway itself or catastrophes disarrange the expected order of affairs. The spurt in general manufacturing and commercial lines in 1912, which occurred in spite of the impending presidential campaign, was an advantage to the electric railway companies.

The factor of gross business, however, is not the solitary index of electric railway fortune. Increased volume of business has been handled by many companies at a greater expense for operation. Higher costs of labor and materials affect the companies in two ways. They increase the cost of investment and hence the fixed charge for additions to the property, and they increase the daily outlay which has to be made and charged to operating expenses in order to keep the cars in operation. There are only two ways in which this rising tide of expenses can be met. One is by increase in the rate of fare. That is not open now to most of the companies, because they operate under fixed franchise terms. The other way is by increase in the density of traffic, and it is through this means that each company tries to improve its position.

There is one more respect in which the relations of all the companies and the communities they serve are very similar now or are rapidly becoming so. Regulative policies of the advanced types found in the New York and Wisconsin laws, with some modifications influenced by local conditions, are succeeding the old relations between the companies and the states and are still raising new problems or old problems in new clothing for the industry to solve. These problems are vital in character and strike at the foundations on which the industry rests. They concern the capitalizable values of the properties, the rates of fare on which the revenues are based and the inviolability of the franchise contracts on which the companies have relied in their sales of securities to bankers and on which the bankers have relied in their purchases and their re-sales to the general public. The new policy of regulation usually regards it as its duty to concern itself with one or more of these serious problems. In some notable instances, however, the regulative bodies have given more attention to questions of service than to those affecting values or rates. That is to say, these bodies in some cases have not considered that they were required, either as a matter of public policy or as a matter of obedience to the law, to analyze existing capitalization in its relation to the property represented or to disturb existing rates, but have exerted a powerful influence toward the improvement of service. Where this course has been followed conspicuously by one conscientious commission, although there has been a manifest effort not to disturb existing securities at the price of sacrifice to individual holders, the terms of issue of additional securities have been safeguarded carefully.

The interests of all of the companies are bound together closely so far as the broad questions of regulation, valuation and rate of fare are concerned, but the real settlement of the problems must be made necessarily with a single commission or a single community in the case of each company. In other words, these problems become individual and must be dealt with as such by each company acting for itself. Local conditions differentiate one case from another. During the last year the problems have been defined sharply and prominently in several cities. A statement of the conditions existing in several of these places, which have been conspicuously before the industry, illustrates what is found in other cities in smaller degree.

In New York the greatest pending development of importance to the industry is the construction of new subway and elevated rapid transit lines proposed by the Interborough and Brooklyn rapid transit companies. Negotiations between the city authorities and the companies have been very tedious, and the long delay in final settlement has been costly to the city. But actual progress in subway construction is being made now, and the last details of operating contracts will undoubtedly be settled in the course of time. The condition of financial chaos into which the principal surface properties were thrown when receivers were appointed for the Metropolitan system in 1907 has not yet been entirely cleared up, but the steps which remained to be taken during 1912, and those which had to go over unsettled until the new year, 1913, are very slight compared with those that were precipitated upon the community when the receivership was announced over five years ago. The withdrawal by the New York Public Service Commission, First District, of its order for the amortization of that part of the securities of the two principal surface companies which it claimed was in excess of the fair value of the properties has removed one cause of litigation and contention between the commission and the companies under its jurisdiction.

In Chicago the elevated and surface companies are engaged in negotiations for consolidation. Their relations toward each other, their capital values and the entire program of future transit development for the city of Chicago are bound up in the outcome of the negotiations. In spite of divided ownership of the surface properties the city has tried to secure a measure of through routing on surface lines between the three principal sections of the city. The four separately operated elevated companies use a common loop terminal in the business district but do not interchange traffic. It is now proposed to combine with one ownership for all the existing properties a definite program to meet future transit needs. At the same time that these negotiations are progressing one of the companies has been engaged in a controversy with its trainmen in regard to wages and the other companies are being confronted by similar issues.

In the State of Ohio two of the cities have problems that were not settled in 1912. Toledo has witnessed the remarkable and wholesome spectacle of a reorganization which included no arrangement for delay until a satisfactory contract for renewal of franchise could be closed with the city. In Columbus the company is going ahead to fulfil an extraordinary provision in its franchise providing for a reduction in the rate of fare as the gross earnings increase. This provision is operative without the slightest regard for the question of whether the operating expenses increase or decrease, and it is an illogical requirement. The questions arising in these two cities involve important issues for the attention of the companies during the coming year.

The companies in other cities have problems, a few of which may be mentioned. In San Francisco the city is developing a new basis for franchise contracts. The city of Cleveland is still continuing its rigid control of the street railway and restricting the service so as to keep a low rate of fare. In Buffalo a plan of financial reorganization has been completed which will be made effective. The valuation of the properties in Kansas City is part of an attempt to reach a franchise settlement. Los Angeles has an elaborate program for the regulation of its public utilities. The Detroit situation is still unsettled. In St. Louis a commission appointed by the Municipal Assembly has made an investigation of the finances and service of the local railway. The Milwaukee company has carried to the courts an order of the State commission directing reduction in the rate of fare. In Philadelphia progress has been made in the settlement of some of the difficulties with which the system has been beset for years, the city service has been vastly improved and the city of Philadelphia is conducting an exhaustive investigation into the best means for introducing rapid transit within its "metropolitan district."

On the part of the public the program for the coming year includes further extension of regulative commissions. Commission bills will be introduced in several of the states whose legislatures meet. The movement in this direction in Illinois has been met by a counter movement having for its object home rule of public service corporations in each city. The principle of this movement appears to be a popular one, and either in Illinois or elsewhere it will have some influence on the design of the public machinery for regulation. The desire for regulation on the part of the public has not diminished, but we believe there is a better understanding in at least several of the commissions of the real difficulties under which the companies labor in these times to protect the investment, to make a good return thereon and to provide adequate service.

ELECTRIFICATION PROGRESS IN EUROPE

In Europe the past year will be remembered as marking a notable advance in the attack on the steam locomotive, because the present electrification projects, either approved or practically sure of approval, have assumed vast proportions in comparison with the small experimental sections of earlier years. The experience derived from the pioneer work, in Italy and Germany particularly, has made the question of the reliability of electrical equipment a dead issue, and the progress of steam railroad electrification in Europe is now more a matter of economics than of design.

So far as systems are concerned, England appears to be the only country where high-tension direct current is being considered at present with great favor for trunk-line conditions. On the Continent the single-phase system, with a trolley potential of 10,000 volts to 15,000 volts and a frequency of fifteen to sixteen and two-thirds cycles, has been adopted by Germany (Prussia, Bavaria and Baden), Austria, Sweden and Switzerland. The French are now experimenting with single-phase equipment, and even Italy, which has expressed such satisfaction with its three-phase Valtellina and Giovi lines, appears willing to take advantage of the progress of single-phase equipment as demonstrated on the Prussian State Railroads. It is understood that, in line with this broad attitude, the 18.6-mile section of the Italian State Railways between Turin and Pinerolo is soon to be supplied with a single-phase outfit, the behavior of which may possibly decide whether single-phase or three-phase shall be the standard for future electrifications. It is significant, furthermore, that the engineers of the largest two electrical firms of Europe favor single-phase equipment for all heavy high-speed railroading. The importance of the various European electrifications is not to be gaged by the total horse-power capabilities required, which are small in comparison with American trunk line installations, like the New Haven, but rather by the fact that they are intended to form parts of great arteries of Continental traffic.

The enthusiasm which foreign engineers and railway officials are showing for electrification may be a surprise to those who are familiar with the conservatism of Europe in other matters, but this anomaly may be explained by the fact that the traffic and economic conditions which favor electrification are more numerous in Europe that they are in America. Switzerland, for instance, offers an ideal set of conditions for electrical railroading, inasmuch as electric operation of the numerous mountain tunnel railways will make tourist travel more agreeable than ever, while the large amounts of money which now leave the country to pay for high-priced fuel will be diverted to the development of home water-powers. On many Continental lines electrification offers the cheapest way of increasing the capacity of congested trunk railways and the opportunity of exploiting water-power sites or low-grade fuels which are not suitable for locomotives. One other excellent economic reason for the choice of electrical equipment on the large systems is that the steam locomotives need not be scrapped but can simply be diverted to branch lines from time to time, while the cars require but few radical changes for use with electric locomotives. For these reasons European engineers have always looked upon electrification as something much more than a terminal proposition, a fact which accounts in large measure for their choice of high-tension overhead systems from the beginning. In general, also, the electrification of European lines is not accompanied by the radical and costly right-of-way changes which have characterized American installations.

A summary of the work under way at this time shows that Germany and Switzerland are far in the lead. Following the initial installation of the Dessau-Bitterfeld section of the Magdeburg-Halle-Leipzig line, as described at length in previous issues of this journal, the Prussian State Railroads have begun the electrification of the Lauban-Königszelt trunk lines and branches to cover 253 miles of single track. Five motor cars and forty-four out of seventy-two locomotives have already been ordered, with the expectation that the first section, Königszelt-Dittersbach, will be in operation late this year and the complete installation by 1915. Energy will be purchased at the high-tension busbars of a new, privately owned power station at 0.69 cent per kw-hr. The other great project of the Prussian State Railroads —namely, the Berlin Stadtbahn and suburban connections— is being delayed by interests that assert that larger steam locomotives will meet the problem of handling the increased traffic. The Prussian Chamber of Deputies has been advised, however, that under the very best conditions steam locomotives would not permit more than thirty-two trains an hour with a maximum of 19,500 seats, compared with forty electric trains during the same period with 25,400 seats. Offers have already been received from private companies to supply energy to the Stadtbahn at 0.8 cent to 0.95 cent per kw-hr. Other German work includes the Wiesental line of the Baden State Railways, on which trial runs were commenced late in 1912, and the contract for the electrification of the Reichenhall-Freilassung division of the Bavarian State Railways.

The most interesting work now under way in Switzerland is the Loetschberg line, which forms a continuation of the famous Simplon Tunnel from Italy. This line, which will be opened in the summer of this year, will receive thirteen single-phase locomotives, each carrying two 1250-hp motors and capable of handling 300-ton trains at a constant speed of 31 m.p.h. These locomotives will be the largest in Europe. The St. Gotthard tunnel, which constitutes the other great highway between Italy and Switzerland, is next in line for an electrification which would cover the distance of 93 miles between Chiasso and Lucerne. The time for the St. Gotthard work is considered opportune as most of the present locomotives require early replacement. At any rate, the water-power concessions have already been bought by the federal authorities.

Th principal three-phase electrifications in Italy are the original Valtellina 67-mile railway and the new Giovi Pass 13-mile division. The next three-phase electrification is that of the Mont Cenis-Freyus tunnel on the Turin-Modane line. In Austria the electrifications like those of the Vienna-Pressburg and St. Pölten-Mariazell lines and the Mittenwald Railway are outside the trunk-line pale. However, the Austrian State Railways have already made study of electrifiction possibilities for 614 miles of route, and the Attnang-Puchheim-Stainach-Irdning division, comprising 66.34 miles of route, has been recommended for early equipment.

As yet no extensive trunk-line work is in operation in France, but at this time the French Southern (Midi) Railway has several single-phase locomotives on trial at Villefranche, and thirty 500-hp four-motor cars are on order for service over 175 miles of single track covering the main line between Pau and Montrejean as well as intermediate branches. The western division of the French State Railways has recently ordered 130 d.c. motor cars for use on its Paris suburban lines, while the Paris-Lyons-Mediterranean Railway is experimenting with permutator locomotives. As for Scandinavia, the 93-mile Kiruna-Riksgränsen line of Sweden has already been described in these columns, while Norway is still without high-speed a.c. railways, although the government engineers have expressed their approval of single-phase. The ample water powers in both of these countries make the outlook for extensive electrification, and even for new lines, very encouraging.

In conclusion, it is gratifying to note the activity in electrification of the steam lines in and about London. The London, Brighton & South Coast Railway will soon take in hand its important suburban lines, and estimates are also being prepared for the electrification of the main line to Brighton. The Midland Railway, which has been operating 8.5 miles of single-phase route on its Heysham-Morecambe-Lancaster line, has not announced any additions or other changes. On the other hand, the London & South Western Railway and the London & North Western Railway have decided to use 600-volt direct current on their converted suburban lines, thereby making it possible for them to operate in connection with the London underground system. The first South Western electrification will involve the conversion of 73 miles of single track with a further 173 miles of single track later on, while the London & North Western Railway is planning to electrify 79 miles. The results of the high-tension d.c. experiments of the Lancashire & Yorkshire Railway are being awaited with interest by English engineers, as it is appreciated that some form of high-tension distribution will be necessary when the d.c. electrifications mentioned are extended beyond the suburban zone of London.

Electric Railway Rolling Stock Ordered in 1912

Number, Type, Length and Builder of All Cars Ordered by Electric Railways, Compiled from Official Returns Made by Railway Companies and Car Builders

The accompanying table shows in detail the number of cars ordered by electric railways in the United States and Canada during 1912. The total number of cars of all kinds ordered was 6001, which is an increase of 1968, or 49.4 per cent, over the number ordered in 1911. As in previous years the table has been compiled from the orders for rolling stock noted from week to week during the year in the rolling stock column of the Electric Railway Journal, from returns made by the railway companies and from reports received from car builders. No claim is made that the record is complete. Every effort was made to secure returns, and those from car builders were checked up against those from railway companies, but a few companies did not reply in time so that their data could be included.

The number of cars ordered, classified according to the service in which they are used, is given below:

	1908	1909	1910	1911	1912
Passenger cars, city	2208	2537	3571	2884	4531
Passenger cars, interurban	727	1245	990	626	783
Freight and miscellaneous cars	176	1175	820	505	687
Total	3111	4957	5381	4015	6001

It will be seen from the table that a great many city cars ordered during 1912 were of the prepayment type. A special enumeration is not made of the prepayment cars because this type is almost universal now in new city cars ordered. Prepayment cars are indicated by an asterisk (*) in the table.

Interurban passenger cars showed an increase of 25.1 per cent over the totals of 1911. The figures for interurban cars include orders for subway and elevated equipment.

The number of electric locomotives ordered was sixty-five, as against eighty-one in the preceding year. The New York, New Haven & Hartford Railroad ordered twenty-four locomotives for passenger and freight service.

Among the striking features of rolling stock orders last year was the spread of the near-side car. Of this type the Philadelphia Rapid Transit Company ordered 950 cars, the International Railway, Buffalo, 316 cars, and the Chicago City Railway 125 cars. The one-man near-side car was also developed. Cars of this type were ordered by the International Railway, the Illinois Traction System and the Fort Wayne & Northern Indiana Traction Company.

Another striking development in rolling stock was the introduction of the center-entrance car. Large orders of this type included one from Brooklyn for 100 cars, one from New York City for 175 cars and one from Los Angeles for 36 cars.

In addition to the rolling stock listed below, there have been large sales of gasoline motor, gasoline-electric and storage battery cars for branch lines and suburban service on steam railroads. The McKeen Motor Car Company received orders from steam railroads for fifteen gasoline motor cars for the United States and five cars of that type for Australia. The General Electric Company built twenty gasoline-electric cars for steam railroad service. Of a total of forty-nine storage battery cars built by the Federal Storage Battery Car Company eleven cars were for steam railroad service in this country and nineteen cars were built for export to Cuba, Australia and Panama.

Purchaser	No.	Class	Length	Serv.	Truck	Builder
Albany (Ga.) Transit Co.	5	Closed	18–0	City	Brill	American
A[illegible]ers Ry. & Ltg. Co.	3	Closed	18–0	City	Balt.	Cincinnati
Allen St. Ry.	2	Closed	25–4	Int.	Brill	Brill
Alt. Jack & Peoria Ry.	4	Closed	48–1	Int.	M'G.C.	McGuire–C.
Ardmore & Llanerch St. Ry.	2	Closed	52–0	Int.	Bald.	Jewett
Arkansas Valley Inter. Ry.	3	Closed	46–0	Int.	St. L.	St. Louis
	2	Trail	40–0	Int.	St. L.	St. Louis
	1	Work	40–0	Int.	St. L.	St. Louis
	1	Flat	36–0	Int.	St. L.	St. Louis
Aroostook Valley R. R.	2	Closed	43–0	Int.	Brill	Wason
Athol & Orange St. Ry.	10	Open	30–0	Int.	Tay.	Wason
	4	Closed	25–0	Int.	Tay.	Wason
Atlantic Coast Elec. Ry.	3	Open	42–0	Int.	Brill	Brill
	3	Closed	28–0½	Int.	Brill	Brill
Auburn & Syracuse Elec. R.R.	3	Closed	20–0	City	....	Kuhlman
Aurora, Elgin & Chicago R.R.	1	Express..	50–0	Int.	....	Jewett
	5	Gondola	41–6	Int.	Press	Pressed St.
Bangor Ry. & Elec. Co.	3	Open..	....	City	......	Laconia
Bay State St. Ry.	12	Open	31–0	City	St. L.	St. Louis
	8	Open	25–6	City	St. L.	St. Louis
	30	Closed	28–0	City	St. L.	St. Louis
	3	Express	....	Int.	St. L.	St. Louis
	1	Flat	....	Int.	....	Laconia
Beech Grove Trac. Co.	1	Closed	44–0	Int.	M'G-C.	McGuire-C.
Bent. Har.-St. Joe Ry. & Lt. Co.	3	Closed	34–8	City	M'G.C.	McGuire–C.
Berkshire St. Ry.	4	Closed	28–0	City	Std.	Wason
	5	Express	32–8	Int.	Std.	Wason
Berlin St. Ry.	1	Open	....	City	Lac.	Laconia
Berlin & Waterloo St. Ry.	2	Semiconv.	31–10	City	Brill	Preston
Billings Trac. Co.	1	Stor. Bat.	18–0	City	Brill	Brill
	3	Stor. Bat.	....	City	Fed.	Federal
Birm., Ensley & Bess. Ry.	20	Closed	45–1	Both	Brill	Brill
Birmingham Ry. Lt. & Pwr. Co.	9	Closed	33–6	Sub.	M'G-C.	McGuire-C.
	17	Trail Pass.	44–6	Sub.	M'G-C.	McGuire–C.
	1	Express	34–0	Sub.	Co.	Co. Shops
	4	Ballast	32–0	Sub.	Co	Co. Shops
Boston Elevated Ry.	35	Closed*	48–2½	City	Tay.	St. Louis
	40	Closed*	48–2½	City	Tay.	Laconia
	20	Closed	69–2½	Sub.	Brill	Laconia
	2	Crane	50–0	Int.	Brill	Russell
	1	Wreck	54–0	Int.	Brill	Russell
Boston, Rev. Beach & Lynn R.R.	1	Stor. Bat.	....	Sub.	Fed.	Federal
Boston & Worcester St. Ry.	6	Express	40–0	Int.	Std.	Osg-Brad.
British Col. Elec. Ry. Co., Ltd.	65	Closed*	30–0	City	Pres.	Preston
	22	Closed	40–0	Int.	St. L.	St. Louis
	1	Cl. St'pl'ss	34–0	City	Brill	Brill
	35	Semiconv.*	30–1	City	Brill	Brill
	15	Closed	....	City	....	Co. Shops
	6	Closed	40–0	Int.	St. L.	St. Louis
	1	Closed N-S.	34–1½	City	Brill	Brill
	4	Bag Ex..	54–0	Int.	Std.	Niles
	70	Frt. Box	41–0	Int.	Seat.	Seattle
	45	Frt. Flat	41–0	Int.	Seat.	Seattle
	6	Dump	28–0	Int.	H.-O.	Hart-Otis.
	2	Snow-swp.	28–0	Int.	Otta.	Ottawa
	5	El. Locos.	33–0	Int.	Bald.	Westingh.
Brooklyn Rapid Transit Co.	1	Closed C-E.	45–6	City	Std.	Standard
	100	Closed C-E.	45–6	City	Brill	Brill
	2	Sweeper	23–7	City	Rus.	Russell
Buffalo & Lake Erie Trac. Co.	1	Sn.-plow	30–0	Int.	Rus.	Russell
Burlingame Elec. Ry.	1	Stor. Bat.	....	City	Fed.	Federal
Butte, Ana. & Pac. R. R.	2	Elec. Loco.	38–0	Pass.	A. L.	Gen. Elec.
Butte Elec. Ry.	4	Closed	28–0	City	Co.	Co. Shops
Calgary St. Ry.	6	Closed*	41–6	City	Brill	Preston
	12	Closed	41–6	City	Brill	Ottawa
	12	Closed	46–6	City	Brill	Ottawa
	6	Trail Pass.	44–0	City	Brill	Ottawa
	1	Sweeper	24–0	City	....	Ottawa
	1	Sprinkler	24–0	City	Brill	Preston
	1	Sight-see'g	....	City	....	Preston
Cape May, Del. Bay & Sewell's Point R. R.	2	Stor. Bat.	18–3	City	Brill	Brill
Capital Trac. Co.	5	Semiconv.*	30–8	Sub.	Std.	Cincinnati
	50	Semiconv.	28–4	City	Brill	Jewett
Carolina Pwr. & Lt. Co.	2	Semiconv.	20–8	City	Brill	Brill
Carolina Trc. Co.	1	Stor. Bat.	....	City	Fed.	Federal
Cedar Rap. & Mar. City Ry.	2	Closed	21–4	City	Co.	Co. Shops
	1	Sweeper	28–3	City	M'G C.	McGuire–C.
Central California Tr. Co.	5	Express	36–0	Int.	Hol.	Holman
Central Park, North & East River R. R.	1	Stor. Bat.	....	City	Fed.	Federal
Cent. Ill. Pub. Serv. Co.	1	Cinder	....	Int.	M'G.C.	McGuire–C.
Central Pennsylvania Tr. Co.	6	Semiconv.*	25–0	City	Brill	Brill
Charleston Cons. Ry. & Ltg. Co.	5	Semiconv.*	20–8	City	Brill	Cincinnati
Charleston Int. R. R.	2	Closed*	48–9½	Int.	Std.	Jewett
Charlotte Elec. Ry.	3	Closed*	....	Int.	....	Cincinnati
Chattanooga Ry. & Lt. Co.	10	Closed*	28–8	City	Brill	Cincinnati
Chicago City Ry.	125	Semiconv.* N.-S.	34–1½	City	Brill	Brill
Chicago & Oak Park Elev. R.R.	1	Fire-ftg.	25–0	Elev.	....	Co. Shops
Chicago Railways	1	Oil	45–2	City	St. L.	Co. Shops
Chillicothe Elec. R. R., Lt. & Pwr. Co.	2	Closed*	40–0	City	Brill	Kuhlman
Chippewa Valley Ry. Lt. & Pwr. Co.	3	Closed*	22–0	City	M'G-C.	McGuire–C.
Cincinnati Trac. Co.	26	Closed*	33–0	City	Brill	Cincinnati
Citizens' Trac. Co.	8	Closed*	21–0	City	St. L.	St. Louis
City & Suburban Ry.	1	Semiconv.	25–6	City	Brill	Brill
Cleveland Const. Co.	1	Work	20–0	Int.	M'G.C.	McGuire–C.
Cleveland Ry.	1	Cl. C-E.	45–4	City	Brill	Kuhlman
	200	Trail Pass.	48–0	City	Brill	Kuhlman
	2	Sweeper	22–3	City	M'G-C.	McGuire–C.
Columbia Ry. Gas & Elec. Co.	2	Closed*	39–0	City	Brill	Co. Shops
Columbus, New Albany & Johnstown Trac. Co.	1	Comb.	50–0	Int.	M'G-C.	McGuire–C.
Columbus Ry. & Lt. Co.	10	Closed*	28–8½	City	Brill	Kuhlman
Conestoga Trac. Co.	4	Open	28–0	City	Brill	Brill
	3	Closed	30–8	Int.	Std.	Cincinnati
	1	Com. & Pl.	45–0	Both	Std.	Cincinnati
Connecticut Co.	1	Express	40–0	Int.	Std.	Osg-Brad.
	2	Elec. Loco.	31–8	Switch	Bald.	Westingh.
	4	Dump	10–0	City	Was'n	Wason

Purchaser	*No.*	*Class*	*Length*	*Serv.*	*Truck*	*Builder*
Connecticut Valley St. Ry	3	Closed	30–0	Int.	Tay.	Wason
	1	Express	40–0	Int.	Tay.	Co. Shops
County Trac. Co	20	Closed*	45–0	City	M'G-C.	McGuire–C.
	1	Work	45–0	Both	M'G-C.	McGuire–C.
	1	Sweeper	....	City	M'G-C.	McGuire–C.
	1	Sprinkler	29-6	City	M'G-C.	McGuire–C.
	3	Dump	....	City	M'G.C.	McGuire-C.
Cumberland (Md.) Elec. Ry	3	Open	22–0	City	Brill	Brill
	3	Closed	22–0	City	....	Brill
Cumberland (Pa.) Ry	1	Stor. Bat.	50–0	City	....	Federal
Dallas Elec. Corp	13	Closed*	26–6	City	Brill	St. Louis
	1	Work	....	Int.	....	St. Louis
Dallas-Southern Tr. Co	6	Closed	34–6	Sub.	Brill	Osg.-Brad.
	1	Baggage	45–0	Int.	Brill	Osg.-Brad.
Davenport & Muscatine Ry	8	Closed*	20–1	City	Brill	American
	1	Sn.-Plow	....	Int.	M'G-C.	McGuire–C.
DeKalb-Sycamore Int. Ry	1	Closed*	28–10	City	....	American
Denver City Tram. Co	2	Closed	44–0	City	Brill	Woeber
	6	Closed	44–0	City	Brill	Woeber
Des Moines City Ry	25	Closed*	28–10	City	Brill	American
	2	Sweeper	28–3	City	M'G.C.	McGuire–C.
Detroit, Monroe & Toledo Short Line Ry	4	Closed	45–10½	Int.	Std.	Niles
Detroit United Ry	2	Closed.	36–3	Int.	Bald.	Niles
	8	Closed	41–10½	Int.	Std.	Niles
	100	Closed*	23–2	City	Dup.	American
	50	Closed*	31–4	City	Std.	Kuhlman
	5	Express	41–5½	Int.	Std.	Niles
	5	Work Tr.	38–0	Both	R.W. & Fdy.	Russell Wheel & Fdy.
	15	Work Fl.	28–0	Both	R.W. & Fdy.	Russell Wheel & Fdy.
	1	....	48–0	Both	Std.	Co. Shops
	1	Supply	49–10	Int.	Std.	Niles
	1	Loco. Cr.	23–0	City	Ind. W.	Ind. Iron Wks.
	1	Con. Mix.	12–7	City	Dup.	Co. Shops
Dominion Pwr. & Trans. Co. Ltd	12	Closed	21–0	City	Tay.	Preston
	15	Closed	30–0	City	Brill	Preston
Dover, Somersworth & Roch. St. Ry	2	Semiconv.	39–0	City	.....	Laconia
Eastern Texas Trac. Co	9	Closed	56–0	Int.	M'G-C.	Jewett
	1	Express	50–0	Int.	M'G-C.	Jewett
Eastern Transit Co	3	Semiconv.*	20–8	City	...	Brill
East St. L. Col. & Waterloo Ry.	2	Sn.-plow	....	Int.	Rus.	American
	1	Bag.-Ex.	42–6	Int.	Brill	American
East St. Louis & Sub. Ry	1	Closed	50–0	Int.	St. L.	St. Louis
	2	Sprinklers	29–6	City	M'G.C.	McGuire–C.
Edmonton Radial Ry	35	Semiconv.*	33–3¾	City	Std.	Preston
	15	Semiconv.*	30–6	City	St. L.	St. Louis
	1	Work	40–0	City	M'G-C.	McGuire–C
	1	Dump.	33–6½	City	Can.	Canadian
Elkins Elec. Ry	1	Comb.	40–0	Int.	St. L.	St. Louis
Elmira Wtr. Lt. & R. R. Co	8	Semiconv.*	33–0	City	Std.	Cincinnati
El Paso Elec. Ry	12	Closed	29–0	City	St. L.	St. Louis
Ephrata & Lebanon St. Ry	2	Stor. Bat.	....	City	Fed.	Federal
Escanaba Trac. Co	1	Flat	42–0	Special	M'G.C.	Co. Shops
Evansville Rys	3	Comb. Pas. & Bag.	50–0	Int.	Brill	American
	1	Ex.-Bag.	45–0	Int.	Brill	American
Fargo & Moorhead St. Ry	1	Sweeper	26–0	Int.	M'G-C.	McGuire-C.
Fonda, Johns. & Glov. R. R	2	Closed	41–8	Sub.	Tay.	Jones
	1	Work	27–0	Line	Tay.	Co. Shops
Fox & Illinois Union Ry	1	Express	36–0	Int.	M'G.C.	McGuire–C.
	2	Closed	48–0	Int.	M'G.C.	McGuire–C.
Ft. Dodge, Des Moines & Southern R. R	2	Closed	40–0	City	Std.	Jewett
Ft. Wayne & No. Ind. Trac. Co	19	Closed*	21–0	City	Curtis	Cincinnati
	17	One-man	21–0	City	Brill	Brill
	4	S-C N-S	34–1⅜	City	Brill	Brill
Freeport Ry. & Lt. Co	1	Sweeper	28–3	City	M'G-C.	McGuire–C
Fresno Trac. Co	4	Closed*	42–8	City	Jewett	Jewett
Galt, Pres. & Hespeler St. Ry	2	Closed	43–5	Sub.	Bald.	Preston
Galveston-Houston Elec. Co	4	Closed	53–0	Int.	St. L.	St. Louis
Gary & Int. Ry	1	Elec. Loco.	....	Int.	M'G.C.	McGuire–C.
	8	Closed	44–0⅜	City	M'G.C.	McGuire–C.
Geary St. Munic. St. Ry	43	Closed*	48–0	City	Brill	Holman
Geneva & Auburn Ry	1	Sn.-plow	36–4	Int.	Bald.	Co. Shops
Goshen, So. Bend & Chi. Ry	6	Express	50–0	Int.	M'G.C.	McGuire–C.
	2	Closed	56–0	Int.	M'G.C.	McGuire–C.
Grand Junction & Grand River Valley Ry	2	Closed*	26–0	City	Bald.	Southern
	1	Express	40–0	Int.	Brill	Woeber
Grand Rapids, Grand Hav. & Musk. Ry	1	Closed	52–7½	Int.	Bald.	Niles
	1	Comb.	52–7½	Int.	Bald.	Niles
	3	Express	46–1½	Int.	Bald.	Niles
Grand Rapids Ry	10	Closed*	28–0	City	Brill	Cincinnati
Granite City Ry	4	Closed	22–0	City	M'G-C.	Jones
Greenville, Spartanburg & Anderson Ry	5	Elec. Loco.	35–0	Freight	Bald.	West.
Guelph Radial Ry	1	Sweeper	26–6	City	M'G-C.	Preston
	1	Sweeper	28–3	City	M'G'C.	McGuire–C.
Hagerstown & Clearspring Ry.	4	Closed	28–0	City	St. L.	St. Louis
Halifax Elec. Tram. Co	4	Closed	21–0	City	Co.	NovaScotia
	1	Sweeper	28–3	City	....	McGuire–C.
Helena Lt. & Ry. Co	1	Semiconv.	28–10½	City	Brill	American
Hillsboro Ry	2	Closed	30–0	City	M'G.C.	McGuire–C.
Homest. & Mifflin St. Ry	1	Open	21–0	City	M'G-C.	St. Louis
	1	Closed	21–0	City	M'G-C.	St. Louis
Houston Elec. Co	14	Semiconv.*	26–6	City	Std.	St. Louis
	1	Work	33–0	City	Std.	Co. Shops
	4	Ballast	33–0	City	Rodg.	Rodger
Hueneme, Malibu & Port Los Angeles Ry	1	Gas. Mot.	....	Int.	Co.	Co. Shops
Hull Elec. Co	6	Semiconv.*	38–0	Both	Brill	Ottawa
Hummelst'n & Camp. St. Ry	2	Semiconv.*	30–8	City	Brill	Brill
	1	Sweeper	....	Both	.....	Brill
Idaho Trac. Co	3	Closed	42–0	City	St. L.	St. Louis
	12	Ballast	36–0	Int.	Rodg.	Rodgers
Illinois Central Elec. Ry	2	Comb.	47–2½	Int.	Brill	American
Illinois Trac. System	10	Closed	....	Int.	St. L.	St. Louis
	1	Closed	57–0	Int.	Curtis	St. Louis
	3	Closed	41–0	City	St. L.	St. Louis
	11	One-man*	20–0	City	St. L.	St. Louis
	8	Trail.	57–0	Int.	St. L.	St. Louis
	1	Observ.	....	Int.	St. L.	St. Louis
Illinois Trac. System	1	Sleeper	....	Int.	St. L.	St. Louis
	50	Frt. Box	40–0	Int.	H&B	Has. & Bar.
	75	Gondola	40–0	Int.	H&B	Has. & Bar.
	25	Ballast	40–0	Int.	H&B	Has. & Bar.
Ind., Col. & East. Tr. Co	50	Closed*	33–0	City	Brill	Cincinnati
Indianapolis Trac. & Term. Co.	25	Closed	33–2½	City	Std.	Cincinnati
International Ry	10	Closed	....	City	St. L.	St. Louis
	200	Closed N-S	34–1⅜	City	Brill	Kuhlman
	103	Closed N-S	34–1⅜	City	Brill	Brill
	13	Cl. N-S*	21–2	City	Brill	Brill
	4	Sweeper	28–3	City	M'G.C.	McGuire–C.
Interurban Construction Co	4	Closed	56–0	Int.	M'G-C	McGuire–C.
	1	Express	48–0	Int.	M'G-C.	McGuire–C
	1	Flat	36–0	Int.	St. L.	St. Louis
Interurban Ry. Co	1	Express	45–0	Int.	M'G-C.	McGuire–C.
	1	Work	42–0	Int	M'G-C.	McGuire–C.
	1	Work. Tr.	32–0	Int.	M'G-C.	McGuire–C.
	1	Line	40–0	Int.	M G-C.	McGuire–C
Interurban Ry. & Term. Co	3	Excursion	50–0	Int.	Std.	Cincinnati
Iowa City Elec. Ry	2	Closed	22–0	City	M'G-C.	McGuire–C
Iowa Ry. & Lt. Co	2	Sweeper	28–3	City	M'G.C.	McGuire–C..
Ironwood & Bessemer Ry. & Lt. Co	2	Closed	40–0	Int.	M'G-C.	Brill
Jackson Ry. & Lt. Co	4	Semiconv.*	20–8	City	Brill	American
	5	Semiconv.*	28–0	City	Brill	American
Jamestown, Chautauqua & Lake Erie R. R	1	Gas. Mot.	55–0	Int.	McK	McKeen
Jersey Central Trac. Co	4	Semiconv.	33–4	Int.	Brill	Brill
Joplin & Pitts. Ry	1	Express	45–0	Int.	Bald.	Jewett
Kans. City, Clay County & St. Joseph R. R	8	Closed	57–0	Int.	Bald.	Cincinnati
	8	Comb.	57–0	Int.	Bald.	Cincinnati
	5	Express	57–0	Int.	Bald.	Cincinnati
	1	Work	40–0	Int.	Bald.	Cincinnati
	5	Frt. Trail	40–0	Int.	AC&F.	Cincinnati
Keokuk Elec. Co	1	Closed	21–0	City	St. L.	St. Louis
	4	Closed	32–0	City	St. L.	St. Louis
	1	Closed*	31–4	City	Std.	Cincinnati
La Crosse City Ry	2	Closed	21–0	City	St. L.	St. Louis
Lancaster Trac. & Pwr. Co	1	Comb.	28–0	Int.	Brill	Cincinnati
LaSalle County Elec. Co	3	Closed	48–0	Int.	M'G.C.	McGuire–C.
	1	Express	45–0	Int.	M'G.C.	McGuire–C.
Laurel Elec. Lt. & Pwr. Co	4	Closed	24–0	City	Brill	American
Lehigh Valley Transit Co	20	Closed*	30–1	City	......	Brill
	6	Closed	55–10½	Int.	Bald.	Jewett
	4	Closed*	30–1	City	Bald.	Brill
	1	Line	30–0	Both	Bald	Russell
	2	Wreck	40–0	Both	Bald.	Russell
Lethbridge Munic. Tramway	5	Closed*	29–0	City	Tay.	Preston
	5	Closed*	32–6	City	Brill	Preston
Lewisburg, Mil. & Wat. Pass. Ry	1	Stor. Bat.	34–0	Int.	Brill	Brill
Lincoln Trac. Co	3	Near-Side*	34–1⅜	Both	Brill	Kuhlman
	1	Ballast	28–0	Both	St. L.	Co. Shops
	1	Sweeper	27–6	City	......	American
Logan R. T. Co	4	Closed	....	Both	......	St. Louis
London & Lake Shore Ry. & Transpt. Co	4	Closed	....	Int.	......	Niles
	1	Bag.	....	Int.	......	Niles
Long Island R. R	30	Comb.	54–0	Int.	AC&F.	A. C. & F.
	4	Bag.	....	Int.	AC&F.	A. C. & F.
	8	Parlor	....	Int.	AC&F.	A. C. & F.
Longview & Junction St. Ry	1	Closed	16–0	City	St. L.	St. Louis
Los Angeles Ry	50	Calif.	44–7	City	Brill	American
Los Angeles & San Diego Beach Ry	3	Stor. Bat.	....	City	Fed.	Federal
Louisville Ry	5	Comb.	40–5	Int.	Bald.	Cincinnati
	5	Comb.	33–2	Int.	Bald	Cincinnati
	1	Sweeper	28–3	City	M'G.C.	McGuire$–C
Macon Ry. & Lt. Co	6	Closed*	28–0	City	St. L.	St. Louis
	3	Flat	30–0	City	Brill	Co. Shops
Mahon. & Shenan. Ry. & Lt. Co	1	Derrick.	....	Int.	M'G.C.	McGuire–C.
Manchester St. Ry	6	Closed	26–6	City	Std.	Laconia
Manhattan Bridge Three-Cent Line	1	Sweeper	....	City	Brill	Brill
Manhattan City & Inter Ry	3	Closed	46–0	Int.	St. L.	St. Louis
Manila Elec. R. R. & Lt. Co	3	Semiconv.	28–4	City	Brill	Brill
	1	Semiconv.	28–4	City	Man.	Brill
Mason City & Clear Lake R.R.	1	Express	50–0	Int.	M'G.C.	McGuire C.
Memphis St. Ry	15	Closed C-E	38–3¾	City	Brill	Brill
Meridian Lt. & Ry. Co	1	Closed	20–8	City	Brill	American
	5	Semiconv.	31–0	City	Brill	Southern
Merrill Ry. & Ltg. Co	1	Trackless	....	City	Field	Field
Mesaba Elec. Ry	10	Closed	50–0	Int.	Bald.	Niles
	4	Trail Pass.	40–0	Int.	Bald.	Niles
	2	Express	....	Int.	Bald.	Niles
	1	Sn.-Plow	38–0	Int.	Was'n	Wason
Metropolitan St. Ry	26	Closed*	34–0	City	Std.	Cincinnati
	1	Dump	36–4	City	St. L.	Co. Shops
	1	Dump	39–8	City	St. L.	Oren-Arthur-Koppel
	1	Material	24–0	City	Dup	Co. Shops
Michigan United Trac. Co	10	Closed	28–0	City	St. L.	St. Louis
	20	Closed*	28–0	City	Brill	Brill
	5	Cl. N-S	21–1	City	Brill	Brill
	1	Comb.	61–9	Int.	Brill	Brill
Milford, Attleboro & Woonsocket St. Ry	1	Sn.-Plow	38–0	City	Was'n	Wason
Milford & Uxbridge St. Ry. Co.	2	Closed	22–0	City	Tay.	Jones
Mill Val. & Mt. Tam. Scenic Ry	2	Trail	36–0	Int.	Brill	Holman
Millville Trac. Co	1	Semiconv.	31–8	Int.	Brill	Brill
Milwaukee Elec. Ry. & Lt. Co.	30	Closed*	47–0	City	Bald.	St. Louis
	1	Special	50–0	Both	......	Co. Shops
	8	Sweeper	43–0	City	......	McGuire–C.
	1	El. Loco.	19–10	Switch	Bald.	Westing.
	6	Closed*	32–4	City	......	Co. Shops
Milwaukee Northern Ry	2	Closed	31–6	City	St. L.	Niles
Minn., St. P., Roch. & Dub. Elec. Tr. Co	2	Closed	56–0	Int.	Brill	Wason
	7	Trail	48–6	Int.	Brill	Wason
Missoula St. Ry	1	Semiconv.	30–8	Int.	Brill	American
	1	Ballast	32–0	Int.	Brill	Co. Shops
Mobile Lt. & R. R. Co	8	Closed*	21–0	City	Brill	American
	4	Closed*	28–0	City	Brill	American
Monongahela Val. Tr. Co	4	Semiconv.	28–0	Int.	Brill	Kuhlman
Montgomery Transit Co	2	Comb.	43–0	Both	Brill	St. Louis
	1	Comb.	40–0	Both	Brill	Brill
	1	Express	40–0	Both	Brill	Russell

Purchaser	*No.*	*Class*	*Length*	*Serv.*	*Truck*	*Builder*
Montreal & Southern Counties Ry. Co	6	Closed	49-4	Int.	Curtis	Ottawa
	2	Comb.	48-4	Int.	Curtis	Ottawa
Montreal Tramway	35	Closed*	32-0	City	Brill	Ottawa
	40	Closed*	32-0	City	......	Canadian
	1	Sn.-Plow	20-0	City	Otta.	Ottawa
	2	Sweeper	39-6	Both	Can.	Ottawa
	1	Crane	36-10	Both	......	Co. Shops
Morris County Trac. Co	1	Sweeper	....	Both	Brill	Brill
Muskogee Elec. Trac. Co	4	Closed*	21-3	City	Brill	American
	10	Semiconv.*	34-0	Both	Brill	American
Nashville-Gallatin Int. Ry	4	Comb.	39-0	Int.	Brill	American
	1	Express	45-0	Int.	Brill	American
Nashville Int. Ry	1	Closed	50-6	Int.	Brill	American
Nashville Ry. & Lt. Co	12	Closed	21-10	City	Brill	Co. Shops
N. J. & Pa. Trac. Co	2	Sn.-Plow	21-0	Int.	Was'n	Wason
New Midland Pwr. & Trac. Co.	4	Closed	55-0	Int.	Tay.	Jewett
	1	Express	45-0	Int.	St. L.	Jewett
Newport News & Old Point Ry. & Elec. Co	4	Semiconv.	45-0	Int.	Brill	Brill
N.Y.C. & H.R.R.R	19	Closed	53-0	Sub.	Pres'd	Pr. Steel
	6	Comb.	53-0	Sub.	Pres'd	Pr. Steel
	1	Stor.Bat.	....	....	Fed.	Federal
N. Y., N.H. & H.R.R	24	El.Loco.	50-0	F.& P.	Bald.	Westingh.
New York Railways	175	Stepless	44-0	City	St. L.	St. Louis
	1	Doub.d'k	43-1	City	Brill	Brill
	1	Stepless*	40-8	City	Brill	Brill
	1	Stepless Stor.Bat.	28-9	City	Brill	Brill
New York State Rys., Utica Lines	20	Closed*	30-11	City	Brill	Brill
	1	Sweeper	24-0	City	Brill	Brill
New York, West. & Boston Ry.	2	Sn.-Plow	....	Int.	Rus.	Russell
Nag., St. Cath. & Tor. Ry	1	El. Loco.	....	F.& Sw.	Bald.	Westingh.
	1	El. Loco.	34-0	Int.	Tay.	Co. Shops
Nipissing Central Ry	2	Closed	35-6	Int.	Beamis	Preston
North Car. Pub. Ser. Co	4	Closed	21-0	City	Brill	Southern
Northern Ohio Trac. & Lt. Co.	15	Closed	42-2	Int.	Brill	Kuhlman
	25	Semiconv.	30-11	Sub.	Brill	Kuhlman
	20	Conv.	35-6	City	Brill	Kuhlman
	2	Express	60-0	Int.	M'G.C.	McGuire-C
	1	Wr.& Pl.	40-0	City	M'G.C.	McGuire-C.
	1	Derrick	....	Int.	M'G.C.	McGuire-C.
	2	Express	60-0	Int.	M'G.C.	McGuire-C.
	1	Substa.	....	Int.	M'G.C.	McGuire-C.
Northern Texas Trac. Co	4	Closed	52-0	Int.	Bald.	St. Louis
	2	Express	50-0	Int.	Brill	Co. Shops
Northwestern Elev. R.R	1	Fire-Ftg.	25-0	Elev.	......	Co. Shops
Norwich & Westerly Tr. Co	4	Closed	30-8	Int.	Brill	Brill
	1	Express	40-0	Int.	......	Wason
Oak. Antioch & East. Ry.	10	Comb.	56-0	Int.	Bald.	Holman
	4	Comb.	56-0	Int.	......	Wason
	1	Parlor	58-0	Int.	......	Wason
	1	Parlor	56-0	Int.	Bald.	Holman
	5	Express	36-0	Int.	Hol.	Holman
	10	Work	36-0	Int.	Hol.	Holman
	1	Derrick	41-0	Int.	Hol.	Holman
	6	Ballast	36-0	Int.	Hol.	Holman
	1	El. Loco.	35-0	Freight	Bald.	Westingh.
Ogden R. T. Co	6	Trail	34-0	Int.	Brill	American
	1	Express	40-0	Int.	St. L.	Co. Shops
	1	Sn.-Plow	....	Int.	....	Co. Shops
Ohio Elec. Ry. Co	6	Comb.	61-6	Int.	Std.	Cincinnati
	6	Trail Pass.	60-0	Int.	Std.	Cincinnati
	2	Open	29-9½	City	Brill	Cincinnati
	3	Express	50-0	Int.	Std.	Cincinnati
	2	Work	40-0	Int.	Tay.	Cincinnati
	14	Fr. Tr.	38-6	Int.	Std.	Cincinnati
	10	Flat	40-0	Int.	Std.	Cincinnati
Ohio River Elec. Ry. & Pwr. Co	1	Elec.Loco.	30-0	Int.	Bald.	American
Omaha & Council Bluffs St. Ry	25	Closed	42-0	City	Brill	Co. Shops
	1	Sweeper	28-3	City	M'G.C.	McGuire-C.
Omaha, Lincoln & Beat. Ry.	1	Elec.Loco.	24-0	Switch	Bald.	Westingh.
Oneida Ry	2	Semiconv.	40-0	Int.	Brill	Kuhlman
Orange County Tr. Co	4	Closed*	44-0	Int.	M'G.C.	McGuire-C.
	11	Closed*	34-8	City	M'G.C.	McGuire-C.
	3	Gondola	21-0	Const.	M'G.C.	McGuire-C.
Oregon Elec. Ry	6	Comb.	58-4½	Int.	Bald.	American
	3	Coaches	57-11½	Int.	Bald.	American
	25	Coach.tr.	58-4½	Int.	Bald.	American
	2	Tr. Sleep.	57-0	Int.	Bald.	Bar. & Sm.
	1	Wreck	....	Int.	Bald.	Co. Shops
	1	Substa.	....	....	M'G.C.	McGuire-C.
Oshawa Ry	2	Conv.	40-0	Both	Tay.	....
	1	Express	36-0	City	Brill	....
	1	Sweeper	35-0	Both	Ott.	Ottawa
	1	El.Loco	25-0	Shunt.	Rath.	Rathbun
Ottawa Elec. Ry	10	Closed*	45-3	Both	Brill	Ottawa
Pacific Coast Ry	1	Comb.	55-0	Int.	Bald.	Cincinnati
Pacific Elec. Ry	10	Closed	42-9	City	Brill	Jewett
	53	Closed	55-6	City	Brill	Jewett
	36	Stepl's C-E	....	City	Brill	Brill
	10	El. Loco.	36-0	Fr't.	Bald.	Westingh.
	3	El. Loco.	36-0	Int.	Bald.	Westingh.
Pacific Northwest Tr. Co	4	Fr't Box	41-0	Int.	Seat.	Co. Shops
	20	Fr't flat	41-0	Int.	Seat.	Co. Shops
	1	Caboose	41-0	Int.	Seat.	Co. Shops
Paducah Trac. & Lt. Co	6	Closed	21-0	City	St. L.	St. Louis
Park, Marietta & Int. Ry	2	Fr't Box	36-0	Int.	Ralst.	Co. Shops
	2	Gondola	36-0	Int.	Ralst.	Co. Shops
Peninsular Ry	1	El. Loco.	36-0	Int.	Bald.	Westingh.
People's Gas & Elec. Co	10	Closed	26-6	City	St. L.	St. Louis
	3	Closed	....	City	War.	St. Louis
People's Ry., Wil., Del	10	Closed*	22-0	City	Brill	Cincinnati
Pet. & Santa Rosa Ry	5	Fr't Box	36-0	Int.	Std.	Co. Shops
Phila & Garret. St. Ry	1	Sweeper	28-3	City	M'G.C.	McGuire-C.
Philadelphia R. T. Co	50	Closed	39-7	Elev.	Brill	Brill
	950	Closed	34-3½	City	Brill	Brill
	1	Funeral	36-6	Both	Brill	Brill
	1	Sweeper	....	City	Brill	Brill
	2	Sand	30-0	City	Brill	Brill
Phila & West. Trac. Co	5	Closed	44-6	Sub.	Bald.	Jewett
Piedmont Trac. Co	1	El. Loco.	35-0	Fr't.	Bald.	Westingh.
Pine Bluff Co	12	Semiconv.	33-0	City	Balt.	Southern
Pittsburgh Rys	6	Cl. C-E	45-0	City	Std.	Standard
	44	Trail	45-0	City	Std.	Standard
Port Jervis Trac. Co	1	Open	20-0	City	Brill	Wason
Portland, Gray & Lew. R R	2	Closed	38-0	Int.	Brill	Wason
	4	Closed	46-0	Int.	Bald.	Laconia
	5	Flat	34-0	Int.	Lacon.	Laconia
Portland Ry. Lt. & Pwr. Co	20	Flat	41-0	Int.	Seat.	Seattle
Portland R.R	3	Closed	30-0	City	Brill	Wason
Portsmouth St. R. R. & Lt. Co.	4	Semiconv.	28-0	City	Brill	Kuhlman
Pottstown & Phoenixville Ry	3	Semiconv.*	30-8	City	Brill	Brill
Pottstown & Reading St. Ry	3	Semiconv.*	45-0	Both	Brill	Brill
Pub. Serv. Co. of No. Ill	10	Closed	30-0	City	M'G.C.	McGuire-C.
Public Service Ry	50	Closed*	32-0	City	Std.	Cincinnati
	26	Closed*	32-0	City	Std.	Co. Shops
	12	Semiconv.	34-0	Int.	Std.	Co. Shops
	12	Semiconv.*	34-0	Int.	Std.	Co. Shops
	1	Line	30-0	Int.	Tay.	Russell
Public Utilities Co	5	Closed*	28-0	City	Std.	Ciniennati
	1	Line	28-0	Int.	Brill	....
Puget Sound Trac., Lt. & Pwr. Co	1	Closed	32-0	City	......	St. Louis
Quebec Ry., Lt. & Pwr. Co	1	Sweeper	....	Both	......	Brill
	1	Sweeper	28-3	City	M'G.C.	McGuire-C.
Reading Transit Co	10	Semiconv.	30-8	Int.	Brill	Brill
	10	Semiconv.	30-8	City	Brill	Brill
Regina Munic. Ry	8	Closed*	21-0	City	Curtis	Preston
	16	Closed*	28-0	City	Brill	Preston
	6	Closed*	21-0	City	Brill	Preston
Rhode Island Co	35	Semiconv.*	28-6	City	Std.	Osg.Brad.
	2	Substa.	....	Int.	M'G.C.	McGuire-C
Richmond & Rappahannock River Ry	2	Closed	31-0	City	Std.	Jewett
Roanoke Ry. & Elec. Co	6	Closed	28-0	City	Brill	St. Louis
Rochester & Manitou R. R	3	Open	46-3½	Sub.	Brill	Kuhlman
Rockford City Trac. Co	2	Closed*	29-0	City	Std.	American
Rome Ry. & Lt. Co	2	Closed	20-8	City	Brill	Brill
St. Joseph Ry., Lt., Ht. & Pwr. Co	6	Closed	30-0	City	Brill	American
St. Joseph Valley Ry	1	Closed	48-0	Int.	M.G'C.	McGuire-C
St. Louis, Brownsville & Mexico Ry	2	Open tr.	....	City	Brill	American
St. Thomas St. Ry	2	Closed*	25-0	City	Brill	Kuhlman
Saginaw-Bay City Ry	1	Open	....	City	Brill	Brill
	1	Closed*	28-0	City	......	Kuhlman
Salt Lake & Ogden Elec. Ry	3	Closed	62-0	Int.	Bald.	Niles
	1	El. Loco.	34-7	Fr't.	A.L.	Gen. Elec.
San Diego Elec. Ry	1	Cent.-Ent.	42-0	City	Brill	Brill
	1	Work	46-0	Int.	Brill	American
Sand., Windsor & Amherst Ry.	2	Closed*	21-0	City	Brill	Preston
Sand Springs Ry	2	Closed	50-0	Int.	Brill	American
San Francisco, Napa & Calistoga Ry	2	....	54-0	Int	Bald.	Niles
	4	Fr't Box	30-0	Int.	....	....
San Jose R. R	4	Closed*	42-8	City	......	Jewett
Santa Barbara Cons. Elec. R.R	5	S-C C-E*	39-4	City	Brill	Brill
Saskatoon Munic. St. Ry	12	Closed	32-0	City	St. L.	St. Louis
Savannah Elec. Co	9	Closed	38-6	City	St. L.	St. Louis
Seattle, Renton & Southern Ry	6	Closed	50-2	Both	Bald.	Cincinnati
	6	Closed	45-0	City	M'.GC.	McGuire-C.
	2	Closed	56-0	Int.	M'G.C.	McGuire-C.
Schenectady Ry	10	Closed*	30-11	City	Tay.	St. Louis
Selma St. & Sub. Ry	2	Semiconv.	26-0	City	......	Co. Shops
Shore Line Elec. Ry	3	Closed	44-5	Int.	Bald.	Jewett
	1	Express	44-0	Int.	S&W.	Sm. & Wal.
	6	Work	30-0	Int.	Brill	Brill
	1	Sn.-Plow	29-6	Int.	Grothe	J. Grothe
Shreveport Trac. Co	5	Closed*	28-10	City	Brill	American
Sioux City Serv. Co	7	Semiconv.	31-0	City	Brill	Co. Shops
Sioux Falls Trac. Sys	1	Semiconv.	21-0	City	M'G.C.	McGuire-C.
Slate Belt Elec. St. Ry	2	Conv.*	30-1	Int.	Bald.	Brill
	1	Sweeper	28-3	City	M'G.C.	McGuire-C.
South Cov. & Cin. St. Ry	20	Semiconv.	....	City	Brill	St. Louis
Southern Cambria Ry	2	Comb.	43-0	Int.	Bald.	Niles
Southern Ill. Ry. & Pwr. Co	2	Pass.Sm.	48-0	Int.	Brill	American
	2	Pass. Bag.	48-0	Int.	Brill	American
	2	Trail	48-0	Int.	Brill	American
	1	Bag.-Ex.	48-0	Int.	Brill	American
Southern Pacific Co	20	Closed	41-0	Int.	Bald.	Pullman
	2	Bag.& Ex.	58-0	Int.	Bald.	Pullman
	13	Coaches	47-0	Int.	Bald.	Pullman
	4	Gas.Mot.	70-0	Int.	McK.	Pullman
	17	Pass.& Bag.	47-0	Int.	Bald.	Pullman
	5	Bag. & Ex.	47-0	Int.	Bald.	Pullman
	11	Tr.Coach.	47-0	Int.	Bald	Pullman
	10	Coaches	58-0	Int.	Bald.	Pullman
	4	Pass.& Bag.	58-0	Int.	Bald.	Pullman
	1	El. Loco.	36-0	Switch	Bald.	Westing.
Southern Trac. Co	4	Closed	41-0	City	......	St. Louis
	4	Trail Pass.	41-0	City	......	St. Louis
Southern Wisconsin Ry	10	Closed*	20-8	City	Brill	American
Southwest Mo. R. R	5	Closed	43-0	Int.	Tay.	Co. Shops
Southwestern Trac. Co	3	Ballast	18-0	Gen.	......	Co. Shops
Southwestern Trac. & Pwr. Co.	1	Open	47-6	Int.	Brill	American
	2	Closed	48-0	Int.	Brill	American
	2	Pass.& Bag.	37-5	Int.	Brill	American
Spokane & Inland Empire R.R	1	El. Loco.	29-2	Switch	Bald.	Westing.
Springfield Cons. Ry	1	Closed*	37-0	City	Brill	American
	7	Closed*	30-0	City	Brill	American
Springfield St. Ry	6	Closed	28-0	City	Std.	Osg.-Brad.
	5	Express	41-2	Gen.	Std.	Osg.-Brad.
Springfield & Jacksonville Elec. Ry	5	Closed	....	Int.	....	....
Stark Elec. Ry	1	Sweeper.	53-0	Int.	M'G.C.	McGuire-C.
Ster., Dixon & East. Elec. Ry	1	Ex.& Sw.	36-0	Int.	M'G.C.	McGuire-C.
Stockton Terminal & Eastern Ry	1	Gas.Mot.	41-0	Int.	Hol.	Holman
Suffolk Trac. Co	1	Stor. Bat.	....	Int.	Fed.	Federal
Syracuse & Sub. R. R	2	Semiconv	34-4	Int.	Brill	Brill
Syracuse R. T. Ry	9	Closed*	44-6	City	St. L.	St. Louis
	1	Cl. C-E	45-4	City	Brill	Kuhlman
	2	Sweeper	....	Both	......	Brill
Tacoma Ry. & Pwr. Co	10	Closed*	34-5	City	Std.	Cincinnati
Tar. Breck & Butler St. Ry.Co.	2	Closed	30-0	City	M'G.C.	McGuire-C.
Terre Haute, Ind. & East. Trac. Co	1	Work	45-0	Int.	Peck.	Cincinnati
	1	El. Loco.	41-8½	Both	Std.	McGuire-C.
	1	Work	....	Int.	M'G.C.	McGuire-C.
Texas City Transp. Co	3	Closed	30-0	City	M'G.C.	McGuire-C.
Tidewater Power Co	43	Semiconv.	20-0	City	Brill	Co. Shops
Toledo Rys. & Lt. Co	20	Closed	42-0	City	St. L.	St. Louis
	7	Closed	42-0	City	St. L.	Co. Shops
Toledo & Western R. R	1	Express	50-0	Int.	Bald.	Kuhlman
Toronto Civic Lines	4	Closed	44-0½	City	M'G.C.	McGuire-C
	1	Sweeper	28-3	City	M'G.C.	McGuire-C

Purchaser	*No.*	*Class*	*Length*	*Serv.*	*Truck*	*Builder*
Toronto Civic Lines	4	Closed*	30-0	City	M'G.C.	Preston
	1	Sweeper	23-0	City	.....	Preston
Towson & Cockneysville Elec Ry	1	Stor.Bat.*	27-8	Int.	Fed.	Federal
Trenton & Mercer Co. Tr. Co.	10	Closed	28-0	City	St. L.	St. Louis
Tri-City Ry	20	Closed*	30-8	City	Std.	St. Louis
	8	Closed*	21-10	City	......	American
	1	Sweeper	28-3	City	M'G.C.	McGuire-C.
Trinidad Elec. Trans. Ry. & Gas Co.	2	Closed	30-0	City	Brill	Woeber
Twin City R. T. Co.	100	Closed	47-0	City	Co.	Co. Shops
	3	Work	38-0	City	Co.	Co. Shops
Twin Falls Ry	2	Stor.Bat.	...	City	Fed.	Federal
Tyler Trac. Co.	4	Comb.	45-0	Int.	Std.	Cincinnati
	1	Express	45-0	Int.	Std.	Cincinnati
	1	Flat	40-0	Int.	Std.	Cincinnati
	1	Fr't Trail	40-0	Int.	Std.	Cincinnati
Union St. Ry	1	Closed	26-0	City	Brill	Brill
	1	Sn.-Plow	15-0	City	Rus.	Russell
Union Trac. Co.	3	Closed	48-0	Int.	St. L.	St. Louis
	1	Bag.	46-0	Int.	St. L.	St. Louis
Union Tr. Co. of Ind.	10	Comb.	60-1	Int.	Std.	Cicninnati
	6	Closed*	34-2	Sub.	Brill	Cincinnati
United R. R. of San Fran.	65	Calif.*	47-0	City	Brill	American
United Rys. Co. of St. Louis	2	Cl. C-E	45-0	City	......	Co. Shops
	25	Semiconv.*	34-0	City	......	Co. Shops
United Rys. & Elec. of Balt.	60	Semiconv.*	30-8	City	Brill	Brill
United Trac. Co.	20	Closed*	32-0	City	......	Laconia
Valdosta St. Ry.	3	Closed*	18-0	City	Brill	American
Virginia Ry. & Pur. Co.	3	Stor.Bat.	26-1½	City	......	Cincinnati
Warren, Brookfield & Spencer St. Ry.	3	Closed	20-8	City	Brill	Wason
Wash., Balt. & Annapolis Elec. R.R.	4	Express	51-0	Int.	Bald.	Niles
Wash. & Old Dom. R. R.	6	Closed	50-0	Int.	Std.	Southern
	4	Comb.	50-0	Int.	Std.	Southern
	6	Trail	42-0	Int.	Std.	Southern
	2	Freight	42-0	Int.	Std.	Southern
Washington Ry. & Elec. Co.	50	Open	40-0	City	......	Brill
	30	Cent-Ent.*	41-0	City	Bald.	Brill
	5	Cent-Ent.*	46-0	Sub.	Brill	Brill
	20	Semiconv.*	41-0	City	Bald.	St. Louis
	10	Semiconv.*	41-0	City	Bald.	Southern
	1	Cent-Ent.*	41-0	City	Brill	Brill
	1	Sweeper	....	City	Brill	Brill
Washington, Spa Spring & Gretta R. R.	2	Stor.Bat.	....	City	Fed.	Federal
Waterloo, Cedar Falls & North. Ry.	2	Comb.	58-0	Int.	M'G.C.	McGuire-C.
	2	Express	50-0	Int.	M'G.C.	McGuire-C.
	1	Sn.-Plow	32-0	Int.	M'G.C.	McGuire-C.
	1	El. Loco.	40-0	Int.	Co.	Co. Shops
	6	Closed	32-0	City	M'G.C.	McGuire-C.
Waycross St. & Sub. Ry.	4	Closed	18-0	City	Brill	American
Wellsburg, Bethany & Washington R. R.	1	Pass.&Bag.	25-4	Int.	Brill	Kuhlman
West Penn Rys.	10	Closed	56-0	Int.	Co.	Co. Shops
Western N. Y. & Penna. Trac. Co.	1	Semiconv.	20-8	City	Brill	Brill
Wheeling Trac. Co.	5	Closed	30-10	Sub.	Brill	Jewett
Wichita Falls Trac. Co.	2	Closed*	21-3	City	Brill	American
Wilkes-Barre Ry.	1	Work	43-0	City	Brill	Brill
	2	Trail flat	32-0	City	Brill	Brill
Wilmington, New Castle & Del. City R. R.	2	Stor.Bat.	....	Int.	Fed.	Federal
Winnipeg Elec. Ry.	40	Closed	45-0	City	Brill	Co. Shops
	2	Sweeper	28-3	City	M'G.C	McGuire-C.
	1	Sprinkler	29-6	City	M'G.C.	McGuire-C.
Wisconsin Pub. Serv. Co.	1	Sprinkler	32-0	City	M'G.C.	Kennicott
Worcester Consol. St. Ry.	6	Closed	30-0	Sub.	Std.	Osg.-Brad.
Yakima Valley Trans. Co.	2	Comb.	45-0	Int.	Brill	Jewett
	1	Express	45-0	Gen.	Brill	Jewett
York Railways	4	Semiconv.	25-0	City	Brill	Brill

RECEIVERSHIPS AND FORECLOSURE SALES IN 1912

Records of electric railway companies for which receivers were appointed in 1912 show that the number of companies which became involved in financial difficulties was larger than in the preceding year but that the miles of track owned by the companies and the capitalization outstanding were much smaller. A number had not reached the stage of operation of completed systems and one, the Chicago & Oak Park Elevated Railway, is not directly an operating company. The record of receiverships for 1912 compares with the preceding three years as follows:

	No. of Companies	Miles of Track	Outstanding Bonds	Outstanding Stock
1909	22	558	$22,325,000	$29,962,200
1910	11	696.61	75,490,735	12,629,400
1911	19	518.9	38,973,293	29,533,450
1912	26	373.58	11,133,800	20,410,700

As will be noticed from the accompanying list of companies most of the properties concerned operated a very small amount of mileage.

The record of foreclosure sales of companies during 1912 involves a smaller number of companies than were affected by similar proceedings in 1911, but, as in the case of the receivership proceedings, the miles of track and outstanding capitalization were much smaller in the last year than in the previous twelve months. As in previous years when records of this character have been compiled, it was found that some companies for which receivers were appointed early in the year were able to carry out a plan of reorganization providing for a formal sale at foreclosure during the calendar year. The record of foreclosure sales compares with the preceding three years as follows:

COMPANIES FOR WHICH RECEIVERS WERE APPOINTED IN 1912

	Miles of Track	Bonds Outstanding	Capital Stock Outstanding
Cassville & Western Railway	5	......	$100,000
Chicago, Fox Lake & Lake Geneva Railroad	..	......	......
Chicago & Oak Park Elevated Railway	..	......	8,714,900
Columbus, Urbana & Western Electric Railway	10	$438,500	380,500
Dedham & Franklin Street Railway, Westwood, Mass.	9.5	100,000	75,000
Ft. Wayne & Springfield Railway	23.7	465,000	673,000
Geneva & Auburn Railway	17.7	400,000	450,000
Ithaca Street Railway	10.5	475,000	325,000
Kanauga Traction Co., Gallipolis, O.	4.6	100,000	100,000
Kansas City, Outer Belt & Electric Railroad	..	......	......
Lakeview Traction Co., Memphis, Tenn.	10.83	......	1,500,000
Marion, Bluffton & Eastern Traction Company	32	720,000	850,000
Medfield & Medway Street Railway, Westwood, Mass.	11.25	100,000	100.000
Nevada Water, Light & Traction Co.	5	200,000	350,000
New Jersey & Pennsylvania Traction Co.	40	1,430,000	1,000,000
New York, Auburn & Lansing Railroad.	39	975,000	1,000.000
North Jersey Rapid Transit Co.	15	2,000,000	2,000,000
Pawcatuck Valley Street Railway, Westerly, R. I.	6.3	50,000	75,000
Philadelphia & Eastern Electric Railway	34.1	911,000	611,800
Rochester, Corning & Elmira Traction Co.	..	1,000,000	......
Sandusky, Norwalk & Mansfield Electric Railway	33	600,000	600,000
Sapulpa & Interurban Railway	11	......	80,500
Schuylkill & Dauphin Traction Co.	10	219,300	25,000
Seattle, Renton & Southern Railway	25	825,000	1,250,000
Seattle, Snohomish & Everett Railway	..	......	......
Warren, Brookfield & Spencer Street Railway	20.1	125,000	150,000
	373.58	$11,133,800	$20,410,700

	No. of Companies	Miles of Track	Outstanding Bonds	Outstanding Stock
1909	21	488	$21,174,000	$22,265,700
1910	22	724.36	26,374,065	19,106,613
1911	25	660.72	115,092,750	91,354,800
1912	18	457.75	26,286,250	19,947,300

The accompanying list of companies whose properties were sold at foreclosure contains the name of the Chicago & Milwaukee Electric Railroad. In this case the Illinois and Wisconsin divisions of the company were sold at foreclosure but the reorganization has not yet been perfected.

ELECTRIC RAILWAYS SOLD AT FORECLOSURE

	Miles of Track	Bonds Outstanding	Capital Stock Outstanding
Baltimore & Washington Traction Co.	4	$100,000	$100,000
Central Park, North & East River Railroad	31.38	1,200,000	1,800,000
Centre & Clearfield Street Railway	13.6	492,500	312,300
Chicago & Milwaukee Electric Railroad.	172.87	15,201,000	5,300,000
Chicago & Southern Traction Co.	47	2,500,000	2,500,000
Eastern New York Railroad	15	150,000	275,000
Geneva & Auburn Railway	17.7	400,000	450,000
Hannibal & Northern Missouri Railway.	..	......	......
Indianapolis, Crawfordsville & Western Traction Co.	45	1,500,000	1,500,000
Indianapolis & Louisville Traction Co.	41	1,650,000	2,600,000
Lakeview Traction Co., Memphis, Tenn.	10.83	......	1,500,000
Pawcatuck Valley Street Railway	6.3	50,000	75,000
Pelham Park Railroad	1.4	27,750	50,000
Portsmouth & Exeter Street Railway	14.4	145,000	185,000
St. Albans (Vt.) Street Railway	13	196,000	200,000
Sedalia (Mo.) Light & Traction Co.	9	749,000	1,000,000
South Shore Traction Co.	10.5	425,000	600,000
Twenty-eighth & Twenty-ninth Streets Crosstown Railway, New York	4.77	1,500,000	1,500,000
	457.75	$26,286,250	$19,947,300

In addition to the properties mentioned in the foregoing lists other companies have undergone various kinds of reorganizations or readjustments, but without the formal receiverships or foreclosure sales which were necessary for their inclusion in these tables, for instance, in Toledo. Properties of the Chicago Subway Company and Illinois Tunnel Company were sold at foreclosure during the year 1912, but were not included because they are not of the class of electric railways which the tables are designed to include. In other cases, such as the Beaumont Traction Company, the receiver was discharged by the court long after the formal foreclosure proceedings had been completed. The Manistee Light & Traction Company was not included in the tables for the reason that the sale was the second one of the same property.

New Electric Railway Track Built in 1912

Statistics of New Track Completed During the Year—Smallest Total Since 1909

The accompanying table shows in detail the length of new electric railway track built and placed in operation during 1912. The table has been compiled from answers received from the railway companies whose names appear, so that the lengths given in each instance are official. The only mileage represented in the table is track which was completed and placed in operation during the year, but lengths of electrified steam road are included. The total is not complete as far as the total amount of track built in each state is concerned, since some of the companies did not reply in time for this compilation. The total new track built or electrified in 1912 was 950.29 miles, as compared with 1191.58 miles reported in 1911, 1397.26 miles in 1910, and 887.16 miles in 1909. Special care has been taken in compiling the table to exclude all mileage previously reported and all track laid but not put in operation.

New York heads the list of states with 93.47 miles reported. The largest part of this mileage is represented by the New York Central & Hudson River Railroad, which electrified 58.3 miles of track. This includes 38 miles, measured as single track, of the four-track stretch between Tarrytown and Croton, 14.3 miles in the Harmon and Croton yards, 0.9 mile in Harlem division sidings, 1 mile in North White Plains yard and 4.1 miles in the Grand Central Station. The New York, Westchester & Boston Railway completed and placed in operation its 18-mile line connecting New York, Mount Vernon, North Pelham, New Rochelle, Eastchester, Scarsdale and White Plains.

Oregon with 83.50 miles is second and includes the longest and most important extension built in the United States during the past year. This is credited to the Oregon Electric Railway, which built 78 miles of track connecting Salem, Albany, Junction City, Harrisburg and Eugene, Ore. During 1913 this company plans to build a 30-mile extension between Tualitin and McMinnville, Ore., and a 6-mile cut-off between Orenco and Helvetia.

California is third with 82.7 miles of new track constructed. A new interurban line 30 miles long was completed by the Tidewater & Southern Railroad between Stockton, Atlanta, Escalon and Modesto. The Los Angeles Railway added 18.5 miles of track to its lines about Los Angeles, and the San Francisco-Oakland Terminal Railways built 12.2 miles of city track.

The new mileage in Pennsylvania amounted to 63.25, of which the Southern Cambria Railway completed 11 miles between Ebensburg and Johnstown. The Lehigh Valley Transit Company and the Hummelstown & Campbellstown Street Railway each completed about 10 miles of new line.

In Texas, which has a total of 56.33 miles, the longest interurban line was built by the Fort Worth Southern Traction Company, between Fort Worth, Everman, Burleson, Joshua and Cleburne. Another interurban line, 12 miles long, was placed in operation by the Gainesville, Whitesboro & Sherman Railway.

The Chicago Railways Company built 19 miles of new city track. The electric railways of Canada built a total of 78.37 miles of track last year, in comparison with 117.1 miles in 1911.

	Miles
ALABAMA	
Birmingham, Ensley & Bessemer Ry	28.00
Mobile Light & Railroad Co	0.38
	28.38
ARIZONA	
Warren-Bisbee Ry.	0.14
	0.14
ARKANSAS	
Fort Smith Light & Traction Co	5.00
Little Rock Railway & Electric Co	0.50
Southwestern Gas & Electric Co	0.10
	5.60
CALIFORNIA	
Bakersfield & Kern Electric Ry	0.50
Cedar Lake R. R	0.70
Los Angeles Ry	18.50
San Diego Electric Ry	8.00
San Francisco, Napa & Calistoga Ry.—Between St. Helena and Calistoga	7.50
San Francisco-Oakland Terminal Rys.—City lines	12.20
Stockton Terminal & Eastern R. R.—Between Fine and Bellota	3.00
Tidewater & Southern R. R.—Between Stockton and and Modesto	30.00
United Railroads of San Francisco	2.30
	82.70
COLORADO	
Arkansas Valley Railway, Light & Power Co	2.50
Denver City Tramway	1.00
Denver & Northwestern Ry	0.06
	3.56
CONNECTICUT	
Connecticut Company	2.80
Shore Line Electric Ry. Through Deep River	4.00
	6.80
DISTRICT OF COLUMBIA	
Washington & Old Dominion R. R.—Connecting line between Great Falls and Bluemont Divisions	6.00
	6.00
FLORIDA	
Tampa Electric Co.—Tampa	1.50
	1.50
GEORGIA	
Macon Railway & Light Co	2.63
Rome Railway & Light Co	0.25
	2.88
IDAHO	
Idaho Traction Co.—Between Meridian, Nampa and Caldwell	18.00
	18.00
ILLINOIS	
Centralia & Central City Tr. Co	2.50
Chicago City Ry.	3.50
Chicago Railways Co.	19.00
Freeport Railway & Light Co	0.50
Hillsboro Street Ry.	2.50
Illinois Central Electric Ry.—Between Bryant and Lewistown	9.50
Illinois Traction System—Second track	0.60
Kankakee Electric Ry.	1.00
Metropolintan West Side Elevated Ry.	1.00
People's Traction Co.	0.50
Quincy Ry.	4.00
Rockford City Traction Co.—Rockford	1.14
Springfield Consolidated Ry.—Second track	0.50
Springfield & Jacksonville Elec. Ry	1.50
	47.74
INDIANA	
Evansville Railways Co.	10.00
Chicago, South Bend & Northern Indiana Ry.—South Bend	1.50
Indianapolis Traction & Terminal Co	1.52
	13.02
IOWA	
Davenport & Muscatine Ry.—Between Davenport, Blue Grass, Pleasant Prairie, Sweetland Center and Muscatine	25.28
Iowa City Electric Railway	2.00
Oskaloosa Traction & Light Co	1.00
Ottumwa Railway & Light Co	0.25
People's Gas & Electric Co.—Burlington	2.00
Tri-City Railway	1.35
Union Electric Co	0.67
Waterloo, Cedar Falls & Northern Ry.—Between Gilbertville and La Porte City	20.00
	52.55
KANSAS	
Manhattan City & Interurban Ry	2.60
	2.50
KENTUCKY	
Owensboro City R. R	0.50
	0.50
LOUISIANA	
Algiers Railway & Light Co.—Algiers	2.00
New Orleans Railway Light Co	0.89
Southwestern Traction & Power Co.—Between New Iberia, Olivier and Jeanerette	12.42
	15.31
MAINE	
Aroostook Valley R. R.—Margison to Sweden	2.00
Portland, Gray & Lewiston R. R.—Between Lewiston, Auburn, New Gloucester, Gray, Cumberland and West Falmouth	20.00
	22.00

	Miles
MARYLAND	
Frederick R. R.	1.00
Towson & Cockeysville Electric Ry.—Between Towson, Lutherville and Timonium	3.16
	4.16
MASSACHUSETTS	
Berkshire Street Ry.—Between Lee and Becket	9.58
Boston Elevated Ry.	2.46
Boston & Worcester Street Railway Co.—Natick and South Framingham	0.13
Oak Bluffs Street Ry.—Oak Bluffs	0.50
Worcester Consolidated Street Ry	0.70
	13.37
MICHIGAN	
Detroit, Jackson & Chicago Ry	1.96
Detroit, Monroe & Toledo Short Line Ry	1.64
Detroit United Ry.—Detroit and Pontiac and Flint Divisions	10.28
Ironwood & Bessemer Ry. & Lt. Co.—Between Ironwood, Jesseville, Ironton, Puritan, Colby and Bessemer	7.00
Rapid Railway System.—Double track in Mt. Clemens and Pt. Huron	3.08
	23.96
MINNESOTA	
Fargo & Moorhead Street Railway Co.—Between Moorhead and Dilworth	3.65
Granite City Ry.	0.50
Mesaba Electric Ry.—Between Virginia, Hibbing, Eveleth, Chisholm, Buhl, Mountain Iron and Gilbert	36.00
Twin City Rapid Transit Co	10.00
	50.15
MISSISSIPPI	
Jackson Light & Traction Co	1.00
	1.00
MISSOURI	
Metropolitan Street Railway Co	2.96
St. Joseph Railway, Light, Heat & Power Co	0.55
	3.51
MONTANA	
Missoula Street Railway Co.—Second track	1.00
	1.00
NEBRASKA	
Lincoln Traction Co.—Between Lincoln and Bethany and between Lincoln and State Hospital for Insane	2.50
Omaha & Council Bluffs Street Railway	1.00
Omaha, Lincoln & Beatrice Railway Co	1.00
	4.50
NEW JERSEY	
Atlantic Coast Electric Railway Co.—Bradley Beach	0.54
Morris County Traction Co.—Summit, Chatham and Madison	10.50
Ocean City Electric Railroad Co	2.00
Public Service Railway Co	1.53
	24.57
NEW YORK	
Buffalo & Lake Erie Traction Co	0.42
International Ry.	1.71
Ithaca Street Railway	0.38
New York Central & Hudson River Railroad	58.30
New York City Interborough Ry. Co	5.00
New York Railways Co	0.31
New York State Railways.—Rochester Lines	1.38
New York, Westchester & Boston Railway Co.—Between New York, Mt. Vernon, North Pelham, New Rochelle, Eastchester, Scarsdale and White Plains	18.00
Schenectady Railway Co.	1.27
Syracuse, Watertown & St. Lawrence River R. R.—Between Cicero and Brewerton	6.20
Westchester Electric Railroad Co.—New Rochelle	0.50
	93.47
NORTH CAROLINA	
Durham Traction Co	1.00
North Carolina Public Service Co	6.00
Tidewater Power Co.—(Second Track)	1.00
	8.00
NORTH DAKOTA	
Grand Forks Street Railway Co	0.50
	0.50
OHIO	
Cleveland Railway	1.00
Columbus Railway & Light Co	0.40
Dayton, Covington & Piqua Traction Co	0.50
Hocking-Sunday Creek Traction Co.—From Myers, through Floodwood and Circle Hill to Chauncey	5.75
Northern Ohio Traction & Light Co	3.00
New Midland Power & Traction Co.—Between Byesville, Derwent and Pleasant City	4.75
Toledo Railways & Light Co	1.32
	16.72
OKLAHOMA	
Muskegon Electric Traction Co	4.50
Sand Springs Railway Co	2.50
	7.00
OREGON	
Oregon Electric Railway Co.—Between Salem and Albany, Junction City, Harrisburg and Eugene	78.00
Portland Railway, Light & Power Co	5.50
	83.50
PENNSYLVANIA	
Chester & Philadelphia Railway Co	4.00
Duquesne & Dravosburg Street Railway Co	2.00
Fairchance & Smithfield Traction Co	0.75
Hummelstown & Campbellstown Street Railway Co.—Between Hummelstown, Hershey, Palmyra, Campbellstown and City of Lebanon	10.50
Lehigh Valley Transit Co.—Between Lansdale and Norristown	10.00
Montgomery Transit Co.—Between Lederach and Harleysville	5.00
Philadelphia Rapid Transit Co.	4.00
Philadelphia & West Chester Traction Co	2.00
Philadelphia & Western Railway Co.—Between Philadelphia and Norristown	6.00
Pottstown & Reading Street Railway Co.—Pottstown	2.00
Scranton & Binghamton Railroad Co.—Between Factoryville and Nicholason	6.00
Southern Cambria Railway Co.—Between Ebensburg and Johnstown	11.00
	63.25
PHILIPPINE ISLANDS	
Manila Electric Railroad & Light Co	5.00
	5.00
SOUTH CAROLINA	
Columbia Railway Gas & Electric Co	1.25
	1.25
SOUTH DAKOTA	
Chicago, Burlington & Quincy Railway Co	0.25
Sioux Falls Traction System	1.50
	1.75
TENNESSEE	
Knoxville Railway & Light Co.—Between Knoxville and Vestal	2.60
Memphis Street Railway Co	4.70
Nashville-Gallatin Interurban Railway	27.00
Nashville Railway & Light Co	4.50
	38.80
TEXAS	
Amarillo Street Railway Co	0.50
Austin Street Railway Co	2.00
Dallas Electric Corporation	2.40
Gainesville, Whitesboro & Sherman Railway Co.—Between Gainesville, Whitesboro and Sherman	12.00
Houston Electric Co	5.03
Fort Worth Southern Traction Co.—Between Fort Worth, Everman, Burleson, Joshua and Cleburne	28.90
Northern Texas Traction Co.—Fort Worth	5.00
San Antonio Traction Co	0.50
	56.33
UTAH	
Logan Rapid Transit Co.—Logan, North Logan, Hyde Park, Smithfield, Providence	12.00
Utah Light & Railway Co.—Highland Park and Holliday	10.00
	22.00
VIRGINIA	
Charlottesville & Albemarle Railway Co	0.38
WASHINGTON	
Grays Harbor Railway & Light Co	0.27
Puget Sound Traction, Light & Power Co	2.42
Spokane & Inland Empire Railroad Co	2.50
Whatcom County Railway & Light Co	0.50
Yakima Valley Transportation Co.—Selah	1.00
	6.69
WEST VIRGINIA	
Charleston Interurban Railroad Co.—Between South Charleston, Spring Hill and St. Albans	9.00
Elkins Electric Railway Co	1.50
Monongahela Valley Traction Co.—Clarksburg to Northview	1.00
Parkersburg, Marietta & Interurban Railway Co.—North End	2.35
	13.85
WISCONSIN	
La Crosse City Railway Co	0.50
Milwaukee Electric Railway & Light Co.—In Milwaukee, Wauwatosa, Lake and Racine	6.03
Milwaukee Northern Railway Co.—Between Milwaukee and Brown Deer	11.00
Southern Wisconsin Railway Co	0.50
	18.03
CANADA	
Berlin & Northern Railway Co.—Through Bridgeport	0.25
Calgary Municipal Railway	18.50
Edmonton Radial Railway	2.50
Guelph Radial Railway Co	0.60
Halifax Electric Tramway Co., Ltd	0.75
Lethbridge Municipal Tramway	11.00
Levis County Railway.—Between St. Romaud and Gorman's Bridge	1.50
London Street Railway Co	1.00
Moncton Tramways Electric & Gas Co., Ltd	2.25
Montreal & Southern Counties Railway Co.—Between St. Lamberts and Greenfield Park	3.00
Montreal Tramways Co.—Montreal	2.07
Nipissing Central Railway.—Between Cobalt, Haileybury and New Liskeard	5.70
Oshawa Railway Co.—Oshawa	2.00
Regina Municipal Railway	3.50
St. Thomas Street Railway	0.50
Sandwich, Windsor & Amherstburg Railway.—In Windsor and Sandwich West	1.25
Saskatoon Municipal Street Railway	22.00
	78.37
GRAND TOTAL	
United States and Canada	950.29

Steam Road Electrifications

The Author Discusses Mountain-Grade Service and Shows That with the Electric Locomotive the Ruling Grade Need No Longer Be a Limiting Factor to Transportation Capacities

BY A. H. ARMSTRONG, RAILWAY DEPARTMENT GENERAL ELECTRIC COMPANY

The electrification of our steam railways has been the goal toward which the efforts of electric railway engineers have been directed for many years. Certain installations such as terminal and tunnel electrifications are thoroughly justified and will take place for reasons other than adequate return upon the capital invested. With a better understanding of the electric locomotive and its operating possibilities, its fitness as a superior type of motive power for main-line electrification has become apparent. This fact, together with certain fundamental conditions which have developed during the past few years, has made it possible to consider immediate electrification of certain portions of our main steam roads where the local conditions are especially favorable to electrification and where the limitations of the steam engine are most apparent.

As a result of several years of operation of electric locomotives, sufficient figures are at hand to indicate within reasonable limits their probable cost of operation and maintenance. After making due allowance for the different conditions obtaining, there seems every reason to believe that the electric locomotive can successfully replace the heaviest type of steam engine on the mountain-grade divisions of our main steam roads, provided the daily tonnage is sufficiently heavy to justify the first cost of electrification. These proposed electrifications show a saving over present steam operation sufficiently large to attract the capital investment required, and therefore come outside the scope of the so-called "enforced electrifications" demanded by local sentiment or for reasons of expediency.

There are certain fundamental causes underlying the fact that mountain-grade electrifications can in many instances be considered immediately, and these may be classed under the following three general headings:

1. Electric power situation.
2. Preparedness of the manufacturing companies.
3. Superiority of the electric over the steam locomotive.

ELECTRIC POWER SITUATION

The past few years have witnessed the formation of large power interests in both the West and the East, and these installations have reached such a magnitude and the high-tension distribution systems now cover such a large territory and are fed from so many sources of supply as to guarantee to prospective railroad purchasers a reliable and cheap source of power. The very mountain-grade divisions that are so troublesome to the operators of steam engines are frequently the centers of large hydraulic installations, so that the abundant supply of power in the mountains finds a ready local market in the railroads. The reliability of such electric power supply is indicated by the operation of the Great Falls installation of the Butte Electric & Power Company, which showed a total of seventeen minutes' delay during its first year of operation and a still better record the second year.

Except under very favorable conditions, it does not appear economical to install and operate a power station devoted solely to supplying electric locomotive load alone, owing to the high fixed charges required to furnish power with a ragged load curve and also maintain sufficient reserve apparatus to guarantee continuity of service. Such loads, however, can be absorbed by large power developments at a cost for power which may in many locations make electrification attractive, because such power systems can take full advantage of the diversity factor of railway, lighting and miscellaneous power load. Not the least of the contributing causes justifying immediate electrification in certain localities is therefore the fact that power can be purchased by the railroad companies at reasonable rates, thus eliminating the necessity of any additional outlay for power house and transmission lines, a condition most attractive when financing constitutes the greatest obstacle toward electrifying certain engine divisions.

ELECTRIC LOCOMOTIVE AND STEAM LOCOMOTIVE DESIGN

It is to be expected that the electric locomotive will be improved from time to time with the advance of the art, and the present preparedness of the manufacturing companies to build electric locomotives of any capacity demanded is based upon the experience gained in the manufacture of many such machines. Compared to the steam engine, the electric locomotive is comparatively new, and the belief is held by some that the purchase of to-day will be rendered obsolete by the improvements of to-morrow. It is difficult, however, to anticipate material improvement in the operating results of such machines, for example, as the locomotives operating over the New York Central electric zone. These machines, purchased at a reasonable price, operating at over 92 per cent efficiency from third-rail to rim of drivers, maintained in original operating condition at a total cost of approximately 3 cents per mile run and requiring inspection only after 1200 miles operation, leave small opportunity to effect any but minor future improvements.

The steam engine, on the other hand, is open to fundamental improvements in future designs that may readily make present machines economically obsolete. The change from simple to compound, coal to oil as fuel, the adoption of the superheater, feed-water heater, etc., may make for a fuel economy considerably greater than that open to future improvements in electric locomotives. The use of mechanical stokers may also be justified by reason of the increased engine output so obtained, provided such increased capacity is not purchased at a too great sacrifice in fuel economy.

In other words, the modern steam engine itself is much more liable to future fundamental changes in design than the electric locomotive, owing to the fact that the latter is already advanced to a high state of development not possible with the more complex steam engines comprising both motive power and steam generating plant. Any fear, therefore, that the electric locomotive constructed to-day will be discarded to-morrow by reason of having become obsolete is based upon a lack of understanding of the inherent qualities of such a type of motive power, as such replacement, if made, will be for reasons other than that of locomotive efficiency.

The main reason for electrification, however, rests in the superiority of the electric over the steam locomotive as a type of railway motive power and its better adaptability to the rigorous requirements of heavy mountain-grade railroading. The electric locomotive possesses certain inherent characteristics not equally shared by the steam locomotive, which offer the opportunity of introducing improved methods of operation and effecting economies in the handling of mountain-grade traffic which will have far-reaching effect.

POWER OF STEAM ENGINE LIMITED

The steam engine is a complete power house on wheels and depends upon the mechanical activity and skill of the fireman as regards its horse-power or service capacity output. Its available tractive effort is a function of the weight upon the drivers, diameter of cylinder and steam pressure, all of which may be thoroughly in keeping with the local conditions obtaining in the class of service to which the engine is assigned. The speed at which this tractive effort is delivered, however, depends upon the rate at which a fireman can throw coal and also upon his skill and the efficiency of the boiler. As the result of the continually increasing demand for heavier trains operating at higher speeds in order to take care of the volume of daily tonnage on a single track and meet the schedule competition of possible parallel lines, it has been necessary to develop steam engines having a continually greater weight upon the drivers. With weight per driving axle of nearly 60,000 lb. it is probable that the limit has been reached with present weight and composition of track rails and bridge construction. A further limit has been reached in the four driving axles comprising the 16-ft. rigid wheelbase of a simple engine; hence the development of the Mallet type of engine comprising two articulated trucks of either three or four driving axles each. All this development of the running gear of the engine has been accompanied by an increase in the diameter of cylinder to keep pace with the additional tractive effort demanded, until up to 90,000 lb. may be delivered from a single Mallet engine during the starting or accelerating period of the run.

The steam engine, however, is still fired by hand where coal is used as fuel, and the limit of continued effort of one fireman is still at the rate of not exceeding 5000 lb. of coal thrown per hour. The use of two firemen alternating in short shifts of say twenty minutes may result in throwing a somewhat greater quantity of coal beneath the boiler than indicated above, but at best the steam engine has reached limits in its horse-power output by reason of the amount of coal which can be fed to the grates. The introduction of the mechanical stoker may effect a considerable increase in the amount of coal fired, but such improvements have yet to show that the increased locomotive output so obtained is not purchased at a decreased coal efficiency that largely impairs the gain effected. Oil is used as fuel in favorable localities with resulting marked increase in the service capacity and hence speed of the locomotive on mountain grades. With the continually increasing demand for oil products, it is probable that the economic operating zone for this kind of fuel will become very restricted; in fact, a return to coal has already been made on certain single engine divisions owing to recent advances in the price of fuel oil.

While the weight upon the drivers and tractive effort of steam engines has therefore kept pace more or less with the requirements of mountain-grade railroading, the increased tractive effort so provided has been purchased at the expense of speed. The simple engine of four driving axles and a total of 200,000 lb. on drivers may haul its rated tonnage on the maximum grade at 12 m.p.h., while the Mallet engine with its greater weight on drivers and increased tractive effort available will haul a correspondingly greater rated tonnage at speeds, however, not greatly exceeding 7 to 8 m.p.h. If greater speeds are required upon ruling grades, the demand can be met with the Mallet engine only by hauling less than its rated load or by providing more engines per train.

It is just in this connection that the electric locomotive offers all the advantages of the high tractive effort demanded without being penalized by the correspondingly reduced speed of its steam competitor. Just what this may mean in the operation of a mountain-grade division is best appreciated by a brief analysis of the inherent characteristics of modern steam engines and the type of electric locomotive just completed for operation upon the Butte, Anaconda & Pacific Railway. These figures are shown in Table I.

Both the Mallet and the electric locomotives have been built in units larger than listed in this table, but for general conditions the size quoted may be taken as typical for both.

LOCOMOTIVE PERFORMANCE

While fuel economy is not the most important consideration, there is generally a certain saving to be effected in this item by the substitution of the electric for the steam locomotive. The cost of coal and its quality, as well as the cost of electric power, will vary so greatly in different localities that no comparison is of any more than general interest. The coal consumption of a steam engine is, however, of the greatest interest from the standpoint of indicating its service capacity. In order not to confuse the issue being discussed, the data shown in Table II have been tabulated, based upon the coal burned by the steam engine itself, while working at full output, although of greater interest are the total amount and cost of coal purchased, including the wastage and cost of handling between purchase point and engine tender.

TABLE I, SHOWING GENERAL CHARACTERISTICS OF SIMPLE MALLET COMPOUND AND RECENT ELECTRIC LOCOMOTIVE.

	Simple.	Mallet Compound.	Electric
Number of driving axles	4	6	8
Weight on drivers	200,000 lb.	300,000 lb.	300,000 lb.
Total weight locomotive and tender	400,000 lb.	530,000 lb.	300,000 lb.
Weight per driving axle	50,000 lb.	50,000 lb.	37,500 lb.
Length of engine and tender	70 ft.	85 ft.	75 ft.
Length rigid wheel base.	16 ft.	10 ft.	9 ft.
Diameter drivers	57 in.	57 in.	46 in.
Cylinder, diameter	23 x 28	21 x 32, 33 x 32	....
Rated tractive power	44,000 lb.	66,000 lb.	66,000 lb.
Coefficient of adhesion	22 per cent.	22 per cent.	22 per cent.

The tonnage rating of a locomotive is based upon its performance on ruling grade, and in many instances the ruling grade may extend over a considerable distance, thus calling for the continued development of maximum output and demanding the best efforts of the fireman. While delivering the large tractive effort required on ruling grade, the steam engine must necessarily operate at a considerable proportion of its full stroke, a fact that should not be lost sight of in determining its coal and water economy, and hence horse-power output, as derived from the amount of coal that can be fired per hour.

TABLE II, SHOWING TYPICAL STEAM ENGINE PERFORMANCE.

	Simple.		Mallet Compound.	
Steam consumption per i.h.p. on ruling grade	30 lb.		23 lb.	
Mechanical efficiency	85 per cent.		85 per cent.	
Steam per hp at rim of drivers	35.5 lb.		27 lb.	
Evaporation per pound of coal*	5—8		5—8	
Coal per hp -hour at rim of drivers	7.06	4.42	5.4	3.38
Hp available at rim of drivers at coal rate of 5000 lb. per hour	709	1130	926	1480
Tractive effort on basis of rated tonnage	36,000 lb.		54,000 lb.	
Coefficient of adhesion	18 per cent.		18 per cent.	
Speed at rated tractive effort	7.35 m.p.h.	11.7 m.p.h.	6.39 m.p.h.	10.20 m.p.h.

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*Evaporation will depend upon the heat units per pound of coal ranging from 10,000 b.t.u. for Western lignite to nearly 15,000 b.t.u. with Eastern bituminous. This points out that the limitations in locomotive output and speed, as determined by the amount of coal which a fireman can throw per hour, are more keenly felt on the Western mountain grades where inferior coal must be used.

SLOW SPEED OF STEAM LOCOMOTIVE ON RULING GRADES

A careful study of Table II is most instructive, as it points out one of the great weaknesses of the coal-burning, hand-fired steam engine, and that is its low speed when operating on ruling grade. The values of steam consumption and evaporation taken are fully representative of good performance, but it must be also admitted that considerable latitude should be allowed in such values as pounds of coal burned per horse-power hour output at driver rims on account of the boiler condition and the efficiency of the crew. Hence the average performance of all the engines assigned to one grade division may quite possibly fall below the figures quoted above.

The table shows why the heavier Mallet must necessarily haul its larger rated tonnage at a lower speed than the simple engine. There are admitted large economies resulting from the movement of heavy unbroken trains over a mountain-grade division; hence the usefulness of the Mallet. But the question of operating speed must not be lost sight of, and with a congested single track a possible marked increase in speed may eliminate the necessity of constructing a second track with the large capital outlay which this would entail in the mountain districts.

Turning again to what relief from these conditions is offered by the electric locomotive, there is presented a machine entirely separate from its power supply and comprising electric motors, running gear and superstructure, all suitably proportioned to best advantage. The motor armatures may be mounted direct on the axles, as in the New York Central design, or may transmit their power through twin gearing, as is the case with the Great Northern, Detroit tunnel and Baltimore & Ohio tunnel locomotives, or may even connect with side rods or combination of gear and side rods. The several types of gearing present a radical difference in appearance but a comparatively small fundamental difference in actual efficiency from electrical to mechanical power.

The main point to be considered at this time is that, however different in type of construction, the electric locomotive, as such, is a highly efficient machine, can be maintained at a lower cost and is capable of giving a sustained output greatly exceeding that of a steam engine. With good-quality bituminous coal, the steam engine may operate its rated tonnage calling for a tractive effort corresponding to 18 per cent coefficient of adhesion of its drivers, at a sustained speed of not over 12 and 10 m.p.h. respectively, for hand-fired simple and Mallet engines. With Western lignite the speed may fall as low as 8 and 6 m.p.h. for the two types of engines working under the same maximum conditions.

The electric locomotive, however, having access to unlimited power, is restricted in its tractive effort only by the weight upon its drivers and has no reasonable speed limits other than those imposed by the curvature of the track. Moreover, several locomotive units may be coupled together and operated as a single locomotive under the control of one operator. The ability of the electric locomotive to furnish both large tractive effort and high speed is best brought out by the comparison shown in Table III applying to the locomotive constants given. A typical ruling 2 per cent grade division is taken as representing general mountain-grade conditions.

TABLE III, SHOWING COMPARATIVE HAULING CAPACITY STEAM AND ELECTRIC LOCOMOTIVES.

	Simple.	Mallet Compound.	Electric.
Total weight, including tender	400,000 lb.	530,000 lb.	300,000 lb.
Weight on drivers....	200,000 lb.	300,000 lb.	300,000
Cofficient of adhesion at rated tonnage....	18 per cent.	18 per cent.	18 per cent.
Tractive effort at rated tonnage	36,000 lb.	54,000 lb.	54,000 lb.
Tractive effort 2 per cent grade	40 lb.	40 lb.	40 lb.
Train and curve resistance	7 lb.	7 lb.	7 lb.
Total resistance.......	47 lb.	47 lb.	47 lb.
Rated tonnage, total..	776 tons	1,150 tons	1,150 tons
Rated tonnage, trailing	576 tons	885 tons	1,000 tons
Per cent of electric trailing, tons	57.6	88.5	100
Speed at rated tonnage*	7.35 m.p.h.	6.38 m.p.h.	14 m.p.h.

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*Speed based upon using Western lignite at approximately 10,000 b.t.u.

A study of steam engine practice discloses the fact that engines receive a tonnage rating on ruling grade that will require a tractive effort of approximately 18 per cent coefficient of adhesion of their drivers.

SERVICE CAPACITY

The hauling capacity of the electric locomotive having the same weight upon its drivers is shown as being but 13 per cent greater than that of the Mallet, but the speed at which this tonnage is hauled is over double that possible with the steam engines. The "service capacity," or the product of trailing tonnage and speed upon ruling grade, is therefore a truer measure of the comparative performance of the several locomotives and is given in Table IV.

TABLE IV. SHOWING COMPARATIVE SERVICE CAPACITY OF STEAM AND ELECTRIC LOCOMOTIVES.

	Simple.	Mallet.	Electric.
Trailing tons, 2 per cent grade	576	886	1,000
Speed	7.35 m.p.h.	6.38 m.p.h.	14 m.p.h.
Speed multiplied by trailing tons	4,235	5,660	14,000
Per cent of electric "service capacity"	30.2	40.5	100

This table shows that the electric locomotive "service capacity,' or its ability to move tonnage per hour, is three times that of the simple and two and one-half times that of the Mallet engine, while its total weight is less than either.

As compared with hand-fired coal-burning steam engines of either the simple or Mallet types, the electric locomotive may be looked upon to furnish the much-needed increased capacity of motive power for mountain-grade divisions. Such grade divisions are not only a heavy expense in operation but introduce a very slow schedule in a trunk-line service, besides greatly congesting the traffic on a single track, when steam engines are depended upon. Many divisions comprise ruling gradients of such a nature as to require the breaking up of through trains or at least a partial rearrangement of the train tonnage delivered by the adjoining low-grade division. The delay thus introduced, together with the lost time incident to steam engine haulage on a heavy grade, amounts to a considerable total.

ELAPSED TIME

A mountain division of 220 miles, comprising ruling gradients of 2 per cent, showed the results published in Table V of elapsed time under existing steam engine conditions compared with the time that could have been made with suitable electric locomotive equipment.

TABLE V, SHOWING ELAPSED TIME WITH STEAM ENGINE ON GIVEN RUN AND THAT POSSIBLE WITH ELECTRIC LOCOMOTIVE ON SAME RUN.

	Steam, Hours.	Electric, Hours.
Actual running time	15.15	13.02
Taking water	.90	.....
Cutting in and out helpers..........................	1.00	.50
Testing air brakes..................................	.20	.20
Changing engines and rearranging tonnage...........	1.40	.....
Total elapsed time..................................	18.65	13.72

The run of 220 miles shown in Table V comprised two steam engine divisions, entailing the necessary delay in changing engines, while the schedule of the electric locomotive is based upon its making the through run of 220 miles, changing crews, however, at the division point.

The electric locomotive run is further based upon making a maximum speed of not over 35 m.p.h. on level track, the speed attained in the steam engine run, but, however, making a much higher speed on the ruling grades than the 10 m.p.h. reached with the steam engine. The delay due to taking on water is best appreciated by having knowledge that the water supply in the tender is sufficient to last only from one to one and one-half hours of continuous running at maximum output corresponding to a possible distance covered of from 10 to 15 miles. With a complement of three steam engines per train, taking water involves a delay of from twenty to thirty minutes, all of which time is saved with electric locomotive operation. Aside from the economies resulting from replacing the steam with the electric locomotive, the providing of increased hauling capacity at increased speed comprises operating advantages that will be fully appreciated in these days of track congestion and competition.

COAL CONSUMPTION

In previous tables values of from 3.38 lb. to 7.06 lb. of coal per horse-power hour at the driver rims have been quoted. Such figures, however, apply only to the coal used while the steam engine is working at full output.

In addition, there is much coal burned from which no return in mileage is made. Commencing with firing up and ending a run with fire banked, coal is continuously being burned during the time that the train is in motion as well as when standing still.

Some idea of the coal wastage inherent to steam engine operation is gained by study of Table VI, which has been compiled from observed operating conditions.

TABLE VI, SHOWING COAL RECORDS OF SIMPLE ENGINE.

Firing up preparatory to run	1000 lb.
Standing on sidings	500 to 1000 lb. per hour
Coasting down grades	950 lb. per hour
Fire banked in roundhouse	150 lb. per hour

The steam engine is actually working but a small part of the twenty-four hours, and to the coal consumed during working periods must be added that burned in making up fire, coasting down grade, standing on sidings, banking fire, etc. A series of readings extending over a period of thirty days and covering two engine divisions of a Western mountain road where lignite coal of less than 11,000 b.t.u. was used showed that nearly 12 lb. of coal was purchased for each useful horse-power hour expended at the driver rims.

In some instances nearly 10 per cent of the tonnage moved over the division consists in the coal required to move the trains.

The price of such coal may vary from $1.50 to $3 per ton upon the tender, and in this item of fuel the electric locomotive holds promise of material saving. While this article is largely devoted to a consideration of the Western mountain-grade problem, there is an even greater saving in fuel to be attained in operating electric yard locomotives. The average demand for power is less than 100 kw in yard shifting service, as given by Mr. Murray, while the coal consumption per horse-power hour of steam yard engines is even greater than the figures given above for road engines on grade divisions.

OTHER OPERATING ADVANTAGES

Electrification promises much in the way of increased hauling capacity, higher speed on ruling grades and relief from track congestion. Other operating advantages result with the use of the electric locomotive. In certain railway systems it is the practice to pool the engines, while in others best results appear to be obtained when an engine is assigned to its own crew. The greater reliability, ruggedness and uniform operation of electric locomotives make it entirely feasible to pool them and secure the benefits of a lesser outlay without risking any marked increase in the cost of locomotive maintenance. Moreover, it is entirely possible to operate an electric locomotive continuously during the twenty-four hours with no reference to coaling or watering stations or roundhouse and no delays incurred thereby or in cleaning fires and washing out boilers. The freedom of action which the electric locomotive enjoys should prove a valuable asset in the operation of a complete engine division. Many other advantages are offered such as electric braking on down grades, thus relieving the brakeshoes and wheels and eliminating possible delay and derailments due to overheating these parts. Freedom from cinders may be a consideration in passenger train operation, but is also of value as reducing the fire risk.

Few comparisons of steam and electric operation are made upon the same basis of schedule and train tonnage moved, showing in itself that electrification is primarily considered from the standpoint of improvement in the service that can be accomplished by steam. It is difficult, therefore, to express any economic value of motive power substitution, as such benefits as, for instance, decreased running time are difficult to put into figures. Such direct savings as are evident, however, indicate a very attractive return upon the capital investment required after paying all the increased fixed charges incurred. In fact, perhaps one of the most effective causes contributing toward the present electrification movement lies in the acceptance of existing proofs that the electric locomotive can be economically as well as reliably operated.

BUTTE, ANACONDA & PACIFIC LOCOMOTIVES

The foregoing data apply to the electric locomotive as such, with no particular reference to any one type of construction. Characteristics of the Butte, Anaconda & Pacific locomotive have been quoted as being typical of the performance required for mountain-grade service. This installation will be in operation in the very near future and test data made available. The Butte, Anaconda & Pacific locomotive is of interest in this article in that it is the most powerful machine thus far constructed for its weight, comprising an eight-motor equipment capable of giving a sustained output of 2200 hp in continuous operation with 75 deg. C. rise, and the complete locomotive weighing 150 tons, all on drivers. When it is realized that this large sustained output is delivered at a speed of approximately 15 m.p.h., the fitness of this locomotive for heavy grade haulage will be admitted.

The Butte, Anaconda & Pacific motors are connected to the driving axles through twin gearing, following the construction of the Cascade, B. & O. and Detroit tunnel locomotives, as affording the greatest possibilities of large horse-power output at low operating speed. The locomotive motors differ from any now in operation in this country only in the voltage, which is 2400 volts d. c. between trolley and rail. The rugged qualities of the direct-current motor are fully known, and the greater radius of action secured by the use of 2400 volts is made apparent by the statement that the 26 miles between Butte and Anaconda will be fed from two substations located at either end, with trains of 3400 tons trailing against a gradient of 0.3 per cent operating at a speed of 14 m.p.h. The Butte, Anaconda & Pacific Railway comprises approximately 114 miles of track, of which 90 miles are being electrified at present.

ELECTRIFICATION OF TERMINALS AND OF MOUNTAIN GRADES

The causes underlying the movement toward terminal electrification in our large cities are so apparent and well founded that this important class of work has received but passing mention in this article. The installation of electric locomotives to operate through tunnels is also a matter beyond question, and this fact is not lost sight of in future plans for mountain-grade divisions, as in some favored localities a very few miles of tunnel can replace many miles of surface grade, with its attendant higher elevation, high cost of maintenance and operation. The fact, however, that is just being appreciated is the value of the electric locomotive characteristics when applied to the haulage of the heaviest trains at the highest speeds feasible on mountain-grade divisions.

The introduction of the electric locomotive robs the dreaded "ruling grade" of half its terrors, as the heaviest trains can be moved up such grades at double the present operating speeds with steam engines and can be safely controlled down grade with electric brakes without having recourse to air brakes except as an emergency resort.

Moreover, the operating advantages which the electric locomotive introduces can be secured with adequate return upon the capital investment called for. In these conditions and in the availability of cheap power, with the present state of development of electric locomotives and auxiliary apparatus, we find the main causes underlying the present earnest movement toward the electrification of mountain-grade divisions.

The Development of the Electric Railway Motor

The Electric Railway Motor Has Now Reached the "Age of Economy"—Dangers in Too Great Reduction in Car Weights Are Cited—Possibilities in Field Control Are Discussed

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The evolution of the modern railway motor began in the early eighties and is practically all confined to a period of thirty years, which may be divided into about five stages as follows:

First—The period embracing the experiments of the early inventors such as Field, Hopkinson, Henry, Daft, Edison, Van Depoele, Farmer, Bentley, Knight and Sprague.

Second—The period covering the exploitation of the double reduction motor between the years 1886 and 1891.

Third—The period from 1891 to 1907, covering the development of the single reduction motor of the straight series type.

Fourth—The period from 1907 to 1911, covering the development of the commutating-pole motor.

Fifth—The period beginning 1911, which is not yet completed, covering the age of economy in operation.

Of the first and second stages it is unnecessary to say anything at this time as they are a matter of history which is already well written in numerous articles in the Street Railway Journal and elsewhere.

The third stage has not been so completely described. It begins with the introduction of the first really successful single reduction motor—the Westinghouse No. 3—and covers the entire range of motors built by the Westinghouse Electric & Manufacturing Company down to the No. 101-B-2, the motors built by the General Electric Company from the S.R.G. to the G.E.-80, and the various motors built by the Short Company, the Walker Company, the Lorain Company, the Stanley Company and the Allis-Chalmers Company. Some of these companies, such as the Short, Walker and Lorain companies, were strong competitors in the early days and made some very good motors. For one reason or another the companies abandoned the manufacture of electric railway motors. However, the good points of the motors were largely retained and transmitted to the later designs. The motors at the end of the third stage may be said to have embodied in them practically all of the improvements which were developed prior to that time. The Westinghouse No. 101-B-2 motor, for instance, had the following features, many of which are now common to all railway motors:

1. Inclosed type with cast-steel frames.
2. Four laminated radial pole pieces bolted into the frame.
3. Mummified strap-wound field coils insulated with asbestos paper between adjacent turns, the entire coil impregnated in a vacuum.
4. Large armature shafts carried in bearing housings extending inside of the armature at the pinion end and inside the commutator at the front end.
5. Bearings well lubricated by the use of oil-soaked waste.
6. Separate oil well for gaging depth of oil and for receiving fresh oil.
7. Efficient oil throwers as a protection against the oil reaching the interior of the motor.
8. Spring packing of field coils to counteract the effect of shrinking insulation, and thus prevent loosening.
9. Improved methods of holding motor leads to prevent vibration and breaking.
10. Two-point suspension of gear cases.
11. Commutator cover with simple and reliable cam-locking device.
12. Slotted drum-wound armature.
13. Ventilated armature.
14. Form-wound armature coils assembled in sets of three coils each.
15. Armature core and commutator assembled on spider.
16. Armature bands laid in grooves in the armature core.
17. Coils protected by asbestos hoods on the commutator end.
18. High-grade insulation.
19. Commutators with mica extending beyond the copper, both on the inside of the commutator and at the end next to the windings to prevent short-circuits.
20. Improved brush holders with insulation consisting of high-grade insulating tubes protected by brass shells where clamped and by porcelain sleeves to give creepage surface.
21. Brush holders with adjustable tension and frictionless springs.
22. High-grade carbon brushes.
23. Many other small details which contribute to the success of the motor but can scarcely be enumerated.

Each one of the features mentioned has its own history which, if completely written, might cover a good many pages. It is, however, not necessary to give this in detail, and only a few comments will be made.

It is, of course, understood that these special features above given did not all originate with the No. 101-B-2 motor. They were carefully selected after a study of the previous types in service and were based upon the comments and suggestions of a great many operating men. The earlier railway motors were almost entirely the product of the manufacturers' designers. It was natural that this should be so since there was so little actual experience in operating motors and so few people in the business who actually knew anything about them. Even after there were thousands of equipments in service, it was rather difficult to get concrete suggestions from operating men for improving the design of motors. At the time the No. 101-B-2 motor was designed, however, a systematic effort was made to make the operating men thoroughly understand that the motor designers were in earnest in asking for their opinion and advice, and the result was that a great many valuable suggestions were obtained and some of the most valuable features in the modern motors were due to suggestions from operating men. The close touch between the operating men and the designers, which has been brought about through association largely in the American Electric Railway Engineering Association, has been of incalculable value in the design of railway motors.

INCLOSED TYPE OF MOTOR AND LAMINATED POLES

The inclosed type of motor resulted from the large amount of trouble experienced from mud and water splashing into the early types and causing them to break down their insulation. The No. 3 Westinghouse motor had the lower half of the frame inclosed, but the top half was more or less open over the commutator. The General Electric W.P. motor went still further and had the motor completely inclosed. The use of the four radial poles followed the attempt to get the most compact as well as the lightest design for street car motors. The Westinghouse No. 3 was the first commercial motor with this feature. It had the four radial poles and four equal field coils.

Laminated pole pieces were introduced to decrease the loss from eddy currents in the pole faces, which, with the high inductions introduced with the slotted armature and small air gaps, greatly increased the total loss in the motor.

The earliest motor having laminated poles was the Westinghouse No. 38-B. The poles were cast into the steel frame. The writer well remembers testing the first No. 38 with solid steel poles and finding such an astonishing loss in the pole face that laminated poles were at once decided upon. The pole pieces were bolted in on later motors, but whether first by the Lorain Company or the General Electric Company, the writer is unable to say. This was done in order to make the motor more compact and to utilize all of the space to the best advantage. It has ever since been standard practice. The induction in the air gap and the pole face is considerably less than the economical induction for working in sheet steel, so that it was quite possible to reduce the section back of the pole face and use the projecting tips to hold the field coils in position. Later the Westinghouse generator practice of saturating the pole tips by cutting off alternate pole tips from the punchings was introduced. This is still used to some extent.

MUMMIFIED STRAP-WOUND FIELD COILS

The use of mummified strap-wound field coils with asbestos insulation has become practically universal, and the use of round wire is permitted only on the smallest sizes of motors where the section is so small that no gain is secured by the use of the flat copper ribbon. This type of field coil has been a wonderful improvement over the earlier types. Insulated as it is with heat-proof insulation in the interior of the coil, it is able to withstand a much higher temperature, and the external insulation which is so completely filled with varnish, etc., makes it practically waterproof as well. The G.E.-57 motor and some others had field coils of copper ribbon insulated with asbestos between turns. They were, however, wound in metal bobbin shells or spools and could not be wound tight enough to prevent chafing of insulation and grounding. The mummified construction adopted for the No. 101-B-2 motor eliminated this trouble and made a solid coil which when used with the spring packing is held perfectly tight. The use of springs back of the field coils to insure their being held firmly at all times has been a great addition to the motors. It prevents the breaking of leads and chafing of insulation which would result in grounded field coils.

LUBRICATION

Probably no improvement has been more marked and has done more to keep the motor cars out of the repair shop than the introduction of the type of bearing housing and the method of lubrication used with the No. 101-B motor. With the old grease lubrication, it was no uncommon thing for armature bearing shells to be replaced after 3000 miles of service. The life of the bearing on the No. 101-B-2 motor may be almost anything up to 300,000 or 400,000 miles. This extraordinary result is due to the excellent design of the bearing, which has the waste packed against the shaft on the low-pressure side, with pressure of a column of waste over it, and the oil fed from below, coming from the well, which may be gaged at any time to see that the oil is kept at the economical level. This type of bearing is now universally adopted. It is scarcely necessary even to add oil to the bearings more than once a month, so that not only is the cost of lubrication reduced to a negligible quantity but the cost of maintaining the bearings and the loss due to the armature getting down on the pole pieces, which was a fruitful source of expense with the old bearings, have been practically eliminated.

OTHER ARMATURE IMPROVEMENTS

The modern armature is a very different piece of apparatus from that of twenty or twenty-five years ago. Then the armatures were either hand-wound, as in the W.P. and S.R.G., or the coils were wound on a form and driven down on the ends of the armature with a mallet in the process of winding them, as in the Westinghouse No. 3. The evolution from that type to the one used at present has been gradual. The early motors, like the No. 3, had only one armature coil per slot; the Westinghouse No. 12-A had two coils per slot; the No. 38-B had three coils per slot. The No. 12-A introduced the barrel-shaped armature winding with the ends left open to provide circulation of air through the coils. The G.E.-57 had form-wound coils with sloping ends bound firmly on a coil. The modern type has the coils projecting straight out banded to the coil support and completely covered with canvas or asbestos cloth caps.

The asbestos hoods on the front end of the armature windings were introduced to prevent the damage incident to flashing which may occur from any reason and is liable to set fire to a canvas covering.

The modern brush holders are a great improvement over the earlier form, not only in accuracy of adjustment but in simplicity of the insulation, substantial design and the use of adjustable frictionless springs. Sluggish brush holders and inaccurate adjustments used to be fruitful sources of bad commutation and flashing, but they have been almost entirely eliminated.

Another scheme that was introduced with the No. 12-A and the No. 38-B motors was the use of longitudinal holes through the armature core that served the double purpose of paths for circulation of air and of saturating the iron beneath the armature slots, which thereby improved commutation. The saturation has been largely abandoned on later motors, but the air ducts are continued.

Introduced with the No. 101-B for small motors was the armature spider, which carries not only the armature core but the commutator and thus permits the easiest possible renewal of bent or broken armature shafts. It also stiffens up the shaft in the spider and gives a much larger diameter for carrying the armature punchings and thus holds them tighter. There is less liability of relative motion between armature core and commutatior, as both are keyed to comparatively large diameters on the same spider.

COMMUTATING-POLE MOTORS

Coming at a time when the straight series motor had thus reached its high state of perfection, it is little wonder that the commutating-pole motor introduced in 1907-08 was an immediate and unqualified success. It had the benefit of all of the experience gained in the design and operation of the earlier motors, and added to that the use of the commutating pole, which eliminated the last serious objection to the direct-current street car motor, namely, the troubles incident to the commutation of the current. It is probable that no class of apparatus ever designed had a greater measure of success than the commutating-pole railway motors introduced at this time. However, the commutating pole was not the only new feature. The close association of the designers with the operating force and the intensive study of the subject led to still further minor improvements in the motors, and some very valuable features were introduced. Among them was the two-turn strap-wound coil with the Westinghouse No. 310 motor, which was a triumph in the art of armature winding. The method of forming the coils used in this motor obviates all of the difficulties which had previously been experienced with that type of coil. It permits of increased efficiency, larger capacity, better insulation and more substantial construction than with the ordinary wire winding.

The high-grade carbon brushes which came into extensive use about the same time, added to the undercutting of the mica on the commutator surface and the sparkless commutation due to the commutating pole, have practically eliminated wear on the commutator and greatly increased the life of the brushes. The amount of carbon and copper dust originating in the motor, which would tend to reduce the efficiency of the insulating surfaces, is, therefore, very small. This feature is of the utmost importance in the motor to be used on high-voltage circuits and greatly increases its reliability. Without it the high-voltage motor would have been a difficult if not a commercially impossible problem. With it the motor operates better on 1500-volt circuits than the old motor did on 600 volts.

THE AGE OF ECONOMY

The first interruption to the course of the commutating-pole motors came with the fifth stage in the history of the railway motor, namely, the age of economy.

One of the most notable signs of the times in the last two or three years has been the demand for economy and efficiency in every field of human endeavor. This has been due in great part to the training of the thousands of engineers who have been working in every possible way to increase the outputs of factories, mills and mines, to reduce operating expenses for a given output, to reduce the losses in generating plants, to increase the efficiency of transmission lines by the use of higher voltages, and so on through the entire field, trying in every way to reduce costs and increase dividends. This craze for efficiency—for such it has become in some quarters—reached the electric railways two or three years ago when someone called emphatic attention to the fact that it costs good money to carry around dead weight on street cars. This cost is variously estimated at from 2 cents to 10 cents per pound—a favorite figure being 5 cents per pound per annum. The exact amount, of course, depends on the cost of power at the car, the mileage and the class of service in which each car is engaged. Undoubtedly there are some classes of city service where the cost of hauling 1 lb. for a year is as much as 5 cents and possibly more.

REDUCTION IN CAR WEIGHT

Of course, this was not a particularly new idea, as it had been preached in some places for a good many years; but, be that as it may, it was brought out strongly at a very opportune moment—at a time when all parts of a car equipment had reached their maximum weights as a result of the demand for safety and reliability. It cannot be denied that there was reason for the complaint about excess weights, for the reduction in weight consequent upon the demand of operators for light-weight cars was prompt, and the reduction was so large as to leave no room for doubt that the previous weights had been excessive. However, as is usually the case, the reduction in weight has been carried to such an extreme in some cases that it has increased rather than decreased the cost of operation. It is always a question where to stop in such changes, and it is always a mistake to have only one idea in mind, especially if this idea consists simply of the possible fact that it costs 5 cents per pound per annum to haul the weight around on the cars.

Other things being equal, a reduction in the weight of a street car will effect a proportional reduction in the power required to move it. However, one should always be certain that the reduction in weight is not accomplished at the price of decreased operating efficiency or of increased cost of maintenance. Either of these can easily far more than offset any saving effected by decreased weights.

The prime idea should be a broader one. The reduction in cost of operation is the most comprehensive idea, but the demand for a reduction in the energy required to move the cars is a far safer and saner idea to inculcate in the minds of the operating men than the sole idea of the reduction of weight to save money. It should be understood that the lightest equipment is not necessarily the one which will have the lowest energy consumption per car mile.[*]

OTHER METHODS OF IMPROVING OPERATING EFFICIENCY

Ample proofs have been offered to show that the energy consumption can be greatly decreased by other methods than by decreasing the weight of equipment. This is especially the case where a decrease in the weight of the railway motor means an increase in the speed and consequently gives a lower efficiency in operation. A light-weight, high-speed motor may have a very good efficiency when operating at full voltage, better possibly than that of a heavier motor which runs at 20 per cent lower armature speed. In service, however, it is very frequently the case, and is nearly always the case in city service, that the motor with the lower speed will give a higher operating efficiency. This is due to the fact that the motor with higher speed will necessarily have a much greater resistance loss in accelerating, which is far more than enough to offset the power saved by reducing the weight.

In general, it is dangerous to make radical reductions in the weight of railway motors. It must be remembered that the motors built ten years ago were lighter in weight than the standard motors of to-day, but they were not nearly so reliable. For instance, a reduction in the size of armature shafts, which have been brought to their present generous proportions by years of hard experience, even though accompanied by the use of heat-treated material, is dangerous. Heat-treated materials have not yet reached the stage where they can be considered as standard, and until the methods of heat-treating of steel are much better understood by the general run of manufacturers and it is possible to obtain more uniform results by such treatment, we believe it will be better to make shafts strong enough to stand the service required of them without a resort to heat treatment. An extremely careful redesign of railway motors is, of course, producing some reduction in weight, but a radical reduction is sure to be followed by increased cost of maintenance, which will render the equipments less reliable and will more than offset any saving that can be made on account of the reduced weight.

The use of a coasting-time clock and of similar devices has drawn attention to the tremendous waste of power due to inefficient handling of equipment. It is said that the coasting-time clock, by putting a premium on rapid acceleration and on the maximum amount of coasting, has resulted in a saving of power consumption in some places of 20 per cent to 25 per cent or even higher. For the benefit of those who are seeking to reduce weights it is well to call attention to the fact that efficient handling of the cars may in some cases result in so much less heating in the motors as to permit the use of a smaller size of motor, which will thus effect a reduction in weight without a decrease in the mechanical strength of the motor.

Another scheme for reducing the weight of the equipment is by the use of ventilated motors. For some years back the use of forced ventilation has been common on locomotive motors and some motors for car service as well; notably, the motors on the Long Island Railroad have been operated for several years with forced ventilation secured by the use of small motor-driven blowers. The circulation of the external air through the internal parts of the motor is very effective in carrying off heat and will very largely increase the continuous capacity of the motor. This same result may be brought about by the use of perforated covers on the motor or of a fan on the armature shaft arranged so as to draw air through all parts of the motor. Either method is very effective and is quite satisfactory where the dust and dirt do not offer a serious obstacle. In cases where the danger from dust and moisture is serious, the air should simply be circulated about inside of the motor with no connection to the outside air, as has been the practice for many years. Any method that will cause the air to circulate inside the motor is helpful, because it brings the heat to the surface much more quickly than if the air were to remain stagnant in the motor.

FIELD CONTROL

Undoubtedly the most positive power saver which has been introduced with the interpole motors in the last two years has been the use of field control for the motors. This, as is well known, is simply a revival of the old-time control system, which was used in some of the earliest railway motors. The Sprague double-reduction motor made the most extensive use of this, since the control was entirely by commutating the field and employed no external resistance at all. It was used to a greater or less degree in the early double-reduction motors and in one or two or the single-reduction motors. However, the commutation with slotted armatures was not good enough, and the selection of equipments and operation of motors were not well enough understood at that time to make the system a success. It was dropped nearly twenty years ago and was not revived to any great extent until it was applied on the locomotives of the New York, New Haven & Hartford Railroad, which were supplied in 1906 and 1907. These were single-phase motors of the series compensated type and permitted a wide range of variation in the field strength without impairing the commutation. The system in this instance worked with marked success. Its later application to the commutating-pole motors on the giant Pennsylvania locomotives used for the New York terminal was also an entire success, so that the engineers of the company which had furnished both of these types of locomotives were satisfied that this system of control could be used safely with any size of motor. The trial equipment placed in service on the Metropolitan Street Railway in New York City nearly two years ago met with just as great success as that of the locomotives, and the decrease in the energy consumption of this car equipment over the standard type of equipment in use was quite remarkable. A motor of very slow speed was used, and the resistance was normally cut out of circuit before the car reached a speed of 8 m.p.h. Higher speeds were obtained by weakening the fields of the motors. The maximum speed obtained was hardly as high as that of the standard equipment so that a part of the saving of power is due to the lower speed, but the larger part of it is undoubtedly due to the use of field control.

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[*] Under the subject of "Economies in Railway Operation," F. E. Wynne has very ably discussed this matter in a paper presented before the Baltimore Section of the A. I. E. E. last spring and published in the *Electric Journal*, October, 1912. He shows clearly the effect of higher armature speed, corresponding to small gear reduction, on power consumption in city service. He also takes up the methods for securing the greatest efficiency in operation.

The table given in Mr. Wynne's paper before referred to shows that the energy consumption of the standard equipments of double 60-hp motors was 152.26 watt hours per ton mile, while that of the equipment of double 40-hp field control motors was 124.41, or a total reduction of over 16 per cent in energy consumption per ton mile. This, added to the fact that the equipment weighs considerably less, effected a total saving of over 20 per cent in the energy consumption. There is no doubt that similar savings can be effected in other places.

When we consider what a large part of the work done by the railway motor in city service, consisting chiefly in storing energy in the moving car, is done at speeds under 10 m.p.h., and we realize that most of this work with ordinary control is done with resistance in series, we can begin to understand how very important it is to cut the resistance out at the lowest possible speed. The standard type low-speed motor operates efficiently in the slow service, but the maximum speed is too low to maintain most schedules. Field control both cuts out resistances at the minimum speed and gives the maximum speed desired. It is almost ideal.

Practically the entire advantage of the use of field control in city service is in securing a lower energy consumption. On interurban railways, however, there are additional reasons for using it. The energy consumption is, of course, reduced a certain amount for each acceleration, the peaks on the line are decreased, and the maximum demand from substations is correspondingly reduced, but possibly the most important advantage for interurban work lies in the fact that the field control equipment is suitable for both limited and local service. There are a great many instances where cars equipped with standard motors have been geared for the high speed required for limited service and are operated in both limited and local service. The high-speed gearing renders the cars unfit for local service, since either the acceleration will be very poor and the schedule extremely low or the motors will be badly overworked. As it is the almost universal custom of railways to maintain the fastest possible schedules at any cost, the natural result of this is that motors have been generally overloaded where used for both classes of service. The use of field control enables the motor to be equipped with a comparatively large gear reduction which fits it for the local service, while the operation with the short field enables the car to attain the high maximum speed which is necessary for the limited service. It has been demonstrated that the motor with field control has great advantages on locomotives, on street cars and on interurban cars. The question may be asked: Is there a twilight zone where it is not good? The opinion of the writer is that its advantages should bring it into use in every known class of railway service. Its advantages are positive. Its disadvantages are almost negative. It requires one extra motor lead and a slightly more expensive and complicated control equipment.

We believe that in most classes of service the use of properly designed field control equipment will effect a saving of not less than 10 per cent in the total power consumption required for operating the cars. When it is considered what a vast amount of power this would save in the course of a year if all the railway motors were operated in this way, one feels justified in believing that it will be only a very short time before every one will demand field control equipments. Already many inquiries have come from roads operating large equipments to know if field control can be applied to their existing motors. In most cases, in city service, it is impossible to do this and effect any considerable economy. This is especially the case where the motors are already provided with the maximum gear reduction.

ADAPTATION OF FIELD CONTROL TO EXISTING MOTORS

In such a case the possibility for saving is very limited since the standard motors are usually worked at a fairly high induction at normal accelerating loads and the induction can be increased very little by the addition of extra turns on the field coil. There will, therefore, be very little decrease in the accelerating current and a correspondingly small decrease in speed. Consequently, the saving in rheostatic losses would be very small and not enough to pay for a change in the equipments. The use of fewer turns on the field for obtaining higher speed would be of no advantage whatever where the equipment is already geared for speed as high as is required. To get the advantage from field control in slow city service, *motors must be wound for slower armature speed than is ordinarily used for standard motors.* This will in most cases require new armature windings. Where interpole motors are now used with large pinions the advantages of field control can be secured in most cases by an increase of the gear reduction, a change in the field winding and by making the necessary changes in the control equipment. These changes in most cases cost so much as to be prohibitive unless made at a time when gears are to be changed and motors overhauled. It should be kept in mind, however, when new equipments are bought and when all the advantages may be secured at a minimum cost.

Field control with non-commutating-pole motors cannot be recommended, as it will result in most cases in trouble with commutation.

Any well-designed commutating-pole railway motor may be adapted for field control by a proper arrangement of its field windings. To get the full benefits, however, the gears must be properly selected. For interurban work the benefits of field control may be secured by the use of standard high-speed armatures with a larger gear reduction than usual. In most cases, also, sufficient space is available to permit the extra field winding to be used. Special armatures for use with field control are necessary only for cases where the slowest speeds and the maximum gear ratio are required.

It will usually be found that where a motor of a given size is used in city service with the maximum gear reduction and the usual series parallel control a slower-speed armature may be used with the same motor frame and will make the same schedule with a lower energy consumption when field control is employed. The motor will have a lower horse-power rating, but the current used will be correspondingly less, and, consequently, the motor will have no more loss in it than with the motor of higher speed with a larger rating. In other words, the use of field control permits the use of a motor of a smaller rating for a given service. Where the maximum gear ratio is used in both cases, the same size of frame must be used. However, where the gear reduction can be increased for the field control motor it will frequently be found that a smaller size of motor can be used at a lower first cost and with less weight to be carried around. A double saving will thus be effected.

The question frequently arises as to what range of speed may be covered by field control. For car equipments it is usually from 15 per cent to 25 per cent, which may be secured by cutting out 20 per cent to 40 per cent of the field turns. This amount may usually be secured by one step on the controller. On the Pennsylvania locomotives the field turns are reduced 50 per cent in three steps on the controller. It will generally be found most economical to have the speed of the motor with the short field 20 per cent to 25 per cent higher than with the long field. This will reduce rheostatic losses at least one-half and will give the simplest arrangement of control. The limit to the amount of variation in speed which is possible by a variation of the field of the commutating-pole motor depends to a large extent on the number of commutator bars. If the average voltage between bars is low, the field may be weakened very greatly without materially affecting the commutation, but where the number of bars is small, so that the average voltage is relatively high, a small change in the field strength may result in an increased distortion of the field, and this will cause a corresponding increase in the maximum voltage between bars and will result in flashing over.

Why do we not use a shunt on the motor field instead of having two separate windings? Simply because a shunt on the field makes the magnetism sluggish and renders the motor liable to flash over in case of sudden applications of current resulting from a jumping trolley or contact shoe. It is always preferable to cut out a certain portion of the field and have neither short-circuited turns nor a non-inductive shunt around the field or any part of it, and though it costs more to do it in that way, it should always be done in railway work.

A number of the possible economies in the operation of railway equipments are dependent to a large extent on the control. Fortunately, the development of controllers has kept pace with that of motors, so we can at once secure the benefits that have been pointed out—at least in new equipments.

It has been stated that the use of the coasting-time clocks put a premium on rapid acceleration. To get the best results, therefore, the rate of acceleration should be fixed beyond the control of the motorman. Various schemes have been devised for checking the speed of operating the hand controller, but undoubtedly the best arrangement is a purely automatic control with the steps dependent on the current in the motor. Multiple-unit control has now reached the point where an automatic field control equipment is in operation that will permit the control to be stopped on any notch and requires only five or six train-line wires and an extremely small number of interlocks. Space will not permit a description of this control, and it is mentioned only to show that the advantages secured by the offer of a bonus for the maximum amount of coasting can be secured without risk of injury to equipment and discomfort to passengers due to bad acceleration. The control is so simple that anyone can take care of it. It has also the advantage of being very light.

PRESENT OUTLOOK

The outlook is extremely hopeful. There never was a time in the history of electric railroading when developments came more rapidly than at present. It has been rather disconcerting to the railway manager to find improvements coming so fast that he cannot keep absolutely up to date unless he buys new equipments every year. Fortunately, however, one does not have to be up to the minute in railroading. The more modern of the old equipments are giving as good service as the new ones can do. The only thing is that they are not quite so economical in energy consumption. The advantages of the most modern equipment should be secured in new equipments, so that in time they will be universally obtained, but the old equipments should be worn out in service.

THE TREND OF PUBLIC UTILITY REGULATION

In an article in the *New York Commercial* for Dec. 14 H. M. Byllesby has reviewed the conditions which are now confronting the public as well as the public service corporations. Mr. Byllesby's statements are in part as follows.

"A community which by accident, design or misfortune is poorly served by any of the so-called public service corporations is a community which necessarily is behindhand in its material development. A community suffering from faulty equipment or management of the public service corporations likewise endures a consequent loss of material advancement with attendant inconvenience and dissatisfaction. No one questions the occurrence from time to time of mistakes, errors, hardships and frauds in the past on the parts of both parties to these enterprises, viz., the projectors and owners of the enterprises and the citizens, communities, governments and municipalities served. The net result, however, has been a service on the part of all such corporations in the United States of America which has not its equal in the world.

"Up to a comparatively recent period the public service official was justified in extending the operations under his charge on the general doctrine of averages—that if a given extension proved unprofitable for the time being or permanently, it would be compensated for by the greater profit to be reached from some other contemporaneous, subsequent or existing branch of or extension to the service. Under this condition of affairs enterprise was fostered and development went forward actuated by the hope of a reward beyond the ordinary fixed small return of the absolutely settled and non-hazardous enterprise.

"To-day throughout the country the unmistakable tendency by Interstate Commerce Commissions, Public Utility Commissions, and by the law-making and legal administering bodies, to hamper and curtail and paternalize the conduct of all of these corporations to a point which is rapidly destroying the enterprise of the individual officers and employees of such corporations is putting a period to the further investment of capital for the extension and enlargement of such enterprises. The result of this policy, if carried along the lines of its present extreme tendencies, will be simply a stop to the further energetic development of these enterprises, and will destroy the individual initiative of these corporations. This policy, if persisted in along the program of the political agitators of the present time, leads inevitably and logically to federal and municipal ownership.

"A new situation and new conditions are now confronting the public and these corporations. It is a time for the underlying common sense of our people to take these questions out of the hands of the muck-raker and the professional politician and to put them before the great tribunal of common sense and love of justice of the American people. These questions are of such deep and far-reaching importance that they should be placed in the hands of entirely non-political tribunals."

Developments During 1912 in Power Plant Design

An Account of the Progress of the Year in the Field of Power Generation, Including Brief Descriptions of Typical Plants, Together with the Author's Comments and His Conclusions Regarding the Tendencies of Modern Practice

BY HENRY H. NORRIS, PROFESSOR OF ELECTRICAL ENGINEERING, CORNELL UNIVERSITY

The past year has been unusually productive of interesting developments in power plant practice. A number of new plants have been put into commission and some evidence of standardization, particularly in large steam plants, is furnished by these. The number of electric railways purchasing energy from central stations has considerably increased, indicating a growing appreciation of this principle of power station economics. This is the period when the early d. c. plants have become practically obsolete and also have reached the stage where they are rapidly wearing out. At the same time the number of large, efficient central stations is growing, and, through the use of very high voltages, their tributary areas are widening. Every railway company located within these areas must carefully consider the advantages to be gained by purchasing rather than generating the energy which it needs.

The principal railway power plants placed in service during 1912 have been described in detail in various issues of the ELECTRIC RAILWAY JOURNAL and other technical papers. It is not necessary, therefore, to mention more than the salient features of a few to prepare the way for some general conclusions regarding the tendencies indicated by latest practice. Among these railway plants may properly be included the central stations designed originally for lighting and power but now called upon to supply railway current in increasing amount.

SOUTH BOSTON STATION

The South Boston station of the Boston Elevated Railway is a fine example of a plant designed for efficient operation with fluctuating loads. In appearance it resembles somewhat the famous Fisk Street plant in Chicago, both inside and out. This plant is part of the general scheme of improvement which has been under way for some years. Ultimately it is to be of 125,000-kw capacity, but at present an output of only 30,000 kw is being produced with two units. The B. and W. boilers, now sixteen in number, are rated at 600 hp on the usual basis of 10 sq. ft. of heating surface per boiler hp. While these are not large compared with the units used by the Detroit Edison Company, they are of a popular size which may be considered standard at present. The completed turbine room will be nearly 500 ft. long and about 80 ft. wide, and the boiler room will be of the same length and only slightly wider. This is a remarkable fact in view of the tendency which has been evident for some time to consider the turbine room, as far as space is concerned, a mere annex to the boiler room. The liberal space allowed in the turbine room in this and other recent plants is partly to accommodate the enormous condensers, partly to provide room for as many auxiliaries on the main floor as possible and to house the increasingly elaborate and bulky electrical switching and transforming apparatus, and partly to give ample space in which the turbines and generators may be taken apart for inspection and repair. The latter consideration is no small item, as the modern machines work under such difficult operating conditions of high speed, high temperature, dusty ventilating air and the like that close watching is absolutely necessary. Obviously if the parts of a dissembled machine can be laid out in an orderly manner without crowding, better work can be done on them than under less favorable conditions.

In the Boston plant provision is made for taking care of variable load by means of forced draft controlled by Mason pressure regulators. These regulators, operated by variation in steam pressure, automatically adjust the speed of stoker engines as well as fan engines to suit the load requirements. The forced draft is necessarily accompanied by liberal combustion chamber space in the boilers, the tubes of which are set high, giving the fuel opportunity to burn before the gases are chilled by the tubes. The stokers, of the Taylor seven-retort type, are designed to carry several times the rated boiler load, and the fans are of similar overload capacity, so that the boilers can be forced to generate steam at a rate far greater than their nominal capacity. In fact, the present installation of 9600 boiler hp is counted upon to supply steam for 45,000 kw of turbines. As a few boilers will usually be out of commission for cleaning or repairs, the remaining ones must evidently be ready for strenuous duty.

Such forcing for peak loads is now recommended practice for railway plants and in no way injures the boilers. At the same time the necessary investment is kept down. At Boston the result is evident in the small relative size of the boiler room, which, unlike those in several recent plants, is arranged with the firing aisle parallel to the turbine room. This plan has the advantage of convenience in handling and in inspection. The steam header, of 14-in. pipe, is placed in the boiler room 2 ft. above the floor near the turbine room partition and on about the same level as the turbine valves. A high-arch connection is made to each turbine and excellent flexibility is thus assured. Steam-flow meters are connected in the boiler leads. The utility of such meters in assisting the firemen to keep each boiler steaming properly is recognized, and if the experience of such companies as have been using steam meters establishes the ruggedness of the device, a wide field of usefulness is open before them.

Among other interesting features of this plant the use of numerous concrete piles under the footings is conspicuous. The site consists of "made" land on the shore of Boston harbor, hence every possible precaution was taken to prevent settling. A total of 1500 concrete piles, as well as many of wood, was used for this purpose. The electrical generators are wound for the moderate voltage of 6600, and this is doubled by means of auto-transformers or compensators which serve also as reactance coils to limit short-circuit currents. The generators are ventilated in a somewhat novel manner, the air being drawn in through large ducts terminating above the boiler room roof and downward through the generator by the usual internal fans. The air thus drawn from a considerable elevation is cool and free from dust.

T. H., I. & E. POWER STATION

The new plant of the Terre Haute, Indianapolis & Eastern Traction Company is another good example of up-to-date practice, and it, too, has two units installed out of an ultimate capacity four times as great. This plant, however, presents several contrasts to the one just reviewed. The boilers, of which sixty will ultimately be required, will be divided into three sections, with the firing aisles perpendicular to the turbine room, somewhat on the order of the familiar unit system. A total of twelve boilers of 520 hp each is now installed to provide steam for two 6000-kw horizontal steam turbines. . This is a much greater provision than is made in the Boston plant. The result is a greater proportionate space occupied by the boiler room. The ultimate boiler capacity of 31,200 hp will supply 48,000 kw of rated turbine capacity. While this boiler allowance appears high, it includes provision for the very large overload rating of the turbines, which are expected to be able to deliver a maximum output of 80,000 kw. The boiler tubes are set 10½ ft. above the boiler room floor, illustrating again the tendency toward liberal combustion space. The boilers are equipped with Roney stokers and differential draft gages. The absence of the usual coal and ash conveyors is noticeable in the Indianapolis plant, the work being accomplished by an industrial railway system. A narrow-gage track is located over the coal bunkers and under the ash hoppers, and the cars which run upon this track are hoisted by means of two electric elevators.

Each of the horizontal turbo-alternator units of 6000-kw capacity discharges its steam into a Wheeler surface condenser hung from the bottom of the turbine frame. The basement floor is thus kept clear for the accommodation of auxiliaries. These are said to be the first large surface condensers to be furnished with Le Blanc type pumps. The steam piping is of open-hearth steel, and the fittings are of cast steel, which is approved practice in plants using superheated steam. The header is located in the basement about 10 ft. below the boiler room floor, and the steam pipes to the turbines are brought up from below without conspicuous arches in the turbine room. The result is a very neat appearance of the latter.

The three-phase alternators generate 13,200 volts, which is used on the local transmission system without transformers. This practice gives simplicity of construction, but is somewhat out of line with the tendency, noted in the Boston and other stations, toward lower generator voltage with step-up compensators. The evil effects of short-circuits on these large generators are so great that reactance is generally considered necessary to limit the short-circuit current, and as this reactance can be obtained in the compensators almost as cheaply as in special reactance coils and the generator construction simplified by the use of the lower voltage, the tendency toward the use of this arrangement is logical.

The Indianapolis station is conspicuous for the neat appearance of the turbine room. The enameled brick walls with simple ornamentation assist the management in instilling a sense of pride on the part of the operatives to keep the machinery in good order. The glass-inclosed operating gallery is free from the noise of the turbine room, insuring strict attention to switching and to the indications of the instruments. The simplicity of the turbine room is enhanced by the partitioning off of the space occupied by all the switch gear, which is located on several galleries, one over the other, closely adjacent to the turbine room but invisible from it.

GEORGETOWN POWER STATION

An interesting plant which shows at a glance the progress made in steam turbine development is that of the Capital Traction Company of Washington, D. C., at Georgetown. There are here two 1500-kw, one 3000-kw and one 5000-kw horizontal turbine. Although the smaller machines have been in use but a few years, such has been the progress in design that the 5000-kw turbine is not noticeably larger than the 3000-kw machine or even the still smaller ones. The same condition has been shown in other plants using vertical turbines where units of 20,000-kw capacity now occupy little more floor space, except for the condensers, than did the 5000-kw machines of ten years ago. The Georgetown plant is the result of the rapid outgrowing of former stations, and much of its equipment has been moved from them. This has, however, been so skilfully incorporated with the new apparatus that there is no evidence of patchwork. The result may be partly due to the fact that the engineering work was done by the company's own staff, which naturally would be well acquainted with the virtues and the faults of each part of the older equipment. The turbine room presents a rather unusual appearance on account of the auxiliary apparatus galleries, which are uninclosed, as is also the operating gallery. The most obvious advantage thus gained is ease of inspection. The general tendency seems to be toward isolation of the switch gear from the turbine room.

The three-phase, twenty-five-cycle generators at this station produce current at 6600 volts, which seems to be the standard toward which practice is tending. Current at this voltage is delivered to the transmission system and to the lowering transformers used in connection with rotary converters for local 600-volt d.c. distribution.

On account of the gradual development of this plant, a considerable variety of condensing equipment is found in it. The smallest turbines have Alberger jet condensers maintaining a 28-in. vacuum. A Wheeler surface condenser on the 3000-kw unit holds a 29-in. vacuum, which is about the same as in the Le Blanc condenser on the 5000-kw unit. The air and circulating pumps for the condensers are of the centrifugal type, but the boiler-feed pumps are reciprocating.

In the design of the building the architect has been very successful in producing a structure which, while it looks like a power station, would be an ornament anywhere but in a residential neighborhood. Much more attention is being given to the architecture of power plants than formerly, and it is fitting that in a vicinity containing so many handsome structures the railway power plant should be in keeping with its surroundings. On account of the danger of dampness in the basement of this building, unusual attention was given to waterproofing. On top of the piles, which are liberally distributed under the entire building, is a concrete cap on which is a five-ply layer of Hydrex felt. On this is a floor of 30-in. concrete slabs under the boiler room and one of 18-in. slabs under the turbine room. The outside of the basement wall is also covered with a thick layer of waterproof concrete.

NORTHWEST POWER STATION

The new Northwest station of the Commonwealth Edison Company of Chicago is possibly the past year's most notable addition to the electric railway equipment of the Middle West. While but two generating units are now installed, the plans are complete for a total of twelve 20,000-kw units in twin stations. This project, which will call for an ultimate expenditure of $20,000,000, illustrates the principle, mentioned earlier, of planning for the future. Under this policy, stations will not be outgrowing their capacity and becoming obsolete, but they will be growing naturally to meet the demand. While this policy may have been followed in a few cases in the past, it was by no means as general as it is now.

The unit system is carried out in this plant, each turbine having its battery of ten boilers of 560 hp each. The entire battery is not necessary to maintain full load on the turbine and the firing aisles are perpendicular to the line of the turbine room. The turbine room is comparatively small because all electrical auxiliaries are placed in separate buildings, the total ground area required for that purpose being greater than that of the turbine room. Taking all of the generating equipment together, it occupies nearly as much space as the boilers.

In the Northwest station the separation of transforming, switching and measuring equipment from the turbine room has been carried to the extreme, there being separate buildings for the compensators and for the busbars and switches. This is to insure absolute reliability, for even if the power house should be destroyed its load could be cared for by other stations by means of the very complete switching arrangements. The switching devices in this plant are very elaborate, and the contrast between the railway power station of twenty years ago and this one is striking. Then the switchboard was on the engine floor and occupied a few panels, on the back of which great busbars were mounted. The space occupied by the board was negligible. Now, at least in the present case, the switching requires a separate building more than half as large as the turbine room, which itself is liberal in size.

KEOKUK HYDROELECTRIC STATION

The hydroelectric power project at Keokuk, Ia., will soon have a close relation to electric traction in its territory. Rapid progress on this great plant has been made during the past year, and within a few months the first generating units will be in operation. Fifteen units, consisting of 10,000-hp Francis vertical turbines and 7500-kw General Electric generators, are being installed for the present. A considerable part of the output has been contracted for by the railway and lighting companies of St. Louis, 140 miles from the plant. The rest will be sold in Quincy, Burlington, Hannibal, Fort Madison, Keokuk and other cities within easy reach. The ultimate cost of the project has been estimated at over $20,000,000, about the same as the cost of the completed Northwest station of the Commonwealth Edison Company. The ultimate capacities of the two plants are the same, 240,000 kw. Energy is to be sold in St. Louis at $18 per hp year at 60 per cent load factor, which price is based on the cost of power with coal at $1.42 per ton. To obtain this load factor it will be necessary for the railways to adopt means to fill in the load-curve depressions. The electric power will be produced at 6600 volts, three-phase, twenty-five cycles, and the transmission voltage will be 100,000. On account of the low speed, 56 r.p.m., the weight of the revolving part of the unit is very great, nearly 250 tons, probably the heaviest load ever placed on a step or vertical thrust bearing.

The question of steam reserve for use in case of low water or high back water will presumably be taken care of by the utilization of existing steam plants in the tributary territory. In many cases the steam reserve greatly increases the cost of energy, sometimes wholly or nearly offsetting the inherent cheapness of the water power. In the present case the cost of reserve service is evidently very low, as is indicated by the low price of the energy delivered in St. Louis.

MARSEILLES HYDROELECTRIC STATION

A much smaller plant, utilizing water power at a lower head than that at the Mississippi River dam, which has a maximum value of 35 ft., was completed last year by the Northern Illinois Light & Traction Company at Marseilles, Ill. The head here is but 11 ft. The new equipment consists of six vertical 74-in. Samson turbines with direct-connected umbrella-type Westinghouse alternators of 320-kva capacity. These alternators are wound for 2300-volt, three-phase current, four being twenty-five cycle machines and the other two sixty-cycle. As the umbrella type of generator is rather unusual in this country, excepting in very large plants, this installation is exceptionally interesting. The machines rotate at 75 r.p.m., and the rotating field magnet is 10 ft. in diameter, the outside diameter of the complete generator being about 14 ft. The Keokuk generators of the same general type are about 32 ft. outside diameter. This type of generator was selected for the Illinois River plant in preference to the horizontal type, geared to the turbines, on account of the higher efficiency and the lower cost of maintenance.

In addition to the equipment of this plant described above, some old 62-in. Samson turbines were utilized in the new plant by gearing them together in two groups of three each by horizontal shafts direct-connected to 2300-volt generators, one of which has a capacity of 450 kva at sixty cycles and the other a capacity of 500 kva at twenty-five cycles. The excitation for all of the alternators is furnished by two 90-kw generators direct-connected to 40-in. wheels and by one 100-kw machine driven by a motor.

The output of the plant is both twenty-five-cycle and sixty-cycle current. The latter is furnished to a number of small lighting and power companies, and the relative demand for each of the two varieties of current varies during twenty-four hours. To meet this condition the generators producing the two frequencies are connected through a 750-kva frequency-changing motor-generator set, so that a large part of the capacity of the plant is available in either form of current.

This plant is one of several which are operated in parallel supplying railway and lighting current for the McKinley properties in northern Illinois. The power system includes two steam equipments which will furnish reserve power for emergency use to take the peaks of the loads and to assist in governing. As the Illinois River is the outlet of the Chicago Drainage Canal, a steady flow of water is practically assured. The new plant has been designed on the basis of the minimum flow of the river, and its size is conservative.

TECHNICAL SOCIETY REPORTS ON POWER PLANT PRACTICE

The two associations most intimately concerned with the electric railway power plant are the American Electric Railway Engineering Association and the National Electric Light Association. Both of these bodies have committees charged with the duty of studying and bringing before the respective memberships the live questions relating to their specialty, power plant practice. The railway association report is presented at the October convention in each year and that of the other society in June. These reports, being based on extended study and correspondence, presumably contain the latest obtainable information. Their recommendations should have great weight in a review of a year's progress. The following paragraphs summarize the findings reported in 1912.

Large central stations interconnected with network of conductors are to be preferred to isolated ones. These conductors will in large cities be mostly underground, and they form a most important part of the system; hence special attention must be given to their maintenance. The problem of locating faults and isolating defective cables is demanding careful attention at present. The methods now in general use are not satisfactory. A plan involving circuit breakers operated by differentially wound relays with the two windings carrying current from the two ends of the protected cable is satisfactory. For short cables—such, for example, as those connecting the Fisk Street and Quarry Street stations in Chicago—the expense is not serious, but with long cables the cost is prohibitive. H. G. Stott has suggested a simple plan for testing which promises well. He applies to the supposed defective cable the secondary emf of a three-phase transformer of considerable magnetic leak. This emf with the secondary on open circuit, as it is when applied to a good cable, has the regular working value. If, however, the cable is short-circuited, a secondary current is set up and its presence is indicated by ammeters in the primary circuit. The magnetic leakage prevents the draft of much more than normal current in the cable.

The increase in the size of generating units and the improvement in their voltage regulation have made the effects of short-circuits more serious than formerly. The result is the introduction of reactance coils to limit short-circuit currents. The preference seems to be for reactance in outside coils rather than in the generator winding. These coils undoubtedly take up space and interfere with good regulation, but they seem to be necessary. Reactance coils are constructed of stranded conductor wound usually on skeleton concrete cores. Their presence in power houses is an interesting novelty. Generator design is being influenced by the demand for higher steam economy, which results in high rotative speed and small diameter. The small size makes ventilation difficult.

ECONOMIES IN THE BOILER ROOM

In the boiler room chain-grate stokers are recommended for low-grade coal high in ash and volatile matter, but they are not adapted to coals with a tendency to coke and run without some means for breaking up the coke as it forms at the front of the grate. With the aid of most types of mechanical stokers which now are in general use it is possible to operate fires practically without smoke after the brickwork becomes heated. This is an important conclusion in view of the considerable agitation for smoke prevention. Steam-flow meters are being found increasingly useful but are not yet perfect.

In steam plants the matter of intelligent purchase of coal is important. Both associations gave attention to this matter last year. The A. E. R. E. A. committee took up the whole matter of chemical testing in connection with power work, especially coal analysis. A number of companies sent in data regarding their practice in this matter. It is apparent that modern methods of coal buying are growing in favor. Both ash and heat determinations are made. Attention is called to the fact that the heat value of coal from a given mine will not vary much, but that the proportion of ash, clay and other non-combustible matter will vary a great deal. The recommendation, therefore, which agrees with that of the N. E. L. A. committee, is that ash determinations be made frequently, even by small companies. Chemical laboratories are useful in analyzing water and oil as well as coal, and the committee believes that all three should be analyzed in order that these most important materials may be intelligently purchased and used.

TENDENCIES IN PRIME-MOVER DESIGN

Steam turbine equipment is still in a state of progress, and new problems are constantly coming up for solution. The general use of superheated steam has brought out the superiority of steel pipe and fittings for service in turbine plants, as cast iron fittings fail when exposed to superheated steam. Strenuous efforts are being made to improve condenser design in order to reduce maintenance and insure reliability. Liberal condensing surfaces are used, and the water of condensation is removed from the tubes as quickly as possible, thus keeping up their heat conductivity, the effort being to create air currents sweeping toward the pumps. Some trouble has been experienced in keeping dirt out of the tubes, even with careful screening.

In hydraulic plants horizontal-shaft wheels continue to be preferred to the vertical type except for very low heads. As is evident in the case of the Keokuk plant, the weight of the rotating member of a vertical wheel imposes difficult design features, particularly in machines of large size. Horizontal bearings present no serious difficulties. The roller bearing is proving of service in vertical turbines and is obviating one of the main objections to them. There is still room for improvement in governing devices. Where steam engines and waterwheels can be operated in parallel the governing is better, being controlled by the steam engine.

ELECTRIC RAILWAY POWER CONTRACTS

The contract between the Commonwealth Edison Company of Chicago and the two surface and one elevated railroad system of that city has now been in operation for several years and is giving excellent satisfaction both to producer and consumers. The contract is very simple, the rate consisting of two parts, a service charge and an energy charge. The service charge is based upon the investment which is assumed to be necessary to have the power plants at all times in readiness to supply a demand of an estimated amount, and amounts to $1.25 per month per kw of maximum demand. In addition there is an energy charge of 0.4 cent per kw-hr. In a contract of this kind a most important element is the manner in which the maximum demand is determined. Obviously a swing of load lasting only an instant is not a fair criterion of the equipment necessary, because any power plant can carry an instantaneous overload without detriment to the equipment. The maximum load therefore must be rated in such a way that it really necessitates a definite amount of equipment. In this contract the maximum demand is determined in a peculiar but effective manner. The supply company selects from the records on three consecutive days in each month the kilowatt-hours of energy consumed in one hour in the morning and evening peaks and adds these hourly demands together. One-sixth of this total is called the maximum demand for the month. The advantages of this contract are its simplicity and the incentives which it offers for the keeping down of the peaks. Unfortunately a railroad company has very little control over the form of its load diagram, but careful operation of the cars and trains, combined with the use of storage batteries, can reduce the peaks somewhat. That the operation of the contract has been satisfactory in Chicago is evidenced by the plans for the development of the power plants on the one hand and the apparent lack of plans on the part of the consumers to build power plants of their own. From this it is not necessarily to be inferred that the railway companies consider that they could not generate energy as cheaply as the Commonwealth Edison Company, but even if they could do so, which is questionable, they could not obtain the degree of security of service at anything like this cost. During the past year the Commonwealth Edison Company has made a new move in the matter of power provision for electric railways by installing a railway substation which it will operate, selling energy in d.c. form.

The first new railway contract announced during the past year was one between the Cleveland Electric Illuminating Company and the Cleveland Railway. The terms are more complex than those of the Chicago contract, which has been in operation for several years. There are similar provisions regarding line losses, installation and maintenance of transmission lines and of substations. The same general theory also underlies the financial features, but the details are much more elaborate. In the first place, the service charge is graduated, varying from $1.475 per kw of monthly maximum demand for the first 500 kw to $1 for excess above 1000 kw. The average value will presumably be somewhat less than the Chicago figure. The unit charge is also graduated from 0.95 cent per kw-hr. for the first 50,000 kw-hr. per month down to 0.38 cent per kw-hr. for excess above 2,300,000 kw-hr. per month. The average will be practically the same as in the Chicago contract. These figures are based upon 90 per cent power factor, the railway obtaining the benefit of increased power factor by corresponding reduction in rates. A table given in the contract shows that with a consumption of 9,000,000 kw-hr. per month, 50 per cent load factor and 90 per cent power factor, the cost is 0.681 cent per kw-hr. The rates are based upon a minimum demand of 15,500 kw, which may be increased by due notice.

The monthly maximum demand in the Cleveland contract is calculated from the sum of the kilowatt-hour consumption during the peak-load hours on three successive days. These hours are integral hours, that is 5 to 6 p.m. or 6 to 7 p.m., and the sum of the kilowatt-hours during these three peak-load periods is to be greater than that of any three similar periods during the month. One-third of the total consumption during the three hours is the maximum demand for the month.

Two new contracts were announced late in the year and details of the financial features are not yet available. These contracts are between the New York Edison Company and the Third Avenue Railway Company in New York City, and between the Philadelphia Electric Company and the Philadelphia Rapid Transit Company. The former contract presents an interesting contrast to the Chicago contract. In the Chicago case the old steam plants were not taken over by the Edison company but were either shut down or are still being operated by the railway companies.

These steam stations will probably not be remodeled but will be allowed to become obsolescent and will gradually be eliminated. The case of the Third Avenue Railway contract in New York, however, is quite different. This company less than ten years ago put in a very modern plant consisting of eight vertical, cross-compound engines of 5000 hp each, with 6600-volt, three-phase, twenty-five-cycle alternators. With the exception of the use of reciprocating engines this plant is quite up-to-date at present, and it is operating very economically. The New York Edison Company has taken over this plant and will operate it in conjunction with the Waterside stations, which have generators of the same voltage and frequency.

The latest contract of all is that in Philadelphia, and it presents some interesting features in that it is divided into several parts. Energy is to be furnished by the Philadelphia Electric Company in a.c. form as well as in d.c. form. The electric-light company takes over, at a nominal rental, a substantial part of the generating equipment of the railway company and may operate this as an emergency reserve. The electric-light company has also the privilege of utilizing its own equipment if it so desires. The load factors guaranteed are 35 per cent in one part of the system and 30 per cent in another. The minimum demand is at present 15,000 kw, which will be increased by 5000 kw during the fall of 1913.

The process of central station energy in railway work will be watched with great interest during the next few years. All of the contracts described have been drawn in such a way that a period of about ten years is allowed for the solution of the various problems involved. During this period, unless some new type of prime mover becomes prominent, central station practice will probably have settled down to a standard construction. During this period much attention will be devoted to a study of cost of generating electrical energy. At the present time operating costs appear to be susceptible of accurate calculations, but overhead costs are still problematic. This will not be the case when central station construction is standardized and after sufficient time has elapsed for the experimental determination of the maintenance and depreciation costs of the new generating units.

PROBLEMS AFFECTING MECHANICAL EQUIPMENT

As has been pointed out in the technical press from time to time, it is questionable from the standpoint of economy whether there is much gain in increasing a plant above a certain size unless this plan permits a marked improvement in the load factor. Some gain comes from the diversity of load obtained by combining lighting, industrial power and railway power in one station, and the purchaser gets at least part of the benefit, but the determination of the cost of generating energy is so difficult that only in a general way can it be estimated. On general principles, however, it should be true that a company specializing in the manufacture of electrical energy can generate it more cheaply than one to which the power plant is a side issue. Manifestly the advantages of large units favor the central station, and the limit in steam turbine size has apparently not yet been reached.

The Commonwealth Edison Company has under construction in England a 25,000-kw unit of the horizontal type, a radical departure for this company. The problem of supporting on a step-bearing the enormous weight of the revolving part of the turbo-alternator in much larger sizes than those at present in use is a serious one. There is also not much further advantage to be gained by the use of the vertical type because the condenser is already larger than the turbine in the 20,000-kw size and will be proportionately larger with increased turbine capacity. It is probable, therefore, that the still larger units which are sure to come will be of the horizontal type.

The demand for higher rotative speeds in the steam turbine brings in other problems for the designer. Aside from the question of mechanical strength, there are serious difficulties in getting the exhaust steam away from the turbine, as the high vacuums used result in the expansion of the steam to enormous volumes. There is an accompanying difficulty in ventilating the cores and windings of the generators. Several serious hindrances, therefore, stand in the way of farther development of the very high-speed turbines.

Thrust and step bearings have given trouble both in steam and water turbines, but progress has been made. The step-bearings of vertical turbines are in general lubricated with oil under high pressure, special attention being given to its quality and condition. In a few cases water is used. In water turbines roller bearings have been used with success. The latest development in high-pressure bearings is the Kingsbury thrust bearing, which has been adopted for the great turbines at the new Keokuk plant of the Mississippi River Power Company and in other important installations. In all high-pressure bearings the problem is to get the lubricant between the rubbing surfaces. In the new bearing the usual stationary collar is replaced by a spherically seated collar, on the working surface of which are several separated spherically seated bearing blocks faced with soft metal. These blocks adjust themselves to the revolving collar and the lubricant is drawn between them and the revolving collar as it is not when the stationary collar is rigid and continuous. At present the greatest load on bearings of this type is in the McCall's Ferry plant at Holtwood, Pa., where it amounts to 410,000 lb. In the Keokuk plant it will be 560,000 lb. The load on the step-bearings of the usual type in the 20,000-kw steam turbine units in Chicago is about 200,000 lb.

TURBO-ALTERNATOR PROBLEMS

In the electrical end of the turbo-alternator unit the heating problem is serious. It is not only a question of getting heat away from the radiating surface of coils and cores but also one of getting the heat to those surfaces, as heat is generated in the interior of cores and coils and these have a limited heat conductivity. This heat can come to the surface only at a certain rate, depending upon the temperature head and the resistance offered to the heat flow. This fact is illustrated by the time-temperature curve at the surface of any part of an electrical machine after a run. A thermometer applied to the surface shows a rise of temperature for some time after the machine has been stopped. indicating a flow of heat to the surface from internal superheated parts. Forced circulation of cold air increases the temperature head and thus assists in the removal of heat, but even with this help internal temperature must still farther increase. Insulation must be developed to stand these higher temperatures, and the conventional 50 deg. rise cannot hold much longer. With this greater rise of temperature will come greater mechanical difficulties due to expansion and contraction. Even now the designer has to scheme carefully to avoid the loosening of windings due to this cause. These problems will be solved as they arise as others equally difficult have been solved in the past, but they are mentioned to indicate the far-reaching effect of the demand for higher speed with smaller and cheaper turbines.

The ventilating air for the turbines is ordinarily very dusty as well as warm. Washing devices have been developed to remove the dust and cool the air, which is passed through sheets of water and around sharp bends. The water washes out the dust or wets the particles so that they are easily thrown out by baffle plates. This matter was covered in detail in the 1911 N. E. L. A. report on prime movers, the committee on the subject having made a careful study of the washing and cooling of air for buildings. A start which was made in applying this principle to a turbo-alternator was described. In view of the ventilation difficulties mentioned above some such treatment of air seems quite necessary.

Progress in Electric Power Transmission Practice

The Author Discusses the Effect of Interpole Design Upon the Development of the Sixty-Cycle Converter and Power Distribution to Direct-Current Lines and Makes Suggestions About Improvements in Line Construction

BY LOUIS BELL, PH.D.

In examining the recent tendency in power transmission practice for railways, one may profitably glance at those limitations which have hitherto made themselves felt in the adaptation of transmitted power to the service of electric railways. Although the utilization of electric power transmission for railway work dates far back, the hydroelectric plant has not been up to the present a usual source of power for the operation of railroads. If the writer remembers correctly, he had the pleasure in 1894 of installing the first plant using transmitted energy for operating a railway, merely a railway generator of the type then standard, belted to a three-phase synchronous motor. It was not then judged practicable to build a synchronous converter of the necessary size for fifty cycles, much less for the sixty cycles used in most subsequent three-phase plants.

The result has been that on the whole hydroelectric plants have been cut off from doing a large business with railways on account of the loss in, and cost of, the apparatus necessary to deliver direct-current energy supplied from a transmission service. There have been from time to time a small number of twenty-five-cycle hydroelectric plants installed which have been able, as in the case of Niagara and a few others, to supply railway power through synchronous converters, but despite the fact that to-day power transmission networks ramify very widely over the eastern and western sections of the country, railways have been slow to utilize this cheap and convenient source of power for the reason stated.

One of the things which are interesting and altogether agreeable changes for the better is the development at last of satisfactory synchronous converters for sixty-cycle circuits, thanks to the interpole construction which has so greatly relieved the difficulties of commutation, the only serious difficulties that have stood in the way of the use of such machines hitherto. With such apparatus available as it is, at least in all except the large sizes, in the present state of progress it will be increasingly common for railway companies to take power from the transmission networks so widely available.

PURCHASED POWER

Most electric roads are not big enough from the standpoint of necessary output to operate power stations of their own with a high degree of economy. Both size and load factor are against them, so that it is quite safe to say that where a road can reach conveniently an existing transmission system of large capacity it can buy power cheaper than it can make it. This is emphatically true in the case of hydroelectric transmissions. It is also true in the case of many of the large central station networks fed from modern steam-driven stations.

Those who have read the columns of this journal during the past year have a realizing sense of the extent to which purchased power is advantageously and economically used even in large amounts, thanks to the economies of generation possible in our present big central stations. These very commonly work at twenty-five cycles and so do not require anything special in the way of synchronous converters. On the whole, perhaps, the most notable tendency of the past year or so in transmissions for railway purposes has been this increase in the practice of purchasing power. It means the replacement of a steam-driven station with its considerable cost of attendance by one or more simple and easily cared for substations, and the possibility of increasing the number of these substations without considerable increase in expense, thus lessening feeder costs and steadying the voltage along the lines—a matter of great importance in the extended electric roads, particularly those of light service. And aside from the use of sixty-cycle synchronous converters, now making decided advance, undoubtedly material progress is being made in the development of the beautiful mercury converters already in widespread use for other purposes. Recent reports from abroad give hope of successful conversion in units perhaps as great as several hundred kilowatts. Of their performance it is too early to speak with certainty, but it goes without saying that such apparatus, if it fulfils the promise of recent developments, will be of the utmost use in facilitating a cheap and efficient supply of power over wide areas from stations now existing. At all events, it is perfectly clear from the progress made during the last year that the unification of power supply, with all which that implies in the matter of operative and installation economies, is going steadily on, to the great benefit of the electric railway business.

DISTRIBUTION TO HIGH-TENSION DIRECT-CURRENT RAILWAYS

Just how far these tendencies can progress depends on the direction of advance in the matter of traction motors themselves. As the readers of this journal are aware, the past year has seen considerable progress made toward high-voltage, direct-current motor service, several installations of 1200 volts from trolley to track having been in operation, and even this voltage has been doubled in one of the projects now under way, and that on a large scale. It is unnecessary to comment on the great advantage of these increased voltages in the matter of distribution, but they involve some serious considerations as to apparatus. Thanks again to the interpole construction, the motors themselves can be worked out with reasonable factors of safety, but when it comes to the supply of energy at this voltage on a considerable scale there are other things to be considered. It is one thing to build a sixty-cycle converter for 600 volts; it is quite another to build it for 1200 volts or for 2400 volts. Just how this difficulty will be met remains to be seen. Possibly converters coupled in tandem or cascade converters, which practically halve the difficulty of commutation, may come into play, although some of the enterprises requiring high-voltage motors are big enough to justify the installation of low-frequency generating stations for their special service. Mercury converters, on the other hand, lend themselves readily to high-voltage work and to installation on locomotives when these are used. It will therefore be seen that things are in an extremely plastic and formative condition as respects the general features of supply for railway operation in spite of the improvements to which reference has been made.

POWER STATION DESIGN

In minor matters of supply, those pertaining to power station design and operation, the most conspicuous tendency has been toward the use of the horizontal rather than the vertical type of turbo-generator and the installation of boilers of considerably greater steaming capacity than those heretofore common. The installation of the huge boilers of the Detroit Edison Company last year taught a much needed lesson. Their very high efficiency gives promise of great improvement over present progress. It is a moot point among steam engineers whether such increase in size or a corresponding increase in steaming capacity by forced draft is the better plan to follow for the future. Several recent railway plants have been using forced draft to secure the intensive combustion necessary for pushing the steaming capacity over the peak of the load, with good results in practical economy and to the considerable simplification of the plant. Personally, the writer believes we are going to have progress along both lines, with big boilers worked intensively to secure still greater output. At all events it is certainly in the boiler and furnaces that the greatest improvements in plant efficiency are now to be obtained, and the movement during the past year has been conspicuously in this direction.

LINE CONSTRUCTION

As to transmission line progress, most transmissions primarily intended for railway purposes are at comparatively moderate voltages, as befits the usually not very great distances of transmission. The line construction standardized during the past year or two seems to answer perfectly well for most cases, but in several instances it has been seriously called in question. It seems probable that the suspension insulator and line construction more closely approximating that of general transmission plants will push their way steadily into railway practice. There is no use of transmitted power in which interruptions occur, because they are never more exasperating than in railway service, and considering the fact that one seldom has to deal with very high voltages it would appear the part of wisdom to take advantage of modern constructions to increase very considerably the factor of safety in transmission circuits. This tendency has already been felt as the work of the last year or so plainly shows, and it should consistently increase in the work of next year and the years to follow.

Attention should here be called to the advantages of steel construction for important feeder lines, a practice which is beginning to appear here and there in isolated spots and is altogether commendable. A steel transmission line with suspension insulators, giving at least double the factor of safety now common on railway transmissions, need not be unreasonably expensive and in the long run will very likely make up in decreased maintenance the modest increase in initial expense. If American constructors would investigate thoroughly the light latticed "A" poles in large use on the Continent, they would get a new light on line construction. A few steel "A" poles have been used for railway work in this country, but so far as the writer is aware they are very much heavier than those used for corresponding work abroad and are consequently more expensive.

NECESSITY FOR DURABLE CONSTRUCTION

Certainly no serious work of electrifying a long line should be undertaken without following the best precedents of general transmission practice in the construction of the supply circuits. Incidentally the increase in the factor of safety of the insulators means greater security against lightning, on the whole the most troublesome thing with which the transmission engineer has to contend. Closely allied with these matters of line construction is the matter of voltage on the working conductors. Where large amounts of energy are required for the rolling stock, high voltage, either direct or alternating current, is a necessity in order to secure proper current collection from overhead conductors, and this in turn requires for small collection accurate alignment of the conductor and first-class mechanical support. Here again steel construction is the obvious remedy for mechanical difficulties, and on recent important lines it is coming into play, although far less than sound forethought would indicate. The design of feeder lines and supports for the working conductor on sound engineering principles is the particular thing on which the success of large electric traction is going to turn. Such design has heretofore only been touched in spots, and one of the encouraging things about very recent work has been the greater attention paid to workmanlike and permanent construction. If asked to level a general criticism at transmission for railway purposes as commonly carried out, the writer would be inclined to say that the average railway line is built only for year after next, with too little regard for the matter of maintenance and for the secure permanence of the investment represented. Few conservative railway managers would be willing to buy power from transmission circuits no better than those along their own right-of-way. Within the last year or two these conditions have improved, which is one of the encouraging things about the growth of the art. And yet, as one rides along beside a railway transmission line, in nine cases out of ten he is roused to instinctive wonder that it meets the necessary demands for continuous service. This comment is by no means intended to "knock" the designers of these lines, who have commonly had to cut their coats acccording to their cloth, but is merely meant to emphasize the increasing necessity for reliable and permanent types of construction.

PROGRESS TOWARD GENERAL MERGER OF CHICAGO TRACTION INTERESTS

The sub-committee appointed by the local transportation committee of the Chicago City Council, in compliance with instructions, has examined the books of the Chicago Elevated Railway Companies and submitted a report to the parent body.

In the work of preparation of this report the subcommittee was assisted by representatives from the Corporation Counsel's office, the comptroller's office and James J. Reynolds of the Harbor and Subway Commission. While no definite steps have been taken toward a satisfactory valuation of the elevated companies, the sub-committee questioned certain items contained in the original figures of $86,086,623 presented by the representatives of the elevated railway companies. Among items in question are the following:

Chicago Junction bonds	$2,327,000
Working capital	2,336,091
Brokerage (reduction urged amounting to)	1,500,000
Value of company's lines outside city limits	3,000,000
Oak Park income bonds, 51 per cent	444,159
Oak Park accrued interest obligation, 51 per cent	283,314
Oak Park 5 per cent notes, 51 per cent	530,400
	$10,420,964

In making up report of progress to the general committee, the chairman of the sub-committee said that it had verified the figures presented by the company, item for item, with slight corrections, and that, although it had found the figures approximately correct, the total contained certain items which could not be considered as the value of the property to the city.

The sub-committee did consider, however, that the time had arrived when satisfactory settlement could be made, as the new proposition submitted by the elevated companies was approximately $11,000,000 under the valuation their experts presented at the time the first negotiations were discontinued. Owing to the absence from the city of the representatives of the elevated companies, it was decided to postpone a general discussion of the verified valuation until such time as all parties interested could be present.

Plans are under way to electrify the present mule line in Merida, the capital of the State of Yucatan, Mexico.

Heavy Electric Traction on the Continent

A Review of Recent and Proposed Heavy Electric Railway Work in Germany, Switzerland, Italy and Other Continental Countries

AUSTRIA

Among recent important electrifications of Austrian railways are the St. Pölten-Mariazell Railway (narrow-gage), 66 miles long, described in the ELECTRIC RAILWAY JOURNAL for Aug. 3, 1912, and the Mittenwald Railway, 63 miles long, on which 800-hp locomotives are operated over grades of 3.6 per cent by means of 15,000 volts single-phase current at 16 2/3 cycles. The Vienna-Pressburg electrification now under way will use 10,000-volt, 16 2/3-cycle single-phase current on 42 miles of right-of-way track and 600-volt direct current over 9 miles of terminal track. This line will be furnished with 800-hp locomotives for freight service. By the end of 1913 at least 191 miles of track in Austria will be operated by means of single-phase motors.

Independently of the foregoing undertakings, the Austrian State Railways have made studies covering the possible electrification of 613.8 miles of route. The administration has now reported to the Ministry of Finance that it would be desirable to proceed as soon as possible with the electrification of 66.34 miles between Attnang, Puchheim, Stainach and Irdning. The maximum grade on this section is 2.5 per cent. The average daily load on this line is 2500 gross metric tons.

FRANCE

The largest a.c. installations in France comprise the Lyons single-phase suburban tramways, which have been in service for about four years; the first electrification of the Haute Vienne network of narrow-gage lines about Limoges, as described in the ELECTRIC RAILWAY JOURNAL for July 6, 1912, and the installation of the Midi railway. In 1908 the Midi company equipped 10 miles of track between Villefranche and Perpignan with 4000-volt, 16 2/3-cycle, single-phase equipment. After experimenting for a couple of years it was decided to electrify about 175 miles of single track. This will consist of 70 miles of main-line track between Pau and Montrejean and 105 miles of intermediate branches. A 12,000-volt instead of 4000-volt overhead line will be used. In 1911 an order was placed with the French Westinghouse Company for all of the line equipment and for thirty double-truck motor cars, each equipped with four 125-hp motors. An order for one trial locomotive each was also placed with the French Westinghouse, French Thomson-Houston, Brown-Boveri, Schneider, Allgemeine and Jeumont companies respectively. The Allgemeine locomotive was described in the ELECTRIC RAILWAY JOURNAL for Oct. 7, 1911. The experimental catenary construction of the Midi Railway was described in the issue for July 6, 1912.

The Paris-Lyons-Mediterranean Railway has not yet begun any important electric operation, but has been experimenting with a permutator locomotive, described in the ELECTRIC RAILWAY JOURNAL for Sept. 21, 1911.

The western division of the French State Railways has ordered for its Paris suburban lines 130 motor cars, twenty of which are to be equipped with two 220-hp and 110 with four 150-hp motors. The smaller cars weigh 65 tons and the larger cars 70 metric tons. The maximum speed for the suburban service for which these cars will be used will be 49.6 m.p.h. There has also been ordered equipment for two substations, each containing four 500-hp, 25-cycle, 650-volt rotaries, and for three other substations, each containing three 2000-kw rotaries. About $1,000,000 worth of three-phase, 15,000-volt cables have also been ordered. Two power stations, one with about 25,000-kw and the other with about 50,000-kw capacity, are to be built by a private contractor who will operate these stations and sell the output to the railway at a special price. The power station contract will include provision for the purchase of the power station by the State at any time in accordance with a certain schedule. At present the management is considering the purchase of eight 1000-hp to 1200-hp electric locomotives for freight service on the Versailles electric line. The average weight of the freight train, including the locomotive, would be approximately 300 metric tons, and the maximum speed would be 37 m.p.h.

GERMANY

The Prussian State Railroads now have in hand three large electrification projects. The first is the Dessau-Bitterfeld electrification, which will be completed in 1914 between Magdeburg, Leipzig and Halle. This installation was described at length in the issues of May 27, Nov. 4, Nov. 11, Nov. 25, Dec. 2, 1911, and March 2, April 20 and May 4, 1912. The second electrification project is the Lauban-Königszelt line, of which a map and electrification costs were published in the issue of July 6, 1912. The third is the Berlin Stadtbahn, the electrification of which is still in abeyance. The Lauban-Königszelt lines are in a mountainous country where the ruling grade is 2½ per cent. The trackage consists of the following divisions: Lauban-Königszelt, 80 miles of double-track main line; Niedersalzbrunn-Halbstadt, 21.7 miles single-track main line; Ruhbank-Liebau, 2.7 miles of double-track and 6.8 miles of single-track main line; Hirschberg-Grünthal, 33 miles single-track branch; Hirschberg-Landeshut, 24.8 miles single-track branch. This district is of a mining and industrial character, and the greater part of the business is freight haulage. There is, however, a heavy summer passenger business on the Niedersalzbrunn-Halbstadt division, which serves a number of mountain pleasure resorts. The latter line is therefore being furnished with five three-car trains, comprising a central motor car and two "control" trailers. The motor truck will carry two motors meshing with a common gear and driving the wheels with the aid of connecting rods. The joint output of the motors on the hour basis will be 500 hp and on a continuous rating 300 hp. The cars will be operated at a maximum speed of 37.2 m.p.h.

A total of seventy-two locomotives, of which forty-four have already been ordered, are to be used on the various lines named. The initial order has been distributed as follows: Siemens-Schuckert Company, twenty freight locomotives, type B + B + B, namely, locomotives with three pairs of driving wheels on separate trucks; Bergmann Company, fourteen passenger and express locomotives, type 1-D-1, namely, trailing axle, four driving axles and one leading axle; Brown-Boveri, ten locomotives, type C + C, namely, two trucks each carrying three pairs of driving wheels. The C + C locomotives will be of the same capacity as the B + B + B type. The contract for the motor cars went to the Allgemeine company. The twenty Siemens-Schuckert freight locomotives will have a maximum tractive effort of 36,300 lb. and a constant tractive effort of 16,500 lb. at the circumference of the wheels. These locomotives will handle trains up to 1200 metric tons, including 1000-ton trains on 1 per cent grades. They are so arranged that the central compartments can be used for baggage. The Siemens-Schuckert Company has also built for this line a combination passenger and freight locomotive of the 1-D-1 type, which is capable of handling 1200-ton freight trains at 21.3 m.p.h. The initial tractive effort of this locomotive is 39,600 lb. and the tractive effort for one hour 18,040 lb. The two motors are rated at 850 hp each. The weight per driving axle is 17 tons, the diameter of the driving wheels is about 45 in. and that of the pony wheels is 33 in. The drive is by means of a jackshaft and connecting rods. The superstructure of this locomotive is fully inclosed at the ends to form the cabs. The transformers are open to the air, while the motors are carried in sheet-iron cases which are also in the open. It is expected that the first section of this installation, namely Königszelt-Dittersbach, will be in operation in the fall of 1913, and that the complete network will be in service in 1915. Energy will be taken from the high-tension busbars of a private company at the rate of 0.69 cents per kw-hr.

The electrification of the Berlin Stadtbahn, covering about 248 miles of double track, including outlying lines, has been approved by the Prussian State Railroads, but at this writing the funds for the work have not been granted by the Prussian Chamber of Deputies.

The Prussian State Railroads now have on order with the Siemens-Schuckert Company thirteen additional accumulator cars. The most interesting feature of the new cars is that the battery equipments are large enough to give a car an operating radius of 112 miles.

In addition to the electrification work of the Prussian State Railways, the Bavarian State Railways are electrifying at 15,000 volts, 16⅔ cycles, a 25-mile section which extends between Salzburg, Freilassung and Berchtesgaden and an 18.6-mile section between Landesgrenze, Griesen, Partenkirchen and Landesgrenze. The Baden State Railways have already commenced trial runs on the Wiesental 30-mile railway for which the Siemens-Schuckert Company has furnished ten and the Brown-Boveri Company two type 1-C-1 combined passenger and freight locomotives. Nine of the Siemens-Schuckert locomotives carry two 625-hp motors each.

ITALY

Since the original three-phase electrification of the 67-mile Valtellina line in 1902 (see STREET RAILWAY JOURNAL for May 30, 1903), the same system has been applied among other lines to the Busalla-Pontedecimo division of the Genoa-Milan line, a distance of 13 miles measured as single-track, and the Savona-San Giuseppe division of the Savona-Turin line. The Italian Westinghouse Company, as noted in the ELECTRIC RAILWAY JOURNAL for April 8, 1911, furnished the locomotives for both of these lines. Another important three-phase electrification now under way is that of the Mont Cenis tunnel. The Italian State Railways are also considering the electrification of the Turin-Pinerolo line, a distance of 18.6 miles, with single-phase current.

SWEDEN

Since its experiments in 1905-1907 on the Tomteboda-Värtan and Stockholm-Järfva lines, the administration of the Swedish State Railways has adopted high-tension, single-phase distribution at fifteen cycles. Its first large installation is the Kiruna-Riksgränsen division, an ore-carrying railway which is the northernmost line in the world. The distance between the towns named is about 80 miles, but it is proposed to continue the electrification to the seaport of Lulea, making the total length about 300 miles. The present equipment consists of thirteen Siemens-Schuckert freight locomotives, each equipped with two 1220-hp motors, weighing 99 metric tons complete and having a maximum speed of 37.2 m.p.h.; two additional freight locomotives of exactly the same design, but constructed by the Allmänna Svenska Electriska Aktiebolaget, Vesteras, Sweden, and two 70-ton passenger locomotives of Siemens-Schuckert manufacture, each equipped with one 1220-hp motor and operated at a maximum speed of 62 m.p.h. A preliminary description of this electrification was published in the ELECTRIC RAILWAY JOURNAL for May 6, 1911.

The Swedish State Railways are also building an entirely new trunk line called the Inlansbanan (Inland Railway) from Gellivare on the Riksgränsen-Lulea line southwest to Gothenburg, a distance of about 1000 miles. The initial section of 68.2 miles between Östersund and Sund is now completed, but is being operated by steam. This line is being constructed with the deliberate intention of opening up virgin territory for settlement, and it is proposed to electrify it as fast as the abundant water powers in this territory are developed.

SWITZERLAND

The ELECTRIC RAILWAY JOURNAL for July 29, 1911, and Oct. 7, 1911, contained detailed particulars of the first or trial equipment for the Loetschberg tunnel single-phase line, to be a part of the Simplon line between Switzerland and Italy.

The additional equipment ordered for the operation of the complete line early in the summer of 1912 consists of thirteen 2500-hp locomotives, the largest in Europe. All of these are of Oerlikon design, but six are being equipped by the Brown-Boveri Company. These locomotives weigh 105 metric tons each and are 52 ft. 6 in. long. The locomotive is of the 1-E-1 type; that is to say, there are five intermediate driving axles and one pony axle at each end. The central driving axle and those adjacent to the pony axles are arranged to have a little side play, but the remaining two driving axles are rigidly mounted. Each locomotive carries two 1250-hp compensated series motors with separate transformer and other unit equipment to permit each machine to be operated independently if necessary. The motors are designed to give their maximum output for one and one-half hours without dangerous heating. The normal speed of the locomotives is 31 m.p.h. and the maximum speed 46.5 m.p.h. The drive is through a combination of single reduction gearing, countershaft, crank pin and connecting rods following the original Oerlikon locomotive for this line. This drive was chosen largely because of its superiority in starting. Speed regulation is obtained through steps on the transformer secondaries, and a motor-operated controller is used instead of contactors. The normal drawbar pull of 22,040 lb. was fixed by State regulations covering Swiss railway equipment.

The next large electrification will probably be the Chiasso-Lucerne division of the St. Gotthard line, a distance of 93 miles. The hydroelectric rights for this purpose have already been obtained. An early decision is expected because a large amount of the steam equipment on this road will soon require replacement. In the event of electrification any steam equipment which was still in serviceable condition would be turned over to branch lines. The Swiss Study Commission estimates that the total cost of the St. Gotthard electrification would be approximately $13,500,000, divided as follows: Hydroelectric stations and transmission, $5,800,000; rolling stock and shops, $4,400,000; overhead system, $1,900,000, and annual cost of maintenance, $1,400,000. The estimated maintenance charge is much less than with steam. It is further estimated that the operating cost with electric traction will be 0.7 centime per ton-km (about 0.224 cent per ton-mile), whereas in 1908 the cost with steam traction was 0.94 centime per ton-km (about 0.3 cent per ton-mile). The commission estimates that a total output of 500,000 hydroelectric hp would be required if all Swiss railways were electrified. The two plants for the St. Gotthard project alone would total 95,000 hp. Ample water power is available for complete electrification.

The Rhaetian Railway, which is a 10,000-volt, 16⅔-cycle, single-phase, narrow-gage line, comprising in all 38.5 miles of single track, has recently ordered two 52-ton locomotives from the Oerlikon Company, each carrying two 620-r.p.m. motors which are geared to the same shaft and develop 600 hp at the wheels for one hour when the locomotive is operated at 17.3 m.p.h. The maximum locomotive speed, however, is 31 m.p.h. Each locomotive is about 35 ft. 6 in. long over all and is of the 1-D-1 type, the four driving axles being so arranged that those next the pony axles have a little side play. Details of the original locomotive orders for this line were published in the ELECTRIC RAILWAY JOURNAL for March 4, 1911, in an article entitled "Single-Phase Railways Abroad."

Gas Rate Decision in New Jersey

The New Jersey Public Utilities Commission Issues Important Decision on Rates Charged by Public Service Gas Company, Reduces Valuation of Intangible Property and Says Price Fixed Will Permit Return of Approximately 8 per Cent on Value of Property as Found by the Board

The Board of Public Utility Commissioners of New Jersey handed down a decision last week involving the rates charged by the Public Service Gas Company in the Passaic district. As this decision considered the valuations to be allowed for good will, going value and franchises, the consideration to be allowed for the amount of securities issued by the original public utility companies in the district which were merged to form the Public Service Gas Company, and the rate of return to be allowed on the valuation as found by the board, the decision is of special interest, although it does not affect the railway properties. The company has not yet announced what it intends to do in the matter. A summary of the decision follows:

THE DECISION

The board determines the existing rate of $1.10 per 1000 cu. ft. of gas with a discount of 10 cents per 1000 cu. ft. for prompt payment to be unjust and unreasonable. It fixes in place of the rate of $1.10 per 1000 cu. ft., with a discount of 10 cents per 1000 cu. ft. for prompt payment, a charge of 90 cents per 1000 cu. ft., as just and reasonable, and requires the company to put such charge into effect in the "Passaic Division" on and after Feb. 1, 1913. It also recommends that the company set the same reduced rate throughout all of the other divisions of the State where now it is exacting the rate of $1 net per 1000 cu. ft. It makes this recommendation as to territory not embraced in the "Passaic Division" because under the statute it can only issue an order fixing rates "after hearing, upon notice." It is also recommended that the schedule for quantitative discounts be readjusted in accordance with the proposed rate.

REJECTS COMPANY'S PROPOSITION

At the outset of the proceeding initiated by the board the Public Service Gas Company and Public Service Electric Company submitted a proposition to the board.. This proposition contemplated in the case of the gas company the putting into operation of a uniform flat rate of $1 as of Jan. 1, 1912, and on Jan. 1, 1914, the reduction of this rate to 95 cents and on Jan. 1, 1916, the further reduction to 90 cents. It further contemplated in the case of the electric company as of Jan. 1, 1912, the adoption of the same schedule of discounts from the base rates put into effect in New York by the Edison company. The proposition was submitted as an entirety with regard to the two properties—gas and electric. The board did not act upon the proposition because it tied up two rates, one for gas and the other for electricity, having no relation, and because to accede to it meant the fixing, without investigation, of rates for a period of five years.

VALUE OF PROPERTY

The board finds the value of the tangible property of the company in the "Passaic Division," as of Oct. 1, 1911, to be:

Land	$111,160
Manufacturing plant	1,161,550
Distributing system	2,465,270
Working capital	250,000
	$3,987,980
Less sum required to adjust figures to July 1, 1911	62,000
	$3,925,980
Less depreciation	200,980
	$3,725,000

For these items a value of $5,818,940 was claimed by the company.

The board allows for organization, franchises, cost of establishing business, etc, $1,025,000. The company claimed allowance for these items amounting in all to $3,090,551.

The total value as found by the board is $4,750,000. The total value as claimed by the company was $8,909,491.

NO ALLOWANCE FOR "GOOD WILL"

As to "good will" the board says: "For good will we allow nothing whatever. The company, we understand, makes no claim for good will. It seems well settled also, that where a particular service is furnished by only one company within a given area, the option of patronizing a rival public concern is absent and that under such circumstances good will, or the value of voluntary patronage where a competing service is available, does not exist."

"GOING CONCERN" VALUE ALLOWED

With respect to "going concern" value the decision says that however the various conceptions of going concern value may fail of precise coincidence, they all have a common core. This is the value a utility property has, or may have, over and above the value of its tangible belongings. In this connection the board puts two questions. First, can a public utility have any excess in value over and above the value of its tangible belongings? This, moreover, presupposes that the excess value, if any, is wholly distinct from any capitalized earning power predicated on a future setting of rates higher than required to afford a just return. To this question the board answers there is such a thing as "going concern value" and continues: "A plant with a business attached has a value greater than the value of the mere plant without the business attached," and concludes: "The going concern value will then be largely represented by the cost of developing the business as distinct from the cost of securing the physical structure."

Next, the board puts the question: "In case it transpires that such excess value, known as 'going concern value,' exists, and in case the costs involved in the acquisition of such value have been met out of rates exacted from consumers, should such excess value, known as 'going concern value,' enter into the base upon which public utilities are entitled to earn a fair return?"

This question, too, the board answers in the affirmative so far as it does not appear that the rates exacted from consumers were legally challenged and says: "We see no escape from the necessity of recognizing the intangible property designated as 'going concern value' as well as actual physical structures similarly obtained as constituting part of the present lawful possessions of a public utility, even though both these tangible and intangible values were built up in the past out of rates exacted from consumers, it being always assumed that the rates exacted were not legally assailed or assailable . . . The business thus acquired must be regarded as a legitimate part of the property of the company. We cannot equitably project back into the unregulated past a form of prices that might today be regarded as fair and adequate and assume that actual rates exacted in the past, in so far as they exceed what are now deemed fair, have not lawfully become the property of the company. If these high rates in the past have been employed by the company to acquire intangible property in the shape of extensive patronage, that expectation of patronage in theirs, and on its fair value the company is entitled to a return. It may or may not be a subject of regret that regulation was so long deferred, but deferred regulation is no excuse for refusing at present to allow a fair return upon what is the lawful property of the company."

COMPANY'S CONTENTION AS TO VALUE OF FRANCHISES DENIED

The company claimed allowance of $1,392,235 as the value of its franchises. This claim the board denied. The board finds the value of all intangible property of the company, including franchises, to be $1,025,000, and says:

"It is the public policy of the State of New Jersey at present not to allow the capitalization of franchises for an amount in excess of the actual cost involved in obtaining said franchises. That this is a wise and equitable policy we think is incontestable. One of the characteristic features of a public utility such as a gas company is that it does not possess and ordinarily cannot afford to purchase the land requisite for the location of its distributing apparatus. When by its secondary franchises such permits to locate are granted to a company without other expense than the necessary business and legal costs of securing municipal consents, it seems unthinkable, as a matter of equity and public policy, that the easements gratuitously granted should be made the basis for an additional charge to be imposed upon the grantor." The board further says: "It is quite obvious that our finding as to the total amount of intangible property ($1,025,000) is tantamount to including the franchises of the company at a moderate rating—at a value comparable with the cost of obtaining these or similar franchises. It amounts therefore to a practical denial of the company's contention as to the value of its franchises. The figures claimed for the franchises . . . by . . . the company . . . of $1,392,235 considerably exceed our appraisal of the company's entire intangible property."

SECURITIES ISSUED IN MERGER NOT PROPER BASIS FOR RATES

The company contended before the board that the par value of securities originating in the merger of six different gas and electric concerns in the district concerned in 1899 determine an amount below which the board's aggregate valuation could not fall. This contention is expressly denied by the board. Dealing with this contention the board points out that in the consolidation of the six gas and electric companies creating the Paterson & Passaic Gas & Electric Company in 1899, the capitalization of the latter company was fixed at $5,000,000 in stock and a like amount in bonds. Of this amount approximately all of the stock and $4,100,000 of the bonds were used in effecting the consolidation. The board finds that the capitalization resulting from the consolidation was in excess of the real assets.

In confirmation of this conclusion it says that it appears that, over and above $2,224,100 issued to the United Gas Improvement Company for "sundry claims and franchises," the excess of par value of stocks and bonds issued over the par value of stock and bonds received was $3,893,691, and while it points out that no evidence of the value of the "sundry claims and franchises" of the company was produced, yet that "as the company under the arrangement received in bonds $764,000 it may perhaps be surmised that not all of the $1,460,100 in stock received by that company was represented by its extant property of an equivalent value. If this stock was all bonus, and if the excess in securities received by the six merging companies was similarly bonus, it would seem that the consolidation involved a total of $5,353,791 in securities based on anticipation rather than of solid assets, and of the capitalization here involved it is agreed that approximately two-thirds is applicable to the gas properties."

In further confirmation the board points to the terms of the lease of 1903 of the property of the Paterson & Passaic Gas & Electric Company to the Public Service Corporation. This lease provided for payment as rental of interest on the bonded debt and of an amount equivalent to dividends on the stock of the Paterson & Passaic Gas & Electric Company for the first year of 1½ per cent, for the second of 2 per cent and for each subsequent year of an additional one-half of 1 per cent, until eventually 5 per cent was reached.

In this connection the board puts the question: "If, at the time of the lease, the property taken over by the Public Service Corporation in excess of the bonded indebtedness was represented by assets of value equivalent to the stock created by the consolidation, why was so low a return accepted by the constituent companies, or how was the Public Service Corporation able to induce the lessors to accept so meager a return as rental upon the stock of the newly created company?" It makes like comment upon the later lease of the Ridgewood company to the Public Service Gas Company, which, while guaranteeing 5 per cent on the bonds, guaranteed only 2 per cent on the stock.

The decision states the claim of the company to be that whatever the precise amount of water that was injected into securities resulting from the consolidation, yet that since the securities were issued under due form of law, are widely scattered "and people have paid for them in honest money," the board, while it should not allow any rate like 10 per cent thereon, should "stamp 5 per cent on the bonds and 5 per cent on the stock" and treat the money behind that (i. e., cash subsequently invested in the property) as "genuine money."

To this claim the board, adopting the language of Smyth vs. Ames, 169 U. S. 466, answers that if a utility corporation has bonded its property for an amount which exceeds its fair value, or if its capitalization is largely fictitious, it may not impose upon the public the burden of such increased rates as may be required for the purpose of realizing profits upon such excessive valuation or fictitious capitalization.

The board states its conclusion "that both at common law and now in this State by statute a public utility assumes the responsibilities of furnishing safe, proper and adequate service at reasonable rates and that it undertakes its business with explicit knowledge of the State's right and power to set reasonable rates, that any capitalization it effects is effected subject to the State's reserved power in the premises and that it cannot plead its capitalization nor any contracts it may have undertaken as barring the State's exercise of its power as to rates. When, moreover, the capitalization, albeit legal, is demonstrably in excess of the value of its assets at the time of capitalization, the public utility cannot cite its unchallenged capitalization as a bar to the State's exercise of inherent prerogative."

RATE OF RETURN

As to the rate of return, the board states that it does not wish to go on record as favoring any particular rate of return applicable to all cases. It declares, however, that the return must be sufficient to attract the large amount of capital required each year in making the additions and extensions to plant and distribution system which the growth in communities demands. The price fixed, 90 cents per 1000 cu. ft., will afford a return of approximately 8 per cent on the value of the property as found by the board.

GENERAL EFFICIENCY GOOD

The board finds that the general efficiency of the company is at least as good as, and probably better than, the average of the companies with which comparisons have been made.

CHRONOLOGY

The case was called to the attention of the board on June 9 through a complaint by Mayor Andrew F. McBride, of Paterson, relating to gas, electric, water, trolley and railroad commutation rates. After a separation of the complaint was required by the board it issued on July 25 a call for a hearing "as to whether the existing schedule of rates of Public Service Gas Company for gas is just and reasonable." Later a petition was received from the city of Passaic for inquiry as to the reasonableness of the gas rates charged in that city.

After the company had submitted its proposition engineers were engaged by the board to make inventory and appraisal of the property in the Passaic division and the taking of testimony was begun. Arguments on the case were heard on Oct. 11-12 and the transcript of the testimony taken contained 2541 pages, not including exhibits.

Counsel for the company were Thomas N. McCarter, Frank Bergen, L. D. H. Gilmour and E. A. Armstrong. The accountant employed by board was Marvyn Scudder, and Prof. Edward W. Bemis represented the cities as expert adviser.

ELECTRIC VEHICLES FOR STREET RAILWAY SERVICE DISCUSSED IN NEW ENGLAND

The regular monthly meeting of the New England Street Railway Club was held at Boston on Dec. 18, with President Lees in the chair. The evening was devoted to an illustrated address upon "The Electric Vehicle," by Day Baker, New England manager of the General Vehicle Company. Touching upon phases of the subject of general interest to electric railway operators, Mr. Baker stated that practically all the electric commercial vehicles of to-day are built upon the same general lines, with a low-hung battery, single series-wound motor, simple chain drive and steering gear. The power application is by a simple controller with large-sized copper contacts. From 60 volts to 85 volts is used on the motors.

SPECIAL USES FOR ELECTRIC VEHICLES ON STREET RAILWAYS

The Philadelphia Electric Company operates a large fleet of electric vehicles, including a pole-setting wagon manned by two attendants. The wagon is equipped with a derrick at its back, and a small winch under the driver's seat hauls the pole to the proper height and drops it into the hole with great ease. The output of the machine is highly satisfactory. In Boston the Edison Electric Illuminating Company has a large fleet of electric machines. One wagon of this type is used in pumping out manholes, and two men with this outfit do the work which formerly required eight men, and it is performed in one-half the time. In Boston conduits are filled with cable by an electrically driven winch located under the driver's seat on the vehicle. The same machine that hauls the wire through the conduits can be used in setting poles. The Rio Janeiro Tramways Company, Ltd., utilizes twelve electric trucks in its service, including six battery-operated tower wagons and machines for hauling wire and doing general heavy work about the city.

The tower wagon is of the Trenton type, and the body and tower are mounted on a 2-ton chassis, which will carry six men in addition to the driver, with a large assortment of tools. The New York Railways Company now has three electrically driven emergency wagons used for clearing the streets, for hauling cars around difficult corners and for general heavy service. During the snowy season cars frequently become stalled at a difficult corner at Madison Avenue and Forty-second Street, on account of the congestion of vehicles. One of these emergency wagons, rated as a 2-ton machine, will pull a horse-drawn vehicle off the track or pull a car around a corner with ease. The Third Avenue Railway Company is also using electric trucks successfully, three emergency outfits being in service at present. A 5-ton electric winch equipment is a recent addition, and a number of large trucks and smaller wagons are in use, notably in hauling cable, reels and other supplies. Electric machines are in use at Washington and Milwaukee in connection with overhead-line construction, and recent purchasers are the Lehigh Valley Transit Company and the Public Service Railway of New Jersey.

CONSTRUCTION AND PERFORMANCE

Mr. Baker specially emphasized the point that within its field the electric truck and delivery wagon is a highly economical transportation agency and pointed out that the cost of supplying it with electrical energy from a street railway plant is trifling, since the charging of batteries can be most effectually done during the small hours of the night when a large portion of the plant capacity would otherwise stand idle. Boosting charges can be given from the trolley system when desirable during the standing of the equipment on the roadside, and in this way the question of mileage per battery charge becomes comparatively unimportant. High speed is undesirable in the operation of motor vehicles through congested sections, and the speeds for which such machines are now designed are ample for practically all purposes.

The speaker also emphasized the advantages of an electric motor bus service in territory where the density of traffic is too light to warrant the installation of track and overhead line construction, and he showed views of motor-driven battery trucks for use inside shops. The electric crane truck is a recent development of value in connection with the unloading of freight cars and the handling of material around railroad yards. A small size of this type of equipment is built to operate inside a car as well as outside and is of great value in handling express matter. Electric runabouts are now available for street railway officers which will travel 100 miles at five hours upon one charge of a battery, and in the near future a guarantee of 150 miles in seven hours is anticipated. The true economic field of the gasoline machine is where it can have an uninterrupted run of at least 10 miles, whereas the electric truck or commercial wagon shows its greatest economy on short runs with many stops, the absence of transmission gears and cranking being important features.

Responding to inquiries, Mr. Baker pointed out that the fire risk has been reduced almost to negligible terms in electric trucks by the use of conduit wiring and the provision of a safety switch by means of which the driver of the vehicle cannot stop in the street and apply his brakes without cutting off the current. The mileage obtainable with a battery-driven Trenton wagon depends upon the number and size of the cells used, as well as upon the speed, but in general, running the wagon at 12 m.p.h., about 40 or 45 miles can be secured per charge of the battery. It is seldom that a Trenton tower wagon has to travel a distance that will use up such a mileage. The average run of the emergency wagon of the Third Avenue Railway is 4 miles. Good results in electric vehicle service are being obtained with Motz tires and also with the Palmer-Webb tire. Most commercial machines are equipped with solid tires. A 3-cent rate per kw-hr. on central-station service compares with gasoline at 7.8 cents per gallon. Notable improvements have been made in the storage battery within the last few years, and the life records now being indicated are much better than was possible until within two or three years With the newer forms of plates there is no reasonable objection to the practice of boosting batteries. Charging at a low rate is preferable.

Frank J. Stone, Electric Storage Battery Company, Boston, brought out the point that in charging the Ironclad Exide cell recent tests show that as high a current input as possible without producing gassing may safely be utilized. By keeping just below the gassing point and consequently running the charge at a reduced temperature, very efficient charging is accomplished. In charging a flat-plate battery and getting to the gassing point, the gas which comes off the plate has a tendency to disrupt or disconnect the small atoms of oxide, which fall to the bottom of the jar as the gassing proceeds. The tube and cell construction of the ironclad type of battery enables the gas to be disposed of from the cells without disturbing the active material, giving about three times the life of the old flat form of plate.

The cost of freight car maintenance on the steam railways of the United States was reported at the November meeting of the American Railway Association to have been 24.75 cents per car per day during the year of 1911. This was divided between repairs, replacements and taxes, repairs costing 16.87 cents, replacements, including the charges which were made to renewals and depreciation, 6.78 cents, and taxes 1.10 cents.

INDIANAPOLIS TRACTION & TERMINAL COMPANY'S EXPERIENCE WITH OXY-ACETYLENE WELDING

The employment of the oxy-acetylene process of welding and cutting of metals in electric railway shops is comparatively recent. Its practicability in this new field, however, has been clearly demonstrated by the results secured by the Indianapolis Traction & Terminal Company's mechanical department. L. M. Clark, master mechanic, who made the initial installation of this type of welding apparatus, has obtained exceedingly satisfactory results with it in his shops, and new work is being found for the equipment almost daily. One man is now kept at work with the welding outfit continually, and it is expected that a second equipment will be purchased in the near future so that two operators may be employed to take care of the large amount of work which may be handled by this means.

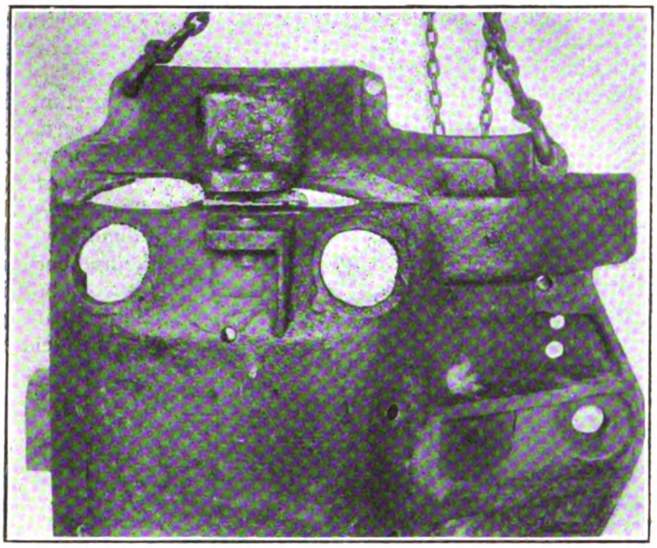
The original installation was made about two years ago and comprised an "Oxweld" 100-lb. duplex acetylene generator, a number of oxygen and acetylene cylinders for portable work, the necessary regulators, blowpipes, welding head and welding material furnished by the Ox-Weld Acetylene Company of Chicago. In looking around for a man to operate the plant a car repairman of average intelligence was selected. After receiving instructions from one of the manufacturer's experts, which extended over a period of about ten days, it was decided that the company's man could go ahead on his own responsibility.

EARLY EXPERIMENTS

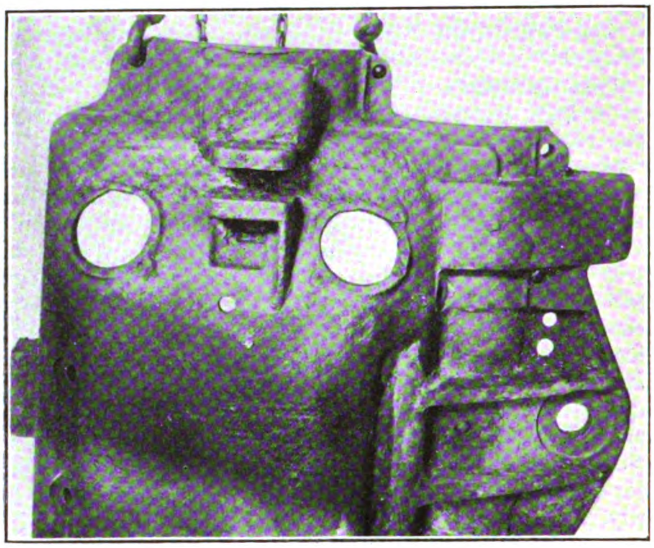
At first Mr. Clark gave considerable personal attention to the plant in order to determine its adaptability to the requirements encountered in his own shop practice, and although he had familiarized himself with the various classes of work which were usually handled by this process before purchasing the plant, he soon discovered that numerous other savings were possible. The convenience of being able to repair in a short time truck frames and motor frames which under ordinary conditions would have gone to the scrap heap resulted not only in a great saving of money, but also in the saving of time required to replace parts which were not regularly carried in stock. This offered an attractive field for experiments, and during the first few months attention was directed to the reclamation of different pieces of apparatus in order to determine the saving over the cost of new duplicate parts as well as the possible saving in time during which cars were held out of service.

After about six months of experience with the original equipment the operator became proficient and there seemed to be no limit to the variety or quality of work that could be done. The money and time saved by reclaiming large pieces of equipment caused attention to be turned to smaller parts in order to determine whether the same proportionate saving could be made, and in some cases similar results were obtained with the smaller castings. Other cases showed that, even though the repair was made at a loss when the cost of a new part was considered, the time required for holding equipment out of service for repairs was reduced more than enough to offset the additional expense. A recent experiment has demonstrated that it is economical to weld or build up pieces even as small as resistance grids.

That successful operation of the oxy-acetylene plant does not require an expert is evident from the fact that not a single weld made at the Indianapolis shops has failed, even though the operator was under instruction for only ten days. As a matter of fact, it is reported that anyone having a practical knowledge of the handling of heated metals will become proficient in a short time. Trouble may, however, result from a failure to allow a proper amount for expansion and contraction, but as this information can be furnished to an operator in tabular form for different kinds of metal the element of individual judgment in this matter may be largely eliminated. Practically all the metals found in electric railway equipment may be welded, built up or cut off, the oxy-acetylene flame being especially adaptable to the latter.



Oxy-Acetylene Welding—Motor Frame Worn Through by Suspension Bar Between Lugs



Oxy-Acetylene Welding—Motor Frame with Hole Between Lugs Built Up with New Metal

The cutting of metal can be handled very quickly by the process at a very low cost, and the small working space required makes it particularly advantageous in places where a hack saw could not be used. For example, Mr. Clark recently found it necessary to trim off portions of the platform knees on certain cars in order to provide proper wheel clearance. Under ordinary conditions it would have been necessary to remove the platform knees from the car, but with the plant available the work was done with the platform knees in place, thus avoiding a considerable item of expense on this score alone.

SAVINGS EFFECTED

Before the economies possible with this plant had become evident it was decided to keep a close check record on the work which was done, in order to give an accurate idea as to the monthly and annual savings. A form of report for this purpose was drafted early in 1912. From April 1 to Oct. 1 of that year the total net saving was $3,200. This amount represents the difference between the actual cost of welding and the cost of replacing the repaired part with a new one. It was impossible to estimate the value of the time which might have been lost by a car awaiting the shipment of a part for renewal, but there can be no doubt that this would have materially increased the net saving. In fact, in many instances the equipment was of an old type and it was practically impossible to purchase repair parts for it.

The two accompanying illustrations showing a motor frame before and after welding are representative of a lot of five lower half-frames shipped to the Indianapolis Traction & Terminal Company by the Fort Wayne & Northern Indiana Traction Company for repair. It will be noted that the body portion of the frame has become worn through by contact with the suspension bar used in connection with this type of motor. This wear was the result of elongation in the bolt holes in the suspension lugs of the frames. In addition to building up the worn portion of the motor frame, the holes in the suspension lugs were filled with new metal and new holes were drilled at the proper locations and at the original dimensions. The cost of repairing this particular frame was approximately $35. This cost is considerably above the average for the five, as it not only represents the cost of repairs but includes the cost of providing a special preheating device which was used in the repairs to the other motor frames. In proportioning this charge against each frame the cost of repairs was reduced to about $25 as compared with approximately $125 or $130 for the cost of a new duplicate part. It is contemplated that there will be a further reduction in the total cost of repairing each motor frame, as the preheating device may be used in other repair work.

Indianapolis Traction & Terminal Company—Material Used and Cost of Typical Jobs at West Washington Street Shops.

Name of Part	Amount of Material			Time, Hours	Cost of Welding	Cost of Duplicate New Part	Net Saving
	Oxy.	Acet.	Filler				
Motor axle cap	5	3	1	1	$0.48	$5.39	$4.91
Armature housing	5	3	1	1	0.48	7.94	7.46
End bearing for mixer	190	104	5	10	9.44	....	....
Cutting anti-climber	30	18	..	2	1.43	....	....
1 bumper iron	70	42	1½	3	3.02	....	....
1 journal box, 5 x 90	90	54	2	5	4.40	5.00	0.60
1 brake valve body	10	6	½	1	0.67	4.12	3.45
1 scissors	5	3	½	1	0.52	....	....
6 motor axle caps	30	18	1	3	1.75	32.34	30.59
1 motor frame	340	204	5¼	20	15.92	....	....
1 magnet frame	20	12	½	2	1.23	....	....
1¼ x 7 journal box	50	30	1	3	2.58	3.55	0.97
Peck. truck side frame	170	102	2	12	8.40	47.50	39.10
Peck. truck frame	150	90	1½	10	7.25	47.50	40.25
6 motor axle caps	30	18	1	3	1.75	32.34	30.59
5 Lorain compressor shells	100	60	2	7	5.26	....	....
1 5 x 9 journal box	40	24	1	2	1.95	5.00	3.05
1 door sheave	20	12	Brass	1	1.04	....	....
5 motor caps	35	21	1	3	1.91	26.95	25.04
1 Peck. truck side frame	190	114	2¼	10	8.56	47.50	38.94
Cam for stoker engine	45	27	5	2	2.43	....	....
1 armature shaft	280	178	3	11	11.73	....	....
1 truss rod anchor	15	9	1	1	0.79	....	....
Heating 2 tires	15	9	..	1	0.72	....	....
Standard truck frame	220	132	3¼	11	9.82	....	....
1 pipe vise	5	3	½	1	0.52	2.50	1.98
Annealing wheels	30	18	..	2	2.42	....	....
Steam trap	20	12	1	1	1.02	....	....
Coal elevator cam	40	24	1½	3	2.25	....	....
Side frame on truck	215	129	2½	12	9.84	47.50	37.66
Cut hole in boiler	30	18	..	4	2.20	....	....
3 coal elevator cams	140	84	3½	5	6.37	....	....
Cut 6-in. I beam	15	9	..	..	0.72	....	....
Peck. truck side frame	175	105	2	4	6.56	47.50	40.94
Westinghouse top motor frame	400	240	4	20	17.16	77.76	60.60
I beams cut-off	50	30	..	2	2.00	....	....
Westinghouse pinion axle cap	100	60	4¼	7	5.25	6.24	0.99
Peckham truck frame	250	150	4	15	11.39	44.25	32.86
Peckham truck frame	50	30	½	5	2.72	47.50	44.78
Anti-climber castings cut	50	30	..	2	2.00	....	....
West'g pinion axle cap	100	60	2	10	5.74	6.24	0.50
West'g top motor frame	400	240	7	20	17.36	84.24	66.88
West'g pinion axle cap	150	90	3	10	7.10	10.05	2.95
Peckham truck frame	150	90	3	15	8.23	44.25	36.02
Lorain bottom motor frame	100	60	2	3	3.91	61.56	57.65
West'g top motor frame	400	240	4	20	17.16	77.76	60.60
West'g top motor frame	140	84	3	12	7.24	105.17	97.93
West'g motor frame	450	270	5¼	15	18.48	33.69	15.21
West'g top motor frame	300	180	4	18	13.61	77.76	64.15
Anti-climber castings	50	30	..	2	2.00	....	....
4 3¼ x 7 Sym'gton fire boxes	350	2.10	5¼	15	15.38	14.20	—1.18
West'g compressor gear case corer cap	25	15	1	3	0.68	22.50	21.82

The net savings for the seven months during which time a record was kept ranged from $230 to $860 per month. This varying valuation is largely due to the character of the parts which are repaired.

A partial list of the pieces welded, the savings made and the cost of welding is given in the tabulated statement herewith. Some of the repairs included in this list consisted in refilling the tapped holes of railway motor frames the threads of which had become stripped and welding on new ends to railway motor armature shafts which had become damaged at the taper pinion fits and would have otherwise required complete replacement. The outfit has also been used in correcting errors made in machine work and punchings in structural steel. In fact, at the present time the plant is considered indispensable in the shop and is a source of great convenience to the department.

COMMITTEES OF NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS

O. P. Gothlin, Columbus, Ohio, president of the National Association of Railway Commissioners, has announced his appointments of committees for the ensuing year. Among the committees are the following:

RAILROAD TAXES AND PLANS FOR ASCERTAINING FAIR VALUATION OF RAILROAD PROPERTY

Milo R. Maltbie, of New York, chairman; J. C. Clements, Washington, D. C.; Royal C. Dunn, of Florida; B. L. Caughman, of South Carolina; W. P. Geary, of Arizona; S. P. Watson, of Oklahoma; E. P. Spofford, of Maine.

RAILWAY CAPITALIZATION

John M. Eshleman, of California, chairman; H. F. Bartine, of Nevada; Frank J. Miller, of Oregon; George A. Lee, of Washington; J. S. Harlan, of Washington, D. C.; William R. Willcox, of New York; J. J. Meredith, of Louisiana.

SAFETY APPLIANCES

William Kilpatrick, of Illinois, chairman; George W. Bellamy, of Arkansas; Sheridan S. Kendall, of Colorado; Henry B. Schrieber, of Louisiana; Joshua W. Hering, of Maryland; H. R. Oglesby, of Missouri; Edward C. Niles, of New Hampshire.

STATISTICS AND ACCOUNTS

B. H. Meyer, of Washington, D. C., chairman; George A. Henshaw, of Oklahoma; H. J. Winnett, of Nebraska; W. C. Wishart, of New York; C. A. Radcliffe, of Ohio; Thomas Yapp, of Minnesota; C. I. Sturgiss, Association of American Railway Accounting Officers.

STATISTICS AND ACCOUNTS OF ELECTRIC RAILWAYS

George W. Bishop, of Massachusetts, chairman; A. F. Weber, of New York; F. K. Lane, of Washington, D. C.; Jesse S. Jones, of Washington, D. C.; George F. Giddings, of Maine; Joseph F. Gray, of Georgia; William F. Ham, American Electric Railway Accountants' Association.

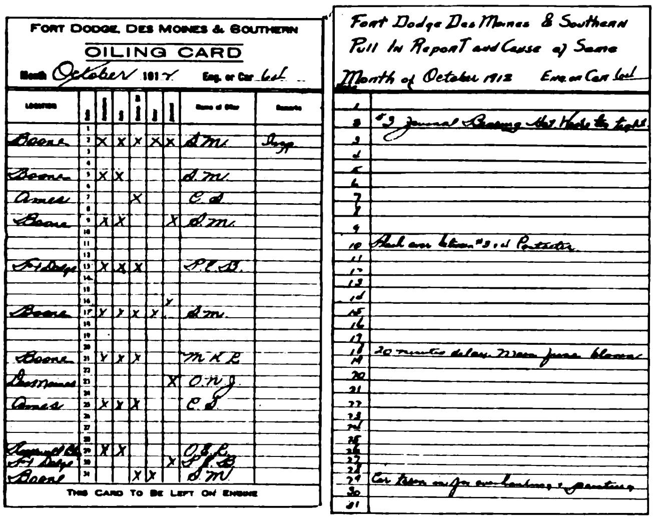
RAILS AND EQUIPMENT

James E. Sague, of New York, chairman; E. E. Clark, Washington, D. C.; W. J. Wood, of Indiana; G. W. Bishop, of Massachusetts; Frank Avent, of Tennessee; J. A. Knott, of Missouri; W. H. Mann, of North Dakota.

To undertake the work of running cars on the Shanghai bund a company was started some three months ago under the name of the Compagnie Chinoise de Tramways. Its capital is $400,000. At present the company is confining its activities to laying a track from the southern end of the French bund, where the boundary of the concession lies, to the station of the Shanghai-Hangchow Railway, but it is understood that it is intended to extend the line to the arsenal. The contract for the construction of the line and for the cars has been placed with Siemens-China Electrical Engineering Company.

FORT DODGE, DES MOINES & SOUTHERN OILING RECORD

The mechanical department of the Fort Dodge, Des Moines & Southern Railroad has devised a scheme which not only informs the inspector at any terminal of the exact date of the last oiling of any car, but serves as a permanent record. The oiling card is of the form shown in the illustration and space is provided for a thirty-one-day month. One of these cards is slipped into a metallic slide attached to the side of the car in the baggage compartment. This slide has a glass cover which holds the oiling card in place but permits the inspector to read it without removal. Instructions have been issued to all inspectors and oilers calling attention to the oil card and requesting that each oiling be recorded in the proper column opposite the correct date.



FORT DODGE, DES MOINES & SOUTHERN
OILING CARD
Month October 1912 Eng. or Car [illegible]

LOCATION	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Name of Oiler	Remarks
	1							
Boone	2	X	X	X	X	X	S.M.	[illegible]
	3							
	4							
Boone	5	X	X				S.M.	
	6							
Ames	7			X			C.S.	
	8							
Boone	9	X	X			X	S.M.	
	10							
	11							
	12							
Ft. Dodge	13	X	X	X			P.L.B.	
	14							
	15							
	16					Y		
Boone	17	Y	Y	X	Y		S.M.	
	18							
	19							
	20							
Boone	21	Y	Y	Y			M.K.E.	
	22							
Des Moines	23					X	O.N.J.	
	24							
Ames	25	X	X	X			C.S.	
	26							
	27							
	28							
[illegible]	29	X	X				O.S.E.	
Ft. Dodge	30					X	P.L.B.	
Boone	31			X	X		S.M.	

THIS CARD TO BE LEFT ON ENGINE

Fort Dodge Des Moines & Southern
Pull In Report and Cause of Same
Month of October 1912 Eng. or Car [illegible]

1	
2	#3 journal bearing hot. Wedge too tight
3	
4	
5	
6	
7	
8	
9	
10	Flash over [illegible] #3 [illegible]
11	
12	
13	
14	
15	
16	
17	
18	20 minutes delay. Main fuse blown
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	Car taken in for overhauling & painting
30	
31	

Front and Reverse Side of Oiling Card

Armatures and axles are oiled every 1000 miles, and 2 lb. of grease is applied to each set of gears every fifteen days. The journal bearings receive 2 gills of oil every seven days. With this set of instructions it becomes the duty of each inspector to read the posted record on the oil card and act in accordance. At the end of the month the inspector removes the card and records the last oiling dates at the top of the new card. This makes the record continuous for the outside men, and the completed card is forwarded to the office of the master mechanic as a permanent record. The back of each oiling card provides space for a record of pull-ins and parts repaired or renewed.

STEAM RAILROAD STATISTICS FOR 1912

It is interesting to note that statistics for steam railroads published in the *Railway Age Gazette* for Dec. 28, 1912, show conditions quite similar to those indicated in the electric railway industry by the figures published elsewhere in this issue of the Electric Railway Journal. The *Railway Age Gazette* shows that one has to go back for fifteen years, namely, to 1897, to find a year in which as small a mileage was built as in 1912, and one has to go back six years, to 1906, to find a year in which as large a number of locomotives and as large a number of freight cars were ordered. The marked increase in activity along industrial lines during the last part of 1912 is shown by the fact that between two and three times as many freight cars were actually built in 1912 as in 1911, and a third more locomotives were actually built in 1912 than in 1911.

Notwithstanding the fact that 1911 was considered a very unsatisfactory year for railroad building, 3066 miles of new first track were built in 1911, while in 1912 only 2997 miles were built. The largest mileage was built in North Dakota, in which State 347 miles of first track were built. Texas, in which 336 miles were built, had second place in the list.

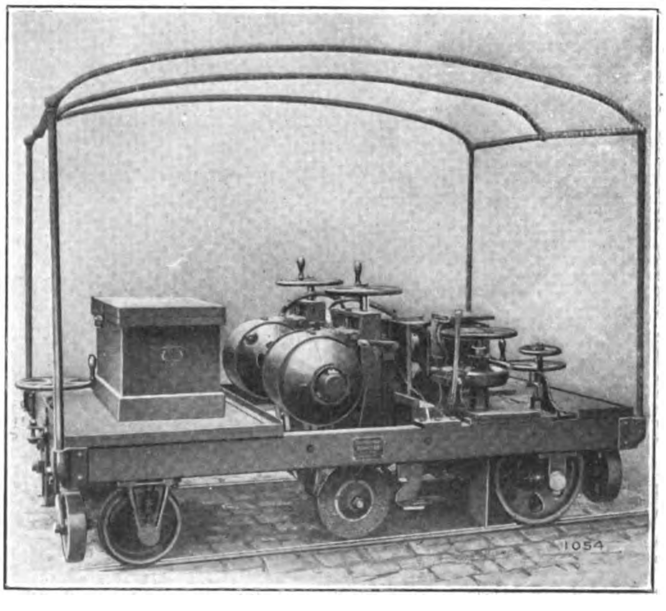
The totals for cars and locomotives ordered during the year show the heavy demands that were made on railroad facilities during the last part of 1912, both for the movement of extraordinarily heavy crops and for the general business resulting from greater industrial activity. The new equipment ordered during 1912 was as follows: freight cars, 226,195; passenger cars, 3623, and locomotives, 4424.

AN IMPROVED RAIL GRINDER

The Goldschmidt Thermit Company, New York, has made several important improvements in its well-known grinder and corrugation machine. The most important is in the character of grinding, for instead of describing the arc of a circle of long radius as it moves backward and forward over the joint, the new grinding mechanism is set to follow a flat sinusoidal curve, which becomes horizontal at each end and therefore tangent to the surface of the rail.

As in the original machine, the entire weight (about 5500 lb.) is concentrated over the grinding wheels so that the maximum cut can be made without danger of chattering. In addition, the possibility of chattering because of worn bearings has been forestalled by mounting the emery wheel on a shaft which runs in two main bearings and a new type of center bearing. This center bearing is drawn up by a flat spring from the saddle casting. As the spring is always under heavy tension, its effect is to draw the emery wheel spindle tightly against the top of the other two bearings, thus holding the emery wheel against chattering and also preventing any tendency it might have to sway unsteadily because of worn bearings.

The use of motor power and the concentration of weight directly over the emery wheels make it possible to take deep cuts and to run at most economical speed. Thus, the most efficient results are secured by running at 1833 r.p.m., which corresponds to an initial peripheral speed of 6719 ft. per minute for a new wheel and proportionately smaller peripheral speeds as the diameter of the wheel decreases with wear. The power equipment consists of two 5-hp inclosed motors, which are belt-connected to the emery wheels, and one 3½-hp inclosed motor for traction.



Non-Chattering Rail Grinder

A third improvement in this machine is the addition of a substantial canopy, which will withstand heavy winds and shed water at the ends but not at the sides. The latter feature permits the crew to work in a heavy rainstorm with no discomfort from dripping water.

LONDON LETTER

(From Our Regular Correspondent)

The report of the Glasgow Corporation Tramways for the half-year shows that 150,000,000 passengers were carried, an increase of fully 21,000,000, due largely to the doubling of halfpenny distances. The receipts for the six months were £492,000, a reduction of nearly £10,000 on the corresponding period last year. Halfpenny fares represent more than 60 per cent of the entire traffic.

The result of the operation of the Morecambe Tramways since the adoption of petrol tramcars has been presented. The company operates only a few cars which previously had been operated by horses at a considerable loss. The directors announce that since the change from horse to petrol-propelled cars there has been a profit of more than £1,200, and they have declared a dividend of 2½ per cent. The petrol cars cost 9.06d. per mile to operate, or 4.57d. less than by horse traction. It is the only line of its kind in Great Britain.

It is expected that by the end of this year the work of constructing the experimental electric railway on the branch line of the Lancashire & Yorkshire Railway from Bury to Holcombe Brook will be completed. This is the line which Dick, Kerr & Company are constructing on the direct-current, high-pressure system. A large staff of men has been engaged on the work and the overhead wires for the high-pressure power are nearly all erected. Power will be supplied by the Lancashire Electric Power Company. The line is to be worked at a pressure of 3500 volts and the installation is the first one at that voltage in Great Britain.

The Tramways Light & Power Company has been organized with an authorized share capital of £600,000 under the ægis of George Balfour, of the firm of Balfour, Beatty & Company, the promoters of a number of successful tramway companies in England and Scotland. The directors are the Right Hon. Viscount Chilston, director of the South Eastern & Chatham Railway Company; Alfred R. Holland, chairman of the Mansfield & District Tramways, Ltd., and Mr. Balfour. The company has been formed to own and work electric supply, tramway and kindred undertakings in Great Britain and elsewhere, and particularly to produce, supply and distribute electricity for power and lighting purposes in the counties of Derby, Nottingham, Leicester and Warwick, to construct the Nottinghamshire & Derbyshire Tramways and other works, and develop other tramway and lighting properties in the immediate vicinity. The company will take over the Derbyshire & Nottinghamshire Electric Power Company, the Nottinghamshire & Derbyshire Tramways, the Leicestershire & Warwickshire Electric Power Company, and the Leamington & Warwick Electrical Company, Ltd., all of which have rights in that district. The annual net earning from these tramways, lighting and power properties are estimated at £46,500. After paying interest on £150,000 debenture stock and a dividend of 6 per cent on 300,000 preference shares, a surplus of about £21,000 should be left for the ordinary shares.

Additional details are available in regard to the London & North Western Railway's electrification scheme from London to Watford. Seventy-nine miles of track are concerned, not including that of the Bakerloo Tube, with which the North Western Railway will have a physical connection at Queen's Road Station. It has been stated that current will be delivered by a third and fourth rail in the same manner as employed on most of the London tubes, and continuous current will be delivered to the track at 600 volts. Tenders have already been invited for part of the electrical equipment, and it is expected that the work of installation will be commenced early in the year. The new power house will be built near Wembley, with an initial capacity of 25,000 kw, but so arranged that large extensions can readily be made. Special attention is being paid to the matter of coal supply, accommodation being arranged for three months' requirements. The rolling stock will be of two types—that for use on the North Western Railway itself, where the trains will run from Watford to Broad Street Station, and that which will have to be used for the trains which have through running on to the Bakerloo. The latter type will be of smaller dimensions, owing to the size of the tunnels.

While the Metropolitan Railway has kept out of the Speyer group of railways, it is making vast improvements. Perhaps one of the most interesting improvements is being effected at Baker Street, where a proper junction is being made with the company's circle track. Hitherto there has only been a single-line junction between the circle and the Metropolitan extension lines to the suburbs, and it has therefore been decided to construct a "flying junction" at this point, which will eliminate many of the possibilities of accident.

The London & South Western Railway has announced that it will commence the electrification of its Thames Valley route immediately. It is expected that the work will take about two years to complete. The first line to be electrified will be the loop line from Waterloo to Kingston and back, via Wimbledon, Richmond and Putney, and the Hampton Court lines will be electrified a little later. Ultimately 246 miles of single track will be equipped, and about 73 miles will be converted as soon as possible. The company has decided to adopt the direct-current third-rail system, using 600 volts on the third-rail, similar to the system in use on the London tube lines and the District Railway, the trains of which already run to Richmond and Wimbledon over the South Western rails. A through service of trains will therefore be made possible. A power house with a capacity of 25,000 kw will be built, and substations will be provided for the first portion of the work at Clapham Junction, Raynes Park, Barnes, Twickenham and Kingston, while the existing generating station at Waterloo will also be used for this purpose. Two classes, first and third, will be used on the electric trains, but the compartment system will be adhered to. The immediate proposals provide for six trains an hour in each direction, and afterward electric trains will leave Waterloo at an average interval of three minutes throughout the day. The new Waterloo Station, which has been under reconstruction, has been designed with a special view to these electrified lines. Sir Alexander Kennedy and his partners are the company's consulting engineers for the electrification, but the electrical work will be in charge of Herbert Jones, the company's electrical engineer, and the permanent way reconstruction will be under the direction of J. W. Jacomb Hood. Within the next few years, therefore, London will be completely surrounded by a network of electric railways working in connection with the various main railways.

A provisional agreement has been entered into between the Metropolitan District Railway and the promoters of the authorized Wimbledon & Sutton Railway, under which the District Company will acquire the Parliamentary powers granted to the Wimbledon & Sutton Railway in 1910, with a view to the dissolution of that company and the construction of that railway as part of the District Railway system. This agreement will require confirmation by Parliament to be made effective.

The North Eastern Railway, with a view to affording improved facilities for the development of the residential area of the Northumberland coast, served by its Newcastle and Tynemouth electrified lines, is arranging to construct a new stretch of railway from Monkseaton to Seaton Sluice on the Northumberland coast. The new section of railway will be of standard gage construction, and traffic will be worked on the third-rail system.

A special meeting was held recently at the Guildhall by representatives of the various local authorities in the London area to consider the question of motor omnibus traffic. A resolution was carried to the effect that requisite powers should be conferred upon the Board of Trade, Local Government Board, or other government authority, to limit and define the routes to be taken by such traffic. Doubtless the board of traffic is causing the London authorities a tremendous increase in the cost of repairing the roads. A select committee of the House of Lords has also been appointed to inquire into the circumstances which have led to the large number of fatal accidents in the metropolis due to the motor omnibus and other power-driven vehicles. In 1909 the number of persons killed was 52; in 1910, 61; in 1911, 95, and this year it would appear as if the number of fatalities caused in this way would be more than 100, while the number of pedestrians and others who have been injured by these vehicles will probably total more than 2500.

A. C. S.

News of Electric Railways

Franchise and Terminal Questions in Dallas

M. M. Phinney, president of the Dallas (Tex.) Electric Corporation, addressed a communication recently to the Chamber of Commerce of that city in regard to extensions and improvements which Stone & Webster propose to make in and about Dallas. These improvements will total about $5,000,000. Mr. Phinney said in part:

"Your letter to Mr. Moore refers to three specific matters in which Stone & Webster are directly interested, namely, the Terrell interurban, the interurban terminal and the extension of street railway lines. As to the Terrell interurban, a contract has been signed by which we have bound ourselves to build the Terrell line, beginning as soon as the right-of-way is provided in accordance with the terms of the contract.

"The interurban terminal project has been advanced to the extent of the purchase of the necessary land. The work of preparing plans for the structure is under way. A difficulty will arise, however, concerning the tracks to the terminal within the city limits. Tracks of the existing Dallas companies to the terminal would be subject to the existing franchises. This disadvantage would, of course, be removed if the franchise extensions were to be cleared up.

"The third matter is that of the extension of our street car lines. Our street railway franchises were granted when Dallas was a comparatively small city, long before Stone & Webster had any interest in the properties in Dallas. The franchise of the Dallas Electric Light & Power Company will expire in 1922, of the Dallas Consolidated Electric Street Railway in 1922 and 1923, of the Rapid Transit Railway in 1923, of the Metropolitan Street Railway in 1922. By reason of the short time which these franchises have to run they no longer furnish a satisfactory security for the investment of new money by Stone & Webster or by those who look to Stone & Webster for guidance in making their investments.

"The Terrell interurban investment is based upon the substantial rights granted under the law to interurban properties, including permanent ownership of the right-of-way. The interurban terminal investment is based on the permanent ownership of the land, without restrictions or qualifications. But the large sums of new investment required for extension of the local lines and new equipment have no other security than that of the expiring franchises referred to. That is not a sufficient security. It is, therefore, impossible for us to consider the construction and operation of extensions until the people of Dallas deal with the franchise situation.

"The kind of a new franchise Stone & Webster would accept is a matter of negotiation, for we do not know what terms the people of Dallas would wish to impose. All the terms of a franchise are interdependent and must be considered in the light of all other conditions. As to the length of the term provided for in a new franchise, however, I can say this: Our present difficulties with an expiring franchise naturally lead us to want to avoid similar conditions in the near future. We have, therefore, earnestly desired a forty-year franchise; that is, an extension of thirty years beyond the time our present franchises have to run. This has been objected to. The charter fixes twenty years as a maximum grant. While still believing that it would be more advantageous to Dallas to grant us the longer term, we are ready to accept a twenty-year extension of our present franchises, making, with the ten years our present franchises have to run, a thirty-year franchise for the properties. In a broad sense relief as to the franchise situation in Dallas would materially advance all the projects we have in view in this vicinity. In reaching an agreement with the city, the management will deal honorably, frankly and justly. It will not neglect to safeguard the interests of the Dallas properties, but it will at the same time act with an intelligent recognition of the fact that the Dallas properties are engaged in a public business, not a private one."

Mr. Whitridge Complains About the Burden of Taxation in New York

Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., and affiliated companies, has addressed a letter to the State Board of Tax Commissioners of New York in which he complains of the excessive assessments tentatively placed upon the special franchises of the various properties under his control. In his letter Mr. Whitridge says in part:

"I have this day filed with you formal complaints against the tentative assessments placed by you upon special franchises of the several surface railways in Manhattan and the Bronx which are under my control. I desire to supplement my formal complaint by this brief history of the experience of these companies and to make a final appeal to you for relief from what is obviously a glaring case of injustice.

"The special franchise tax law was passed in 1899 and the first assessments were placed on these companies in the year 1900. Since that time they have, with one exception, either remained substantially stable or show slight increases, although with the electrification of the elevated railways and the operation of the subways everyone knows that street railway franchises in New York City are not of great value, and their value has, speaking generally, fallen since 1901. You have now announced practically the old figures as the tentative assessments for 1913.

"From 1901 to 1909 the companies did not pay any special franchise taxes. In 1901 the companies were solvent. In 1907, together with all the other surface railways in New York City, these companies all became financially involved, and at the beginning of 1908 they were placed in the hands of myself and others as receivers, and the receiverships continued for several years. In spite of this insolvency, your predecessors in office never made any reduction in their valuations.

"When I took charge of these companies in 1908, I found that very little intelligent effort had been made on behalf of the companies or the State to settle the correct amount of the overdue taxes, although certioraris to review the assessments had been taken out each year. In conjunction with the other roads, we decided to make the assessment on the Third Avenue Railroad for 1901 a test case, and had it carried up to the Court of Appeals. The Court of Appeals cut the assessment practically in half and laid down clear rules for future assessments.

"With the result of that test case to go by, I then set about settling all the arrears of franchise taxes, and I had lawyers and accountants working on this matter for months. Finally a settlement for all years up to 1910 was made which was, generally speaking, on the basis of this test case, and I paid up all the arrears.

"Within the last year there has come a change in the personnel of the State Tax Board, and with that change I took fresh hope that something would be done. I instructed my lawyers to present fully to you the facts in regard to these companies and to try to avoid all the trouble of litigation and it was therefore a good deal of a shock to me to find that the tentative assessments which your board made for the coming year were along the old lines.

"Your assessment for this year aggregates $20,000,000, substantially the same figures you fixed thirteen years ago. It was, as I state, cut in half for the first ten years; nevertheless, you have continued to make the assessment of about $20,000,000, thus presuming to recall the decision of the Court of Appeals and compelling me to begin a separate set of actions for each of the three last years. Is this fair from any point of view? Especially, is it fair when you consider that all our theorists hold, under the Public Service Commissions law, that on a reorganization of these companies the whole $20,000,000 is lopped off from the supposed value of the properties? I submit to you that you are doing me a grave injustice and I ask you for relief."

Changes in Boston Elevated Organization

Important changes in the executive organization of the Boston (Mass.) Elevated Railway were put into effect on Jan. 1, 1913, to meet new administrative conditions. C. S. Sergeant, vice-president, will continue to perform such duties relating to the general conduct of the company's business as have been or may be required of him, but will be relieved of his duties as chief of the bureau of operation. Among other duties, he will take immediate charge of the bureau of elevated and subway construction. The bureau of operation will be divided into two bureaus—one to be known as the bureau of transportation, and the other the bureau of maintenance. Matthew C. Brush, second vice-president, has been appointed chief of the bureau of transportation, and Charles H. Hile, for the past seven years assistant to the vice-president, has been appointed chief of the bureau of maintenance. H. B. Potter has been named as Mr. Brush's assistant.

Subject to the approval of the president, the chief of the transportation bureau is placed in charge of all matters relating to car and train service, on both surface and rapid transit lines, including the care of motive power, arrangement of timetables, making of rules and hours of operation, and the recommendation for appointment or removal of all assistants and employees of the road in his bureau, including compensation. He reports as may be required by the president, executive committee or board of directors upon conditions in his bureau and upon the general interests of the company.

In the bureau of transportation, the head of the department of surface lines, George R. Tripp, will be in charge of the movement of surface cars and of all officials and employees engaged in surface car service and in the carhouses and subways used by surface cars. He is required to arrange timetables, investigate complaints, receive and care for lost articles, provide for chartered cars, etc.

The head of the department of rapid transit lines, H. A. Pasho, is assigned general charge of the movement of all elevated, subway and tunnel trains, and of all officials and employees engaged in train service, and under his jurisdiction are also placed the elevated and tunnel shops and yards and all stations, tunnels and elevated structures.

The department of power, headed by James D. Andrews, includes the operation and maintenance of all the company's power plants and substations, with the exception of maintenance delegated to the department of wires and conduits.

Clarence E. Learned, head of the department of inspection, has charge of the inspection of the conduct and efficiency of car service employees, and performs such other duties as the chief of the transportation bureau may determine.

J. E. Rugg, head of the department of employment, is responsible for the hiring of all employees for service, and is to report to the chief of the transportation bureau.

The chief of the bureau of maintenance reports to the president, and has charge of the maintenance work required by the company, such construction work as devolves upon the several departments composing the bureau and all necessary supplies except those otherwise provided for.

In the bureau of maintenance, the head of the department of mechanical and electrical engineering, Paul Winsor, is placed in charge of mechanical and electrical engineering work arising within the bureau. The department consists of the mechanical engineering drafting room force and the electrical engineering division.

The department of maintenance of way is placed in charge of H. M. Steward, chief engineer, who is required to exercise general supervision over the civil engineering of the company other than that performed by the bureau of elevated and subway construction, and over the maintenance of way of both surface and elevated lines. He is required to report to the chief of the maintenance bureau, as do other department heads in its organization. The civil engineer and the roadmaster of surface lines report directly to the chief engineer of maintenance of way. The roadmaster of rapid transit lines reports to the chief engineer as in the foregoing cases, but through the superintendent of the rapid transit lines. Division trackmasters on surface lines are held responsible to the chief engineer of maintenance of way through their respective division superintendents.

The department of rolling stock and shops, in charge of John Lindall, includes the immediate supervision of the Albany Street and Bartlett Street shops, tools and machinery, and of all repairs to cars and car equipment, besides the distribution and collection of coal and supplies by car. The immediate care of the buildings, shops and rolling stock of the department of rapid transit lines devolves upon the superintendent thereof, and that of the surface cars in the several carhouses, together with buildings and structures, upon the division superintendents. The superintendent of rolling stock and shops, however, is required to exercise a constant inspection and supervision over all work of car repairs.

The superintendent of wires, J. P. Boyden, is placed in charge of the department of wires and conduits, and is held responsible for the repair and maintenance of all overhead and underground wires and equipment, interior wiring and all wiring construction. The immediate care of signal, telephone and certain power and lighting wires used in the rapid transit line and subway service devolves upon the superintendent of rapid transit lines and upon the superintendent of division.

The department of buildings, under F. F. Low, is concerned with the inspection, repair, maintenance and construction of buildings.

The stores department, in charge of F. T. Lewis, handles the receipt and issue of material and supplies.

The general maintenance force of the department of power stations is placed under the superintendent of power, and its general foreman is held responsible to the chief of the bureau of maintenance through the superintendent.

Strike in Yonkers

The trainmen in the employ of the Yonkers (N. Y.) Railroad went on strike on Jan. 1, 1913, claiming that the terms of the verbal agreement which they had with the management had been violated. The men on strike have demanded the reinstatement of three employees whom they allege were discharged because they refused to meet requirements of the management which the men as a body felt were in violation of the understanding between the men and the management. The men also claim that the company has violated the promise which is said to have been made to them to adhere strictly to the plan of hiring men in numerical order from the eligible list. Charles Long, representing the men, said on Jan. 1:

"We will hold a meeting on Jan. 2 in which to formulate our demands. These may include a change in the wage scale, together with the elimination of many rules that are unjust. I expect that Mr. Whitridge, the president of the company, will have a force of strike-breakers here. If he does he will find he has a battle on his hands."

Mr. Whitridge is reported to have expressed himself as follows:

"This is purely a question as to whether the railroad is going to be operated by the motormen and conductors or by the officials. The union came to me with a preposterous agreement which the members asked me to sign. It was impracticable, unconstitutional and opposed to the terms of the Sherman law, and I refused to meet the conditions which it sought to impose. I am not going to fight the men. I think that if Yonkers is left without service for a few days the public officials will be glad to take the matter in hand and bring about a settlement. It is going to be an arrangement according to my own ideas, however."

Toronto Civic Line Opened.—The new civic line in the east end of Toronto, Ont., has been placed in operation with a ten-minute service at a 2-cent cash fare. Tickets are sold at the rate of six for 10 cents. The new line is operated by power from the Hydro-Electric Commission.

Municipal Road Opened in San Francisco.—The first section of the Geary Street Municipal Railroad, built and equipped by the city of San Francisco, Cal., has been placed in operation. The road extends from Kearney Street downtown to Golden Gate Park, a distance of 4 miles.

New Companies Incorporated in Ohio in 1912.—Twelve street, suburban and interurban railways were incorporated in Ohio during 1912, with a capitalization of $2,080,000.

Some of the new companies were organized as successors of other companies in reorganization proceedings.

Joint Use of Poles in Winnipeg.—Public Utilities Commissioner Robson has issued an order for the joint use and ownership of poles between the city and the Winnipeg (Man.) Electric Railway. The matter has been under consideration since June 15, 1912, when the first application was made. This is said to be the first case in which a municipally owned utility and a privately owned utility have adopted the policy of joint use and ownership of poles.

Rehearing Refused in United Railways Case.—The Supreme Court has overruled the motion of the United Railways for a rehearing in the J. Brooks Johnson case. The company must settle Johnson's claim and the claims of those with him in the suit, totaling about $63,000. It is understood that the company will appeal to the United States Supreme Court. The decision holds the company liable for all outstanding claims against the St. Louis Transit Company, which was absorbed by the United Railways.

Public Hearing on New York Rapid Transit Operating Contracts.—The Public Service Commission of the First District of New York announced on Dec. 30, 1912, that the terms of the agreement of the city of New York with the Interborough Rapid Transit Company and the New York Municipal Railway Corporation, as the new Brooklyn Rapid Transit Company is called, had been so far determined that the statutory public hearings on the form of contract for the proposed dual rapid transit system would be held on Jan. 14, 1913.

B. S. Josselyn Honored by Employees.—Employees of the Portland Railway, Light & Power Company, Portland, Ore., on Dec. 24, 1912, presented B. S. Josselyn, president, with a scroll containing the signatures of 1000 of their number and testifying to their appreciation of his efforts in their behalf during the closing year. The scroll was inclosed in a frame 4 ft. wide and 5 ft. long. Across the top was engrossed the legend "Christmas Greetings." The text called particular attention to Mr. Josselyn's loyalty to the cause of humanity and to the precepts of the golden rule.

Test of Automatic Train Stop on the Delaware, Lackawanna & Western Railroad.—After an examination of the mechanism of the device, as shown in a model in the office of the International Signal Company, New York, N. Y., the Delaware, Lackawanna & Western Railroad recently authorized the signal company to install one of its signals on a branch line of its road, the mechanism for the test to be put on a single engine of the railroad. The International Signal Company is busy in its shops making up parts for the apparatus and expects to have it ready for installation soon.

New Traffic Ordinance in Newark.—On Dec. 25, 1912, the Public Service Railway, Newark, N. J., posted in its carhouses bulletins informing the employees of the notice served on the company by the Police Department of Newark of its intention to enforce after Jan. 1, 1913, the traffic ordinance as it relates to the stopping of street cars. This ordinance requires that cars shall be stopped on the near side of all intersecting streets except where trolley stations are designated. At the same time lists of the stops that will be made in Broad and Market Streets after Jan. 1, 1913, were distributed.

Amendment to New York Public Service Commissions Law.—Counsel to the Public Service Commission for the First District has been directed to prepare a form of amendment to the Public Service Commissions law for presentation to the Legislature, giving jurisdiction over telephones and telegraphs within the First District to that commission. The First District embraces the territory within the boundaries of Greater New York, and while the commission for the First District exercises control over railroads, gas and electric companies in that territory, the jurisdiction over telephones and telegraphs within the city is vested in the commission for the Second District.

Public Utility Bill Introduced at Washington.—Representative A. W. Lafferty, of Oregon, has introduced a bill which calls for the creation of a public service commission with jurisdiction over the public utility companies which operate in Washington, D. C. The commission proposed by Mr. Lafferty would be composed of three members to be appointed by the President for terms of three years. The commissioners would receive compensation of $4,000 a year each. The bill provides for a valuation of the properties of the public utilities corporations of the District by the commission as a basis for fixing rates. The District Supreme Court would have power to review and revoke a decision of the commission where compliance with the orders of the latter would endanger the property of the concern financially.

Failure of Railroad Stairway with Concrete Treads and Risers.—The upper section of the stairway at the east end of the platform at the Nostrand Avenue station of the Long Island Railroad in Brooklyn collapsed on Dec. 19, causing the death of one person. The stairway was built in two sections, and was erected in 1905 at the time the station was constructed. There was a landing and support at about mid-height. The framework was of structural steel, with cast-iron columns beneath the landing. The stairs were built of reinforced concrete. The individual steps, however, were not separately reinforced. A hearing to investigate the collapse of the stairway was held by the Public Service Commission for the First District on Dec. 24. Testimony at the hearing tended to show that the collapse was due to the breaking of the connection between the steel girder forming the side of the stairway and a cast-iron post on the first landing, against which the end of the girder rested. The commission has directed its engineers to examine all similar stairs from all elevated railroads, with a view of disclosing any defects which may exist in their condition.

Public Utilities Issue.—The New York *Commercial* of Dec. 14, 1912, issued a special supplement of seventy-two pages devoted to public utilities, including light, heat and power companies. Notable features of the issue were the following articles: "Maintenance and Depreciated Replacement Values," by John F. Wallace, president of Westinghouse, Church, Kerr & Company; "The Work of the Public Service Commission in Safeguarding the Investor," by William R. Willcox, chairman of the Public Service Commission of the First District of New York; "Valuation of Public Service Properties," by L. R. Nash, of Stone & Webster; "The Great Problem of the Public Service Corporation," by H. M. Byllesby, of H. M. Byllesby & Company, and "The Interrelation of Traction, Light, Power & Heating Companies," by Francis C. Prest, of Meikleham & Dinsmore. Operating statements were published of representative companies such as the American Light & Traction Company, the Portland (Ore.) Railway, Light & Power Company, the Electric Bond & Share Company, Stone & Webster, California Railway & Power Company, Tennessee Railway, Light & Power Company, Henry L. Doherty & Company, the United Light & Railways Company, etc. Maps showing the territory covered by the properties of these companies were also published.

New Haven Railroad Acknowledges Inspection Report of the Public Service Commission.—E. H. McHenry, vice-president of the New York, New Haven & Hartford Railroad, New Haven, Conn., has replied in part as follows to the letter addressed recently by the Public Service Commission to the company in regard to the inspection of the tracks of the company made by the engineers of the commission. Mr. McHenry's reply follows in part: "I beg to advise that instructions have been issued to correct all of the defects noted by the inspectors and the commission may feel assured that the recommendations therein contained will receive complete and literal compliance. The criticisms concerning the belated renewal of ties are well founded, but it should be explained that the ties for renewals were ordered in sufficient season and the deliveries were made not more than thirty days later than the time stipulated in the contract. Through some error on the part of the contractor the ties were improperly bored for the reception of the screw spikes, and it was accordingly necessary to reject the entire lot, which correspondingly delayed the receipt of new ties in replacement. I note the conclusion of the commissioner in regard to the possible improvement in the detailed supervision of maintenance work and will give this matter prompt attention. In conclusion I beg to express the appreciation of the railroad company for the fair and impartial form in which the inspection and conclusions of the commission have been presented."

Financial and Corporate

Stock and Money Markets

Dec. 31, 1912.

Trading on the New York Stock Exchange to-day was more active than on recent days, and the price movement was upward. There was unusual breadth to the trading in bonds to-day, the total business in the bond department being $2,346,000, par value. The stringency in the money market has been relieved, and to-day call money opened at 6 per cent, which was the highest price for the day. Rates in the money market to-day were: Call, 5@6 per cent, with the last loan at 3 per cent; sixty days, 5½@5¾ per cent; ninety days, 5¼@5½ per cent; five and six months, 5@5¼ per cent.

The trading in Philadelphia to-day was broad and active. The demands for bonds were good.

In Chicago the market was broad but the volume of transactions not very large. The bond transactions to-day totaled about $60,000.

In the Boston market there was very little trading in the railroad issues. The market for bonds was quiet.

In Baltimore the only traction issue dealt in to-day was the United Railways. The market for bonds continues good, the transactions to-day totaling $46,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 24	Dec. 31.
American Brake Shoe & Foundry (common)	93¼	95
American Brake Shoe & Foundry (preferred)	132½	135½
American Cities Company (common)	47½	47½
American Cities Company (preferred)	a98½	78½
American Light & Traction Company (common)	400	400
American Light & Traction Company (preferred)	107½	108
American Railways Company	41	41
Aurora, Elgin & Chicago Railroad (common)	40	40
Aurora, Elgin & Chicago Railroad (preferred)	88½	86
Boston Elevated Railway	113½	113
Boston Suburban Electric Companies (common)	10	10
Boston Suburban Electric Companies (preferred)	75	75
Boston & Worcester Electric Companies (common)	6⅞	7
Boston & Worcester Electric Companies (preferred)	40	40
Brooklyn Rapid Transit Company	92⅛	92⅛
Capital Traction Company, Washington	122	122
Chicago City Railway	150	150
Chicago Elevated Railways (common)	30	27
Chicago Elevated Railways (preferred)	91	92
Chicago Railways, ptcptg., ctf. 1	90	86
Chicago Railways, ptcptg., ctf. 2	23	26¼
Chicago Railways, ptcptg., ctf. 3	8¼	8
Chicago Railways, ptcptg., ctf. 4	4	3½
Cincinnati Street Railway	123¾	122½
Cleveland, Southwestern & Columbus Ry. (common)	*6½	*6½
Cleveland, Southwestern & Columbus Ry. (preferred)	*34	*34
Cleveland Railway	104½	103½
Columbus Railway & Light Company	55	55
Columbus Railway (common)	82	82
Columbus Railway (preferred)	90	81
Denver & Northwestern Railway	121	*121
Detroit United Railway	70	70
General Electric Company	182¼	186
Georgia Railway & Electric Company (common)	120½	120
Georgia Railway & Electric Company (preferred)	83	83
Interborough Metropolitan Company (common)	19¼	18½
Interborough Metropolitan Company (preferred)	64¼	64
International Traction Company (common)	39	*39
International Traction Company (preferred)	92	*92
Kansas City Railway & Light Company (common)	18	18½
Kansas City Railway & Light Company (preferred)	41	40
Lake Shore Electric Railway (common)	*6	*6
Lake Shore Electric Railway (1st preferred)	*89	*89
Lake Shore Electric Railway (2d preferred)	*25½	*25½
Manhattan Railway	128	129
Massachusetts Electric Companies (common)	16¾	17
Massachusetts Electric Companies (preferred)	75½	75
Milwaukee Electric Railway & Light Co. (preferred)	*100	100
Norfolk Railway & Light Company	*26	*26
North American Company	79	79
Northern Ohio Light & Traction Company (common)	75	80
Northern Ohio Light & Traction Company (preferred)	105	100
Philadelphia Company, Pittsburgh (common)	50	50
Philadelphia Company, Pittsburgh (preferred)	43½	44
Philadelphia Rapid Transit Company	27¾	27½
Portland Railway, Light & Power Company	*66	*66
Public Service Corporation	119	117
Third Avenue Railway, New York	40¼	40½
Toledo Railway & Light Company	*3½	2¾
Twin City Rapid Transit Co., Minneapolis (common)	102½	105
Union Traction Company of Indiana (common)	*6½	*6½
Union Traction Company of Indiana (1st preferred)	*80	*80
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	24⅞	24½
United Rys. Inv. Company (common)	34	35
United Rys. Inv. Company (preferred)	63	63½
Virginia Railway & Power Company (common)	51	51
Virginia Railway & Power Company (preferred)	89	90
Washington Ry. & Electric Company (common)	88	88
Washington Ry. & Electric Company (preferred)	89	90
West End Street Railway, Boston (common)	80	80
West End Street Railway, Boston (preferred)	*99	96
Westinghouse Elec. & Mfg. Company	79	79¼
Westinghouse Elec. & Mfg. Company (1st preferred)	121⅜	115

*Last sale. a Asked.

Hearing on Application of United Railroads to Refund Issues of Subsidiaries

The Railroad Commission of California held a hearing at San Francisco, Cal., on Dec. 21, 1912, on the application of the United Railroads, San Francisco, Cal., for permission to issue five-year serial notes to the amount of $2,350,000 with which to retire bonds of the Market Street Cable Railway and the Park & Cliff House Railway which matured on Jan. 1, 1913. Patrick Calhoun, president of the United Railroads, explained the application of the company and reviewed its history in part as follows:

"There are two applications pending before this commission, and I desire to give a correct idea of what they are. The first is an application for permission to issue serial notes, secured by the bonds of the Market Street Cable Railway, with which to retire $3,000,000 in bonds of the same corporation, coming due Jan. 1, 1913. The second proposition is to issue other notes of the same description, the funds from which are to be used in retiring $350,000 of bonds of the Park & Cliff House Railroad, maturing at the same time. The sinking fund created at the time these bonds were issued will furnish $1,000,000 toward retiring them. We ask the commission for permission to secure $2,350,000 more, with which to pay our debts.

"If the commission so desires, we will consent to a reduction of our application to $2,150,000, the exact amount of our present indebtedness. Since its formation in 1902 the United Railroads has increased its assets $15,000,000. The debit side of its ledger has been increased only $9,000,000. During the terrible times following the fire, when this utility was scarcely earning anything, there was never a morning when I went to my office that I did not feel the possibility of being compelled to place the road in the hands of a receiver before night. I was urged to do so, but, through the efforts of the holding company which owns the United Railroad stock, the company held on, paying honest debts as they came due, just as it is now trying to do.

"The gross revenue per year of the United Railroads in 1902, the year of its origin, was more than $5,000,000. The earnings grew to $21,000 per day the first fifteen days of April, 1906. In 1907 there was a deficit of about $1,100,000. That shows what stormy times this utility has passed through. Yet, at the present time the gross earnings of the United Railroads are 6 per cent greater than in 1906."

Following the hearing the commission ruled as follows:

"The books of a corporation in which the details of transactions are at once set down are considered by this commission the best evidence of its financial condition. Sufficient information has not been furnished the commission to enable it to form an intelligent conclusion concerning the financial condition of the United Railroads of San Francisco. The information thus far furnished would lead to unfavorable action on this application. Hence, until the books of the United Railroads are produced, no order will be made authorizing the issue and sale of the securities asked for in this proceeding."

Central Park, North & East River Railroad, New York, N. Y.—The protective committee of stockholders of the Central Park, North & East River Railroad has brought suit in the Supreme Court of New York against Thomas F. Ryan, August Belmont, Theodore P. Shonts and others connected with the old Metropolitan Securities Company to recover the estimated value of the property of the Central Park, North & East River Railroad, sold under foreclosure recently as noted in the ELECTRIC RAILWAY JOURNAL. It is alleged that when the road was leased to the Metropolitan Street Railway it was agreed that the new company should refund or retire the $1,200,000 of bonds outstanding when they became due, whereas after maturity the bonds were held alive in the investment account of the Metropolitan Street Railway and deposited as part collateral for its bonds.

Choctaw Railway & Lighting Company, McAlester, Okla.—Control of the Choctaw Railway & Lighting Company is reported to have passed to other interests, and Russell Palmer, Mobile, Ala., has been elected president of the company to represent the new owners.

Cleburne (Tex.) Street Railway.—The Cleburne Street Railway, control of which recently changed hands, has elected new officers as follows: Daniel Hewitt, president and general manager; A. M. Morgan, vice-president; John F. Floore, Sr., second vice-president; Lawrence Hewitt, secretary-treasurer; Daniel Hewitt, J. M. Moore, Brown Douglass, Lawrence Hewitt and John F. Floore, Sr., directors.

Cleveland (Ohio) Railway.—The operating receipts of the Cleveland Railway for November, 1912, were $565,426, as compared with $519,306 for November, 1911. The actual surplus shown by the statement was $7,461, while the ordinance surplus was $25,883. In November, 1911, there was an actual deficit of $30,499 and an ordinance deficit of $18,833. The number of car miles increased 4.11 per cent over November, 1911, while there was an increase of 9.82 per cent in the number of passengers and 8.88 in the receipts from fares. The number of passengers carried during the month was 24,423,531, which was a gain of 2,183,115 over November, 1911.

Ephrata & Lebanon Street Railway, Ephrata, Pa.—The entire $250,000 of bonds recently authorized by the Ephrata & Lebanon Street Railway have been sold to J. A. Vandegrift, representing a New York syndicate, which also took over 3340 unsold shares of common stock of the company. The company expects to finish the line by Sept. 1, 1913. Of the 23 miles of proposed line 7½ miles have been completed at a cost of $135,000. The Ephrata plant of the company is to be enlarged and a new plant is to be built at Lebanon.

Hendersonville (N. C.) Traction Company.—C. A. Carlson, Red Bank, N. J., is reported to have purchased the property of the Hendersonville Traction Company, which operates about 4 miles of line in Hendersonville.

Hoosick Falls (N. Y.) Railroad.—On Dec. 30, 1912, the Public Service Commission of the Second District of New York heard the application of the Vermont Company, which seeks approval of the lease of the Hoosick Falls Railroad. For the Vermont Company Attorney J. Garfield and for the Hoosick Company Attorney George E. Greene said that the lease would result in economy in operation and the rendering of more efficient service. Mr. Greene said that with the credit of the Vermont Company the Hoosick Falls Railroad intended to renew its overhead system and inaugurate express service on its line. Decision on the application was reserved by the commission.

Interborough-Metropolitan Company, New York, N. Y.—The collateral trust 6 per cent notes of the Interborough-Metropolitan Company have again been extended for six months, to July 1, 1913. These notes, which now amount to $2,039,520, were extended in 1908, 1910, 1911 and 1912, the last time until Jan. 1, 1913.

International Traction Company, Buffalo, N. Y.—The International Traction Company has announced that the coupons on the $18,335,000 of fifty-year 4 per cent collateral trust bonds of the company due on Jan. 1, 1912, July 1, 1912, and Jan. 1, 1913, will be paid at the office of J. P. Morgan & Company, New York. Pending the readjustment of the finances of the International Railway, interest on these bonds was deferred, but the financial reorganization of the subsidiary corporation having been completed the past due interest can be paid. Steps will be taken to replace the present 4 per cent collateral trust bonds of the International Traction Company with new collateral trust bonds as provided in the agreement of the committee representing the bondholders.

Pawcatuck Valley Street Railway, Westerly, R. I.—The property of the Pawcatuck Valley Street Railway was sold under foreclosure recently to Harry M. Verrill, Portland, Maine, for $10,797, subject to a mortgage of $50,000. Confirmation of the sale by the court is opposed by John W. Sweeney and John Champlin.

Pottsville (Pa.) Union Traction Company.—A special meeting of the stockholders of the Pottsville Union Traction Company will be held on Jan. 27, 1913, for the purpose of voting upon a proposed increase in the company's indebtedness from $1,250,000 to $2,250,000.

Youngstown & Ohio River Railroad, Youngstown, Ohio.—The directors of the Youngstown & Ohio River Railroad have declared a quarterly dividend of 1⅛ per cent on its preferred stock, which will make 4½ per cent for the year, as compared with 4 per cent last year.

Dividends Declared

Auburn & Syracuse Electric Railroad, Syracuse, N. Y., quarterly, 1½ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, three-fourths of 1 per cent, common.

Bay State Street Railway, Boston, Mass., 3 per cent, first preferred.

Boston Suburban Electric Companies, Boston, Mass., quarterly, $1, preferred.

Cincinnati, Newport & Covington Light & Traction Company, Cincinnati, Ohio, quarterly, 1⅛ per cent, preferred; quarterly, 1⅜ per cent, common.

El Paso (Tex.) Electric Company, 3 per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1 per cent, common.

Stark Electric Railroad, Alliance, Ohio, quarterly, three-fourths of 1 per cent.

Thirteenth & Fifteenth Streets Passenger Railway, Philadelphia, Pa., $6.

Washington, Baltimore & Annapolis Electric Railroad, 4½ per cent, preferred.

Western New York & Pennsylvania Traction Company, Olean, N. Y., 3 per cent, first preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct. '12	$13,315	*$7,638	$5,677	$1,730	$3,947
1 " " '11	10,593	*6,894	3,699	1,730	1,969
12 " " '12	143,664	*85,470	58,194	20,763	37,431
12 " " '11	117,066	*75,370	41,696	20,675	21,021

BROCKTON & PLYMOUTH STREET RAILWAY COMPANY, PLYMOUTH, MASS.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct., '12	$9,595	*$8,023	$1,572	$1,028	$542
1 " " '11	9,336	*7,818	1,518	1,025	493
12 " " '12	120,365	*89,988	30,270	12,511	17,769
12 " " '11	118,743	*90,490	28,253	13,112	15,141

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct., '12	$31,133	*$16,340	$14,794	$5,619	$9,175
1 " " '11	31,650	*15,769	15,881	5,653	10,228
12 " " '12	353,635	*193,950	159,686	68,047	91,639
12 " " '11	334,626	*180,176	154,449	67,833	86,616

COLUMBUS (GA.) ELECTRIC COMPANY.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct. '12	$54,913	*$22,434	$26,332	$18,952	$7,380
1 " " '11	49,362	*22,469	21,982	18,361	3,621
12 " " '12	542,593	*268,726	266,799	225,021	41,778
12 " " '11	545,857	*233,765	250,135	182,701	67,435

HOUGHTON (MICH.) COUNTY TRACTION COMPANY.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct. '12	$24,853	*$13,203	$11,650	$5,677	$5,973
1 " " '11	24,250	*14,597	9,652	5,227	4,425
12 " " '12	303,790	*173,860	129,930	66,270	63,660
12 " " '11	301,979	*179,014	122,965	62,640	60,325

JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Nov., '12	$47,488	$28,287	$19,201	$12,541	$6,660
1 " " '11	39,060	22,160	16,900	12,911	3,989
12 " " '12	528,136	312,742	215,394	153,134	62,260
12 " " '11	464,964	272,255	192,709	152,359	40,350

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct., '12	$201,567	*$89,710	$111,857	$24,940	$86,917
1 " " '11	168,512	*82,549	85,962	20,978	64,984
12 " " '12	1,727,037	*916,645	810,392	258,756	551,636
12 " " '11	1,593,749	*875,257	718,492	244,559	473,933

PADUCAH (KY.) TRACTION & LIGHT COMPANY.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct., '12	$24,643	*$16,389	$8,253	$7,388	$815
1 " " '11	21,775	*13,783	7,992	7,399	593
12 " " '12	283,399	*188,298	95,100	85,857	9,243
12 " " '11	260,824	*157,758	103,067	80,232	22,835

PENSACOLA (FLA.) ELECTRIC COMPANY.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct., '12	$24,759	*$15,858	$8,901	$6,377	$2,524
1 " " '11	24,415	*15,409	9,006	5,014	3,992
12 " " '12	286,942	*178,167	108,775	75,184	33,591
12 " " '11	286,794	*178,583	108,211	59,189	49,022

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct., '12	$715,378	*$396,814	$318,564	$169,366	$149,198
10 " " '12	6,877,898	*3,969,420	2,908,478	1,633,997	1,274,481

TAMPA (FLA.) ELECTRIC COMPANY.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Oct., '12	$65,640	*$33,782	$31,858	$4,475	$27,383
1 " " '11	59,328	*33,246	26,082	4,482	21,600
12 " " '12	751,601	*392,919	358,682	53,532	305,150
12 " " '11	655,118	*365,016	290,102	59,363	230,739

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*Includes taxes.

Traffic and Transportation

Accidents on Interstate Electric Railways

The Interstate Commerce Commission, Washington, D. C., has issued a summary for the year ended June 30, 1912, of the casualties to persons on the electric railways which come under its jurisdiction. This statement as issued by the commission contains the following statistics which did not appear in the quarterly bulletins of the commission, the reports from which they are taken having been received after the quarterly bulletins were printed: 8 collisions, 72 passengers and 1 person not trespassing injured; 2 derailments, 2 passengers injured. Accidents other than those to trains and roadway resulted in the following casualties: 1 passenger and 1 other person not trespassing killed, and 92 passengers, 7 employees on duty, 7 other persons not trespassing and 3 trespassers injured. Industrial accidents resulted in injury to 14 employees, making a total of 10 train accidents, 2 killed and 198 injured. From a statement of the commission which is appended there have been eliminated the columns which give the records of employees not on duty who were injured and the records of trespassers who were injured. The record of casualties to employees not on duty shows 1 killed and 24 injured, while the record of casualties to trespassers shows 100 killed and 128 injured. The summary of accidents as contained in the bulletin of the commission, with the eliminations which have been mentioned, follows:

Causes.	Number of Accidents.	Passengers Killed.	Passengers Injured.	Employees on Duty Killed.	Employees on Duty Injured.	Other Persons Not Trespassing Killed.	Other Persons Not Trespassing Injured.	Total Persons Killed.	Total Persons Injured.
Collisions	159	7	1,208	13	96	..	1	20	1,316
Derailments	102	..	242	1	41	..	6	1	289
Accidents other than collisions, derailments and boiler explosions	8	..	12	..	7	..	..	..	19
Total train accidents	269	7	1,462	14	144	..	7	21	1,624
Accidents to roadway or bridges not causing derailment	11	..	..	..	..	..	..	..	..
Coupling or uncoupling cars. (Does not include accidents with air or steam hose)	..	..	..	2	18	..	..	2	18
While doing other work about trains or while attending switches	..	..	..	6	124	..	..	6	124
Coming in contact while riding on cars with bridges or other fixed structures above or at side of track	..	2	14	..	22	..	..	2	40
Falling from cars or engines	..	6	67	8	49	1	1	16	119
Getting on or off cars or engines	..	16	1,002	5	47	1	19	24	1,090
Other accidents on or around trains not here named	..	..	199	..	10	1	16	3	231
Being struck or run over by engines or cars at stations or yards	..	2	7	3	6	6	9	17	38
Being struck or run over by engines or cars at highway grade crossings	..	1	3	..	..	63	388	71	400
Being struck or run over by engines or cars at other places	..	..	8	5	9	45	192	130	281
Other causes	..	1	100	3	10	1	27	8	147
Total other than train accidents	..	28	1,400	32	295	118	652	279	2,488
Total accidents, exclusive of industrial accidents	..	35	2,862	46	439	118	659	300	4,112
Industrial accidents to employees[1]	..	..	..	24	550	..	..	24	550
Grand total	..	35	2,862	70	989	118	659	324	4,662

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[1] "Industrial" accidents are those which do not involve train operation, but occur to railroad employees other than trainmen on railroad premises.

The bulletin of the commission also contains the following statement of employees in the service of the interstate electric railways on June 30, 1912:

Class of Employees.	Number of Persons.
Employees specially exposed to railway accidents:	
Trainmen, road service (enginemen, firemen, motormen, conductors, brakemen, rear flagmen, train baggagemen, train porters performing duties of trainmen)	17,501
Other persons employed on trains (dining-car employees, train porters not performing duties of trainmen, etc., when actually employed by the respondent carrier)	179
Yardmen (all employees in yard train work and switching—enginemen, firemen, conductors, brakemen, foremen, droppers, fieldmen, hostlers, hostler helpers, yardmasters, etc.)	718
Switch tenders, crossing tenders and watchmen	506
Bridgemen and trackmen	13,618
Other employees specially exposed to railway accidents (station and miscellaneous employees, shopmen, etc., excluding all officers, clerks, indoor employees, and others engaged in work in which they are not specially exposed to railway accidents)	8,777
Total number of employees specially exposed to railway accidents	41,299
Employees not specially exposed to railway accidents (includes officers and other employees specifically excluded from item No. 6 above)	9,174
Total number of persons employed on June 30, 1912	50,473

Pension System Announced by San Francisco-Oakland Terminal Railways

The San Francisco-Oakland Terminal Railways, San Francisco, Cal., announced the establishment on Jan. 1, 1913, of a pension fund for the benefit of its employees which is to extend to all branches of the service. The fund is to be administered by a board of directors to be composed of the following officers of the company: E. A. Heron, president; W. R. Alberger, general manager; Harmon Bell, chief counsel; F. W. Frost, secretary, and B. W. Fernald, auditor. The following rules have been adopted to govern the employees who may be retired or pensioned:

"All officers and employees who have attained the age of seventy years shall be retired. Such of them as have been continuously in the service twenty years or more shall be pensioned. Motormen, conductors, train collectors, towermen, dispatchers, boat captains and other deck officers and marine engineers who have attained the age of sixty-five years may be retired. Such of them as have been continuously in the service twenty years or more shall be pensioned if and when retired.

"Officers and employees between sixty and seventy years of age who have been twenty years or more in the service and who have become incapacitated for the performance of the duties in which they have been engaged and who cannot be transferred to other work which they are able to perform may be retired and pensioned. Officers and male employees under sixty years of age who have been twenty-five years or more in the service and all female employees who have been twenty years or more in the service and who have become permanently disabled may be retired and pensioned.

"Physical examination shall be made of employees recommended for retirement for disability who are under seventy years of age, and a report thereof, with the recommendation of some reputable surgeon to be selected by the board of directors, shall be transmitted to the board of pensions for consideration in determining such cases. Retirement shall be made effective from the first day of the calendar month following that in which the person shall have attained the specified age, or from the first day of a calendar month to be determined by the board of pensions.

"The terms 'service' and 'in the service' will refer to employment upon or in connection with any of the railways owned or operated by the San Francisco-Oakland Terminal Railways, and the service of any employee shall be considered as continuous from the date from which he has been continuously employed upon such railways, whether prior or subsequent to their control, acquisition by or consolidation into the San Francisco-Oakland Terminal Railways."

The pension allowances authorized are upon the following basis:

"For each year of service an allowance of 1½ per cent of the first $50 of the highest average monthly pay of the officer or employee during any consecutive ten years of service, and in addition, 1 per cent of any excess of such highest average monthly pay over $50, provided, however, that in no case shall the allowance made be less than $20 or more than $75 per month, subject to provisions of Rule 8 hereof. Thus, by way of illustration: If an employee has been in the service for thirty years and his highest average salary or wages for any ten consecutive years was $80 per month, his pension allowance would be $31.50 per month.

"For exceptionally long and unbroken service, with first-class record, or for other good and sufficient reasons apparent to the board of directors, upon recommendation of the board of pensions, the board of directors may, at its discretion, place any officer or employee on the pension list and fix pensions at such amount as may in the judgment of the board of directors be equitable and appropriate. In order to preserve direct personal relations between the company and its retired employees, and that they may continue to enjoy the benefit of the pension system, no assignment of pension will be permitted or recognized. The acceptance of a pension allowance does not debar a retired employee from engaging in any other business which is not prejudicial to the interests of the company, but he cannot re-enter the service of the company.

"No person inexperienced in railway work more than thirty-five years of age, and no experienced person more than forty-five years of age, shall hereafter be taken into the service; provided, however, that under conditions approved by the president or vice-president persons may temporarily be taken into the service irrespective of age for a period not exceeding six months, and that this period may be extended, if necessary, to complete the work for which said persons were originally employed; provided, also, that, with the approval of the board of directors, persons may be employed indefinitely, irrespective of the age limit, where the service to be rendered requires professional or other special qualifications. No person, however, over the age of forty-five who shall hereafter be taken into the service, shall be eligible to the payment of a pension."

Additional Cars Recommended for Los Angeles

As a result of its study of traffic conditions in Los Angeles, Cal., the Board of Public Utility Commissioners of that city has addressed letters in part as follows to the Los Angeles Railway Corporation and the Pacific Electric Railway respectively:

"Our study of the local systems shows that during the coming year there should be added to the car equipment at least seventy-five additional cars of the present seating capacity, also seventy-five cars to be used as trailers during the rush hours and on holidays. These cars should have the same seating capacity and the same style and finish as the cars now in use. These trailers can be bought for 50 per cent less than the regular cars and can be purchased and put in use in much less time than the regular cars. In order to get the regular cars in time to take care of the constantly growing demand, they should be ordered at once, and we therefore wish to inquire if there is any reason why the Board of Public Utilities should not order you to include in your budget for increased investments for next year an item requiring the delivery of the cars mentioned as soon as possible, together with the attendant facilities of additional power, power houses, substation equipments, etc. We will be pleased to receive a communication from you on the subject, and, if necessary, set a day for a hearing covering this very important subject of more cars."

"We must call your attention to the crowded condition of your cars, as well as of the other line, and the necessity of supplying additional car equipment at a very early date. The city of Los Angeles is just as vitally interested in securing good service on the interurban lines as are the surrounding communities, and any congestion which affects the development of its satellite cities in turn hinders the growth and prosperity of the central metropolis. Will you therefore acquaint this board at an early date with the appropriation you are making for additional cars and indicate the probable date of delivery as well as the size and type of cars which you expect to add to your rolling stock equipment during the next year?"

Increase in Wages in Fort Worth.—Trainmen in the employ of the Northern Texas Traction Company, Fort Worth, Tex., have been granted an increase in pay of 1 cent an hour.

Transportation as Prize in Corn Show.—The Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has awarded six months' free transportation over its lines as the first prize in a corn show and three months' free transportation as the second prize.

Insurance Policies Presented to Employees.—The Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., has posted a notice to the effect that it has presented each employee with a life insurance policy for $500 in the Equitable Life Assurance Society, without cost, the company paying the premiums. The policies went into effect on Dec. 24, 1912.

Accident at Cincinnati.—On the night of Dec. 27, 1912, a car of the Cincinnati, Newport & Covington Light & Traction Company plunged off the approach of the Central Bridge over the Ohio River on the Cincinnati side. It dropped 30 ft. and landed on end on the river bank. Ten persons, including the crew, were on the car, but only the motorman was seriously injured.

New Transfer Rules in Trenton.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has issued to the conductors in its employ a new set of rules to be complied with in the future in the issuance of transfers to patrons of the road. Under the new system the company issues transfers from all cars that do not make the entire run of any one line or that run partly on the same line but to different destinations.

Record Passenger Traffic on One of Chicago's Surface Systems.—All previous records of the company for carrying passengers were broken by the Chicago Railways Company on Christmas Eve, the report showing the collection of 1,186,135 cash fares and 830,295 transfers. The company's old record was broken on Dec. 21, 1912, when 1,967,308 cash fares and transfers combined were collected. The record of Dec. 24 was 12.89 per cent over that of the same day a year ago.

Increase in Wages in Atlanta.—On Jan. 1, 1913, the Georgia Railway & Power Company, Atlanta, Ga., put into effect the following wage scale for motormen and conductors: First three months, 17 cents per hour, instead of 16 cents; second three months, 18 cents per hour, instead of 17 cents; remainder of first year, 19 cents per hour, instead of 18 cents; second year, 21 cents, instead of 19 cents; third year, 23 cents; instead of 21 cents; fourth year, 24 cents, instead of 22 cents; fifth year and afterward, 25 cents, instead of 23 cents.

Accidents in Greater New York in November.—Reports of accidents on railroads and street railroads in Greater New York for November, 1912, as made to the Public Service Commission for the First District, show that the total number of accidents was 5783, against 5291 in November, 1911. Of these accidents 3651 involved injuries to persons, against 3221 in November, 1911. The number killed was thirty-two, against thirty-one in November, 1911, and the total number of serious injuries was 192, against 216 in November, 1911.

Inquiry Into Reasonableness of Milk and Cream Rates.—The Public Service Commission of the Second District of New York has instituted an inquiry and investigation into the reasonableness and justice of rates proposed to be charged by the Wallkill Transit Company, Middletown, N. Y., on milk and cream. The company filed with the commission a tariff increasing rates on milk and cream effective Jan. 1, 1913, and a number of complaints have been filed with the commission against the proposed rates. The hearing was set for Jan. 3, at Middletown.

Increase in Fare Asked Between Trenton and Princeton.—On the ground that the present rate of fare between Trenton and Princeton, N. J., is insufficient, Alfred Reed and Sydney L. Wright, receivers for the New Jersey & Pennsylvania Traction Company, the Trenton, Lawrenceville & Princeton Railroad, the Trenton, Lawrenceville & Princeton Extension Railroad and the Princeton Street Railroad, are considering a plan to increase the fare to 15 cents. The fare between Trenton and Princeton has been 10 cents.

Heating Question in Wilmington.—The members of the Board of Public Utility Commissioners of Wilmington, Del., conferred on Dec. 21, 1912, with R. W. Crook, general manager of the People's Railway, Wilmington, about the heating of the cars of the company. Mr. Crook agreed at the request of the board to place thermometers on a few cars for experimental purposes. Mr. Crook said that all the cars were equipped with electric heaters and that the company had always tried to meet the requirements of the traveling public. The board suggested that the temperature in the local cars in Wilmington should be kept between 50 deg. and 60 deg. Fahr. during the winter months.

Fare Questions on the San Francisco-Oakland Terminal Railways.—The Hayward Chamber of Commerce has filed a complaint against the San Francisco-Oakland Terminal Railways, San Francisco, Cal., charging excessive and irregular rates between Oakland and points as far as Hayward. H. G. Walker filed a complaint against the company charging that illegal conditions had been inserted in the commutation book contract issued for transportation between San Leandro and Hayward. On the other hand, the company has applied to the commission for permission to increase the rate of fare between San Leandro and Hayward from 10 cents to 15 cents. The company has collected 15 cents instead of the published rate of 10 cents. It asserts that the rate of 10 cents as published was a clerical error.

Children Who Ride Free Not to Occupy Seats.—The Twin City Rapid Transit Company, Minneapolis, Minn., is enforcing the rule against children occupying seats while older persons stand. Heretofore an adult has been allowed to take three children of six years and under on cars of the company without paying fare. The rule which is now being enforced is as follows: "Children under six years of age, when accompanied by parent or guardian, provided not more than three such children are in the care of one person, will be allowed to ride free. Should more than three children be in charge of one guardian, a full fare will be collected for each child in excess of that number. Should conductor see free-riding children occupying seats while other passengers are standing, he will ask the parent or guardian either to take the child on his or her lap, have the child stand, or else pay full fare on account of each occupied seat."

Reduction in Fare Ordered.—The Public Service Commission of the Second District of New York has ordered the Syracuse, Lake Shore & Northern Railroad to reduce the fare per passenger for one-way transportation on its line between Stop 31 and Fulton from 10 cents to 5 cents per passenger. This action by the commission followed a hearing held in Fulton by Commissioner Martin S. Decker on Dec. 15, 1912. The company is also ordered to stop its limited train which leaves Oswego at 8:15 a. m. at Stop 31 on signal until the further order of the commission, or until it shall substitute therefor a local service at approximately the same time between Stop 31 and Fulton. The request of the complainant for the running of hourly trains between Fulton and points north of Fulton is denied without prejudice to the filing of new complaints by interested parties. The distance from Stop 31 to the business portion of Fulton is 1.9 miles and the distance from Stop 31 to the southerly end of Fulton is 3.1 miles.

Street Car Delays During Winter.—At the close of last winter, just after the snow had disappeared, the Detroit (Mich.) United Railway published the second of its service of advertisements in the public press prepared for the purpose of acquainting its patrons with some of the problems that have to be met and overcome by the company in keeping up its service. The advertisement referred to was devoted to the topic "Why the Street Cars Sometimes Pass You By." The company has recently deemed it expedient to republish in connection with other matter the following statements made in the previous advertisement which referred to the rule which prohibits cars from passing by those who wish to board them: "The unpleasant feature of street railway transportation is that these exceptions crop out most frequently in the cold and dreary months of the year and this despite the best efforts of the conscientious and hard-working force of superintendents, foremen and car operators. The winter now closing has been the severest upon the employees and property in its existence, with a record of interruptions varying from a half-hour stop, due to trolley wire breaking from the intense cold, to a similar lengthy gap at grade crossings, the result of a steam train becoming stalled."

East Boston Tunnel Tolls Upheld.—Corporation Counsel Corbett of Boston has sent an opinion to Mayor Fitzgerald stating that in his judgment the exaction of a 1-cent toll by the Boston Elevated Railway from patrons using the East Boston tunnel is a legal procedure. A movement has taken shape lately among citizens of East Boston to refuse to pay the toll, and the matter has been brought before the Mayor and the police commissioner. Mr. Corbett says that the evasion of the toll is not a criminal offense before the law, as no penalty is specified in the statute. In a letter to Police Commissioner O'Meara the corporation counsel says that any concerted action by a number of persons determined to evade the tolls established by law would undoubtedly result in disturbances and breaches of the peace. He joins with the officials of the company in requesting the detail of a sufficient number of police officers to preserve order in the tunnel and its stations and to prevent any breach of the peace dangerous to the safety of the traveling public. Mayor Fitzgerald has announced that in his opinion every citizen of East Boston owes it to the honor of the city to pay the toll. The cost of the tunnel was about $3,000,000 and the tolls during the year ended June 30, 1912, aggregated about $150,000, the cost of collection being about $21,000. The sinking fund to meet the cost of the tunnel had reached $468,178 on June 30.

Nine-Hour Day in Force at Boston.—The directors of the Boston (Mass.) Elevated Railway placed a new schedule of wages and working hours in effect on Jan. 1, 1913, in accordance with the terms of Chapter 533, Acts of 1912, which provides for a working day of nine hours in eleven as against ten hours in twelve. The management has announced its intention to give the same pay for a day of nine hours as it formerly gave for ten hours of service, with an allowance of overtime pay for all platform time in excess of nine hours. Beginning with Jan. 1 transportation employees will be paid by the hour and will receive when beginning service 25.6 cents as compared with 22.5 cents as formerly. The company continues the practice of minimum pay, considering eight and one-half hours as a day's work on Sundays and certain holidays, and paying stripe money, except that in the future stripe money, instead of being paid separately, will be included in the regular rate per hour. Motormen and conductors on the surface lines will receive a rate varying from the above minimum to a maximum of 28.9 cents per hour, depending upon the length of service, and on the elevated lines motormen will receive a rate per hour varying from 26.2 cents to 31.7 cents in accordance with the years of service. The company will permit the selection of runs on the basis of seniority.

Announcement of Initial Bank Deposit in Christmas Greeting.—Just before Christmas the Chicago, Ottawa & Peoria Railway, Peoria, Ill., mailed to each of its employees, together with a bank pass book showing a deposit of $2 in each man's favor, a Christmas greeting over the signature of W. B. McKinley, president; H. E. Chubbuck, vice-president executive, and F. E. Fisher, general superintendent. The hope of the company is that the initial deposit made by it will have a tendency to induce the men to acquire the habit of saving a part of their earnings. Nearly all of the banks along the line of the company where these deposits have been made have indicated their approval of the arrangement, agreeing to add 50 cents additional to each account which is left on deposit for a year. The Christmas greeting of the company to the men was as follows: "It having been the custom of this company for years to extend to its employees a small annual remembrance in recognition of their loyal efforts in furthering the interests of the property, the offering this year, herewith inclosed, is in the form of a savings account opened in your favor with the ....Bank of.............. The initial deposit is $2, and we trust that you will accept it in the same spirit in which it is offered, and that when another year has rolled around you will have added to the account all you consistently could considering your working conditions. A bank account, no matter how small, is always a source of comfort and satisfaction to the owner. If you already have one this can be transferred to same, and if not—'get the habit.' Thanking you for your assistance and co-operation during the year of 1912, and asking for a like service during 1913, we extend to you and yours the compliments of the season."

Personal Mention

Mr. Russell Palmer, Mobile, Ala., has been elected president of the Choctaw Railway & Lighting Company, McAlester, Okla., to succeed Mr. William Busby.

Mr. Howard Fravel has resigned as auditor of the Scranton & Binghamton Traction Company, Scranton, Pa., on account of ill health. He will make his future home at Cranbury, N. J., where he will engage in manufacture.

Mr. Joseph D. Evans, who has been chief engineer of the Montreal (Que.) Tramways since June, 1911, severed his connection with that company on Jan. 1, 1913, to become construction manager of the Electric Bond & Share Company, New York, N. Y. No announcement has yet been made as to who will succeed him at Montreal.

Mr. Claude O. Weidman, connected with the Otsego & Herkimer Railroad and its predecessors for the past fourteen years and for the past five years superintendent of transportation, has resigned from that company to accept the position of superintendent of the Western Division of the Morris County Traction Company, with headquarters at Dover, N. J., vice Mr. George H. Ross, Jr., resigned. Mr. Weidman's resignation and appointment are both effective on Jan. 1, 1913.

Mr. C. L. Murray has resigned as general manager of the Northwestern Pennsylvania Railway, Meadville, Pa. Mr. Murray was formerly general manager of the Schuylkill Railway, Girardville, Pa. He has had an extended experience in managing electric railways. He was connected with a number of properties controlled by the Railways Company General and was assistant superintendent of construction for J. G. White & Company, Inc., New York, N. Y., for two years and was assistant for two years to Mr. D. A. Hegarty when Mr. Hegarty was general manager of the Little Rock Railway & Electric Company, Little Rock, Ark.

Mr. Charles H. Hile, who became chief of the bureau of maintenance of the Boston (Mass.) Elevated Railway on Jan. 1, 1913, has acted as assistant to the vice-president of that organization since 1905. For about eight years previous to that time he was superintendent of wires for the same company, and prior to that was for three years in charge of underground conduit construction. Mr. Hile was graduated from the Pennsylvania State College in 1892 as a mechanical engineer. He then took a post-graduate course at the University of Wisconsin, making street railway work the chief subject of his studies. He later joined the staff of the Philadelphia (Pa.) Traction Company as an engineer in connection with the electrification of the existing horse-railroad system, and after one year's service entered the employ of the West End Street Railway, Boston, continuing with that organization when it was taken over by the Boston Elevated Railway. He is a past president of the New England Street Railway Club and is well known in American Electric Railway Association circles.

Mr. Dean Treat has resigned as superintendent of District D of the Illinois Northern Utilities Company to become superintendent of the railway department of the Wisconsin Public Service Company at Green Bay, Wis. Mr. Treat entered railway work as a timekeeper with Westinghouse, Church, Kerr & Company, New York, N. Y., during the construction of the Grand Rapids, Grand Haven & Muskegon Interurban Railway, which company he served as substation operator, on the car equipment, in the power plant and as train dispatcher. He was appointed to the last-named position with the company in July, 1903, and continued in that capacity until July, 1907, when he became assistant to Mr. John St. John, constructing engineer for the Comstock-Haigh-Walker Company, which was then building the Milwaukee Northern Railway. On the completion of the Milwaukee Northern Railway, Mr. Treat was appointed chief train dispatcher and a few months later was made operating superintendent in charge of interurban operation. He resigned from the Milwaukee Northern Railway in August, 1910, to become superintendent of the Sterling, Dixon & Eastern Electric Railway. On Jan. 1, 1912, Mr. Treat was made manager of the Lee County Lighting Company in addition to superintendent of the railway. Upon the purchase of the property of the Lee County Lighting Company and the Sterling, Dixon & Eastern Electric Railway by the Illinois Northern Utilities Company, Mr. Treat was made district superintendent of District D of the Illinois Northern Utilities Company, which includes all of the company's holdings in Whiteside and part of Lee County.

OBITUARY

Hugh Grant, roadmaster of the Flint division of the Detroit (Mich.) United Railway, died at his home in Orion, Mich., on Dec. 25, from cancer of the throat which is believed to have originated from a severe bruise received while in the employ of the old Northern Railway, now a part of the Canadian Pacific Railway. Mr. Grant was born in Scotland fifty-five years ago and had been roadmaster of the Flint division ever since the line was built. Previous to becoming connected with the Detroit United Railway he helped to build the Pontiac, Orion & Northern Railway between Pontiac and Caseville.

Col. D. B. Dyer, who was president of the Augusta Railway, now part of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., died at his home in Kansas City, Mo., on Dec. 22, 1912, after a lingering illness. Col. Dyer had been soldier, pioneer, frontiersman, journalist and capitalist. For many years he was United States Indian agent in Kansas and the Indian Territory. The street railway system in Augusta which he financed is said to have been the first in that section of the country to be operated by electricity generated by water power. Col. Dyer was born in Joliet, Ill., on March 21, 1849. At the age of fifteen years he entered the United States Army. It was through his association with the Indians and the Indian police, however, that he acquired his title of colonel. He became connected with railway work in Augusta in 1889. In 1891 he built the first modern office building in the city. In 1901 he bought the gas property at Augusta and did much to improve it. A few years ago Col. Dyer and his associates bought the Augusta *Chronicle*, and he was elected president of the company which publishes the paper. His other interests, however, demanded so much of his time that two years ago he disposed of his holdings in the paper to the present management.

Metropolitan Railway of London to Be Operated Independently

Since the consolidation of the Central London Railway with the Underground Railways much interest has been shown in regard to the future of the Metropolitan Railway. The directors of the Metropolitan Company state that after long and careful consideration of all the circumstances they have concluded that the interests of the company will be best served by the maintenance of a position of complete financial independence. The negotiations that were proceeding with the Underground company have therefore been discontinued, although an understanding exists between the Metropolitan company and the various companies controlled by the Underground company that they should co-operate in order to eliminate unnecessary competition and to afford the public, as far as possible, all the advantages that would have accrued from the working of the two systems as one. The Metropolitan company has also acquired the Great Northern & City line, a tube railway which extends from Moorgate to Finsbury Park Station, immediately under the main line of the Great Northern Railway. It is proposed to extend that line to connect with the Waterloo & City Railway, a short tube connecting Waterloo Station with the City, at the Bank, and with the existing Metropolitan line in the neighborhood of Liverpool Street. This consolidation of interests ought to increase traffic for the Metropolitan Railway, and the electrification of the East London line ought to give valuable through connections between the Metropolitan system in the northwest and all the stations of the South Eastern and the Brighton Railways in the southeast. The junction with the Great Northern & City Railway will afford a through route between Finsbury Park, in the northern portion of London, and New Cross, on the South Eastern Railway. The fact that the underground lines of the Great Northern & City Railway are so constructed that they will accommodate ordinary railway rolling stock is an advantage.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

California Railway & Power Company, San Francisco, Cal.—Chartered in Delaware to take over the property of the United Railroads, San Francisco, the Sierra & San Francisco Power Company, the Coast Valley Gas & Electric Company and the San Francisco Electric Railways. Capital stock authorized, $60,000,000. Offices, San Francisco and New York. [E. R. J., Dec. 14, '12, page 1210.]

***Wisconsin Railway, Light & Power Company, Chicago, Ill.**—Incorporated in Illinois to take over the properties of the La Crosse Water Power Company, the La Crosse City Railways and the Winona Light & Railway Company. Capital stock, $1,200,000.

Indiana Railways & Light Company, Kokomo, Ind.—Incorporated in Indiana to take over the Kokomo, Marion & Western Traction Company, the Kokomo, Frankfort & Western Traction Company and the Kokomo Public Utility Company. The company plans to extend its lines into Wells, Huntington, Miami and Carroll Counties. Capital stock, $3,000,000. Directors: George J. Marott, John H. Holliday, A. R. Holliday, Henry Kahn, Lee Hall, T. C. Reynolds and L. J. Kirkpatrick. [E. R. J., Dec. 14, '12.]

***Southern Interurban Company, Terre Haute, Ind.**—Incorporated in Indiana to build electric railways and carry on a general construction business. Capital stock, $25,000. Directors: W. L. T. Rawlins and S. B. Boggs.

***Inter-Ocean Railway, New York, N. Y.**—Application for a charter has been made by this company in Delaware to build electric railways and operate other public utilities. Capital stock, $5,000,000. Incorporators: Ludwig de Leopold, Paul J. Huelser and Walter E. O. Schultz, all of New York City.

***Brazil, Devil's Lake & Minneapolis Electric Railway, Devil's Lake, N. D.**—Incorporated in North Dakota to build an interurban line east and west from Devil's Lake. The company has bought the Devil's Lake & Chautauqua line and plans to build to Minneapolis on the east and to Williston, N. D., on the west. The company will operate gasoline-electric cars.

***Fairmont & Veblen Railway, Veblen, S. D.**—Incorporated in South Dakota to build a 50-mile interurban railway from Fairmont, N. D., south to Veblen, S. D. Capital stock, $25,000. Incorporators: Julius Roshall, L. R. Roshall and C. A. Paulson, Minneapolis, and George H. Anderson and P. S. Hanson, Veblen, S. D.

FRANCHISES

Birmingham, Ala.—The Kelly Company has asked for a new franchise from the Council in Birmingham. The plans of the original franchise have undergone considerable change. [E. R. J., Nov. 16, '12.]

Birmingham, Ala.—The Highland Lake Land Company has received a franchise from the Council for a line from the terminus of the Owenton line of the Birmingham Railway, Light & Power Company in Birmingham southwest to Tuxedo. The line will be constructed by the Birmingham Railway, Light & Power Company. [E. R. J., Dec. 14, '12.]

Phoenix, Ariz.—The Salt River Valley Electric Railway has received an extension of the time fixed in which to begin the construction of its line in Phoenix. It will connect Phoenix, Scottsdale, Tempe, Mesa, Chandler, Alhambra, Glendale and Peoria. S. C. Lewis, president. [E. R. J., Dec. 21, '12.]

Antioch, Cal.—The Oakland, Antioch & Eastern Electric Railway has asked the Council for a franchise in Antioch.

Los Angeles, Cal.—Emmet H. Wilson, Los Angeles, has received a twenty-one-year franchise for an electric railway on Vernon Avenue from Dalton Street to the westerly city limits. [E. R. J., Dec. 14, '12.]

Richmond, Cal.—The Southern Pacific Company, San Francisco, has asked the Council for a fifty-year franchise in Richmond.

Riverside, Cal.—The Pacific Electric Railway has received a franchise from the Board of Supervisors over the northerly driveway on Magnolia Avenue from the Riverside city limits westward. The company plans to extend its Riverside Magnolia Avenue line as far as Corona in the direction of La Habra.

Stockton, Cal.—The Tidewater & Southern Railroad has received a franchise to cross several other lines in Stockton. This company has entered into an agreement with the Central California Traction Company whereby it is to secure half the use of the Central California Traction Company's Pilgrim Street and Weber Avenue lines in Stockton.

Killingly, Conn.—The Attawaugan Street Railway has asked the Council for an extension of two years in which to begin the construction of its line in Killingly. It will connect Dayville, Attawaugan, Williamsville, Ballouville and Pineville. E. L. Darble, president. [E. R. J., Aug. 19, '12.]

New Britain, Conn.—The Connecticut Company has asked the Council for a franchise to build a line through the Fifth Ward in New Britain.

Norwalk, Conn.—The Connecticut Railway & Lighting Company will ask the Council for a franchise for a number of extensions in Norwalk, South Norwalk, New Britain, Berlin and Ansonia and a line from Bridgeport to Nichols. The company asks for a revival of rights to build northward from Milford to the tracks of the New Haven & Derby Railroad.

St. Augustine, Fla.—T. R. Osmond, St. Augustine, general manager of the St. Johns Light & Power Company, has received a thirty-year franchise to build a new line in St. Augustine from Bernard along Rivera Street extension to De Haven Street. The line will connect Jacksonville and St. Augustine.

Martinsville, Ind.—The Capital Circuit Traction Company, Indianapolis, has asked the City Council for a three-year extension to its franchise in which to build its line in Martinsville. It is the intention of the company to build an electric line encircling Indianapolis and taking in all the towns within a radius of 30 miles. [E. R. J., April 13, '12.]

Cheboygan, Mich.—The Cheboygan Electric Light & Power Company has received an extension of eighteen and one-half years on its franchise from the Common Council in Cheboygan. The line will connect Cheboygan and Petoskey, via the Mullet Lake and Burt Lake districts. [E. R. J., Dec. 14, '12.]

St. Joseph, Mo.—The Kansas City, Clay County & St. Joseph Railway has received a franchise from the Council in St. Joseph.

Freeville, N. Y.—The Ithaca-Cortland Traction Company, Ithaca, has asked the Council for a franchise in Freeville. The line will connect Ithaca and Cortland, via Varna, Etna and Freeville. [E. R. J., Sept. 7, '12.]

Irondequoit, N. Y.—The Public Service Commission, Second District, has authorized the Rochester & Suburban Railway to exercise franchises granted by the town of Irondequoit for an additional track in and along the Ridge Road between Portland Avenue and Woodman Road, and upon and across Woodman Road at a point where said Woodman Road and the Ridge Road intersect in Rochester.

Columbus, Ohio.—The Columbus Railway & Light Company has received a franchise from the Council to extend its Leonard Avenue line in Columbus to Shepard.

Newberg, Ore.—The Portland, Eugene & Eastern Electric Railroad has received a six months' extension of time on its franchise in Newberg.

Fulton, Pa.—The Pittsburgh, Steubenville & Wheeling Street Railway has asked the Council for a franchise in Fulton.

Wyomissing, Pa.—The Reading Transit Company has received permission to double-track its Pennsylvania Avenue line through Wyomissing.

Nashville, Tenn.—The Nashville Railway & Light Company has received permission from the City Council to allow the Nashville-Gallatin Interurban Railway the use of its tracks in Nashville.

Beaumont, Tex.—The Jefferson County Traction Company, Beaumont, has received a franchise from the Council in Beaumont. This 20-mile line will connect Beaumont and Port Arthur. C. W. Kellogg, Jr., Dallas, represents Stone & Webster, Boston, who will build the line. [E. R. J., Aug. 24, '12.]

Houston, Tex.—The Houston Electric Company has received a franchise from the Council to lay T-rails on most of its lines in Houston and to repave and double-track several of its lines.

Salt Lake City, Utah.—The Utah Interurban Electric Company has asked the County Commissioners for a franchise from the southern boundary line of the county into Salt Lake City. The line will connect Salt Lake City, American Fork, Pleasant Grove, Provo, Springfield and Spanish Fork. W. C. Orem, Salt Lake City, president. [E. R. J., Dec. 21, '12.]

Asotin, Wash.—F. L. Sturm, South Bend, Ore., has asked the Council for a franchise in Asotin. He has secured franchises in Lewiston and Clarkston. [E. R. J., Dec. 14, '12.]

Seattle, Wash.—The Puget Sound Traction, Light & Power Company, Seattle, has received permission to reconstruct its Madison Street line from Broadway to Pike Street in Seattle.

Vancouver, Wash.—The Northwestern Electric Company has asked the Council for a fifty-year franchise to build an electric line in Vancouver.

Wenatchee, Wash.—The Wenatchee Valley Railway & Power Company has secured a six months' extension to its franchise in Wenatchee. The line will connect Wenatchee, Leavenworth and Cashmere. A. J. Linville, president. [E. R. J., Dec. 21, '12.]

TRACK AND ROADWAY

San Pedro Street Railway, Los Angeles, Cal.—The Board of Public Works has advertised for bids for the construction of the first link of this municipal railway in Los Angeles on San Pedro Street from Aliso Street to Ninth Street. This line is to be a three-rail system, so that it can be used by both the Pacific Electric Railway and the Los Angeles Railway. Bids are to be opened on Jan. 10.

***Madera, Cal.**—J. S. Harker, Coarse Gold, and the Madera Chamber of Commerce are considering plans to build an electric railway from Madera to Yosemite Valley. It is proposed to store the waste waters of the North Fork watersheds and utilize them for developing electric power for this line. Surveys will soon be made.

Geary Street Municipal Railway, San Francisco, Cal.—This company has placed in operation its 4-mile line in San Francisco from Kearney Street downtown to Golden Gate Park. The company will soon complete the line from Golden Gate Park to the ocean beach.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—This company's line to Hope Farm from the Cedars, via Marshallton and Newport Turnpike, has been completed and will soon be placed in operation.

St. John's Light & Power Company, St. Augustine, Fla.—This company has placed in operation its line between St. Augustine and New Augustine.

Georgia Railway & Electric Company, Atlanta, Ga.—It is reported that this company will spend $1,250,000 in 1913 for double-tracking some of its lines. Work has been begun by the company on the extension of its old Decatur line to Stone Mountain, a distance of 16 miles.

Americus, Tifton & Atlantic Railway, Tifton, Ga.—Preliminary surveys have been begun by this company on its line from Americus through Sumter County to the Flint River. I. W. Myers, Tifton, president. [E. R. J., Nov. 23, '12.]

Valdosta (Ga.) Street Railway.—This company has decided to change its name to the Valdosta Traction Company and to build two extensions of 1½ miles to 2 miles each. The capital stock will be increased from $60,000 to $125,000.

East St. Louis, Columbia & Waterloo Railway, East St. Louis, Ill.—This company has placed in operation its line in Waterloo. Its railway extends through Columbus, Dupo, Prairie du Poe and East St. Louis.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has completed its line between Kankakee and Urbana. G. M. Bennett, Urbana, president. [E. R. J., March 16, '12.]

Union Electric Company, Dubuque, Ia.—This company has been asked to consider plans to extend its line from Dodge Street and South Locust Street south to South Dodge Street, making a loop with the Dodge Street line in the lower section of Dubuque.

***Taylorsville, Louisville & Jeffersontown Railway, Taylorsville, Ky.**—This company has been organized at Taylorsville and is completing a survey of an interurban line from Jeffersontown to Taylorsville. I. F. Jewell, Rowland Cox, B. D. Cook and J. A. Stone, Taylorsville, are members of the company, which will ask the Louisville Railway to undertake the extension.

Springfield (Mass.) Street Railway.—Plans are being made by this company for an extension across the bridge in Chicopee Falls.

Detroit (Mich.) United Railway.—Work will soon be begun by this company to double-track its line from Detroit to Mount Clemens.

Saginaw-Bay City Railway, Saginaw, Mich.—This company has been asked to consider plans to extend several of its lines in Saginaw.

Electric Short Line Railroad, Minneapolis, Minn.—Preliminary surveys are being made by this company for its line through Dawson. It has secured right-of-way for 36 miles of line out of Minneapolis. Earle D. Luce, president. [E. R. J., Oct. 19, '12.]

Twin City Rapid Transit Company, Minneapolis, Minn.—It is reported that this company has decided to build an extension in St. Paul from the Agricultural College to the Belt Line bridge to connect there with the Como-Harriet line. The plan is for the university to build the track, operate the line and pay the company for the power and use of its equipment.

St. Louis, Lakewood & Grant Park Railway, St. Louis, Mo.—This company, which is building a line southwest from St. Louis, has secured sufficient funds to extend it to Fenton. Rails have been laid ½ mile west of its former terminus at Lakewood and nearly all the right-of-way to the Merimec River has been contracted for.

***Twin Bridges, Mont.**—The Waters Tunnel Company plans to build an electric line from a point on the Northern Pacific Railway midway between Sheridan and Lauri to its mines located in Tobacco Root range. It is stated that the company has secured financial backing for the project.

***Seneca Falls, N. Y.**—A company has been formed to build a power plant in Seneca Falls to provide power for a proposed electric railway to connect Lodi, Interlaken and Covert, a distance of about 30 miles. Plans are being made to secure a private right-of-way for the line, which will eventually be extended north to Clyde and Lyons. No names have yet been given of those interested in the project.

Hendersonville (N. C.) Traction Company.—The line and franchise of this company have been purchased by C. A. Carlson, Red Bank, N. J., and the new owner states that if he can secure the co-operation of the townships between Hendersonville and Asheville he will extend the line to the latter point and also encircle the lakes and other points near Hendersonville.

Newbern-Ghent Street Railway, Newbern, N. C.—This company has completed and will soon place in operation its 5-mile electric line between Newbern and Ghent. E. C. Armstrong, Newbern, is interested. [E. R. J., Aug. 10, '12.]

Fargo & Moorhead Street Railway, Fargo, N. D.—Plans are being considered by this company to extend its lines 40 miles into northwestern Minnesota.

Toledo Railways & Light Company, Toledo, Ohio.—This company has been asked to consider plans to build a crosstown line to connect with the Cherry Street line on the north and the Broadway line on the south in Toledo and also to extend its Wayne Street line to the city limits.

Consolidated Electric Railways, Tulsa, Okla.—This company advises that it will begin construction about Jan. 10, 1913, on its 70-mile line to connect Tulsa, Sapulpa, Broken

Arrow, Coweta, Porter and Muskogee. Capital stock authorized, $10,000, to be issued at once. Officers: A. A. Small, president, and A. B. Davis, secretary and treasurer, all of Tulsa. [E. R. J., Nov. 23, '12.]

Ottawa & Morrisburg Electric Railway, Ottawa, Ont.—This company has received permission from the Ottawa Electric Railway to use certain divisions of its tracks for a period of fifteen years, so that the Morrisburg cars can enter Ottawa. The Ottawa-Morrisburg Electric Railway will pay the city at the rate of $450 per mile on unpaved streets and $1,000 per mile on paved streets, and also 10 per cent of revenue on business within the city limits. [E. R. J., Dec. 7, '12.]

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company announces that the only extension contemplated for 1913 is that from Fort Hunter to Dauphin, and this is contingent upon obtaining the necessary right-of-way grant of the old canal bed from the Pennsylvania Railroad.

Hagerstown, Greencastle & Mercersburg Railway, Middleburg, Pa.—This company has voted to increase its capital stock from $100,000 to $600,000 and has arranged to mortgage its property to secure an issue of $600,000 of bonds to provide funds to complete the construction of the railway during 1913. The following officers have been elected: John E. Ensign, Cleveland, Ohio, president; C. M. Hoffman, Greencastle, vice-president and secretary; Alexander Hamill, New York, treasurer; James W. Rice, Greencastle, and S. A. Roth, Hagerstown, directors. [E. R. J., Dec. 21, '12.]

Pittsburgh, Steubenville & Wheeling Street Railway, Pittsburgh, Pa.—This company is reported to have completed surveys for a route from Pittsburgh through Burgettstown, Avella, Independence, Bethany, West Liberty, Greggsville, Fulton and Wheeling. Construction will be begun in the spring. W. H. Hildebrand, Pittsburgh, president. [E. R. J., Dec. 1, '12.]

Pottstown & Reading Street Railway, Pottstown, Pa.—Plans are being made by this company to build three extensions in Phoenixville.

***Pottsville, Pa.**—Plans are being developed to build an electric line in Schuylkill County to connect the Mahanoy Valley through Frackville with the Eastern Pennsylvania Railways lines south of the Broad Mountain at St. Clair. This proposed 9-mile line will unite more than 50 miles of electric railway operated by the Eastern Pennsylvania Railways with 30 miles of track owned by the Schuylkill Traction Company north of the mountain, running through the Mahanoy Valley, Shenandoah, Mahanoy City, Girardville and Ashland.

Charleston-Isle of Palms Traction Company, Charleston, S. C.—This company has asked the United States Senate to authorize the construction of a bridge over the Cooper River at Charleston and also another bridge across Shem Creek to Mount Pleasant, S. C. James Sottle, president. [E. R. J., Nov. 30, '12.]

Jackson Railway & Light Company, Jackson, Tenn.—Plans are being considered by this company to extend its line up Porter Street to Winter's Grove.

Jefferson County Traction Company, Beaumont, Tex.—This company has increased its capital stock from $600,000 to $1,000,000. The line will connect Beaumont and Port Arthur. [E. R. J., Aug. 24, '12.]

Southern Traction Company, Dallas, Tex.—This company's reports from the field engineers show 59 miles of roadbed completed, ready for ballast, with 39 miles of roadbed more than 80 per cent completed. The above is in addition to the roadbed graded between Ferris and Waxahachie. The contractors have completed driving piling for thirty-one trestles. They have completed sixteen concrete culverts and they have completed masonry abutments for the following structures: Ten-Mile Creek, on the Corsicana line, and at White Rock, Richland, Mill and Chambers Creeks on the Waco line. During the last month the contract has been awarded for the superstructure for the Waxahachie viaduct. About 98,000 ties have been received and over 20,000 ties are now in transit. About 170 tons of rail have been received. Specifications have been prepared and bids are now being received for track laying and for overhead material.

***Houston, Tex.**—Announcement has been made by the Alderson-Stille-Force Company, Houston, that construction will be begun at once on the electric line to extend from the end of the Liberty Avenue line in Houston, where it will turn into Schwartz Street and run on Odin Avenue and east to the Houston Harbor Addition. Arrangements have been made with the Houston Electric Company to operate this line when completed. A. D. Alderson is interested.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company plans to build a new five-story building on the corner of Main Street and Prior Street in Vancouver for its trainmen. The company also plans to build a station for the Lulu Island lines at the south end of Granville Street bridge. The cost is to be about $10,000.

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—This company has awarded the contract to build its new depot at Calistoga to E. W. Doughty, Napa.

Crescent City Railway, Riverside, Cal.—Work has been begun by this company on the construction of three new passenger stations. The structures will be of concrete construction and will be located at points between Riverside and Crestmore, namely, at Fairmont Park, at Strong Street and at the junction with what is known as the Jurupa ditch.

Washington-Virginia Railway, Washington, D. C.—This company plans to build a new freight station in Alexandria.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Plans are being considered by this company to build a new station on School Street in Clearmont on the Ben-Hur route.

Grand Rapids (Mich.) Railway.—This company has opened its new carhouse in Grand Rapids. The structure is 187 ft. x 200 ft.

Bay State Street Railway, Boston, Mass.—An addition will be built by this company to its office building at the corner of North Montello Street and Elliot Street, Boston. The structure will be one story in height and 56 ft. x 40 ft., with concrete foundations.

Mesaba Electric Railway, Duluth, Minn.—This company has awarded the contract to Augustus Anderson for the erection of its new depot in Chisholm. The structure is of frame construction and will provide for passengers, freight and express.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Work will be begun at once by this company on its new express station and ticket office in St. Joseph.

POWER HOUSES AND SUBSTATIONS

Washington-Virginia Railway, Washington, D. C.—This company plans to build a new substation in Alexandria.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—The Vandalia Coal Company, the Coal Bluff Mining Company and the Western Indiana Mining Company are reported to have contracted with the Terre Haute, Indianapolis & Eastern Traction Company for current to be supplied by transmission lines for which the company has secured a franchise along most of the public highways in Vigo County.

Kentucky Utilities Company, Winchester, Ky.—This company plans to build soon a new power plant in Somerset. The cost is estimated to be about $75,000. A new filter and pumping station is now being constructed by the company.

East Liverpool Traction & Light Company, East Liverpool, Ohio.—Final arrangements have been made by this company and the Ohio Valley Scenic Route Railway to build a power plant 1 mile north of Smith's Ferry on Beaver Creek at the Island Run mines. The cost is estimated to be $2,000,000.

Eastern Pennsylvania Railway, Pottsville, Pa.—This company plans to build a new substation at Frackville, and work has been started on a high-tension line from Pottsville to Frackville to feed the substation.

Southern Traction Company, Dallas, Tex.—This company has awarded a contract to the General Electric Company for all necessary electrical equipment for all substations of its lines. The contract awarded totals between $250,000 and $300,000.

Manufactures and Supplies

ROLLING STOCK

General Electric Company, Schenectady, N. Y., has ordered from the Wason Manufacturing Company two CE-68-B-10 cars.

Lynchburg Traction & Light Company, Lynchburg, Va., has ordered from The J. G. Brill Company one 40-ft. construction car body with Brill 50-E-1 trucks.

Oakland & Antioch Railway, Oakland, Cal., has ordered from the Wason Manufacturing Company four 56-ft. combination passenger and baggage cars, and one 58-ft. parlor car.

TRADE NOTES

Standard Roller Bearing Company, Philadelphia, Pa., has disposed of its iron foundry to the P. Kennedy Foundry Company of Baltimore, Md.

H. M. Byllesby & Company, Chicago, Ill., have appointed W. R. Thompson, formerly assistant chief engineer, as manager of engineering and construction, effective Jan. 1, 1913.

Pyrene Manufacturing Company, New York, manufacturer of fire extinguishers, has appointed the Gorham Engineering Company, San Francisco, Cal., its representative on the Pacific Coast.

Dearborn Chemical Company, Chicago, Ill., announces that Warren P. Sayers has joined the sales department of the company. Mr. Sayers will assist Daniel Delaney, manager of the Cincinnati office, in the surrounding territory.

Pressed Steel Pole Company, Pittsburgh, Pa., has disposed of its plant at Mount Pleasant, Pa., to Pittsburgh men. Officers have been elected as follows: W. H. Schoen, president; Harry D. McCutcheon, vice-president; John D. Wilson, treasurer.

Ottawa Car Company, Limited, Ottawa, Ont., is adding a new machine shop to its present plant at Ottawa. This building is 66 ft. x 135 ft., four stories and basement, and is of solid brick and fireproof construction. The company is now running to its full capacity.

Jones & Laughlin Company, Pittsburgh, Pa., has appointed F. B. Hufnagel general superintendent of the Aliquippa department to succeed W. H. Lewis, who has resigned to engage in business for himself. Mr. Hufnagel has been general superintendent of the South Side works of the company.

A. H. Framhein, who has been connected for about five years with the Chicago sales department of the Railway Steel-Spring Company, has resigned, effective Jan. 1, to introduce in that city Latheroil cleaning products, manufactured by the Heinrich Fischer Company of Cincinnati, Ohio. Latheroil is a liquid soap, new in that field, which has given unusual satisfaction elsewhere, and is especially efficient for cleaning railway and street cars. Mr. Framhein will be located at Room 440, Marquette Building, Chicago, Ill.

The J. G. Brill Company, Philadelphia, Pa., has received the following orders for trucks: Lehigh Valley Transit Company, Allentown, Pa., six Brill 27-MCB trucks and eight Brill MCB-3X trucks; Georgia Railway & Power Company, Atlanta, Ga., fifty Brill 39-E trucks; General Electric Company, Schenectady, N. Y., two Brill 50-E-2 trucks; Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., four Brill 50-E-2 trucks; Washington-Virginia Railway, Washington, D. C., four Brill 23-D trail trucks; Cumberland County Power & Light Company, Portland, Maine, two Brill 27-GE trucks.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has announced a special guarantee for trial orders covering a mileage six times as great as from ordinary gearing, four times as great as from oil-treated and twice as great as from case-hardened material. The company suggests the equipment of a car with two grades of material so that comparative records can be simply and accurately kept and agrees to refund in cash to cover any deficiency in connection with the guarantee, the records which it is said to have established indicating that the results with the company's products will greatly exceed the guarantee.

Drake Railway Automotrice Company, Chicago, Ill., calls attention to an error which appeared in the issue of this paper for Dec. 21, 1912, quoting the consumption of gasoline on that company's motor car during the run from St. Louis to Chicago. The run was made on an average of 2½ to 3 car miles per gallon of gasoline instead of on 2½ to 3 gal. of gasoline per car mile. The rest of the trip, from Chicago to Kansas City over the Chicago Great Western and from Kansas City to Muskogee over the Missouri, Kansas & Texas Railroad, was equally successful, there being absolutely no trouble of any kind. The run from Chicago to Kansas City was made on Sunday, Dec. 15.

H. W. Johns-Manville Company, New York, N. Y., has completed its new plant at Manville, N. J., which is to begin operations this year. The plant consists of nine buildings, which, together with their products, are classified as follows: A—textile and packing; B—rubber plant, electrical specialties and printing department; C—pipe coverings; D—paper mill; E—magnesia; F—roofing; G—mastic and waterproofing; H—roofing coatings, power plant and pump house. Each building has an average length of 1000 ft., and is a separate factory in itself. The total combined floor area of all the buildings is about 1,000,000 sq. ft. About 3000 men will be employed at this new plant, making a total of about 7000 who are now employed by the company.

ADVERTISING LITERATURE

Dossert & Company, New York, N. Y., have reprinted in pamphlet form an article from the *Signal Engineer* entitled "The Use of Dossert Connectors in Signal Work."

Standard Underground Cable Company, Pittsburgh, Pa., has issued a folder in which attention is called to the various brands of Standard rubber insulated wire manufactured by the company.

C. F. Pease Company, Chicago, Ill., has printed a thirty-two-page booklet entitled "Everything for Blue Printing," which briefly describes and illustrates its line of automatic blue-printing machinery.

H. M. Byllesby & Company, Chicago, Ill., has issued a map of the United States showing the cities which are headquarters for the principal operating properties under its management. A complete list of all towns in which service is supplied is given under the heading of "Operating Companies," which are listed alphabetically.

American Vanadium Company, Pittsburgh, Pa., has issued *American Vanadium Facts* for December, 1912, which contains service records, results of drop tests and specifications of heat-treated chrome-vanadium steel tires. It also contains a list of steam railroads which will use vanadium steel in the construction of their new locomotives.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued several new bulletins which are descriptive of its products: Bulletin E-22 describes and illustrates heavy duty electric drills for alternating current; Bulletin E-26 describes Universal electric drills operating on direct or alternating current; Bulletin E-27 describes heavy duty electric drills; Bulletin No. 34 G describes air receivers, aftercoolers, air line drain traps, reheaters and economizers.

The London County Council has decided not to proceed with the scheme of tramways along Edgware Road from the Marble Arch to Cricklewood. It was shown that with street widenings the scheme would cost more than £425,000, and would require assistance from the rates to maintain. It was also shown that as all four local authorities over whose roads the tramways would pass opposed the scheme, there was not much chance that it would pass Parliament, especially as there was ample motor omnibus accommodation along the route. In the meantime the returns from the London County Council trams are steadily decreasing, the receipts for the week ending Dec. 4, for instance, being £2,700 lower than those for the corresponding week last year, so severe is the motor bus competition. The Council is considering the question of enlarging the capacity of its generating station at Greenwich by withdrawing four 3500-kw reciprocating engines and installing in their place four steam turbines of 8000 kw each, with an adequate increase in the boilers and condensing plant.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JANUARY 11, 1913 No. 2

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office............................1570 Old Colony Building
Philadelphia Office.......................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. **Foreign subscriptions may be sent to our European office.**

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

LAWS AGAINST TRESPASSERS

One of the public services which the National Association of Railway Commissioners performs is its action in calling attention to the correct standing of trespassers on the private right-of-way of railways. A railway seeking to operate with a minimum of accidents in a hazardous business should not be forced to take, as it frequently is in the uninformed public mind, the responsibility for accidents to trespassers on its own property. A railway buys a right-of-way and fences it in for the purpose of having a controlled thoroughfare for the transportation of its passengers at high rates of speed. By fences and signs it serves notice that trespassers not only are not wanted but that if, in spite of that fact, they go on the right-of-way they do so at their peril. At the last meeting of the National Association of Commissioners the report of the committee which touched on this subject said that trespassers can be kept off only by penal laws rigorously enforced. All that the state commissioners can do to bring about a public recognition of this fact and corrective steps will help to reduce the total of accidents and in particular those accidents for which the railways are not responsible.

SAFETY VALVE MAINTENANCE

The modern safety valve is one of the most delicate parts of the steam boiler and demands constant care and attention if accurate working is to be assured. Like many other pieces of apparatus associated with the "steam end" of the station, any neglect of the equipment not only opens the door to a possible accident or interruption of service but also tends to reduce the operating economy through the escape of heat in the form of vapor or excessive condensation. Experience has led in one important railway plant to the practice of quietly lifting all safety valves off their seats at least once in twenty-four hours in order to avoid the formation of a so-called skin on the spring and seat. If a valve is not lifted for a week, the effect of this skin is to increase the lifting pressure and consequently to expose the boiler to a slightly larger strain in operation than may be desirable. The above method of handling the safety valve is that commonly used in practice, but for close regulation careful engineers raise or lower the cushion seat according to the range within which it is desired to have the valve act. The custom of striking the safety valve spindle or any other of its parts in order to make it close is a dangerous one and may cause serious results. Where station logs provide for regular records of the condition of valves, high-pressure and low-pressure steam lines, fire-protection systems and water valves, the safety valve equipment may well be included and periodical entries made as to the setting, the blow-offs which take place and the adjustments or repairs required at various times. In any case full instructions should be secured from the valve manufacturers and these, with the details of construction and setting, should be carefully studied before adjustments are attempted in service. Under no circumstances should any attempt be made to change adjustments except under direct supervision of the head of the power station organization, as the result of setting, even accidentally, a safety valve to pop at a pressure higher than that authorized will vitiate the boiler insurance and open the way for legal difficulties in case almost any kind of accident occurs.

THE NEW JERSEY GAS DECISION

Important questions as to what should constitute the value of a public utility when appraised for rate-making purposes promise to be brought before the courts for adjudication in New Jersey as the result of the gas decision by the Public Utilities Commission of that State, reported in the issue of this paper for last week. The Public Service Gas Company has accepted the rate established by the board, but has reserved the right to test at its convenience the legality and constitutionality of the board's valuation of its property. Undoubtedly one of the most important matters to be settled during the next few years, concerning both public service companies and the public, is this question of the proper basis for the valuation of public utility properties for rate-making purposes. The statutes in nearly all States which grant rate-making powers to public commissions authorize them to establish rates which shall be "just and reasonable," but these words are meaningless without some generally accepted standard as to what percentage constitutes a "fair return" on the investment and what assets should be included in a "fair valuation." As our readers know, the views on these two points, even among the rate-making bodies, are practically as far apart as are the poles. A long hearing extending over the past three years and involving these points, so far as electric lighting rates are concerned, is fast drawing to conclusion in the Westchester lighting case, which is being considered by the Public Service Commission of New York, Second

District. There are other cases before the courts involving other public utilities, but none other, perhaps, so far as the electric lighting companies are concerned, which is being considered so thoroughly. After all, the final word in the matter will have to be pronounced by the highest court in the land. Until then the financial status of new capital in such enterprises will be uncertain, and investors will be unwilling to risk much money in public utilities.

PUBLICITY IN THE CLAIM DEPARTMENT

That the attitude of publicity in methods and policies on some electric railways has been effective in molding public opinion and bringing about more friendly relations between the public and the managements is evidenced by the results obtained by those taking this attitude. There still is room, however, for improvement along the same line in the claim department. Recently this department of a large railway system was made the subject of very strenuous attacks by the press concerning what were assumed to be underhand methods in caring for injured persons and adjusting their claims. These attacks continued until the general claim agent decided that the best policy to pursue under the circumstances was one of publicity. A printed letter in pamphlet form explaining the methods and policy of the railway company in cases of personal injury was mailed to the managing editor of each of the papers. The result of this open letter was that the attacks were discontinued and friendly relations now exist.

We believe that this example is an excellent one to follow. The claim department should have nothing to conceal and certainly has many things to expose to public view. Little does the public know of the methods employed by the unprincipled in personal injury cases. The "ambulance chaser" is ever ready to take up the case of the faker and, in many instances, the innocent, asserting that others have received large sums for similar injuries. The usual result follows; the claimant receives certain damages, but it all goes to pay the attorney's fees. We believe that many of the legitimate cases for damages would be settled out of court to the benefit of both claimant and company if the same methods of publicity were pursued in the claim department as in other branches of the industry. This policy would also bring about a spirit of fairness on the part of the public in its dealings with the railway company.

Without doubt any claim department can cite innumerable cases in which claims were admitted amicably and letters were received praising it for its fair methods. These recommendations in the form of letters of praise should not be filed immediately; the public should know about them. The limelight of publicity is not a cure-all, but it is a step in the right direction. At first it will be found that the public is suspicious of the company's motives, but in the end it will become educated as to the new condition of affairs. and the fruits of the changed policy will be apparent to the railway company. As has been remarked at meetings of the Claims Association many times recently, the modern claim agent must be an educator of public opinion. Efforts of the Boston Elevated Railway in these directions, described in this issue, illustrate this point.

WHAT CONSTITUTES A FAIR TEST OF MATERIAL

Every engineer is confronted by the problem of so conducting his department as to reduce the amount of waste and lost motion to a minimum. To do so he must get the best results out of both the labor and the material with which he has to deal. As a rule each is as important as the other, and an error in judgment in the selection of the proper material for repairs may be just as expensive as slackness in the conduct of the work. This fact points to the importance of testing materials and to the question of what constitutes a fair test. Shall the engineer base his judgment on the service tests of a sample or shall he purchase a small quantity from which an average may be obtained under varied service conditions?

At first thought the solution appears simple enough; that is, to request samples from the different manufacturers and draw conclusions from the results obtained under actual service conditions. This method may serve as the basis for the placing of the first order, but it should not be conclusive evidence. It may be unfair to the road, as the material obtained may not be up to the original sample, and again some of the samples of other manufacturers may have been tried under more severe conditions than the one apparently giving the best results.

In the purchase of paint or varnish, as an example, we believe that one's judgment should not be based on the life of a paint as given by a sample on a paddle but should be based on a sufficient amount to paint a car or bridge. The chemical tests are very good as a means of elimination, but where the results obtained from several samples are about the same service conditions only should be trusted, as a chemical test is only secondary at best. The same method holds in the selection of parts of car equipment One should base his conclusions on the averages of several samples from each manufacturer. We do not believe in "snap judgment." It may serve in some instances, but not when true economy is desired. One may be able to procure information relative to results obtained by other companies, but at the same time one should be sure of the other company's service conditions and the fairness of the test.

Another point which must receive consideration is the question of price, but not to the extent of eliminating a sample from the test. In numerous instances it will be found that the material which will give the greatest economy will be one costing considerably more than the other samples. For instance, we know of a case where paint costing one-third more than that already in use not only covered one-third more surface per gallon but gave a greatly increased life in service. It also decreased the cost of labor per square foot of surface covered, as it eliminated one-third of the lost motion, namely, that of dipping the brushes into the paint and refilling the painters' buckets. Before one chooses any material as against another, he must be sure in his own mind that the test conditions were absolutely fair to himself and the manufacturer and that he has considered the expected economies from every possible angle. Although the net saving effected may be small on a single gallon or piece of any material where great quantities are used each year, the total saving is worth while and will materially assist in adding to the net profits.

THE STATUS OF THE INDUSTRY AS SHOWN BY STATISTICS

A great deal has been said during the past few years about the condition of the electric railway industry, but no descriptive statement could illustrate so clearly and pointedly the actual status of the electric railway lines of the country as the statistics in regard to miles of track built and cars ordered during 1912 published in the last issue of this paper. In brief, they show that while the number of cars ordered is in excess of those ordered during 1911—in fact, is greater than during any one of the past five years during which the ELECTRIC RAILWAY JOURNAL has compiled statistics of this kind—the length of new track built or electrified is practically the smallest during the same period.

We use the word "practically" because, while nominally the miles of track built or electrified in 1912 were more than those built during 1909 by 63 miles, the excess is more than accounted for by the extensions of two electric railways which are not properly either city or interurban railways and so should not be considered as being included in the class of roads which we are now discussing. One of these was the electrification of part of the main line of the New York Central & Hudson River Railroad, which amounted to 58 miles, and the other was a 78-mile extension of the Oregon Electric Railway, which is controlled by the Spokane, Portland & Seattle Railroad, a steam railroad. These two extensions alone account for 136 miles, or more than 14 per cent of the total. The fact clearly shown by these figures is that while the business on existing electric railway lines is increasing, owing to the increased population and expanding business of the country, and cars have to be purchased by electric railway companies to carry these passengers, the construction of new lines and of extensions to old lines has almost ceased.

It should be remembered in this connection that during the past year there has been on the whole a marked revival of business and that the population of the country has been increasing at the rate of about 2 per cent a year. Normally one would expect the electric railway lines to increase in length in about this proportion, especially because of the small amount of track built during the previous few years. But in such a state as New York, outside of the main line of the New York Central Railroad, already mentioned, and the New York, Westchester & Boston Railroad, which was also built practically for steam railroad conditions, there was only 17 miles of new track, or an increase of less than one-half of 1 per cent, although during the decade from 1900 to 1910 the population increased at the rate of 2½ per cent yearly. Similarly, Massachusetts last year reported an increase of only a little more than 13 miles, also less than one-half of 1 per cent of its trackage. Ohio reported only 16 miles and Indiana only 13 miles. Several states, including Georgia, Kansas, Kentucky, Maryland, Missouri, Nebraska and Virginia, reported less than 5 miles of track each.

It would be foolish not to attach significance to these figures. No one, we believe, will claim that the real needs for transportation facilities in the states mentioned increased only at the trivial rates which this added mileage would indicate. We do not intend here to discuss the causes, but the facts disclose a condition which is of serious import to the public at large, if city and interurban railways are really as great factors in the prosperity of urban and interurban communities as they are generally credited with being. The question is not one simply of concern to the railway companies. They need not attempt to serve any more territory, but can devote their attention to the more intensive cultivation of the lines which they have. But how will such a plan help those communities which are not now served by any existing railway line and hence are deprived of the transportation facilities which might be a factor in their growth? We bring this question and the figures already quoted to the attention of the legislatures which are now meeting in most of the states in this country.

NEW MOUNTAIN ELECTRIFICATION

The announcement made this week of the decision of the Chicago, Milwaukee & Puget Sound Railroad to electrify some 440 miles of its main line between Harlowton,, Mont., and Avery, Idaho, proves the correctness of the arguments often advanced by electrical engineers on the desirability of electric locomotives for service on mountain grades. Not only is the available fuel in the far Western mountain districts of low grade, but water-power is usually near at hand. Finally, the capacity of the locomotive, and hence of the track, can be greatly increased by the substitution of electric for steam power, as shown in the article on this subject by Mr. Armstrong published in this paper last week. The proposed installation will be similar in general character of service required to that of the Denver & Rio Grande proposed electrification, announced a few weeks ago, but will be considerably more extensive, as nearly four times the length of track to be equipped electrically is mentioned in the dispatches. On neither of these lines has a definite selection been made yet of the electric system to be used, but in an interview a prominent official of the company in Chicago is reported to have said that the chances favored the use of 2400 volts. This is, of course, the voltage adopted for the Butte, Anaconda & Pacific Railroad, which will also be supplied with electrical energy from the same power distribution system, and possibly the choice for the Butte, Anaconda & Pacific road was made in contemplation of the future electrification of the main trunk line. Recuperation, an especially valuable factor on mountain-grade divisions, is also mentioned as a probability, although whether this was, or will be, a factor in the choice of the electric system to be used is yet simply a matter of conjecture.

In one respect it seems at first somewhat of an anomaly that the superiority of electric power to steam power should have been recognized first at what appear to be the two extremes of railroading, namely, for rapid transit commuter service near densely populated cities and in the sparsely settled mountain districts of the country. But these two classes of service have this point of similarity, the question of increased track capacity is a very important one, and electric power affords the cheapest means of securing it. On the whole, the outlook for an increase of heavy electric traction lines during 1913 is promising.

Accident Prevention in Boston

Special Form of Inquiry Which Follows Accidents in Boston—Campaign of Education to Avoid Accidents Conducted with Owners of Vehicles, Trainmen and Public

BY EDWARD DANA, ASSISTANT SUPERINTENDENT OF TRANSPORTATION BOSTON ELEVATED RAILWAY

The street car accidents which occur daily are numerous, and their reduction imposes a task of the first magnitude. Such an end demands the constant application of all the intelligence that a company can command. One often hears of certain accident "campaigns" being productive of results. These usually are of a temporary nature, but indicate what is within the range of possibility and the goal to strive for. Novel methods are employed until the enthusiasm weakens, whereupon a period of rising accidents sets in and lasts until such time as the company awakes to the need of another "campaign."

The successful company of the future must plan to exist without these sprints. The "campaign" must be a consistent, perpetual movement productive of results. It must strive to prevent rather than cure, for cures are not always permanent. The underlying causes of accidents must, therefore, be analyzed to the finest degree possible. Proper record should be secured to the end that if some condition attracts attention it can be traced back, as well as watched in the future, without prohibitive expense.

Boston Safety Campaign—View from Moving-Picture Film

BLANKS FOR RECORDING CAUSES

In Boston there has been developed for this purpose a series of forms which pertain to the three classes of collisions, namely, with car, with vehicle and with pedestrian. Of these the first and the last are shown on page 60. The remaining one contains questions similar to most of those in either one or the other of the blanks reproduced, with the addition of questions to show the direction in which the vehicle was going. The information called for is readily obtained in the form of a memorandum at the time a superintendent interviews the employees concerned. The blanks are then sent to the superintendent of transportation, where they are filed and analyzed, and, if called for by the claim department or vice-president, they are easily accessible.

It has usually been difficult to show managers that an expenditure calculated to reduce accidents was warranted because of the fact that it is well-nigh impossible to secure tangible evidence which can be attributed thereto. The two surest avenues, however, to fewer accidents are competent instruction and reinstruction and efficient street supervision. Modern managers must be liberal in supplying appropriations for these two items if results worth while are to be expected. As a system enlarges these items must receive their proportional share of the growth, and even more if possible.

The narrow streets of the business section of Boston are conducive to vehicle collisions. During the autumn the company mailed the following letter to as many owners of vehicles as it was possible to reach. The tone of the replies received indicated an appreciation of the situation:

CIRCULAR LETTER TO VEHICLE OWNERS

"Dear Sirs: During the last twelve months the surface cars operated by our company have been concerned in 4087 collisions with vehicles upon the public highways. Some have been slight, others have been more serious in their consequences. In the aggregate, however, they represent a financial loss of no mean proportions to both the company and the owners of the vehicles. It is safe to say that but a very small percentage were unavoidable.

"We have exerted ourselves to the fullest degree to prevent the occurrence of these collisions. We have evolved a thorough method of instruction and system of following up our motormen. We find that these efforts have not been in vain, and that, during the period quoted, in 40 per cent of the collisions our men were in no wise to blame and in 40 per cent more they were not responsible for the collision, but we deemed it wise further to instruct and caution them. In 80 per cent, therefore, of the collisions cited the responsibility for them has rested with the drivers of the vehicles. In the remaining 20 per cent our men have been responsible and have suffered the consequences of their negligence.

"The volume of vehicular traffic here in Boston is on the constant increase, and the modern tendency is for speed at almost any hazard. The conditions, therefore, will be more conducive to accidents as time goes on.

"This, however, is the age of co-operation, and we ask you, for your own interests, our interests and the interests of the community at large, to co-operate with us in a practical, effective manner to reduce the collision account.

"We recommend to you the practice of having talks given to your drivers and the good which bulletins or cautionary instructions might do. A careless driver is in more ways than one as unprofitable an investment for you as is his counterpart with us.

"We should be glad of any suggestions, and any information which you may desire concerning the difficulties of car operation on bad rails, etc., we should be glad to afford you.

"We trust you will look upon the matter along the broad lines which we endeavor to, and we earnestly hope that you will see fit to expend energies along this line."

This letter was signed by the superintendent of transportation.

TALKS BY SUPERINTENDENTS AND "ACCIDENT CLERKS"

Much good can result from periodic, forceful talks to the men collectively by superintendents and others. If these are held too frequently, however, or are too protracted, the results secured are much lessened.

Within the past year "accident clerks" have been appointed in Boston, and it is the general opinion that the company has profited by the appointment to a considerable degree. Educated in the claim department, these men are in a position to show trainmen how serious the accident question really is from the viewpoint of the department where the income of the company flows the wrong way. The three men assigned spend a week in one division and then move to the next, and it is so arranged that they are not assigned to the same division more than once in two months. Their duties require them to study all conditions which may seem conducive to accidents and to point out in individual conference at the time that accident reports are made the ways in which the employee was negligent.

As indicative of the manner in which a proper atmosphere can be created in which to present the accident problem to the men, the following letters were mailed to the home addresses of conductors and motormen. They were signed by the superintendent of transportation. The letter to conductors was dated Nov. 18, 1912, and that to motormen Sept. 30, 1912. It was thought that as these letters were read around the home table in the evening there would come a deeper realization of the responsibility of him who day in and day out wears the, to him, commonplace uniform. Undoubtedly other members of the families read them and conceived ideas which caused the subject to be brought up again at a later date. Replies were received from some and they were most gratifying as showing the sentiment of responsibility which existed upon the platforms.

PARAGON
3023

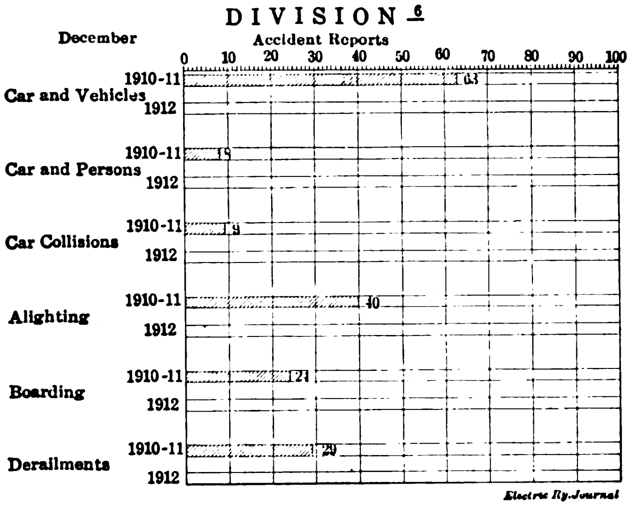
Boston Safety Campaign—View from Moving-Picture Film

LETTER TO CONDUCTORS

"To Conductors:

"This company comes in contact every day with about a million and a half individuals, all of them different. To them you represent the policies as well as the kind of service which it provides. We deal in the commodity of transportation and you are the agents of the company as it is delivered. It is recognized as sound business policy to discriminate against no one. More especially is this true in this business, a public service, at a uniform rate, that all must be accorded the same treatment.

"Doubtless it is true that no agent in other lines comes in contact daily with as many customers as you do. Many of them, for want of else to do, observe with interest the manner in which you perform your duties. It should be a source of satisfaction therefore to know that if your work is well done others observe it, not infrequently call it to the attention of the management, and in any event inwardly respect you. By proper conduct you build up the good will of the business. If the good will of the business is strong, it is by just so much an easier matter satisfactorily to explain matters which may not suit the individual.



Boston Safety Campaign—Comparative Chart Posted in Carhouses

"If a passenger aggravates you, retain always your self-control. The next time the same passenger rides make no allusion to the past and conduct yourself properly. You cannot but change his attitude from one of anger to respect and probably a feeling of shame upon his part. By simply doing right in such a case you have done unquestionable good in that you have taught a moral lesson.

"Always bear in mind that by your careless act a boarding or alighting accident is likely to occur. You may be responsible not only for the financial loss which the company may sustain but for suffering and injury. It may be a young, active person who must carry the burden of this injury down the years of life, or it may be an elderly person whose brief remaining span of life is shortened because of this injury. In either case it is too great a toll for a few seconds which the company has never asked that you save or spend in such a way.

"A comparatively fixed relation exists between the gross receipts of the company and the amount which can be disbursed as wages. Failure therefore because of inattention, carelessness or inefficiency on the part of a conductor to collect the revenue rightfully due the company for service rendered bears directly upon the company, the general public and the conductor himself, as well as upon his fellow employees. Much there is to try you, but in the short dealing you have with passengers it is not for you to know the burdens each may be carrying which, in their outward expression, bear heavily upon you.

"Remember that your work well done is constructive effort making stronger the company, those who observe you and yourself, and further remember that you will never be regarded as 'a good railway man' till you run your car without accident and with civility to passengers."

LETTER TO MOTORMEN

"To Motormen of Surface Lines:

"In these busy autumn days let your energies be exerted to the avoidance of the accidents which heretofore have been peculiar to the season. Bear in mind that each collision leaves a scar, and no one wishes to cause a scar.

"That scar may cause human suffering, and no one wishes even to reflect upon the fact that many homes each Christmas are saddened from the scars of street car accidents during the previous twelvemonth. That scar may cause the company to pay out money for repairs to car or object damaged, in which case it is an economic loss, merely replacing what formerly existed.

"If the company did not have to pay out these sums it could, by just so much, improve the facilities for transportation as well as the compensation of its men. In the last analysis every accident is the result of carelessness or failure of judgment on the part of someone and consequently is preventable.

"Every motorman has but one duty to himself, the company and humanity while his car is in operation, and that is to give his entire attention to operating it safely. This company has stood in the front ranks of street railway operation in this country. The incentive should be therefore not to be satisfied but to progress and be a leader in every way.

"The management believes that this fall a successful stand can be taken against accidents. It has communicated with the schools, the public authorities and others who use the public highways. It now appeals to its men to strive earnestly for this end and show results.

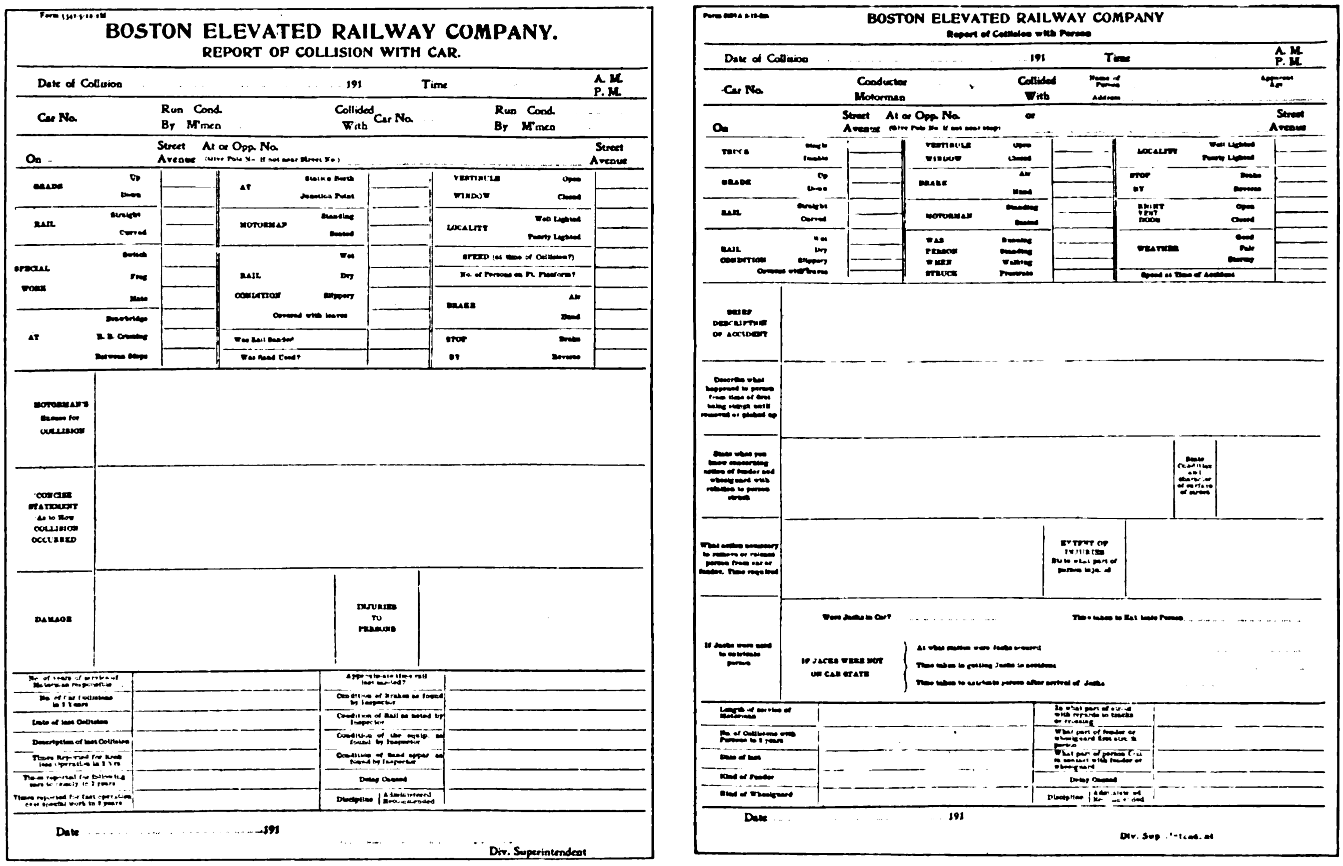
"Each day from Oct. 1, 1912, there will be posted the number of collisions which occur during October and November with those that occurred during the same time the previous year.

"Be sure you have sufficient sand for an emergency, making allowance for the frosty rails of this time of year as well as the falling leaves. If you observe a motorman younger in the service than you are make a careless move which, if repeated, might cause a serious accident, make it your duty at some time, in a friendly way so that he cannot help but appreciate it, to warn him.

"Do not allow yourself to imagine that the other users of the highways will make any move except the one most unfavorable to your position and be prepared for it. Remember, when on a car you should concentrate your attention on your work just as much as should a surgeon who is performing a delicate operation in which life hangs in the balance. Enter upon this reduction of the accident account with a determined mind and surprising success well worth while from any point of view will result."

MOVING PICTURES

A wide range of persons were also reached by means of running a series of pictures at twenty-one of the moving picture theaters in the city. Typical views from these pictures are reproduced. Appropriate wording was displayed before each was thrown upon the screen. Just how valuable such an outlay really was can only be presumed, but it is inconceivable that serious impression was not made upon a good many, old as well as young, and that some acts of carelessness were not by this means prevented.



BOSTON ELEVATED RAILWAY COMPANY.
REPORT OF COLLISION WITH CAR.

Date of Collision 191 Time A. M. P. M.
Car No. Run Cond. By M'men Collided With Car No. Run Cond. By M'men
On Street Avenue At or Opp. No. (Give Pole No. if not near Street No.) Street Avenue

GRADE Up Down
RAIL Straight Curved
SPECIAL WORK Switch Frog Mate
AT Drawbridge R. R. Crossing Between Stops
AT Station Berth Junction Point
MOTORMAN Standing Seated
RAIL CONDITION Wet Dry Slippery Covered with leaves
Was Rail Sanded?
Was Sand Used?
VESTIBULE WINDOW Open Closed
LOCALITY Well Lighted Poorly Lighted
SPEED (at time of Collision?)
No. of Persons on Ft. Platform?
BRAKE Air Hand
STOP BY Brake Reverse

MOTORMAN'S Excuse for COLLISION
CONCISE STATEMENT As to How COLLISION OCCURRED
DAMAGE
INJURIES TO PERSONS

No. of years of service of Motorman responsible
No. of Car Collisions in 2 Years
Date of last Collision
Description of last Collision
Times Reported for Reckless operation in 2 Yrs
Times reported for following cars too closely in 2 years
Times reported for fast operation over special work in 2 years
Approximate time rail last sanded?
Condition of Brakes as found by Inspector
Condition of Rail as noted by Inspector
Condition of the equip. as found by Inspector
Condition of Sand appar. as found by Inspector
Delay Caused
Discipline Administered Recommended

Date 191
Div. Superintendent

BOSTON ELEVATED RAILWAY COMPANY
Report of Collision with Person

Date of Collision 191 Time A. M. P. M.
Car No. Conductor Motorman Collided With Name of Person Address Apparent Age
On Street Avenue At or Opp. No. (Give Pole No. if not near stop) or Street Avenue

TRUCK Single Double
GRADE Up Down
RAIL Straight Curved
RAIL CONDITION Wet Dry Slippery Covered with leaves
VESTIBULE WINDOW Open Closed
BRAKE Air Hand
MOTORMAN Standing Seated
WAS PERSON WHEN STRUCK Running Standing Walking Prostrate
LOCALITY Well Lighted Poorly Lighted
STOP BY Brake Reverse
FRONT VENT DOOR Open Closed
WEATHER Good Fair Stormy
Speed at Time of Accident

BRIEF DESCRIPTION OF ACCIDENT
Describe what happened to person from time of first being struck until removed or picked up
State what you know concerning action of fender and wheelguard with relation to person struck
State Condition and character of surface of street
What action necessary to remove or release person from car or fender. Time required
EXTENT OF INJURIES State what part of person injured
If Jacks were used to extricate person
Were Jacks in Car? Time taken to Extricate Person
IF JACKS WERE NOT ON CAR STATE
At what station were Jacks secured
Time taken in getting Jacks to accident
Time taken to extricate person after arrival of Jacks

Length of service of Motorman
No. of Collisions with Persons in 2 years
Date of last
Kind of Fender
Kind of Wheelguard
In what part of street with regards to tracks or crossing
What part of fender or wheelguard first struck person
What part of person first in contact with fender or wheelguard
Delay Caused
Discipline Administered Recommended

Date 191
Div. Superintendent

Boston Safety Campaign—Blanks Used for Obtaining Information of Collisions with Cars and Persons

ACCIDENT CHARTS FOR TRAINMEN

To focus the attention of trainmen concretely upon the accident standing from day to day, charts, similar to that shown on page 59, were posted at all carhouses, and each day the number of the several classes of accidents was drawn in beneath the average record for the previous two years. There seemed to develop a genuine purpose among the men not to allow the current year line to creep up on the "bogey," they realizing the consequences to the company if it did. Simple as is this plan, there is no question that it accomplished good results. It might be well if prizes of some sort were given to the division making the best record against its own previous performance in this connection.

OTHER PRECAUTIONS

The words "Do not talk to the motorman" have long been stenciled on some part of the vestibules of electric cars. In most cities the observance of these words is the exception rather than the rule. How many accidents might have been avoided had this not come to be the case can only be conjectured, but certain it is that violation of the rule is conducive to accident, and up-to-date operation should combat it vigorously. Policemen and firemen are frequent offenders and should be reached through their respective departments.

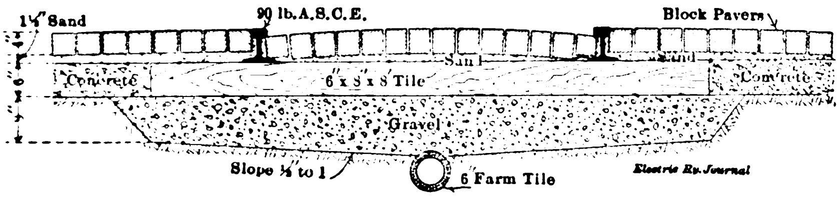
It has been said that drivers of horse-drawn vehicles should be licensed, and there is considerable merit in the proposition, although the labor organizations would in all probability oppose such legislation. It is a fact that many of the vehicle drivers are unfit for the responsibility and should be prevented by law from jeopardizing in the public highways their own lives and those of pedestrians or those of a carload of passengers.

In congested cities harrowing accidents result from the street gamins and newsboys stealing rides. Here is presented a problem, the seriousness of which is increasing as congestion increases. It has its pathetic side which must be studied and met, for many of the boys stealing rides are the product of families which have been wrecked. Often their mothers are away all day earning the wherewithal to support them, while their fathers have deserted them or are "good-for-nothings." This task is one for the church, the schools, the juvenile courts and the railroads to pursue earnestly and thoughtfully if we are to have a reduction in this class of accidents.

In conclusion, it more and more becomes an economic problem of far-reaching consequence to reduce the accidents of common carriers in this country and bring to pass a conservation of our human resources.

ILLINOIS TRACTION T-RAIL PAVEMENT CONSTRUCTION

The engineering department of the Illinois Traction System has recently developed a type of track construction in pavements which includes several novel features. A section of this new construction is shown in the illustration. It was designed for both creosoted block and brick pavement and its advantages are found in the method of handling the pavement between the T-rails. The section was designed for 90-lb. A. S. C. E. rail on 6-in. x 8-in. x 8-ft. wooden ties with a 6-in. concrete foundation under the pavement. By employing a template which will prepare the sand cushion between the rails and give a crown at the center equal to the height of the ball of the rail no special filler block in the pavement is required. In case brick is used a special brick may be purchased which is 3 in. deep, or the paving block, if the width is less than the depth, may be turned on the side. In case a creosoted block is employed, the shallow block may be purchased at no additional cost over the price of the standard size. It has been found that the public expressed no objection to this type of construction, and at the same time it affords a cheaper method of paving between the rails.

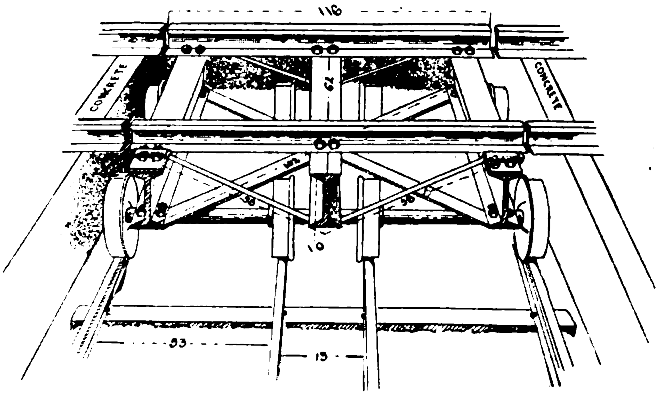


Standard T-Rail Construction in Paved Streets—Illinois Traction System

Another feature is the method of preparing the subgrade. Usually the trench containing the ballast under the ties is rectangular in section, but in order to provide drainage to a 6-in. farm tile, which is installed at the center of the trench, the subgrade is sloped from the ends of the ties to the tile, ½ in. to 1 ft. The installation of farm drain tile with outlets in the center of the track trench is advantageous in that the trench is usually below the subgrade of the street and provides drainage from both sides as far as the building lines. Its installation is limited, however, to streets where an outlet can be provided to the city sewer system or otherwise.

CROSS PIT TRUCK TRANSFER TABLE

One of the problems confronting the master mechanic of a small road where the amount of rolling stock does not warrant the installation of an overhead crane in the repair shop is the replacement of trucks at a minimum expense.



Cross Pit Truck Transfer Table

This problem is particularly pertinent on interurban roads where it is necessary to jack up the heavy car body to a sufficient height not only to clear the trucks but to allow the trucks to pass out under the pilot. In case it is not possible to do this, the pilot and possibly the draft rigging must be removed, a task which entails considerable expense. In solving this particular problem the master mechanic of the Fort Dodge, Des Moines & Southern Railroad Company built a cross pit between the inspection pit and the track on which truck repairs are made. He also designed and built a comparatively inexpensive transfer table of scrap material found in the company's storeyard. A sketch showing the transfer table construction as well as the cross pit is shown. The numerals on the drawing give the dimensions of the several parts in inches.

Since the cross pit has been built and the transfer table installed the cost of removing trucks from cars has been reduced to a minimum. An interurban car is run on the inspection track so that the trucks rest on the table. Two jacks are placed under the side sill of the car and bear on the concrete cross pit walls. After the car body has been raised to a sufficient height to clear the center bearing plates, the transfer table is pushed by hand to the truck repair track, where the defective truck is removed and one in good order replaces it on the table. The transfer table is then moved back to the inspection track, the car body lowered, the king pin dropped in place, and the car is again ready for the road.

One of the largest hydroelectric plants thus far installed has recently been placed in service at Trollhättan, in Sweden. It is a government enterprise utilizing as its storage basin Lake Vänern, the third largest lake in Europe, with an area of 2150 sq. miles. With the regulation possible to be applied on the lake the minimum flow can be considerably increased and the possible output will rise to not less than 200,000 hp. Approximately half this amount is the output planned for the present installation. The equipment of the initial plant consists of eight turbines, six of which are already in operation. These turbines are double-runner units of the Francis type, working under 108-ft. head, each directly coupled to a 11,000-kva generator.

Reports on San Francisco Conditions

One Report Just Rendered Recommends the Construction of 72 Miles of New Track Within the Next Five Years and Says the City Must Adopt a Definite Railway Policy—Another Report Analyzes the Rush-Hour Traffic—The Third Discusses the Probable Growth of Traffic and Required Investment

Three reports have recently been submitted to the Board of Supervisors of the city of San Francisco by B. J. Arnold. The first is a continuation of report No. 10, of which an abstract appeared on page 1240 of the ELECTRIC RAILWAY JOURNAL for Dec. 21. It refers to the extensions, immediate and future, of street railway facilities in San Francisco which Mr. Arnold considers necessary. This report was submitted Dec. 2, 1912. An addendum to the report, dated Dec. 11, 1912, refers to the defeat of the proposed charter amendment No. 34 by a small majority at the referendum.

The second report, No. 11, was submitted Dec. 23 and relates to traffic and service in the downtown district of San Francisco. The third report, No. 19, was submitted Jan. 2, 1913, and discusses the growth of traffic in San Francisco, past and future, and the investment which will be required to provide new transportation facilities in the city adequate to care for the future traffic. The reports are of especial interest because of the expressed policy of the municipality to own all of its electric railway systems.

In the earlier reports Mr. Arnold showed the necessity, especially in view of the approaching exposition, for the city to provide some means by which the transit facilities should be made adequate to the needs that will arise in 1915. A charter amendment which permitted the co-operation of the city and of private capital to make certain extensions to care for this situation was defeated by popular vote, as already mentioned. The addendum to Report No. 10, abstracted first below, outlines the courses now opened for the city and urges the adoption of a definite transportation policy. The final report, No. 19, then discusses the requirement for rapid transit during the next forty years and shows that under the constitutional debt limitation of the city the assessed valuation of its property will not provide sufficient margin to enable the city to make the improvements and extensions which would be required yearly.

A DEFINITE POLICY IMPERATIVE

The addendum to Report No. 10, Part 2, made immediately after the election already referred to, says that it is now incumbent upon the city:

"First—To finance, by local assessment or bond issue, all or a large part of the extensions called for and to secure the right of exchange of its own cars with the connecting United Railroads lines (involving an adjustment of wage scales); or

"Second—To build the roadbed only and grant private operation rights there-over; or

"Third—To secure private capital to finance these extensions and secure the right of through service under present charter conditions.

"The time has now arrived for the city of San Francisco to establish a definite transit policy, either to undertake a prolonged warfare of competition with established lines or else to accept a reasonable compromise and subdivision of territory served between the municipal and private systems until such time as it is able to assume the financial burden of the entire transit system."

NEEDS OF THE FUTURE

In the full report, which was submitted before the election, Mr. Arnold says in part:

"While the necessities of the present are being considered it is equally necessary that those of the near future and of a decade hence shall be anticipated as far as possible in order that piecemeal development may be avoided and a transit system planned which will eventually co-ordinate all of these successive steps into one efficient and unified operating system, whether under one or several managements, municipal or private. The extensions herein recommended are designed as parts of such a unified system, irrespective of ownership, i. e., with a system developed only with reference to the best needs of the respective districts, and with duplication of capital investment eliminated.

"This unified plan does not in any manner prevent the future control by the city of all of its traction lines but may be regarded at the present time as simply the best means to a much-desired end—adequate service. From the standpoint of the patron, the ideal condition of service necessitates one city, one fare, universal transfers.

"However, plans have been prepared for the subdivision of this unified program of development into its component parts, one of which contemplates a privately operated system and the other a municipally operated system, both covering the entire city as far as possible and operating in direct competition. But such a plan necessarily results in extensive duplication of investment along parallel streets and consequently duplication of service."

Among the conclusions and recommendations set forth are the following:

"A study of the relative growth of population, operated trackage and riding habit indicates that the principal traction system in its extension program is at least six years behind the average rate established by the company from 1900 to 1905, which was 6 2/3 miles of single track per year. During the preceding decade an even higher rate was maintained—8¾ miles per year. Furthermore, extensions are by no means keeping pace with the growth in population, and only about 8 miles more track is now being operated than in 1905.

"The apparent needs of the immediate future, determined independently of the above facts, require the construction of about 72 miles of single track, 94 per cent of which is under municipal jurisdiction, and by far the greater proportion of this mileage is to be regarded as simply completing a delayed program.

"Upon the completion of the above construction, five years hence at the most, a second construction program should be entered upon, involving about 50 miles of single track, which may possibly be warranted within the present decade.

"After this period further extension work should be steadily carried out as indicated, both in the outlying districts and within the city proper, solidifying and perfecting the present system. Inasmuch as San Francisco is hardly half developed, there remains much to be accomplished before a so-called saturation point shall have been reached to justify retrenchment in extensions.

"This work will call for an approximate expenditure of about $6,000,000 in track and equipment within the next five years and $11,000,000 for all the extension work indicated herein, exclusive of all special street improvement work, such as regrades, tunnels, etc., and exclusive of all rapid transit undertakings, except the Twin Peaks tunnel project already recommended.

"At a very conservative estimate the investment in physical property should increase at the rate of $3 per $1 earned per year, and possibly at a higher rate. As the earnings for the future are conservatively estimated as doubling in from fourteen to eighteen years, this means that within the next decade probably $18,000,000 will have to be invested in extensions, additions and betterments to the transportation facilities of San Francisco.

"A large proportion of these extensions must be operated as part of the private system having no possible connection with the municipal lines, present or contemplated. But if these various outlying fragments were built by the city, some form of contract should be entered into to guarantee through service during the life of the trunk line franchise.

"As the maximum benefit from service will be derived from extensions nearest the business center or into comparatively thickly settled suburbs, these should receive consideration before lines into thinly settled districts.

"Single-track construction, with turn-outs, will be justifiable in the case of some extensions into very thinly settled districts. This, together with the lighter construction employed, will so reduce the relative investment as to make it possible to serve a much greater territory than if standard construction were used throughout. But such single-track lines, if of reasonably permanent construction, especially as regards the substructure, should be laid at the side of the street, so as to be in position when the line is double-tracked and re-railed.

"In outlying territory, where the streets and topography permit, a spacing between adjacent lines should be adopted which will divide the undeveloped territory with reasonable equality of service, as herein indicated. In other words, parallel lines should not be located nearer than three or four blocks apart, unless through exceptionally dense settlements. Otherwise unwarranted duplication will occur.

"It is probable that a number of the extensions recommended, especially those not in a direct line of through traffic, may be better handled for the present by means of a shuttle service rather than to attempt through service to the downtown district. On such lines smaller car equipment would be permissible, such as would not be of sufficient capacity to warrant operating through the business district.

"In conclusion, it is again necessary to draw the attention of your board and the citizens of San Francisco to the serious fact, with which they are confronted, that capital must be found to build these extensions. The municipality, of course, has a free hand in this contemplated use of its streets; but many of the extensions are of such a fragmentary character that it is a grave question whether it should undertake, under present conditions, a capital burden of this nature. The only alternatives are for these extensions to be financed by assessment upon the property benefited thereby, or else by private capital, and to make this possible the passage of charter amendment No. 34, with proper restrictions, is therefore necessary and vital to the proper development of your city, particularly in time for the Panama-Pacific exposition."

A table which accompanies the report gives figures of approximate cost for extensions. The estimates assume that electric power would be purchased, thus excluding the cost of power stations and transmission lines, and they include only roadbed, overhead, cars and power-converting equipment. They are as follows: Immediate, city, 66.92 miles of single track; outside control, 4.76 miles; cost for total of 71.68 miles, $5,730,000; after five years, city, 44 miles; outside control, 3.79 miles; cost for total of 47.79 miles, $3,820,000; ultimate, city, 21.37 miles, cost $1,710,000.

TRAFFIC CONDITIONS IN DOWNTOWN DISTRICT

Traffic and service in the downtown district of San Francisco are discussed in preliminary report No. 11, submitted under date of Dec. 23, 1912. An abstract of this report follows:

"Owing to the variation in travel from day to day, this traffic study cannot represent all conditions that occur but rather is intended to give an impression of typical operating conditions existing during a normal business day, that is, excluding Saturdays and Sundays and other days of unusually light or heavy travel. Further, the report is confined to the 'downtown' or loading district, the outer limits of which may be defined, from a traffic standpoint, as including the points of maximum outbound loading on the individual routes; that is, the limits within which the loading of cars is completed. These points form the basis of a so-called 'cordon count' of traffic, the object of which was to intercept during the maximum rush hour every outbound passenger on his homeward journey.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

"Adequate city transportation is largely a question of meeting, on the one hand, the capacity demands of the four rush hours, when one-half of the total day's travel must be handled, and, on the other, of providing a reasonably frequent headway during the remaining hours of light travel. The former requires, for four hours only, about twice the number of cars and crews necessary for the rest of the business day.

"Outside of the extra investment in rush-hour equipment, the greatest problem is to provide a reasonable day's work for rush-hour trainmen without running idle cars during the day to fill out the working day of 'tripper' men.

"Of the two rush-hour periods, the evening has by far the heavier travel—easily 100 per cent greater than the average for the business day and 20 per cent greater than the morning peak. On practically all lines, maximum travel occurs within a short period from 5:15 to 5:30 p. m. and is approximately 10 per cent higher than the hourly average.

"A composite passenger count of all lines leaving the business district during the evening rush hour indicated a total homeward travel of about 49,000 passengers per hour, 84 per cent of whom were city-bound and only 16 per cent transbay commuters. Although nearly 15,000 commuters cross at this time each day, ferry-bound riding was found to be generally light, as over half of the commuters, encouraged by street and terminal obstructions, walk to the ferry.

"The operations of the traffic squad have been effective and should be encouraged, as street congestion is responsible for a considerable reduction in speed and carrying capacity. The average operating speed in the terminal district is exceedingly low, but since 1905 the average schedule speed for the city has increased from 7.6 to 8.5 m.p.h., or over 12 per cent.

"Every effort should be made to eliminate unnecessary stops. Within the usual range of speed, a reduction of one stop per mile will result in an increase in speed of about 5.6 per cent.

"The prepayment principle for collecting fares has not had a fair trial in San Francisco especially as applied to short platform cars designed for non-prepay collection, particularly those fitted with fare boxes, which require about two-thirds more time to load a passenger than for the long platform of the latest Oakland cars. With a properly designed platform, passengers can load at a speed of about one second each.

"A comparison of official schedules of 1909 and 1912 indicates on the whole a small increase in equipment operated as determined by trips scheduled. Checks against operating schedules covering every car in the system showed that practically all of the available rolling stock is being operated, there being only 8 per cent idle cars out of the total, 5 per cent being held for emergencies and the remainder undergoing repair.

"Comfortable standing should be limited to 50 per cent above seating capacity for cross seats, 100 per cent above for longitudinal seats, or 3 sq. ft. per standing passenger allowed for normal maximum capacity.

"Analysis of service standards indicates excessive loading on many routes. While the average car loading throughout the city during the rush hour was 58 per cent in excess of seats furnished, that of Mission Street was 112 per cent for the hour and for the heaviest 15-minute period both Market and Mission throats showed 135 per cent excess loading over seats furnished.

"Individual car loading was frequently so excessive as to make it impossible for conductors to reach passengers on non-prepay cars. In one case ninety passengers were missed on a single trip—38 per cent of the registration—which shows the necessity for prepayment platforms, properly designed.

"The most prolific cause of excessive car loading is irregularity of headway, due to street obstructions, careless dispatching or improper schedules. At present delays of three to four times the headway are common.

"The great interchange of transfer passengers clearly indicates the effectiveness and need of crosstown lines in city service.

"The new equipment now under construction will probably reduce the average excess rush-hour loading from 58 per cent now to about 38 per cent, which will hardly suffice for the present, even neglecting the needs of the exposition in 1915, unless by means of a general re-routing much car mileage now unused can be conserved where most needed, thus giving more service for the same number of equipments and trainmen on duty.

"In conclusion, permanent relief from the conditions above enumerated may be obtained only by, first, an increase in car mileage (carrying capacity) to be secured through effective re-routing and additional equipment; second, more uniformity in headway to be secured by improved schedules, inspection and dispatching and decreased street obstruction, and, third, increased operating speed, both in the loading of passengers and along thoroughfares.

GENERAL DISCUSSION

"During the four rush hours approximately one-half of the total day's travel must be handled. Furthermore, a considerable difference exists between morning and evening travel in the suddenness and severity of the peak loads. Thus, the outbound evening peak is two and two-fifths times that of the morning, while the morning inbound peak is only one and two-fifths times as great as the inbound evening peak. And finally, the difference in this fixed riding habit is shown in a total evening peak, both inbound and outbound, one and one-fifth times, or 20 per cent, more than the morning peak.

"With an adequate day service the rush-hour service must be exceedingly poor. With an adequate rush-hour service the day service must be unnecessarily good. This condition, in effect, has occurred in the street car operations of this city. While the maximum evening travel is two and two-fifths times the minimum midday travel, the maximum car movement is only one and thirteen-twentieths times that of the minimum midday—that is, 65 per cent additional trips are run during the evening rush period, which is far too low for a proper balance of service. In most large American cities practically double service during evening rush hour is found necessary. This rush-hour service ratio must be interpreted with caution, however, and in the last analysis the only absolute criterion is actual average loading of equipment.

"One very serious cause of the increased difficulties of giving adequate service is the interference of vehicle traffic. A very material improvement, however, has resulted from the institution of traffic regulation in this city by the traffic squad. While the average schedule speed for the entire city is 8.5 m.p.h., the actual operating speed in the terminal district is but little over half—4.4 m.p.h.; in the next zone of operation, 6.7; further out in the districts where vehicle interference is small, 8.9, and finally, on streets clear of interference, as high as 11.3 m.p.h.

"This exceedingly low speed in the central terminal district, averaging about the same speed as brisk walking, undoubtedly accounts for the loss to the railway company of a very large amount of short-haul traffic, which is by far the most lucrative of all the traffic handled. Therefore, any measures tending to increase running speed will make possible more service in the poorly paying outlying districts for the same total income per year.

"Since the electrification of the cable lines, the schedule speed has increased about 12 per cent and is continually improving, thus realizing one of the greatest advantages of electric service: In 1905 it was 7.599 m.p.h.; in 1906, 7.647; 1907, 6.85; 1908, 7.91; 1909, 8.113; 1910, 8.284; 1911, 8.43; 1912 (eight months only), 8.509. These average figures are based upon the actual car hours or running time of trainmen.

"Another important element in preventing high schedule speed is too frequent stops. Numerous observations made on various routes indicate a relation between stops and speed as follows: Ten stops per mile, 528 ft., 7.5 m.p.h.; eight stops per mile, 660 ft., 8.4 m.p.h.; six stops per mile, 880 ft., 9.4 m.p.h.; four stops per mile, 1320 ft., 11 m.p.h.; two stops per mile, 2640 ft., 13.7 m.p.h.

"The results of a large number of observations on the various types of cars in service referred to in a previous report on lower Market Street indicate that the prepayment principle has not had a fair trial in San Francisco, because of its being applied to cars designed for non-prepay service with short or constricted platforms. Thus, for a group of twenty-five passengers boarding at one point (a condition which occurs at the ferry regularly), the short-platform cars fitted with fare boxes require about two-thirds more time per passenger than for the long platforms in the latest Oakland cars fitted with a movable handrailing.

"Comparisons of headway, past and present, show not only a general improvement in service, although small, but also no evidence of attempt by the operating company to improve temporarily the service on particular lines counted while the traffic record was being obtained. The operating company is using its available rolling stock to the best possible advantage, and it is a creditable showing that so large a percentage of its equipment remains in service, which indicates a high degree of maintenance.

"It is recommended that reasonable standards to be applied to all types of cars are as follows:

"(1) Comfortable standing, 50 per cent in excess of cross seats and 100 per cent in excess of longitudinal seats.

"(2) Normal maximum capacity, 3 sq. ft. per standing passenger.

"(3) Emergency maximum capacity, 2 sq. ft. per standing passenger.

"A summary of observations on all the various outbound routes shows that for a typical composite business day slightly less than 49,000 passengers travel homeward on the surface cars during the maximum rush-hour period—5 to 6 p. m. Of this total 42,500, or about 87 per cent, were handled by the electric lines and less than 13 per cent by the cable lines, and 41,000, or about 84 per cent, represents city-bound traffic, the balance, or 16 per cent, representing trans-bay commuter traffic to the ferry terminal.

ANALYSIS OF SERVICE

"Taking the hourly basis, it was found that the average loading for all lines of city-bound passengers only was 158 per cent, i. e., 58 per cent excess passengers over seats; or for every 100 seats outbound fifty-eight passengers were forced to stand. For the electric lines only the corresponding loading was 158.5 per cent and for the cable lines 155.4 per cent of the seating capacity. These figures give due credit to the operating company for all unoccupied seats—that is, they recognize the standing by preference, due to the fact that many people stand even with seats vacant, as has been previously explained.

"If the trans-bay traffic to the ferry be included, the average loading for the system is then reduced to 131.1 per cent, due to the fact that the ferry-bound traffic is relatively light, averaging for the hour only 69.2 per cent of the seating capacity, i. e., one-third more seats than passengers. But it is not deemed proper to include in the final analysis this trans-bay commuter traffic to the ferry, for the reason that it is handled almost entirely on inbound cars and has no bearing on the outbound city service.

"It is necessary to state here that the above percentage loadings, while apparently fair considered on the rush-hour basis, are in reality entirely too high. The ratio between rush-hour and base midday schedule indicated too low a rush-hour service standard. The throat counts fully confirm this conclusion. In modern urban transportation, where the rush-hour load much exceeds 133 per cent of the seating capacity on an average, excessive standing results. Here the rush-hour average of city-bound traffic is 158 per cent, or nearly 20 per cent higher.

"Disparity between the records of the operating department and those found by actual count may largely be accredited to the fact that it is a physical impossibility for any conductor to keep an accurate record of passengers or fares where continued car loading as excessive as that enumerated above is encountered. And here exists the most forcible argument for the installation of the prepayment principle on all lines.

"To make sure of results, as many as five observers were stationed on the non-prepayment cars of both double-truck and single-truck type. These counts showed the following missed fares or passengers missed by the conductor on a single trip: One line was ninety passengers short; four lines were fifty passengers short; eight lines were twenty-five passengers short; thirteen lines were ten passengers short.

"In comparison therewith, only two prepayment lines showed ten passengers or more missed by the conductor, the average being four or five, and in these two cases the excessive crowding on the rear platform (which is against the rules of the company) prevented the conductor from reaching the passengers clinging to the rear step.

"It is therefore deemed unquestionable that the prepayment car has served a most useful purpose in securing the proper income that should be derived from the passenger traffic handled, which should not be considered for the sole purpose of increasing dividends, as often considered, but also for the purpose of securing from this justly increased revenue the additional car service made possible thereby."

GROWTH OF TRAFFIC AND INVESTMENT IN TRAFFIC FACILITIES

On Jan. 2 Mr. Arnold presented a report to the Board of Supervisors on the growth of traffic in San Francisco and investment in traffic facilities. It was entitled "Preliminary Report No. 19." It discusses the general laws of cities and makes predictions as to the future income of the transit lines in San Francisco with their necessary equipment investments. The city at present contains 450,000 people, and Mr. Arnold believes that this will double in twenty-six years and will reach 1,000,000 in 1945. The city is now growing more rapidly than before the fire, but not as rapidly as other large cities on the Pacific Coast. The report says further:

"An analysis of railway earnings shows that they are increasing in proportion to the square of the population—that is, when the population doubles earnings quadruple. United Railroads earnings alone should double in the next thirteen and one-half years—i. e., should reach $16,000,000 by 1924-5—and should quadruple by 1942. Earnings per capita are now the highest in the country—$20 per capita for all companies."

On the other hand, "in extension of track mileage San Francisco is at least six years behind the necessities of the growth in population. Trackage should extend at least as fast as the population, if not faster. The total track mileage is now about the same as before the fire, due to abandonments, and the last fifteen years show a slower growth than at any period of the city's history. This delayed construction must now be made up. The present necessities for track extension require about 15 miles per year up to 1920."

DIFFICULTIES OF MUNICIPAL OWNERSHIP

The city's expressed policy of municipal ownership of public utilities makes an analysis of the purchasing power of the city with respect to its utilities of interest. The report shows that the underlying property valuation is increasing at a slower rate than the necessary railway investment—viz., as the 1.7 power of the increase in population, instead of the square as in the case of earnings. At the very lowest estimate, $3 of capital must be invested for every $1 gross earnings. Under the present bond limit, therefore, the city's liability to purchase or build is becoming more and more inadequate, thus requiring a progressive refunding basis.

The present available purchasing power of the city is approximately $51,000,000 for all purposes, including water supply. By 1930 the total railway investment required will be $62,000,000; by 1950, $123,000,000. This means that over one-third of the total bonding capacity of the city on its present 15 per cent basis would be continually pre-empted for railway investment alone, assuming the city entirely free from debt.

The conclusion from this situation is that "if the city of San Francisco declines to accept the assistance of private capital in financing its utilities both for the present and the future, the conclusion cannot be evaded that a revision of the bond limit must be secured immediately in order to provide the capital necessary for preserving the normal rate of growth of the city."

PROBABLE INCREASE IN EARNINGS

The analysis in the report of the predicted growth of the city and its suburbs in population and territory occupies considerable space in the report, but no abstract of this part of the report is presented here because it does not relate directly to street railway traffic. Portions of the discussion on the growth of the earnings of the street railways are as follows:

The report lays down the general law that the total annual railway earnings increase approximately as the square of the increase in population; or, in other words, the earnings per capita will increase approximately in direct proportion to the increase in population. In this connection the diagram on the next page is presented. This diagram is plotted on logarithmic cross-section paper, like other similar diagrams in previous reports by Mr. Arnold, so that ratios represented by $Y = X^n$ appear as straight lines, the value of n being indicated by the angle which the line makes to the horizontal line. In the case of San Francisco, the earnings of the railway system have increased more rapidly than the square of population and the value of the property at a somewhat less ratio. The broken guide line indicates the square relation, and any line parallel to it conforms to this law. In the chart the rate of earnings for the distant future has been conservatively decreased, as the report refers largely to surface transportation and is not intended to include expensive rapid transit projects.

INCREASE IN EQUIPMENT

The track mileage in San Francisco up to the time of the consolidation of the properties had increased at a more rapid rate than the population, but not lately. According to the report, a proper development of the transit facilities requires that it should increase at a rate at least proportional to the increase in population. The seating capacity of the cars in San Francisco is now practically the same as before the fire.

An estimate of the proper rate of increase in car equipment and car mileage can be made, according to the report, by several methods as follows:

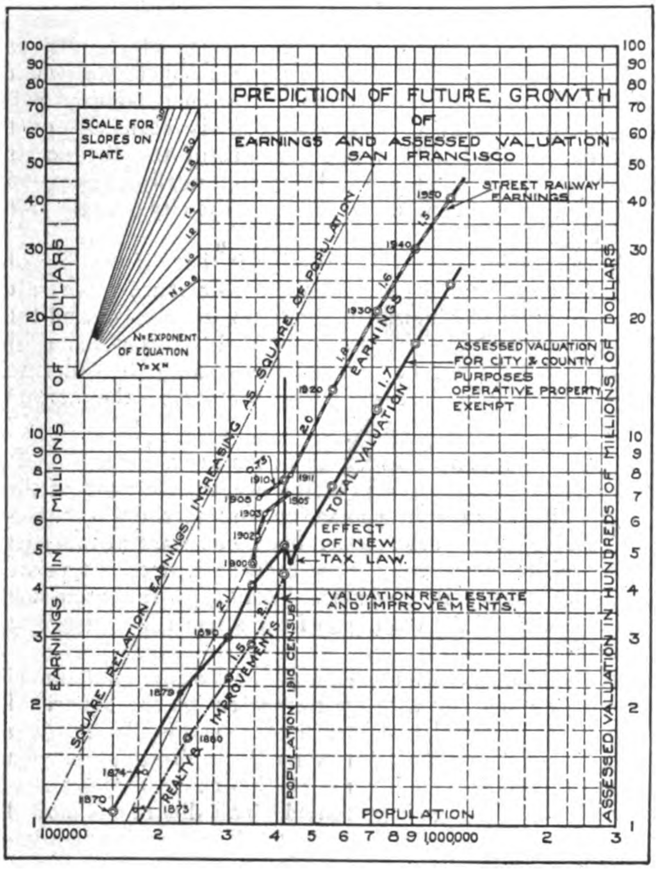
"(1) Assuming a uniform density in cars per mile of track, and increasing in proportion to track mileage.

"(2) Assuming a fixed income per car year, and thus increasing in proportion to the gross earnings.

"(3) Assuming a fixed operating ratio, expenses per car mile, and car mileage per car year, and increasing in proportion to the gross earnings."

Considering these in their order, on the first basis, "the car density resulting from a total of 741 cars averages for 1911 2.52 cars per mile of track. For a total trackage in 1920 of 414 miles there will be required 1043 operating cars, or adding 5 per cent for reserve and repair, a total of 1095 cars, equivalent to thirty-nine cars added per year. This represents a minimum, as the car density in San Francisco is low."

According to the second method, "the average income in 1911 for 741 cars was $11,600, which is much higher than in other cities. For gross earnings in 1920 of $13,100,000, a total of 1176 cars would be required, or forty-eight per year."



San Francisco Report—Chart of Future Growth and Railway Earnings

According to the third method, "taking the present ratio, including taxes, of 65 per cent, an operating expense of 20 cents per car mile and the present yearly mileage per car of 36,700 miles, the estimated earnings for 1920 of $13,100,000 will require a total of 1218 cars, or fifty-three per year.

"Thus it appears that on the present operating basis thirty-nine to fifty-three cars per year should be added to the entire system. That this latter rate is entirely practicable is shown by the fact that it would permit earnings of about 10 per cent on the investment, assuming $3.50 invested for each $1 of earnings.

"The only way in which this car purchase schedule can be reduced for the same service is that proportionate economies in operating car mileage be introduced by means of increased speed and effective re-routing of present lines."

INVESTMENT NECESSARY

The deductions from these data are of interest not only to San Francisco but to every municipality contemplating exclusive municipal ownership. As the future earning power has been determined, it is possible to deduce the total investment which will be necessary to extend the railway system according to the policy. These figures appear below:

Financial Summary of Future Growth.

Year	1912	1920	1930	1940	1950
Population (thousands)	443	558	722	909	1,121
Street railway earnings (millions)	8.4	13	21	30	41
Total assessed valuation for city and county (millions)	511	750	1,160	1,710	2,420
Investment in street railway property of $3 to $1 earned (minimum) (millions)	25	39	62	90	123
Bond limit (15 per cent of valuation) (millions)	77	113	174	257	363
Per cent of present bond limit necessary for railway investment	33	34.8	35.9	35.1	33.9

This table shows that an average investment of at least $1,750,000 per year will be required to 1920. The investment ratio assumed is $3 to each $1 earned. This, the report says, applies only to a system which is properly extended year by year in proportion to the growth in population and is probably the minimum investment necessary. If rapid transit undertakings in any form should be carried out during the intervening period, a considerably higher investment ratio would result, somewhat according to the following plan:

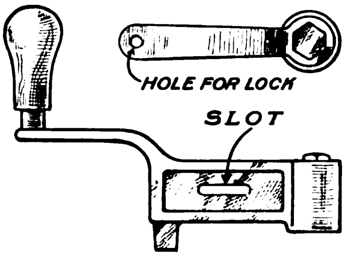
Rapid transit subways	$6.00	to	$8.00
Electrified steam lines	4.00	to	6.00
Street railways	3.00	to	4.00

CONCLUSIONS

The conclusions reached are that unless some revision is made in the basis of the bond limit for the purposes of investment in municipal utilities, the city can never hope to acquire, much less to construct, a complete transit property of the character necessary to meet its future. The table shows that more than one-third of the total bonding capacity on the present basis would be continually pre-empted for railway investment alone, assuming the city entirely free from debt. It was for this reason that the provisions of Charter Amendment No. 34 were so drawn as to permit private capital to assist municipal development until such time as the city could take over its utilities upon an adequate bonding basis, as in the case of New York City in its latest subway acquisitions.

PADLOCKING CONTROLLER HANDLES

As a result of several serious accidents, two of which were fatal, the Lincoln (Neb.) Traction Company made the removal of the controller and reverse handle compulsory. After this rule became effective the car crews and repairmen at the shops experienced considerable difficulty in keeping a sufficient number of extra handles on hand to take care of emergencies. To eliminate this trouble all controller handles were slotted to receive the handles of the reverse levers and ½-in. holes were drilled in the ends of the latter. Now when a crew leaves a car at the close of the day both handles are removed, the reverse handle is slipped through the slot in the controller handle, and the lever of a padlock, permanently attached to the brake staff bracket, is passed through the ½-in. hole in the reverse handle and locked. This arrangement keeps a set of handles with each car, and all properly authorized parties have keys to the padlock.



Interlocking Controller and Reverser Handles

Electric Arc Welding on the Pacific Coast

An Account of the Experiences of Two Electric Railways in Rehabilitating Worn Track and Equipment by Building Up with New Metal Welded Into Place by the Electric Arc

The commercial development of the art of electric arc welding, placing as it does an opportunity before the user for almost unlimited rehabilitation of worn or broken material, is a matter of great interest to electric railways, as such enterprises, having always available a supply of cheap electric current, are in a peculiarly advantageous position for its utilization. Although arc welding is still in its early stages, the development has been exceedingly rapid, and on several railways enough progress has been made already to demonstrate beyond any doubt the practicability of the method and the satisfactory results which may be obtained from it.

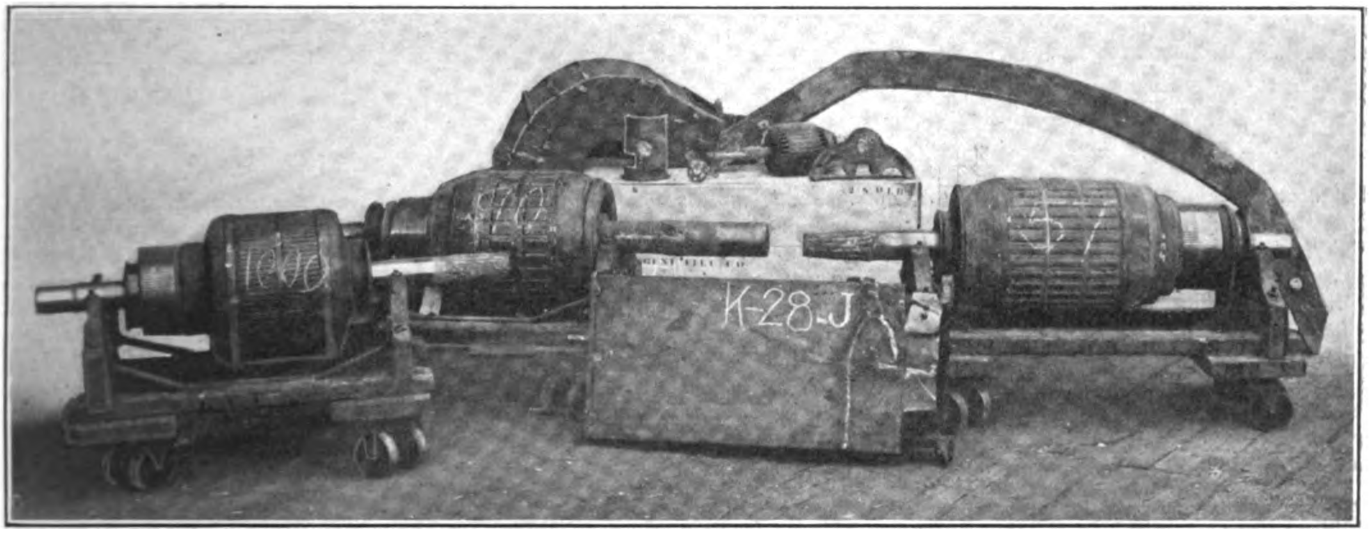
On the United Railroads of San Francisco eight or nine electric welding outfits of the portable type, manufactured by the Indianapolis Switch & Frog Company, have been in use since the beginning of 1912 and have proved thoroughly satisfactory in every respect. Through their use the road has been able to reclaim and rehabilitate many thousands of dollars' worth of material in the repair shops as well as a very large amount of rail and special work in the streets. In the latter case corrugations and cup-outs have been built up easily and satisfactorily in addition to plates in hardened center special work where the points have become broken or worn.

For repairs to track and special work the apparatus is especially economical. The road reports that, for a very nominal sum, material to the value of several thousands of dollars is reclaimed annually and the life prolonged for several years. It is, of course, almost impossible to estimate the exact saving on track work through the use of electric arc welding for the reason that, while the value of a new piece of special work may be $1,500 or $2,000, the actual cost of replacing the worn-out piece will amount to considerably more when the cost of labor for installation and the amount involved in tearing out and replacing the pavement is considered. As an example, it is reported that at one of San Francisco's busiest corners considerable complaint arose on account of the noise caused by cars running over a worn double-track section. This layout cost about $1,400, and the cost of replacing it with new material would have amounted to $1,000 additional, but through the use of the new process the road was able to rehabilitate the crossing, thereby prolonging its life for possibly several years at a cost of between $75 and $100.

It is, of course, the feature of portability which affords the greatest opportunity for saving. In many cases where welding is done at a forge or furnace by a blacksmith by far the greatest part of the cost of the complete operation is that which is involved in dismantling the damaged piece, transporting it to and from the forge and reassembling it after the repairs are finished. The ability to bring the welding flame to the work and to apply it from almost any direction or angle eliminates practically all of this indirect expense, and through the localization of the welding heat it has now become possible to make the so-called spot welds, to weld in narrow strips along crooked lines, or to operate upon material of a degree of thinness which would prohibit its being handled on a forge or on an anvil.

This accounts largely for the great variety of work which can be done with the electric arc, an example of which is given in the list of material repaired by the electric arc on the United Railroads of San Francisco. Here they report that they regularly make repairs to gear cases, motor cases, axles, truck frames, axle bearings and brake-shoe heads where the dowel pin has become oblong, armature shafts where the keyway and the tapered pinion seat have become worn, axle caps, brake levers, bolster castings, brake hangers, controller backs, step castings, and in fact all of the material used in their repairs of cars. In the track department the road has used the electric arc for repairing switch tongues, frogs and mates, for filling up cup-outs and corrugations in rail and for filling up low joints in both straight rail and special work.

An interesting example of the application of the electric arc welding on this road occurred soon after the introduction of the process, when about 600 half gear cases which were taken from the scrap pile were reclaimed at a price not exceeding 50 cents each. The new value of these gear cases was about $4,000, so that the saving on the lot amounted to about $3,700. These gear cases could not be repaired by ordinary methods. To all intents they were scrap material, quite incapable of being reclaimed commercially until the introduction of the new process permitted patches to be welded over the holes worn through



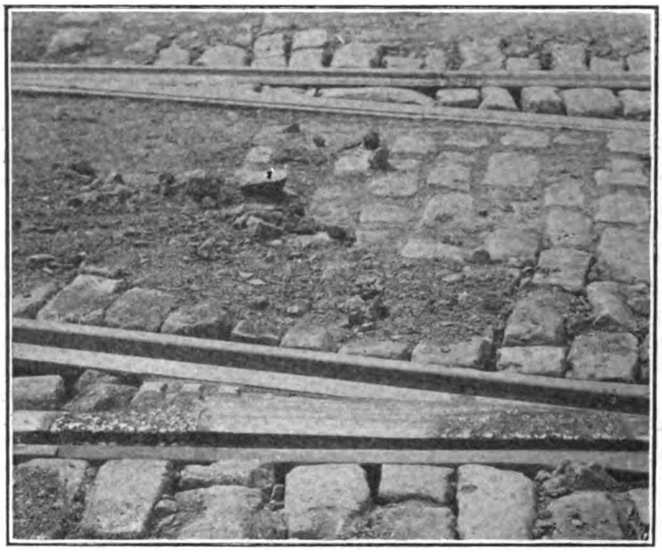
Electric Arc Welding—Different Classes of Car Equipment Repaired in the Shops of the United Railroads of San Francisco

the original metal. The use of a localized flame which could be directed around the edges of the patch regardless of its irregularity naturally made these repairs rapid as well as inexpensive.

In the car repair shop the ability of the electric arc to weld cast iron is the most surprising of its features, and this adds very materially to its sphere of usefulness. One of such pieces of repair work is shown in the accompanying illustration of various parts of car equipment reclaimed in the shops of the United Railroads of San Francisco. This is a cast-iron controller back which was broken into several pieces, but was welded together into its original form without the necessity for any further labor or machine work.

Electric Arc Welding—Cart Containing Resistance Grids for Use with Trolley Voltage

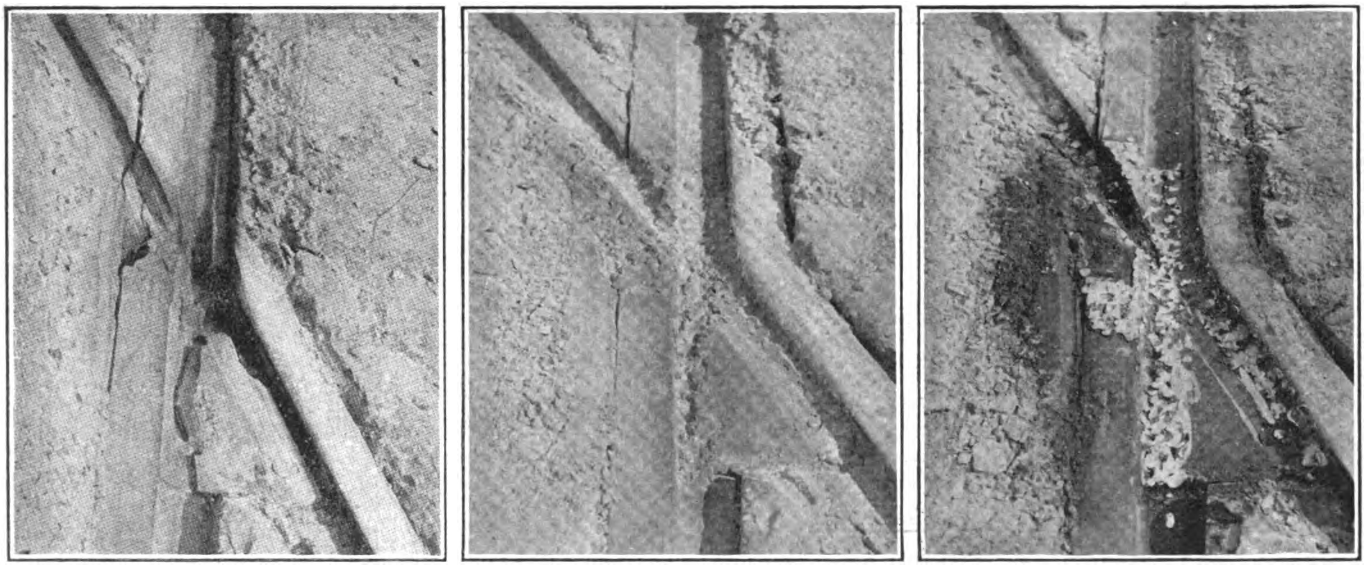
One of the illustrations shows the carriage for the resistance grids used for cutting down the trolley voltage where the current is collected from the trolley wire in order to make repairs to the track. Alongside of this illustration is another showing two cup-outs in the head of a typically worn rail, the photograph having been taken immediately after the welding operation and before the application of the grinder, which is used to grind the filled portion of the rail to a smooth surface even with the adjacent track.



Electric Arc Welding—Typical Built-up Cup-outs Before Grinding

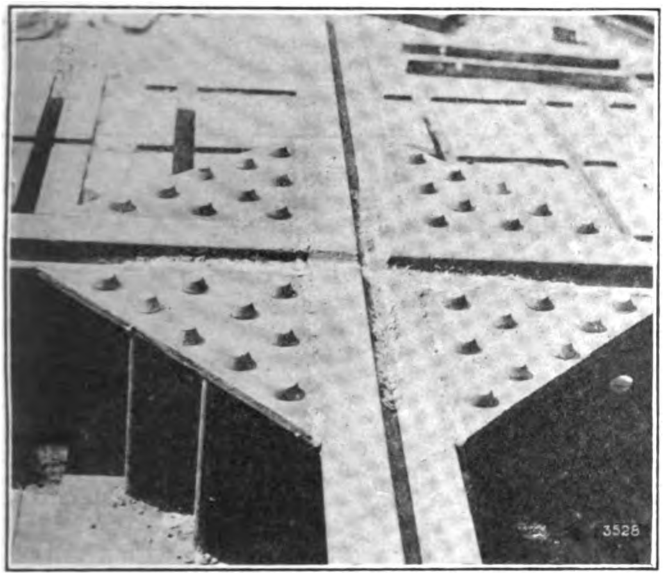
The three illustrations on this page show a badly broken piece of special work in the various stages of rehabilitation. At the left the joint is shown in its original condition before repair, and the adjoining two illustrations show the same joint immediately after welding and after the grinding of the built-up metal had been commenced. This was stated to be a somewhat difficult task for the reason that the frog was in such a worn-out condition as to be almost beyond reclamation. The railroad officials considered that in this case the frog might better have been replaced. However, it shows the really extraordinary possibilities of the process.

Of the two upper halftones on page 69, one is of a hardened center crossing which has been built up by the welding of additional metal both on the manganese plates where they had become chipped and also on the rail which had cupped out. The operation has undoubtedly prolonged the life of this crossing for several years. The other illustration shows an electrically welded built-up crossing in which no bolts or rivets have been used. The rivet heads which are on the corner plates are installed merely to keep horses' hoofs from slipping and do not enter in any way into the construction of the crossing.



Electric Arc Welding—Progress of Repairs to a Badly Worn Frog, Showing Its Condition Before Welding, After Welding and During Process of Grinding

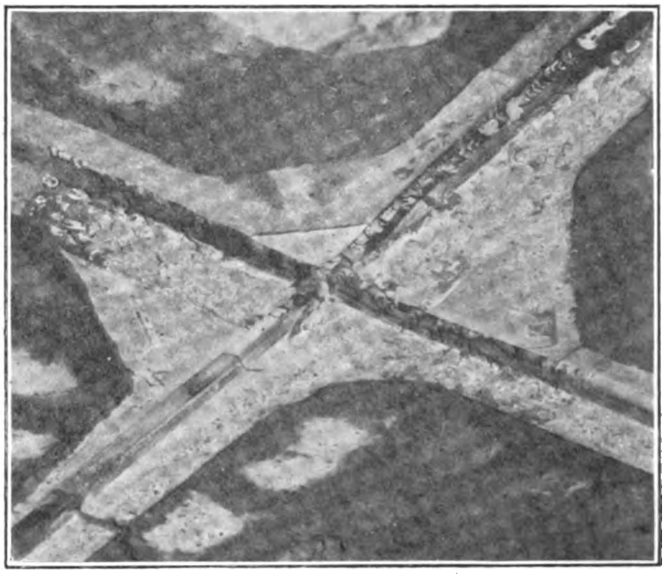
The two illustrations on page 70 show an electrically welded fishplate and bond which has been proved through actual service on the United Railroads of San Francisco to be able to withstand the severe stresses and strains of the heaviest city traffic. It is stated to possess greater conductivity than the usual bolted fishplate joint with copper bonds and can be made at a cost of from 40 to 50 per cent of that of an ordinary joint. The company has in service over 400 compromise joints, connecting rails of two different sections, and with this welded fishplate installed on them they have met with excellent success. The officials of the road feel that if the joint can withstand the severe stresses of the compromise joint it naturally should prove even more satisfactory for straight rail. The joint which is shown in place in the street was installed during February of last year, and in order to give it severe service the ties were left untamped. It is still in service and reported to be apparently in perfect condition.



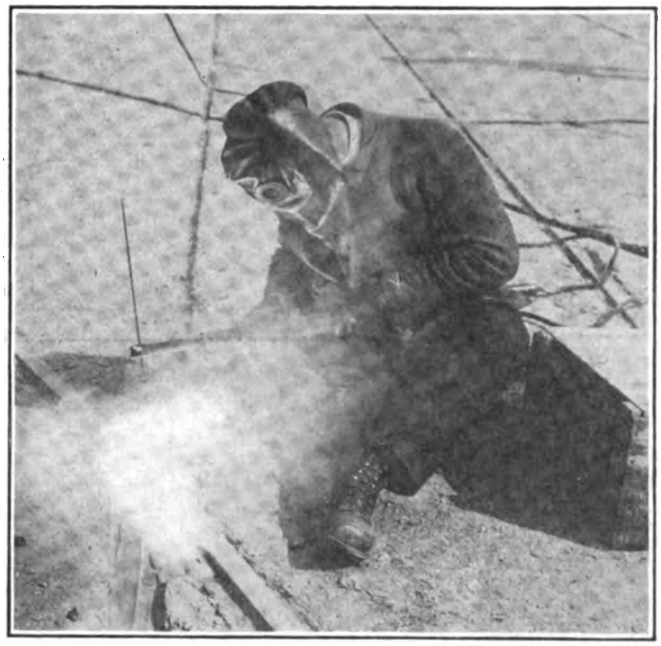
Electric Arc Welding—Built-up Crossing with all Joints Welded, No Bolts or Rivets Being Used

Electric Arc Welding—Apparatus Used for Applying the Arc

The other illustration shows a specimen test joint which had been suspended on 6-ft. centers under a load of 140,000 lb. applied to the head of the rail. After this application the rail was reversed and the same load was applied at the base of the rail. The final result of the reversed loads is shown in the photograph. The two rails when welded were close together, and the separation which is shown was caused by the elongation of the fishplates. The joint itself was found after this extremely severe test to be in perfect condition, with the exception of a very short space along the top of the plate where the elongation of the plate had broken the weld between it and the rail. This elongation of the plate is clearly shown by the patches of scale broken off from it on each side of the rail joint in the form of a roughly shaped triangle, and this would indicate that the plate had nearly reached its elastic limit. As the usual spacing between ties is 2 ft., the suspension of a specimen joint on 6-ft. centers provides an unusually severe test, and it is surprising that any joint could have withstood it with so little damage. On a tensile strength test of the joint a load of 380,000 lb. was reached without signs of rupture.



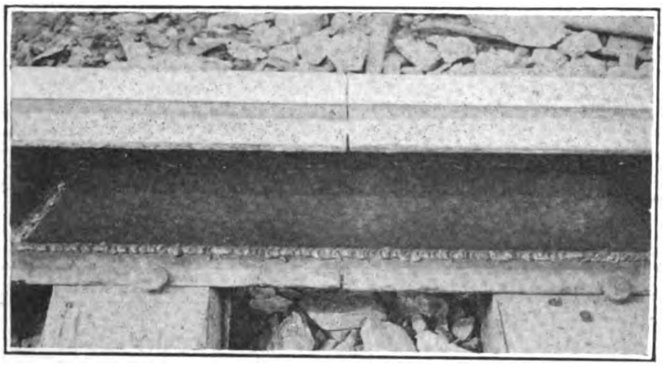
Electric Arc Welding—Hard-Center Crossing with New Metal Welded Onto Treads and Grooves



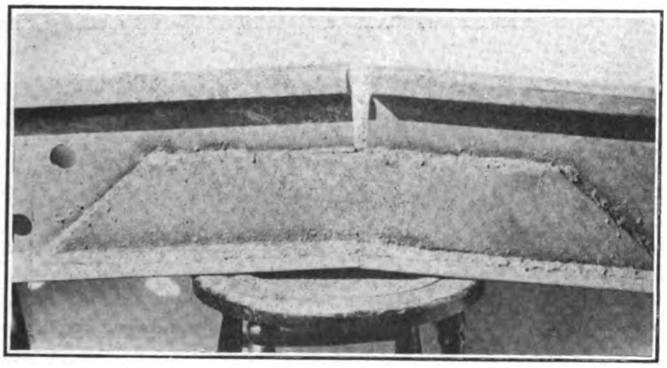
Electric Arc Welding—View Showing Apparatus in Use on Track Work

The officials of the United Railroads of San Francisco state that the welding can be done by any intelligent laborer after receiving reasonably thorough instructions, and that, in general, Greek laborers are being used for performing all the operations in the track department. In the repair shop the operators are developed from a similar class of labor for much of the work which is done.

On the Pacific Electric Railway Company a machine similar to those used in San Francisco was placed in service several months ago. This is reported to be kept busy almost all of the time since its purchase and is stated to have done exceedingly satisfactory work in building up cupped rails. It is stated to have prolonged the lives of crossings and special work from eight months to a year, and although there has been no occasion to use the machine on any manganese special work as yet, the operating officials consider that it will prove satisfactory for this service. It is in fact used at present to a considerable extent for cutting rails and boring holes in manganese steel. The operating cost to make a weld in a rail is reported to be approximately $3, Mexican labor being used, as it has been found that the apparatus does not require any special skill after the operators have been advised how to handle it.



Electric Arc Welding—Welded Fishplate Which Eliminates Necessity for Bonds



Electric Arc Welding—Welded Fishplate Joint After Test of Reversed Load of 140,000 Lb. with a 6-Ft. Span

This paper is indebted to Thomas Finigan, purchasing agent United Railroads of San Francisco, for the illustrations and the account of the work on that railway and to E. C. Johnson, assistant chief engineer Pacific Electric Railway Company, for the comments on its practice.

The mechanical department of the Metropolitan Street Railway, Kansas City, Mo., has decided to abandon all other methods of preparing exposed steel in car bodies for paint in favor of sand blasting. This method assures a complete removal of old paint scale, exposing a bright, pitted metal surface to which paint is sure to adhere. If compressed air is available, this is the cheapest of all methods.

ELECTRIFICATION PLAN OF THE CHICAGO, MILWAUKEE & PUGET SOUND RAILWAY

An important step in the electrification of the mountain divisions of transcontinental railroads between the Rocky Mountains and the Pacific Coast was made this week when President A. J. Earling of the Chicago, Milwaukee & Puget Sound Railway announced that that company expected to electrify its main line division from Harlowton, Mont., to Avery, Idaho, a distance of 440 miles. The electrification will be in operation within the next three years, and the number of electric locomotives required is estimated to be between 50 and 100. Nine separate water-power developments will supply the required energy for the full stretch of 440 miles, which traverses the Belt Mountains, Rocky Mountains and Bitter Root Mountains. No contracts have yet been placed, and no detailed plans have yet been made for the electrical equipment, but C. R. Goodnow, assistant to the president, in a recent interview, said that the plans in general provide for the handling of all of the traffic with electric locomotives and that probably the 2400-volt system will be used. Regeneration is being considered seriously and plans for the equipment and overhead construction are being pushed forward rapidly. The installation will be begun within eighteen months and the completion rushed.

Part of the railroad power will be supplied by the Great Falls Power Company, which has secured from the federal authorities for a term of fifty years the grant of a right-of-way across the public domain for a 150-mile transmission line. In fact, the first announcement of the proposed railway electrification was made through a statement by Walter L. Fisher, Secretary of the Interior, that this grant for a right-of-way had been made.

The grant embodies the fundamental principles of water-power policy which Secretary Fisher has been advocating for the past two years and the transmission line, in matter of fact, is already in operation, but it was built under a revocable permit issued in 1909. At that time no better right could be given for any power development, but the agricultural appropriation act of March 4, 1911, authorizing the making of fifty-year grants for transmission, telegraph and telephone lines, provides that the grants are to be made under general rules and regulations to be fixed by the Secretary of the Interior. The act further provides that old lines already constructed can have the benefit of the statute on like "terms and conditions" as new lines. In view of the importance of this application to travelers and shippers by rail, and in further view of the fact that only transmission lines, not water-power sites proper, are involved, Secretary Fisher felt justified in ruling that he has the power to grant the more permanent right obtained. The installation of the new system will involve the expenditure by the railroad of many million dollars and the railroad company was unwilling to invest so large a sum while the power company's rights were revocable in the discretion of the government. Therefore Secretary Fisher's grant is conditioned upon the power company's entering into and performing its obligations under a contract to supply electricity for the motive power of the railroad.

Energy at 110,000 volts and at 60,000 volts will be fed to the railroad company at eight different points on its right-of way, the minimum requirement for power being 25,000 kw and the maximum for the present 50,000 kw. Ultimately five stations of the Montana Power Transmission Company, three stations of the Great Falls Power Company and the station of the Thompson Falls Power Company will supply the load. The Thompson Falls Power Company is now constructing a 50,000-hp hydroelectric station at Thompson Falls, Mont., and the Great Falls Power Company has also under construction a 130,000-hp hydroelectric development on the Missouri, at Great Falls, Mont.

POWER PLANT EXTENSION FOR THE UTAH LIGHT & RAILWAY COMPANY

An instance of rapid power plant construction will be found in the extension to the Jordan steam station of the Utah Light & Railway Company at Salt Lake City, Utah, which was designed and constructed by Westinghouse, Church, Kerr & Company, constructing engineers, New York City. The original station was built in 1910 and consisted of an 8500-kw single-unit steam turbine station, designed to act as an adjunct to various hydroelectric plants operating in the vicinity and also to form the nucleus for such steam generating equipment as might be later required to serve Salt Lake City.

The new work, which consists of an extension to the old station, comprises in general a brick and steel building, approximately 100 ft. x 60 ft. The building walls rest on a pile concrete mattress composed of 36-ft. piles, overlaid with about 3 ft. of concrete. Condenser intake and overflow flumes are formed in the foundations. The boiler room consists of a steel frame structure supporting an overhead coal bunker with brick walls and concrete floor and roof. The turbine room is similarly constructed, the only steel, however, being in the crane rails, floor beams and roof trusses.

Utah Light & Power—General View of Salt Lake City Power Plant

Utah Light & Power—General View of Turbine Room Showing New 8500-kw Turbine

The new boiler equipment consists of six Stirling boilers and Roney mechanical stokers, supplied with natural draft by means of a radial brick stack 11½ ft. in diameter by 225 ft. in height. The boilers operate at 200-lb. pressure and 125 deg. superheat. The piping is thoroughly modern, designed with welded flanges for high-pressure work and cast-steel fittings and valve bodies. Valve seats, disks and spindles are of Monel metal, particular attention being given to providing for expansion and contraction in view of the high steam pressure and the superheat.

In this station it was not necessary to store coal in large quantities and the coal and ash handling equipment is comparatively simple. It consists of a track hopper into which coal is dumped from railroad cars and carried by an inclined bucket conveyor up to the top of the boiler house, where it discharges on a horizontal belt by which it is distributed through the length of the bunker over the boilers. Ashes are dumped from ash pits into side dump cars, which run on an industrial railroad in the boiler room basement, are lifted to ground level by an elevator and are run out by hand to dump on adjacent land which is being filled.

The new turbine equipment consists of one Westinghouse-Parsons unit of 8500-kw capacity running at 3600 r.p.m. and delivering current at sixty cycles, three-phase, 4400 volts. The unit is served by a Leblanc condenser placed directly beneath it in the turbine foundation, the condenser having turbine-driven air and circulating pumps. The main generator is provided with the usual air ducts for ventilation and is excited by a turbine-driven set of 100-kw capacity. General Electric switching apparatus is contained in concrete cells, and the ring type of bus is used to secure the desired flexibility in switching operations.

The construction of the extension and the installation of the equipment were carried out with unusual rapidity owing to the necessities involved by operating conditions. The extension to the plant was authorized on March 27, 1912, and completed on Aug. 26, 1912. Actual field work was commenced ten days after authorization, so that the time spent in actual construction up to the time when the new unit went under commercial load was only 142 days. The work described in this article was carried out under the direction of O. A. Honnold, electrical engineer Utah Light & Railway Company.

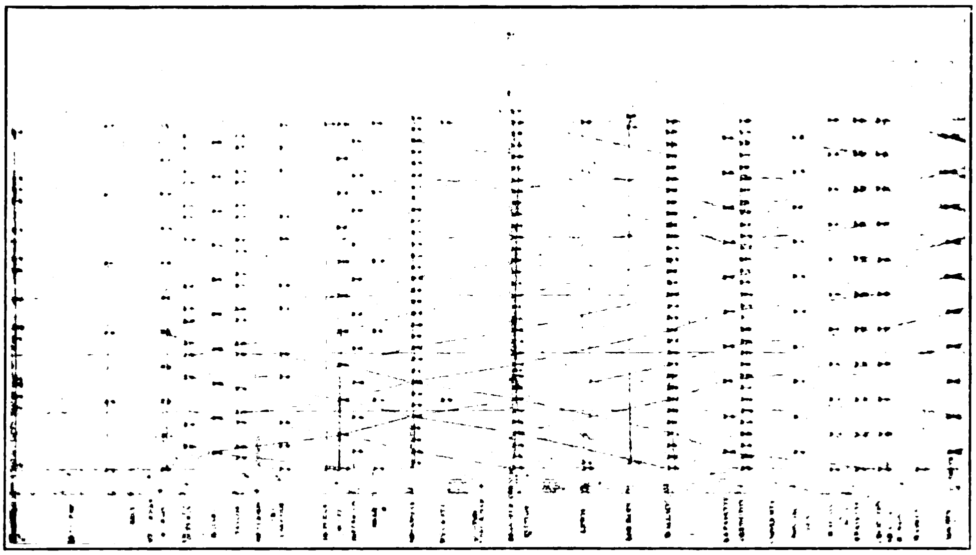
APPROVAL OF MELBOURNE ELECTRIFICATION

It is announced that the resolution providing for the electrification of the Melbourne (Australia) suburban lines, which was recently passed by the lower house of the Victorian Legislative Assembly, has now passed the Legislative Council, or upper house. The plan of Messrs. Merz and McLellan, providing for electrification at 1500-volt direct current, has therefore been approved. It is understood that the contract will be arranged as early as possible. The principal features of the approved report were published in the ELECTRIC RAILWAY JOURNAL for Dec. 14, 1912.

SCHEDULE BOARDS FOR CITY LINES

In the modern American city of 50,000 population and more the quality of the electric railway service rendered is measured largely by the regularity of the schedule. To facilitate the actual arrangement of a schedule or a number of schedules which interspace, the schedule board as described in this article has been introduced on the surface lines in the city of Fort Wayne, Ind. While the purpose and principle of the board were taken directly from the boards in use on many steam roads and some interurban lines, the application to city work, where the track lay-out is generally much more complicated, is comparatively new.

It has been found there that a well-designed board offers to the trained eye a graphical process in which every car will be portrayed, as well as its exact location at every moment during a trip, its relation to all other cars on the same route in both directions and its relation to all other cars on the same and parallel routes at switches, sidings, junctions and turn-outs. In fact, almost any desired condition relative to the car movements can be instantly and accurately determined. In addition to the car movements the exact car speeds can be determined at any point along the line. The schedule can be made to fit the track and traffic, lessened in some places and increased in others. Where single track plays an important part in the make-up of the schedule, the speed, delays and other conditions can be shown accurately. Lastly, the board can be used in an educational way to instruct inspectors, starters and even the carmen themselves how the running time is determined and what affects the time points which they know to be so important.



Schedule Board for Four Interspacing Routes, Showing an Hour's Run with 36 Cars

The experience at Fort Wayne shows that the following specifications are well suited for the purpose of such a board. It should be made of well-seasoned white pine or other soft wood, 1 in. to 1½ in. thick, depending on the outside dimensions of the board. It should be carefully joined and cleated on the back to prevent warping.

The height should be a direct multiple, to scale, of the longest route combination possible. In some cases where there are suburban lines much longer than this a second scale for such routes may be chosen. A good scale for a line length of 5 miles is ¼ in. to 100 ft. Where the length of line is greater than 7 or 8 miles, it is very desirable to have the track lay-out extend horizontally, as in the accompanying illustration, in which case the board can be made long with only the limits of the room as a determining factor. The length of the board depends upon the scale of time chosen. A good value, regardless of the maximum track length, is ⅜ in. to each half-minute space. For a sixty-minute board, the best one for most uses, this gives 45 in. of time space; and by adding to this the space required for the track lay-out, scales, street names, etc., a total length (or height if used the other way) of from 50 in. to 60 in. is established.

In laying out such a board the best results can be obtained with a ruling pen and inks on a flat white surface. After the lay-out is complete a number of thin varnish coats should be put on to complete the appearance of the board as well as to protect it. In preparing the track layout care should be exercised to be accurate and to show the location, diagrammatically if possible, of all points necessary to the make-up of the future schedules. In other words, all topographic conditions, factories and other points affecting operation should be shown.

The actual procedure of arranging any particular schedule by strings will be greatly facilitated if thumb tack plugs are used. These plugs are the ordinary brass furniture tacks used in upholstering, and if the receiving holes are of the proper size they can be most conveniently removed and re-inserted. The size of the hole should be slightly smaller than the shank of the tack and not over ⅜ in. in depth. The tack must fit the hole snugly but not so tightly as to cause difficulty in removal.

To determine the speed of a car at any point a series of slant lines are drawn close enough to each other to allow the operator to compare the slant of the string with the nearest series of speed lines. These speed lines naturally slant at an angle depending on the scale used. In other words, the speed slant is a function of the distance, vertically, and of the time, horizontally, or vice versa if the board is placed in the position shown in the illustration.

This paper is indebted for the suggestions printed above, as well as for the accompanying illustration, to C. E. Warwick and R. R. Ritchie, both of Fort Wayne, Ind.

REPORT OF THE BOSTON TRANSIT COMMISSION

The eighteenth annual report of the Boston Transit Commission, covering the year ended June 30, 1912, has been made public. It is a pamphlet of 218 pages, and reviews the work of the board in the period above stated, with special reference to the completion of the Boston connection of the Cambridge subway, the subways now under construction under Winter Street and in the Back Bay, and the extension of the tunnel and subway leases of the Boston Elevated Railway Company until 1936. A large amount of miscellaneous legislative matter, canvasses of bids, costs of work accomplished and reports upon transit bills is included in a lengthy appendix. The board had expended to the date of its report $19,120,207 in the construction of subways in Boston, including the Charlestown Bridge.

Work is actively in progress on the Boylston Street subway, which is to be a two-tracked structure about 1.9 miles long designed for large surface cars. It begins at an inclined entrance in the Commonwealth Avenue parkway, at Kenmore Street, and after passing under the Fenway district runs under Stony Brook conduit and Newbury Street to Massachusetts Avenue, and thence through city property to Boylston Street. It then continues in nearly a direct line in and under Boylston Street to Tremont Street. From this point to Park Street the precise location of the subway and its stations have not yet been determined. Other stations will be located at Massachusetts Avenue and Copley Square. At the lowest part of the subway the track level will be 19 ft. below mean low water of the sea and 27 ft. lower than the surface of the Charles River Basin.

An extension of the East Boston tunnel is now under construction. Under Court Street the grade of the tunnel is to be changed so as to run under the present Scollay Square station of the Tremont Street subway, with a station for the East Boston tunnel traffic at this point. Thence it will continue westerly to Bowdoin Square, coming to the surface near Chambers Street in the West End. A station in the vicinity of Bowdoin Square is contemplated, and the extension, although only 2300 ft. in length, will materially facilitate the entrance and egress of surface cars between Cambridge and Boston, and will permit, so far as required, the operation of through cars between East Boston and Cambridge. Still another important extension now under construction is that of the Boston connection of the Cambridge Main Street subway under Winter and Summer Streets to the South Station, and thence to South Boston and Dorchester.

COMMUNICATIONS

A REMARKABLE SERIES OF COINCIDENCES

Augusta-Aiken Railway & Electric Corporation
Augusta, Ga., Jan. 4, 1913.

To the Editors:

Quite accidentally I noticed the frequency of the figures 1 and 3 in connection with a big wreck we had at North Augusta at 3 a. m. on Dec. 29, 1912. There was no loss of life nor serious personal injury. After the first 13 was commented on as being the final figures on Car 25,213, I found a lot of 13's right on the spot. I send you a list I made out the other night, thinking it will have some interest for your readers. I also inclose a photograph of the wreck, just to let you know it was no insignificant affair. The express car was thrown on its side, down the road, a distance of 190 ft. All trucks were dismembered from the three cars, and they took all sorts of directions. The express car is back in the shop, but the steel gondolas are still in the canal they dug. A track has been built for them to the main line, and jacks are being used to elevate them to the level of the road.

Accident at North Augusta, S. C.

The two gondola coal cars were being shifted from Clearwater, S. C., to the Hampton Terrace Hotel, in that State. The train was handled by the following men: Charles Herron, motorman; Yeoman Padgett, conductor; Thomas Hawkins, colored, helper. Count the letters in each of the names:

Charles Herron.................................. 13
Yeoman Padgett.................................. 13
Thomas Hawkins.................................. 13
The year was 1912. Add those figures; result........ 13
Add the letters in the name of the State, South Carolina. 13
It happened Sunday morning. Count the letters in "Sunday morning"........................... 13
One of the coal cars had defective brakes. It was C. & O., No. 52,150. Get the result by adding the figures 13
The other coal car was C. & O., No. 25,213. Take from the five the last two figures, and you have.......... 13
Or, for amusement, add the figures in the number, 25,213 13
The smash-up was on twelfth, 29, 1912. Add the letters in the number of month and the digits in the dates.. 13
The cars jumped the track in front of the home of James U. Jackson. See if the letters in his name don't add up.. 13
The number of the express car which hauled the coal cars was 130. Cut off the cipher and gaze at beautiful 13
The coal cars chewed up thirteen cross-ties. Without purpose in so doing, except to get them out of the way, eight were sent to James U. Jackson and five to George Jackson 13
Just for fun, count the letters in the last name—George Jackson, at whose door the cars were demolished. Hush! 13
Take the middle figure from the conductor's badge number—123. Once more we get...................... 13
And what do you get if you take the final figures from the same badge number? Skiddoo!................ 23

George H. Conklin, Claim Agent.

RIVETED-WELDED JOINTS

Cleveland Railway Company
Cleveland, Ohio, Jan. 4, 1913.

To the Editors:

I note with interest the article in your issue of Dec. 21, 1912, on "The New Type of Joint for Baltimore." This heading is rather misleading. This is not a new type of joint, although I note in the article that you give a slight credit to me by saying that it is somewhat similar to the "Clark joint." This, of course, is practically so. However, there is nothing about this joint which we have not already developed. In fact, a saving could be made in this joint of about 2 lb. of thermit if the shape of the mold was changed. We found by experimenting, five years ago, that the bottom of the mold under the base of the rail should not be level but should be brought up to within ¼ in. of the base of the rail at the center. This allows the thermit steel to flow through this opening and heat the base of the rail as it flows by. This change would permit a saving of 2 lb. of thermit to each joint. We also undercut our rails by mitering them at the base three years ago.

Another criticism which I would make of the joint is the fact that the riveting is being done by hand, the rivets being backed up with a "dolley." I am very sure that the plates cannot be made as tight in this way as in our method of using a riveting machine which squeezes the rivets with a 100-ton pressure. Another improvement which we have made, but which is not mentioned in connection with the Baltimore joint, is that we drill our rails 3 1/32 in. from the center of the first hole to the second hole, and the other two holes are spaced 3 in. The joint bars are rolled from the same material as the rail, and the drilling is 3 in. to the center of the first hole and 3 in. from center to center of the remaining holes. This small difference of 1/32 in. in the drilling allows a drift pin to crowd the heads of the rail together.

Charles H. Clark,
Engineer Maintenance of Way.

Messages of the Governors

The Regulation of Public Service Corporations, Minimum Wages and Workmen's Compensation Measures Are Discussed

Legislative sessions are held in nearly all the states this year, and most of the sessions will be begun this month. Among the states where the sessions are now in progress are the following: New York, Massachusetts, Pennsylvania, Rhode Island, Connecticut, Oklahoma, Maine and South Dakota. Extracts from the messages of the Governors of all these states follow:

GOVERNOR SULZER OF NEW YORK

"The question of the conservation of the natural resources of the State, and their development and utilization for the benefit of all the people, is a matter of vital importance to our Commonwealth and demands the most careful consideration at your hands. We should favor the preservation of our forests by intelligent forestry legislation. We should protect our watersheds and utilize to the utmost our numerous rivers as they flow from the hills to the sea.

"To secure for those less accustomed to the competitive struggle protection that other workers have won for themselves through organization, we should carefully consider the establishment of wage boards with authority to fix a living wage for conditions of work below which standards no industry should be allowed to continue its operations.

"Another type of legislation beneficial to the state that aims to conserve human life and health is that which requires the use of safety appliances and establishes safety standards. Practical results of such legislation prove that these regulations are a good investment. Statistics prove that the welfare of the worker is indissolubly involved in permanent industrial progress."

GOVERNOR FOSS OF MASSACHUSETTS

"The railroad situation in New England, and especially in Massachusetts, is such as to cause the deepest concern. In this day and generation no public service corporation can prosper if it lacks public confidence. The continued hostility of the press and the public to the great railroad system upon which we depend is sure to lead to serious results. The situation to-day clearly demands something more than criticism. It behooves us to take fully into account the probability of the acquisition and operation of the railroad systems of the United States by the national government. We must do our part by providing adequate regulation in this Commonwealth to make national ownership and operation unnecessary. The only way to postpone national ownership of railroads and to retain in the Commonwealth the power to regulate our transportation system is to assert that power at once and to apply it without delay. I therefore renew my recommendation, that a powerful public service commission be created, armed with mandatory authority over the public service, so far as this is within the power of Massachusetts to control. This commission should have power to compel the adoption of an interchangeable mileage. It should enforce such train schedules as will provide convenient connections between trains at junction points. This commission should have authority to fix freight and passenger rates on an equitable basis, to examine and audit the books of all transportation companies at any time, and to hold the railroad corporations to a sworn statement of their current operating expenses and disbursements. It must have authority to order the construction of railroad extensions, side tracks and spurs wherever required.

"It is equally important that this commission should have power to supervise and force the electrification of all the railroads within the metropolitan area, and their connection through whatever tunnel system is required to unite our principal railroad and water terminals into a complete system, giving us adequate facilities for rail and deep-water connections. If you were to fail in this crisis to create a public service commission with mandatory power, this Legislature would fall under just public condemnation. It is your obvious duty to exhaust every means within your constitutional power to regulate our public service and to compel from its existing agencies the full discharge of their duty to the public.

"A second measure, by which the benefits of both private and public ownership may be secured, would be to enact a law providing that henceforth the Governor shall appoint a number or the majority of the directors of every corporation which owns, operates or controls a railroad in Massachusetts, proportionate to the mileage of that railroad in the State. Thus, if every state in which the railroad operates shall pass a like statute, the directors representing these states shall constitute a majority of the board of directors of the railroad. The act should provide further that the Commonwealth shall obligate itself to purchase at any time, at a price to be fixed by a court of competent jurisdiction, any share of stock offered to it for purchase, unless the Commonwealth shall at the time of said offer already have acquired and then hold shares of the capital stock of that corporation equal in proportion to the total capital stock to the proportionate representation of the Commonwealth in the majority of the directorate of that corporation. Also, the directors of any railroad shall not have the power to withhold the declaration and payment of any dividend that has been earned over and above a reserve for depreciation.

"Such a measure would accomplish directly every result which could be achieved indirectly through the condemnation, purchase and operation by the Commonwealth, or any other state, of every mile of railroad over which it has power. It would also preserve to the public every advantage of private ownership and management. It would not only be fair to the stockholders, but would benefit them."

GOVERNOR TENER OF PENNSYLVANIA

"I earnestly urge the early passage of a sane, sound, comprehensive and effective public utilities law, framed along substantially the same lines as that drafted by Attorney-General Bell, which failed of passage at the last session of the General Assembly. No doubt several bills will be introduced concerning this subject. I therefore recommend the early reference of all such proposed legislation to an active committee, which shall forthwith give intelligent consideration to the same, with a view of reporting to the Legislature the best of such proposed enactments, or, if deemed wise, a new or composite bill, which shall contain the best provisions to be culled from any or all of those suggested bills and from the field of such legislation in other states.

"I strongly urge the enactment of the workman's compensation bill, and the other related bills included in the report of the industrial accidents commission, without change in their essential features, and without delay, especially the bill regulating the employment of women and children.

"In my inaugural address I called attention to the necessity of the State exercising jurisdiction over the issuance of obligations by public utility corporations, to the end that such obligations should represent actual value. I renew that recommendation, with the further recommendation that every corporation, company, copartnership or association, organized, proposed to be organized, or which shall hereafter be organized, within or without this State, whether incorporated or unincorporated, shall not be permitted to sell, or negotiate for the sale of, any bonds, stocks or other evidences of property or interest in itself or any other company, unless subject to regulation and supervision by the proper departments of the Commonwealth, to the end that such securities shall represent actual value only.

"An enlarged application of the water policy already begun by the State, through the co-operative relationship of the Department of Health and the Water Supply Commission, is one of Pennsylvania's greatest needs."

GOVERNOR POTHIER OF RHODE ISLAND

"Public regulation of the public utilities in Rhode Island had been undertaken none too soon, and the efficiency of such regulation should be maintained by vesting sufficient power and authority in the commission to enable it to achieve the results for which it was created. The rates charged for the service rendered by the various utilities are now matters of record with the commission, but with no authority to inspect their securities or to make a physical valuation of their properties, the commission finds it difficult to determine whether or not the rates charged are just, or such as would be warranted to insure a fair return on the capital invested. Provision for such physical valuation of the property of all public utilities operating in the State, and also for the inspection of their securities by the commission, should be made by an amendment to the present law. The commission also should have the power of prescribing proper and uniform accounting methods, and of requiring, from all companies under its jurisdiction, reports of operating expenses and financial and other data. Provision should be made in the law for the appointment of experienced men to act as inspectors of the equipment of steam and electric railways, and of the gas and electricity supplied for public consumption. The most important need, however, is some provision for the physical valuation of utilities and the inspection of their securities, and the General Assembly should enact an amendment to the present law containing such provision.

"I recommend the passage of an amendment to the workmen's compensation act, requiring employers to report all accidents in their several establishments to the commissioner of industrial statistics, immediately after each accident has occurred, upon blanks to be furnished by the commissioner, and also to make to him a further statement as to the settlements made in all such cases, in order that the State may be fully informed as to the benefits which accrue as a result of the law."

GOVERNOR BALDWIN OF CONNECTICUT

"The results attained by the Public Utilities Commission have fully justified the expectations of those who contributed to its creation.

"A commission appointed pursuant to an act of the last General Assembly to consider, among other things, the expediency of adopting a workmen's compensation act has agreed on a bill for such an act, the passage of which it unanimously recommends. The scheme is to place the administration of the remedy mainly in the hands of four commissioners, with an annual salary of $5,000 apiece and a very moderate allowance for expenses.

"I think three commissioners could do all the business, and that a salary to each of $3,500, with an allowance of not exceeding $1,200 for expenses, would be more advisable than a salary of $5,000 and the allowance for expenses recommended by the commission of not over half that sum. With such changes in these respects as you may think desirable, I should recommend the enactment of the bill."

GOVERNOR BYRNE OF SOUTH DAKOTA

"I believe that the time has come when all public utilities should be brought under control of the Board of Railroad Commissioners and it be given the powers and duties of a general public utilities commission and charged with the duty of regulating service and charges. The basis of successful regulation and control must be the physical valuation of the property in use, the determination of proper standards of equipment as to kind, quality and construction, and an accurate system of accounting to show the gross earnings and the necessary and proper expenses and thus the net income. For this purpose the board should have a competent engineer and expert accountants and the question of proper regulation and control be taken up broadly, comprehensively and with a view to permanent results, Considerations of economy should be kept in mind and the utmost care exercised in appropriating public funds, but it is to be remembered that it would be false economy indeed to fail to put this board in a position where it can accomplish the important work there is for it to do in securing good and efficient service from the public service corporations doing business in the State and saving to the people large sums in rates and charges. The board recommends the enactment of a law requiring the railways to report annually their gross receipts and disbursements at each station in the State. This is a matter of importance, and I especially urge it upon your attention. In this connection I call your attention to the recommendation of the Attorney-General for the enactment of a law providing for appeal from the Board of Railroad Commissioners to the Supreme Court of the State, direct. This recommendation of the Attorney-General relates to an important matter regarding the enforcement of orders of the Board of Railroad Commissioners and should receive your careful attention."

GOVERNOR CRUCE OF OKLAHOMA

"I recommend that you give to the people a law upon the subject of workmen's compensation, framed with the view of dealing out absolute justice to the employer and employee alike, based upon the experience gained from other states in the Union that have adopted such a measure."

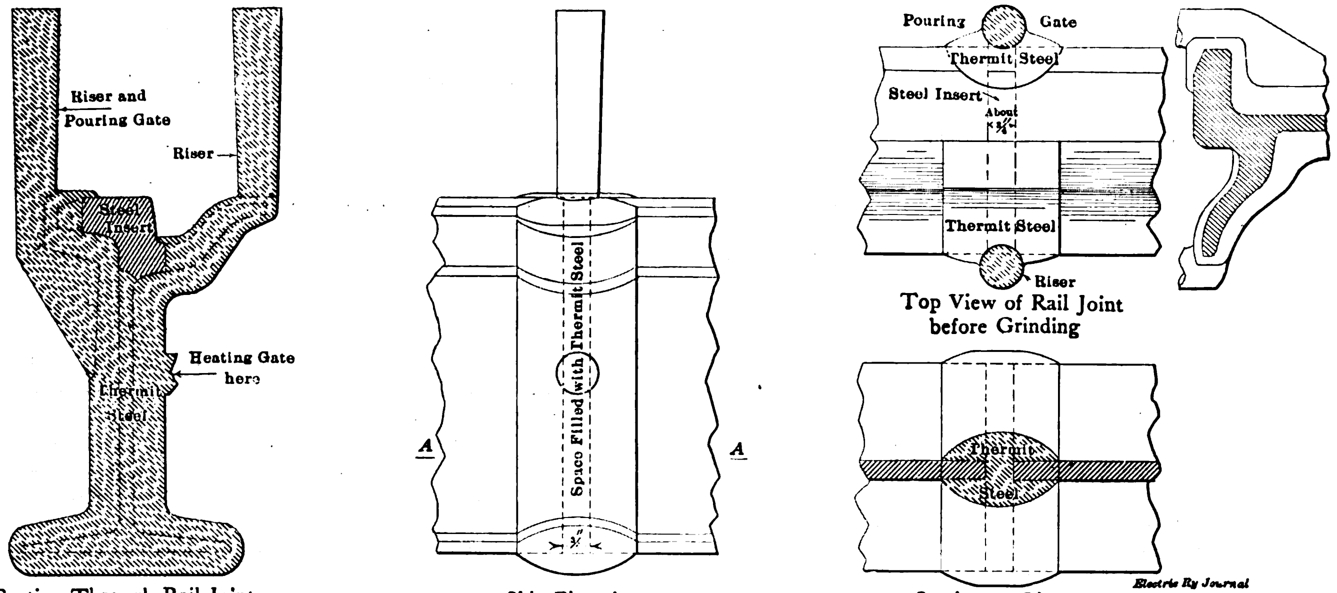
GOVERNOR HAINES OF MAINE

"We now have nearly 80,000 wage-earners in the manufacturing plants of the State. Under the rules of the common law now in force in this State, the employer is bound to provide a reasonably safe place in which to work, reasonably safe tools and machinery, to be reasonably careful in hiring competent fellow workmen, and to make proper rules for doing work. Under modern conditions these rules work much hardship and injustice to the wage-earner. Placing the liability for accident upon the employer only in cases where his negligence is established, under these rules, leaves the employee in a hazardous and uncertain condition as to maintenance and support when injured. Under modern manufacturing conditions these rules of the common law can but result in great injustice. That we have outgrown this system in Maine cannot be denied. I believe it to be your duty to pass a workmen's compensation law such as will place our State abreast of other states, for the protection of our wage-earners and the insuring of friendship and a feeling of mutual interest and dependency between employee and employer.

"The question of reasonable regulation and control of persons and corporations furnishing public service of different kinds to the people of our State is one uppermost in the public mind to-day. While our statute contemplates some regulations in some cases in these matters, and the common law undoubtedly clothes our court with such authority, there is no easy and practical way for the average citizen to get at this question; and the public seems to feel that such a means should be provided. I believe that the time has come when a public service commission or court should be established for this purpose. Such a court could do the work which is now done by the railroad commissioners. It may also be vested with authority in the matter of the issue of stock and bonds of corporations, which would tend to give confidence and encourage the investment of capital in new enterprises in our State. I recommend its establishment, with proper authority for the regulation and control of the public service business of the State."

A SIMPLIFIED FORM OF THERMIT RAIL WELDING

After considerable experimental work, the Goldschmidt Thermit Company announces that it has devised a successful method for welding the entire rail section without incurring the risk of changing the composition or wearing qualities of the steel in the head of the rail. In the method of welding used until recently a space of ¾ in. was left between the rail ends. This space was filled with thermit steel, which also flowed around the rail at a temperature sufficient to melt the sections with which it came in contact and to amalgamate with them to form a homogeneous mass when cooled. Although this method proved satisfactory, it involved much preliminary analysis of the rail steel to determine the amount of alloy, such as chromium or nickel, which would have to be added to the thermit in order to produce a steel of the same wearing quality as the steel in the head of the rail. The new method is a modification of the one just described and also of the procedure for thermit rail welding followed in Europe.



Section Through Rail Joint after Pouring

Side Elevation

Top View of Rail Joint before Grinding

Section on Line *AA*

Sections and Elevations Showing Combination of Thermit Welding and Insert for the Head of the Rail

In Europe butt welding is most generally used. The reason for two thermit rail-welding methods is, of course, the fact that abroad the high-carbon rail (0.65 per cent to 0.08 per cent carbon) is an exception, whereas American rails sometimes contain as much as 0.95 per cent carbon. A low-carbon rail adapts itself very easily to a butt-welding process. The rails are lined up on temporary ties, and a special patented clamping apparatus is adjusted on the rails. An opening is left between the rail ends sufficient to introduce a circular ratchet file. With this the ends of the heads of the rails are very carefully filed to parallel surfaces. The ratchet is then removed and the rails are drawn together by means of the clamping apparatus. The heads of the rails are preheated by a small charcoal furnace, after which the molds are applied quickly. The thermit is then ignited in the crucible, and the thermit steel is tapped into the mold, fusing and forming a collar about the base and web of the rail, while the slag runs over the head. A further addition of thermit is next made and is directly ignited by the heat of the slag, so that the rail head is thus brought to a welding temperature. This takes about four minutes after the pour has been made. The powerful clamp is then again brought into operation, and the heads of the rails become butt-welded. Several modifications of this method, of course, are also used for special cases.

As the American practice has been to weld the whole section with thermit steel, the difficulty was in providing for the welded head a composition which would wear equally with the original rail steel. After considerable testing the following process was developed:

A ¾-in. piece cut from the same rail section as the one to be welded or from a rolled section of the same composition and of the shape shown in the accompanying drawing is introduced between the ends of the rails. Although this insert is cut to fit closely, its retention of its position between the ends of the rails is insured by the process of preheating, which, of course, expands the abutting rails. No clamps are used, as their functions are performed by a thermit weld on the outside edge of the ball of the rail and by another weld on the lip. These welds are made in one operation. The force due to the shrinkage of the two welds compresses and butt-welds the white-hot rail ends to the insert. It should be noted that the usual thermit weld of the base and rail has been retained. From the foregoing description, it is evident that as no part of the wearing surface is replaced with thermit steel, there is no further need for special alloys, chemical analysis of the rails or other preliminary work.

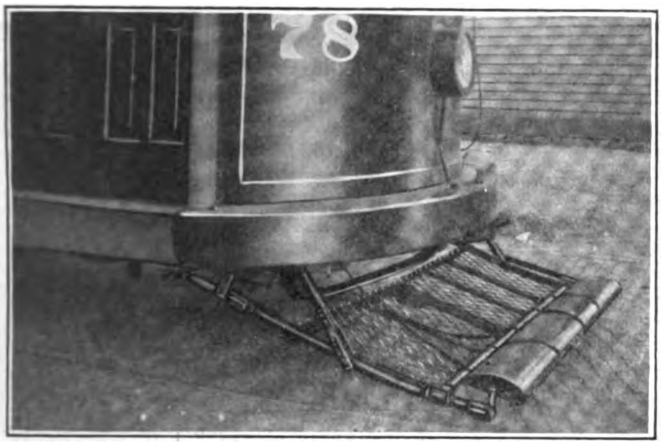
The improved method has been found to result in an absolutely continuous running surface of the same composition and hardness as the rail itself. Furthermore, it gives a joint which is stronger than the rail and has but a slightly greater mass of metal at the joint than elsewhere along the rail. The slight extra cost of using the insert is balanced by a decrease in the amount of grinding required to finish off the rail surface with the Goldschmidt Thermit Company's special grinder.

As the physical principles of the new method of welding may not be entirely clear, the following demonstration may be of interest:

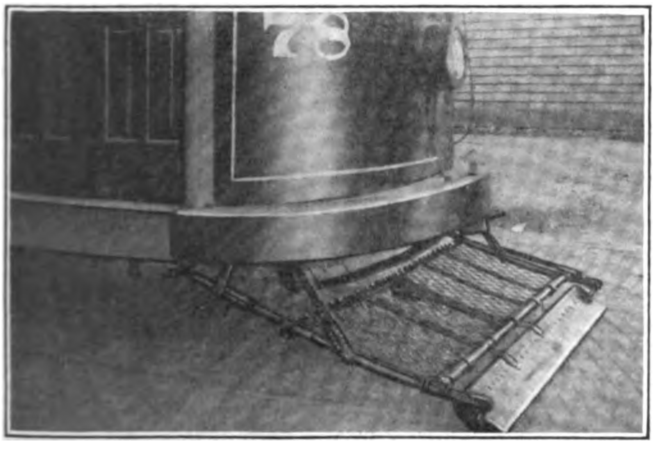
Assume that the rails are 30 ft. long and that the contraction is taken up locally in this rail length. Then the total tension put in the rail by the contraction strain due to the welded joint would under good track conditions be about 10,000 lb. per square inch. This strain, however, is distinct from the secondary strain which is set up in the added metal surrounding the insert. If with a ¾-in. gap the steel is made molten for a distance of 1½ in. (the molten steel contracting about 3/16 in. to the foot), there would be a contraction of 1/50 in. in this distance, and in the distance of the insert, ¾ in., there would be half of this, or 1/100-in. If a modulus of elasticity of 30,000,000 is assumed and the insert is considered cold, the strain produced on this insert would be more than 400,000 lb. per square inch, which force would, of course, rupture the joint. That the joint does not rupture and develops its full strength is proof that the larger part of this strain is taken up in the upsetting of the insert, which, owing to the preheating and to the added heat from the thermit steel, is brought to a welding temperature and is, of course, welded during this upsetting.

A NOVEL DISAPPEARING FENDER

The Fonger Fender Company, Chicago, has placed on the market a new type of projecting fender which has several unique features. The illustrations show this fender in three different operating positions as installed on one of the cars of the Union Electric Company, Dubuque, Ia. The most unusual feature of the fender is a tilting shield at the lower end of the basket which, upon coming in contact with an object on the track, automatically overturns and serves as a scoop in picking up the object encountered.



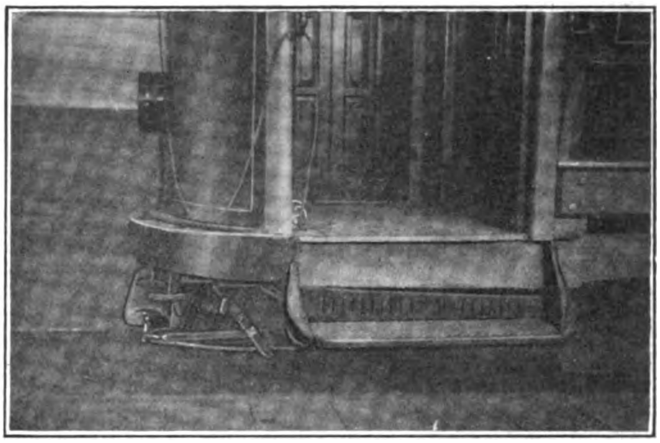
Disappearing Fender—View Showing Fender in Normal Position with Scoop Held Up by Trigger



Disappearing Fender—View Showing Fender with Scoop Tilted

In its operating position the fender projects less than 2 ft. beyond the bumper, and it is so attached to the car by pivoted hanger rods that it may be swung out of the way beneath the car when it is at the rear end.

One of the greatest advantages claimed for the new type is that it can be easily released from the operating position by the motorman and swung back under the platform of the car when a collision with a vehicle or other inanimate body is unavoidable. Its position is, in fact, governed by the judgment of the motorman, as a foot lever and chain enable him to set the fender in operating or carrying position at will. The position of the scoop, however, is governed by a trigger spring which holds it in the normal operating position. After it has been tripped it is necessary to reverse the scoop and set the trigger by hand. The fender is constructed entirely of steel with the exception of the scoop, which is made of oak incased in sheet steel.



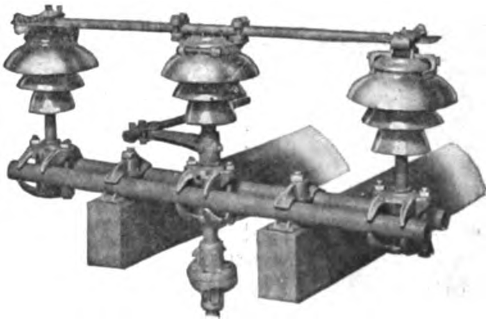
Disappearing Fender—View Showing Fender in Concealed Position

POLE-TOP DISCONNECTING SWITCHES

Pole-top switches are coming into wider use as the sole switch equipment of the high-voltage side of outdoor substations. Such switches should be made so as to open all poles at once from the ground, in order to insure the safety of the operator. As made by the Electrical Engineers Equipment Company, of Chicago, Ill., they can be obtained in single, double, triple or four-pole types of either the single-break or double-break feature per pole, as well as with the combination of these features for use in connection with fuses.

A single pole of a 30,000-volt, 150-amp pole-top switch of the double-break type is shown in the first illustration. The contacts are of the flexible, self-aligning type. The switch is furnished so that it can be locked in either the open or closed position as desired. This style of switch, when equipped with discharging horns, can break considerable loads.

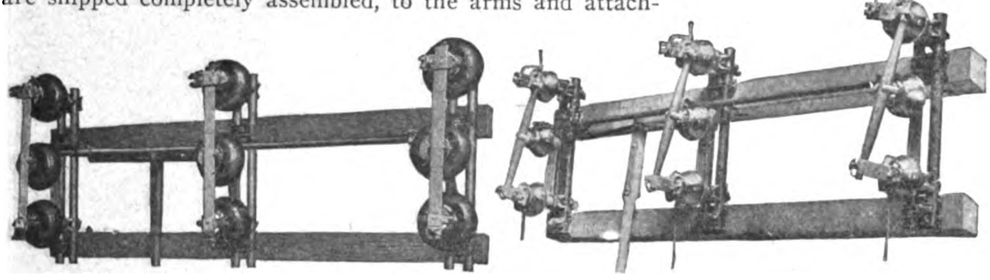
A triple-pole, 22,000-volt, 100-amp pole-top switch of the single-break type is shown in the second view. This style of switch can readily be mounted either vertically or horizontally, since the control handle adapts itself to either mounting, as well as at either the center or the end of the switch as desired. The switch illustrated in this view is not equipped with fuse tubes or fittings, but can be so furnished if required.



30,000-Volt, 150-Amp Pole-Top Switch of Double-Break Type

The third illustration shows a triple-pole, 15,000-volt, 100-amp combined switch and fuse, the usual switch blade in this type being supplanted by a hickory tube, boiled in linseed oil, dried and then varnished. The hickory tube contains the fuse, which is readily renewable. The switch and control handle can be mounted in a manner similar to that described above.

All three types of pole-top switches have been so designed that the work required for installing them is of the simplest nature, consisting of bolting the switch units, which are shipped completely assembled, to the arms and attaching the control. The switches are built with clamped pipe arms and are capable of adjustment in every way, thus affording a rigid construction readily adaptable to standard pole line framing. It is only necessary for the user to furnish the required pole and cross-arm work.



22,000-Volt, 100-Amp Pole-Top Switch and 15,000-Volt, 160- Amp Switch and Fuse

Of the many uses to which switches of the pole-top type have been put, the most usual are opening branch lines, disconnecting transformer banks, diverting energy past substations when installed upon the roof, disconnecting portable substations from high-tension lines of electric railways, and as line sectionalizing switches.

CITY CAR WINDOW-GLASS TEST

The service obtained from car window glass has received little attention from electric railways, yet window glass is a continued source of expense. This expense is not only attributable to glass renewals, but broken glass often results in personal injury claims. It is also practically impossible to obtain perfectly clear glass of a uniform thickness for cab windows, where clearness is especially desirable and when the glass must stand severe wind strains. Another desirable feature is that if the glass has these qualities it must also withstand the sandblast action of dust and remain perfectly clear as long as it lasts.

In 1910 a large street and interurban railway system in the Central West received forty-four double-truck, closed-type cars from the Cincinnati Car Company. The specifications covering this rolling stock required that the cars be glazed with a special quality of imported blown glass. The master mechanic had heard of the advantages claimed for this material but wanted to verify the claims to his own satisfaction. After these forty-four cars had been in service for some time his attention was called to the almost negligible amount of breakage, as compared with cars glazed with ordinary double-strength glass, as well as to the clearness of the glass after considerable service. On receipt of this information forty-four more cars of the same design were selected and glazed with the ordinary double-strength cast glass. To make the test conclusive these cars were operated along with the new ones so that service conditions would be exactly similar.

TABLE SHOWING THE COST OF GLASS REPLACEMENT DURING A YEAR'S TEST

Ordinary Double-Strength Cast Glass Broken. Forty-four Cars

No. Pieces	Size	Cost	Labor Resetting	Total Cost
34	14x38	$6.12	$8.50	$14.62
2	18x30	.38	.50	.88
44	18x36	10.56	11.00	21.56
9	20x36	2.34	2.25	4.59
444	24x24	92.00	111.00	203.00
9	24x26	1.97	2.25	4.22
84	24x30	21.25	21.00	42.25
37	24x38	12.95	9.25	22.20
2	26x30	.55	.50	1.05
2	30x30	.64	.50	1.14
37	30x36	14.80	9.25	24.05
Totals.. 704		$163.56	$176.00	$339.56

Imported Cylinder-Process Blown Glass Broken. Forty-four Cars

No. Pieces	Size	Cost	Labor Resetting	Total Cost
8	10 x24	$2.21	$2.00	$4.21
2	10 x28⅝	.66	.50	1.16
5	11¼x38	3.15	1.25	4.40
2	16 x33½	1.07	.50	1.57
5	18 x23½	3.10	1.25	4.35
5	18 x35⅝	4.27	1.25	5.52
1	21¼x23½	.71	.25	.96
5	22½x38	7.70	1.25	8.95
26	23⅓x24	20.30	6.50	26.80
6	28⅝x34⅝	8.72	1.50	10.22
Totals.. 65		$51.89	$16.25	$68.14

The mechanical department had had previous unsatisfactory experience with polished plate glass, and it was not considered in this test, as it had been found to cost more than the double-strength or the blown glass, and did not give the desired strength in service tests with interurban equipment.

The service tests from which the accompanying data were collected extended from Jan. 1, 1911, to Dec. 30 of the same year. The difference in the sizes of glass used, noted in the column containing this information, was due to the fact that a stock of one kind of glass was on hand, while the other was purchased to size. The stock of double-strength glass consisted of approximate sizes for general use, it being considered better economy to keep approximate sizes and cut to fit rather than pay interest on the large stock required to supply renewals for the large number of cars in service. The blown glass was purchased in two thicknesses, 5/32 in. for areas under 5 sq. ft. and 3/16 in. for areas more than 5 sq. ft.

	Double Strength	Blown Glass
First cost of total glass per car, plus replacement per year	$19.10	$44.35
Weight of total glass per car, lb.	361	495
Average cost of replacement per car per year	$8.41	$1.69
Interest on investment, at 5 per cent. per car per year	1.36	2.30
Cost of hauling, at $0.05 per lb. per year	18.05	24.75
Total cost	$27.84	$28.74

Although the first cost of the blown glass was about three times that of the double-strength, the saving made in cost of renewals at the close of the test was 80 per cent, or $271.42 for forty-four cars. In addition to the saving in money the blown glass which remained in the cars gave no evidence of any sand-blast action, which could be seen very plainly in the double-strength cast glass.

Before drawing definite conclusions as to the economy to be obtained in changing to the higher priced glass, the question of car weight reduction and cost of hauling was investigated. It was found that when cost of replacement, interest on investment at 5 per cent and cost of hauling at $0.05 per pound per car per year was considered, the total cost of the special glass was $0.90 per year in excess of the double-strength glass. This small difference could not be considered to offset either the charges coming from the claim department due to broken glass or the advantages of the clear condition of the blown glass after long service. Another item which had to be taken into account was the time consumed in selecting perfectly clear double-strength glass of a uniform thickness for vestibule sashes. In view of these indirect savings it was decided that the special glass would be more economical and should be adopted as standard.

News of Electric Railways

Pacific Electric Railway Development Plans

Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., has addressed a letter in part as follows to the Public Utility Commission of Los Angeles in reply to the letters from the commission published in the ELECTRIC RAILWAY JOURNAL for Jan. 4, 1913, page 48, recommending the addition of cars for use in the city:

"This company has the following equipment, due in Los Angeles, according to the latest advices from the factories, in January or February: Forty-five interurban cars, latest improved type, similar in general design but seating eight more passengers than our present Pacific Electric Railway interurban cars; ten center-entrance, all-steel type, seating fifty-two passengers, suitable for short suburban runs; ten pay-as-you-enter, end-entrance type, seating forty passengers, our present standard city type. We have also ordered for delivery within six months twenty center-entrance stepless cars, similar to type in use in New York City. As soon as these cars are received and we determine whether they are satisfactory we will order an additional thirty, or if we evolve a better type, will order thirty of the latter.

"Further, we are about to order twenty long-distance interurban cars, superior, we think, to any interurban cars heretofore designed, for use on long-distance runs, which we expect to have by the time our line is completed from Los Angeles to San Bernardino and Riverside. Within ninety days a further order of twenty-five interurban cars similar in type to those we expect to receive during the next two months will be placed. The cost of the above equipment will be about $1,600,000. The foregoing does not include any of the investment in new electric locomotives and freight cars which we are ordering or have recently ordered. I trust this will satisfy you that we are keeping abreast of the progress of Southern California. The Pacific Electric Railway is trying so to do in the matter of new extensions, of adding to its equipment and in the reconstruction and betterment of existing tracks through replacing light rail with heavier rail, ballasting tracks, etc.

"Our earnings show that during the first five months of the present fiscal year beginning July 1, compared with the corresponding months of last year, we have been providing 4.4 per cent greater car mileage than has been the increase in our revenue—in other words, on the whole, we are giving 4.4 per cent greater accommodation for the same number of passengers. With the Pacific Electric Railway the difficulty is not so much one of car shortage as it is one of street congestion, and your board is quite familiar with the co-operative efforts of the city and of the railway made during the last six or eight months to work out this problem. Increasing the number of cars will not aid materially if they cannot be got through the streets promptly at rush hours, but I am hopeful that the use of San Pedro Street will materially lessen this rush-hour congestion.

"However, this is not a measure of permanent relief, and that can be secured only by the co-operation of the city through liberal franchise provisions in connection with interurban railways on private rights-of-way which will justify the exceedingly heavy investment necessary to make and keep easy of access to the business heart of Los Angeles the surrounding territory within the radius of Pacific Electric Railway service. Indeed, with such co-operation from the city, I think we may reasonably expect the territories so served to be with Los Angeles one great urban and suburban community. So fully has this subject been discussed that it is perhaps hardly necessary again to point out that if the electric railways serving Los Angeles and the surrounding territory are to be enabled to promote and keep pace with the growth of this city and its tributary country, the policy of the city toward investments made and yet to be made must be one that will assure protection since the railways must, in securing their funds, compete with all other forms of possible investment and they will be able to secure funds in such competition only as they, in proportion, can demonstrate assurance of safety for the investment and a fair return thereon to the investor."

Re-routing Plan in Operation in Cleveland

Under the re-routing plan put into operation at Cleveland, Ohio, on Jan. 1, 1913, the interurban cars were forced to stand on Prospect Avenue while awaiting passengers for their regular trips. This was found to be very inconvenient for both the companies and the passengers, and Street Railway Commissioner Witt has consented to permit the cars to stand on Champlain Street, which is nearer the Public Square. In departing from the city the cars are routed over Superior Avenue for a short distance to pick up passengers who do not desire to go to them on Champlain Street.

Mr. Witt states that fifty new motor cars will be in operation within a few months. It will not be long until the company will have 1200 cars in operation.

Express cars have been put into operation on the Clifton Boulevard line. After leaving the business section of the city they make few stops until they reach the section of the city where most of the passengers reside who patronize the line. Passengers pay their fares as they leave the cars. They enter at the front door and leave by way of the rear platform. In that way it has been necessary to make only a slight change in the location of the fare box.

The Electric Depot Company has purchased about three acres of land fronting on Eagle Avenue and East Ninth Street, in order to be prepared for the increasing package business and the electric freight business, if the interurban lines finally take up that branch of transportation. This will depend upon the action of the City Council in regard to granting the right to haul freight cars over the tracks of the local company. It is believed, however, that some arrangement will be made to that end. The depot company will not make any additions to its buildings now, but will hold the land in readiness for future use.

The G. C. Kuhlman Company, Cleveland, was the lowest bidder on the fifty new motor cars that are to be built for the Cleveland Railway.

It is said that the actual surplus from operation for December, 1912, will be between $6,000 and $8,000, while the franchise surplus will be about $25,000. The total receipts for the month are about $575,000.

Public Hearings on New York Subway Operating Contracts

The Public Service Commission for the First District of New York has concluded its conferences with the officers of the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company over the terms and conditions of the proposed operating contracts for the dual system of rapid transit, which is to cost more than $300,000,000. The law requires that public hearings shall be held on such contracts before they are executed. Accordingly the commission has called for public hearings as follows:

On Jan. 14 at 10 a. m. on the proposed contract with the Brooklyn Rapid Transit Company for the construction by the city, with a contribution by the company, of the Broadway and Centre Street Loop subways in Manhattan, a tunnel under the East River and the Fourth Avenue Subway and its extensions, and the Eastern District subway in Brooklyn, and for the operation of such lines in conjunction with the existing elevated railroad system of the Brooklyn Rapid Transit Company.

Jan. 14 at 2 p. m. on the proposed contract with the Interborough Rapid Transit Company for the construction by the city, with a contribution by the company, of the Lexington Avenue and Seventh Avenue subways in Manhattan, the Steinway tunnel, a new tunnel under the East River to Brooklyn, and the Eastern Parkway and its extensions in Brooklyn; also for the construction by the city of the Corona and Astoria rapid transit lines in Queens, for operation by both companies.

Jan. 17 at 10 a. m. on the proposed certificates to the Interborough Rapid Transit Company and the Manhattan Railway for the right to construct and operate certain extensions to and third-tracks upon existing elevated railroads in Manhattan and the Bronx.

Jan. 17 at 2 p. m. on the proposed certificate to the New York Municipal Railway Corporation (Brooklyn Rapid Transit) for the right to construct and operate third-tracks upon existing elevated railroads in Brooklyn and Queens.

Jan. 18 at 10 a. m. on the proposed certificate to the New York Municipal Railway Corporation for the right to construct and operate certain extensions of existing elevated railroads in Brooklyn and Queens.

After these hearings are held the contracts and certificates will be put in permanent form, adopted by the commission and transmitted for approval to the Board of Estimate and Apportionment, after which they will go to the companies concerned for acceptance and execution.

The Public Service Commission for the First District has received the report of the commissioners appointed by the Appellate Division approving the Whitehall Street-East River-Montague Street rapid transit route and the order of the court confirming the report. This is the route selected by the commission for the Brooklyn Rapid Transit Company's tunnel to connect the proposed Broadway subway in Manhattan with the Fourth Avenue subway in Brooklyn. Commissioners were appointed by the court on the application of the commission because it had been impossible to obtain, as required by law, the consents of property owners to the extent of a majority in value of the property along the route for the construction of a rapid transit railroad thereon.

Geary Street Municipal Railroad.

The placing in operation of the first section of the Geary Street Municipal Railroad, San Francisco, Cal., on Dec. 28, 1912, was attended with elaborate ceremonies in which practically all of the city officials of San Francisco participated. The first car carried among its passengers the Mayor and the city treasurer, and George Schaver, construction engineer, and C. E. Heise, of the Westinghouse Company. The operation of the property is in the hands of T. A. Cashin, who was formerly superintendent of the Fresno (Cal.) Traction Company. Ten cars are being used at present, but forty-three semi-steel, double-end pre-payment "California" type cars, seating forty-eight passengers each, are under construction by the W. L. Holman Company, San Francisco. The section which is in operation is about 5½ miles long. The carhouse is at Presidio and Point Lobus Avenues. It is constructed of concrete and steel and has a storage capacity for sixty cars. It was built at a cost of $228,363. A contract has been entered into with the Pacific Gas & Electric Company for the purchase of power, and current is delivered at 600 volts to the feeders of the railway at Kearny and Geary Streets, Broderick and Geary Streets and Presidio and Point Lobus Avenues.

The Geary Street Municipal Railroad is built over part of the route formerly occupied by the Geary Street, Park & Ocean Railroad, the franchise of which expired in 1903. With the expiration of the franchise the first municipal bond issue to build the road was proposed by the Supervisors, but this was defeated as the vote in favor of the plan did not meet the charter provision which required a two-thirds vote in favor of any expenditure of this kind. The second election to effect this purpose was held the following year and the proposition again failed to carry. Nothing more was done in this connection until 1907, when an issue of $720,000 of bonds was authorized by the Supervisors. Suit was brought to nullify this action, and the Supreme Court upheld the contention that the Supervisors had acted without authority. In June, 1909, the plan to issue bonds to provide funds to construct the road was again defeated by the voters. In December of that year, however, on resubmission of the proposition the proposal was carried. An injunction was secured, but the case was decided in favor of the city, and on appeal the Supreme Court of California affirmed the decision of the lower court. In February, 1911, the Legislature of California passed a bill to insure the legality of the bonds, and in April, 1912, the entire issue of bonds was sold to Adams & Company, Boston.

The contract for building the road was awarded on April 1, 1912, to Bates, Borland & Ayre, but that firm forfeited the contract and new bids were called. On April 17 the contract was awarded to B. H. Mahoney. He was allowed 180 days to complete the work, with a bonus of $200 for every day which he saved in carrying out the work. The operation of cars over the route by the Geary Street, Park & Ocean Railroad was suspended on May 5, 1912, and the construction of the municipal railway was begun on May 7, 1912.

Following is a statement compiled by the Board of Works of San Francisco in regard to the expenditures on the road:

Bonds authorized		$2,020,000
Geary street construction	$1,900,000	
Market street extension	120,000	
Bonds sold		1,900,000
Premium		2,341
		$1,902,341
Bonds to be sold		120,000
Grand total		$2,022,341
Estimated expenditure to date		1,543,721
Balance		$478,620

The principal expenditures of construction, right-of-way, buildings and equipment are as follows:

Trolley poles and overhead wires, labor and material	$27,952
Track construction, day labor, Fifth to Thirty-third and Tenth Avenue	97,647
Track construction and paving Kearny to Fifth Avenue	267,490
Paving right of way Fifth to Thirty-third and Tenth	62,737
*Paving right-of-way Kearny to Devisadero	7,244
Purchase of cars	337,725
Carhouse construction, possible extras and bonus	228,363
Electric conductors	64,705
Underground conductors, Kearny to Presidio Avenue	31,151
General construction, materials, supplies, etc	276,701
Lands and miscellaneous	114,171

*Balance expended for this purpose included in track construction.

New Jersey Gas Decision

On Jan. 6 Thomas N. McCarter, president of the Public Service Corporation of New Jersey, announced that the Public Service Gas Company would accept the order of the Public Utility Commission to establish a 90-cent rate for gas beginning on Feb. 1, 1913. This order was published in abstract in this paper last week. The company reserved to itself, however, the right to test at its convenience the legality and constitutionality of the board's valuation of its property upon which the order was based. The company will also establish the same reduced rate for gas on May 1 for the other divisions of the company's business, to remain in force, unless changed by the commission, pending the termination of the litigation of the principle of valuation upon which the order in the Passaic division case was made.

The Board of Public Utility Commissioners has accepted this date of May 1 as reasonable. It also adds that "the board approves the desire of the Public Service Gas Company to test the legality and constitutionality of the principles of valuation on which the board's order was based. The public, the company and the board should welcome a definitive adjudication of this matter."

President Brown of the New York Central Favors Permanent Arbitration Body

W. C. Brown, president of the New York Central & Hudson River Railroad, is reported by the *Evening Post* of Chicago to have declared himself emphatically in favor of action by Congress at the earliest possible date to make compulsory the arbitration of all public service labor troubles, with the public recognized as one of the three main groups at interest. Mr. Brown is quoted in part as follows in regard to the labor situation as it affects the railroads:

"One of the most significant and important results of the arbitration of the controversy between the locomotive engineers and the Eastern railroads is the emphasis that is placed upon the fact that the public is a party, and a very important party, to all controversies of this character. When public service corporations and the labor organizations are a unit in recognizing the public's right in these disputes we shall have come to a basis where controversies of this character will be less frequent and more easily settled. The report of the arbitration board is one of the most able and exhaustive that have been made, and I should like to see Congress take up the recommendations in regard to some permanent form and method of arbitration of labor troubles between employees of all public service corporations and the corporations themselves and express them in a statute which will clearly define the rights of the three parties to all controversies of this kind, so as to prevent interruptions of the orderly conduct of the business of these concerns, which are so closely related to the public and upon which the public depends for light, water, heat, power and transportation."

The Yonkers Strike

Up to Jan. 9, 1913, no attempt had been made to operate the cars of the Yonkers (N. Y.) Railroad. The Chamber of Commerce suggested that the employees return to work pending arbitration, but this the men refused to do on the mere assurance of that body. Mayor James F. Lennon of Yonkers sent a letter to President Whitridge on Jan. 5, recommending an arbitration committee of three, one to be selected by the strikers, one by Mr. Whitridge himself, and the other to be mutually agreed upon, or in case this proved impossible the third member to be appointed by the Mayor himself. Mr. Whitridge in reply said in part:

"So far as my willingness to negotiate with the men is concerned, I sent for them and told them substantially what I have told you and what is contained in my published statement, and I emphasized particularly that, while in the nature of things there could not be any binding agreement with Mr. Sutherland in respect to these matters, I had not the least intention of replacing them, or of interfering with Mr. Sutherland's settled policy, which is as stated, and I explained to them, at considerable length, the reasons why the person they objected to had been appointed, and at the time of their interview with me they seemed to recognize the justice of what I said and quite to understand that this man's appointment was not in any way to be regarded as a precedent or a breach of any understanding. I thought my interview with them was entirely satisfactory to them, and I was greatly disappointed to find that they should have twisted it, after some hours, into something quite different from what I said."

Mr. Whitridge also said in his communication to the Mayor that he had not received any specific statement of the reasons why there was a strike. From the public press he understood that after the strike took place the men formulated objections to certain rules and thereafter adopted resolutions adding to their demands so that at the time of his letter to the Mayor he did not know whether he was dealing with the first thought, the second thought or the third thought of the men. He suggested to the Mayor that the men state the cause of the strike in writing. At the same time Mr. Whitridge addressed a communication to the men in which he said that he felt sure they did not understand the attitude of the company and that they had been deliberately and grievously misled. He also reviewed the statements which were contained in his communication of Oct. 29, 1912, to the committee representing the men.

On Jan. 8 Mr. Whitridge made public another letter to Mayor Lennon in regard to the strike. He said:

"I believe it is my duty, as a public servant, to see that this strike is settled permanently when it is settled, not in any makeshift fashion which will enable it to be renewed every three or six months. I see only three ways in which this can be done: By the repeal of this pro-strike ordinance, the operation of which is now so disappointing to the men; by a legal decision which will enable me to man the road and run it; by the return of the men to work voluntarily.

"If I find a disposition on the part of the men to resume, I shall then be prepared to state the conditions, in addition to those referred to in my statement on Jan. 1, on which they may come back. I may be permitted to add that what I have said in writing is not to be regarded as a mere form of words, but is a precise statement of facts and my intentions. Finally, I venture to feel quite sure that in demanding a permanent settlement, which will permit discipline to be enforced and prevent a recurrence of these performances, I have the hearty support of the good people of Yonkers, in whose interest as well as that of the company I have taken up my position."

In a statement which he issued at Yonkers on Jan. 2 Mr. Whitridge referred to rules which he had made to prohibit men in uniform from drinking, requiring conductors to stand on the rear platform, and demanding that all men who desired to be excused for sickness present a doctor's certificate. He said these were requirements in the interest of the public, and that experience had shown that such rules were necessary and that he intended they should be enforced.

A local ordinance of Yonkers complicates matters by requiring men to have fifteen days' instruction on the cars operated in Yonkers before they can qualify as motormen or conductors.

Electric Service to New Haven by July.—Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, is quoted as stating that the completion of the work of electrification between Stamford and New Haven, Conn., should occur about July 1, if everything goes as planned.

New Ohio Road Opened.—The Cleveland, Alliance & Mahoning Valley Railway was placed in operation between Ravenna and Alliance, Ohio, on Jan. 2, 1913. Cars are run on an hourly schedule. As soon as repairs have been made to the bridge over the tracks of the Baltimore & Ohio Railroad the cars will be operated to the business district of Ravenna.

Preliminary Tax Assessments in Wisconsin.—The State Tax Commission of Wisconsin has fixed the preliminary valuation of the twenty-eight electric railways and the light, heat and power companies in Wisconsin at $55,505,000. This is an increase of nearly $8,000,000 over the final assessment of these companies last year, which was fixed at $47,365,000. The largest valuation is that of The Milwaukee Electric Railway & Light Company, the property of which is valued at $30,500,000. Last year the property of the company was valued at $26,750,000. The property of The Milwaukee Light, Heat & Traction Company is valued at $8,250,000 in the preliminary report, as compared with $6,500,000 in the final assessment last year.

Proposal in Regard to Re-routing Suburban Cars in Cincinnati.—J. C. Ernst, president of the Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., has informed Mayor Hunt of Cincinnati that the changes deemed necessary for re-routing cars as desired by the city will necessitate the expenditure of about $32,000 by the company. Since the company's franchise will expire in about three years Mr. Ernst said he did not consider it fair to the company to require it to make such an expenditure at this time. Mayor Hunt has suggested that the City Council grant a special franchise to the company in the streets to be used under the re-routing plan, the new grant to continue in force until the expiration of the original franchise and the company to be reimbursed on the basis of the value of the track if the franchise is not renewed.

Reasons for Activity of Tractions on Change.—The writer of the column "News for Investors," which appears daily in the New York *Evening Sun*, referring to the recent activity in the trading in the traction issues on the New York Stock Exchange, said: "The tractions are neither prosecuted for restraining trade nor threatened with reductions in rates. In the Supreme Court they figure not at all. Their earnings never fall below what they were last year, and if they suffer any radical change it is all in favor of the investor. Public Service Commissioners may make them put in center-door cars and ventilating systems and electric lights, but for every electric light or ventilator there is another new passenger, and the center side doors are not to let people out but to let them in. The crops do not fail along their lines and people do not stop riding on elevated or subway trains when trade happens to be poor—which are some of the reasons why Stock Exchange traders turn to the traction stocks to the neglect of the others in the interim of waiting for a decision in the Minnesota rate case and a solution of the Union Pacific-Southern Pacific puzzle."

Pittsburgh Subway Matters.—At a special meeting of the service and surveys committee of the Council of Pittsburgh, Pa., on Jan. 6, 1913, the report on the subway ordinance with its amendments was presented. This ordinance was referred to the law department recently for an opinion.

Several amendments were added to the ordinance by councilmen. Charles K. Robinson, who appeared for the law department, said that he was not in favor of any company being compelled to pay part of the salaries of the board of supervisors and would leave that proposal to the judgment of the members of the Council. Mr. Burns raised the question of the disposition of the ordinance if the detailed plans were not approved. Mr. Wilkins said that in building subways all of the detail plans could not be agreed upon at the time of the passage of the ordinance. He thought that by adding a clause which would provide for the consideration later on of such detail plans as might be necessary the matter could be advanced. It was finally agreed that the ordinance should become null and void if the Council and the company to which the award was made could not reach an agreement in regard to such details within ninety days after the passage of the ordinance.

Report of New Jersey Board.—The Board of Public Utility Commissioners of New Jersey has submitted its annual report to Governor Wilson. A considerable part of the report is devoted to the subject of the elimination of grade crossings. The work of the year in disposing of rate cases and other matters is also reviewed. Notwithstanding the density of railroad traffic in New Jersey, the large number of trains which are operated and the many passengers carried, the commission points out that there have been no collisions between passenger trains and no derailments of passenger trains during the year in which passengers have been killed. The report concludes with suggesting a number of amendments to the present law, the purpose of most of which is to make clear some of the provisions regarding which questions have been raised. One suggestion is the repeal of the act of 1911 which limits the annual total expenses of the commission to $100,000. The board expresses the opinion that the Legislature might make more explicit its intent in enacting the provision of 1911 that no franchise granted to any public utility shall be valid until approved by the board. Similar suggestions are made regarding the provisions of the act of 1911 relative to the proposed issues of stocks, bonds or other evidence of indebtedness and the purposes to which the proceeds are to be applied.

New Orleans Company to Build Its Own Cars.—Hugh McCloskey, president of the New Orleans Railway & Light Company, New Orleans, La., is quoted as follows in regard to plans which the company is working out to build in its own shops such cars as may be needed for the operation of the system in the future: "We find with the experience we have had in constructing the cars now nearing completion that the work can be done by home labor with entire satisfaction to us and at a cost considerably less than that spent for cars built elsewhere. Therefore, we have decided to do all of the work at home and with home labor. We have an expert car builder, to whom will be given all the skilled help required to build modern cars. We are in excellent position to get all of the material required to build the cars, and can do the work fast enough to meet the requirements of the operating department of the company." Such car construction as is now done by the company is carried out at the Magazine Street carhouse. According to the same source of information, the engineering and the operating departments of the company are now at work on plans for larger and more complete shops for the company. It is planned, so it is said, to standardize the small cars of the company, and Mr. McCloskey is reported to have said that these improvements will be made known to the public just as soon as the operating and the engineering departments have completed their plans for what the respective heads of these departments consider the best and most serviceable cars for use in New Orleans.

PROGRAMS OF ASSOCIATION MEETINGS

National Civic Federation

The thirteenth annual meeting of the National Civic Federation will be held in New York Jan. 28 and 29, 1913, at the Hotel Astor. The subjects to be discussed include the following: "Workmen's Compensation," "Accident Prevention," "Pensions for Federal, State and Municipal Employees," "Reform in Legal Procedure," "Regulation of Public Utilities," "Mediation in Industrial Disputes," "Regulation of Industrial Corporations." Model bills for passage by the legislatures of the several States will be considered on all of these subjects.

In connection with the subject of "Mediation of Industrial Disputes," the Federation will consider the recommendation to the several states of a model mediation bill somewhat on the plan of the Erdman federal act. This act, of course, does not apply to intrastate utilities. The chairmen of the four committees which are considering this subject and will report at the meeting are Marcus M. Marks, Charles P. Neill, head of the Federal Bureau of Labor; William C. Rogers, of the New York State Board of Arbitration, and Henry B. F. Macfarland, former Commissioner of the District of Columbia.

In drafting the proposed model workmen's compensation bill the Federation's department, of which August Belmont is chairman, has had the co-operation of the compensation committees of the American Bar Association and the Uniform State Law Commissioners. Its principles have been indorsed by the executive council of the American Federation of Labor, and it is the basis of the federal act for railroad employees, which passed the United States Senate and is now before the House for consideration.

The Federation's model state bill regulating public utilities has already been mentioned in these columns. It has been drafted by a department, of which Emerson McMillin is chairman, and Dr. John H. Gray is director of investigation. In the investigation made by the department the general question was, "How far can public regulation go to be effective and not interfere unnecessarily with management?" Especial study was made of the sliding-scale principle employed by London in dealing with electric light and gas companies, and particular consideration was given to the question of state versus municipal regulation of public utilities, as now in force in California.

The annual dinner of the Federation will occur on Wednesday evening, Jan. 29, at the Hotel Astor.

Program of Wisconsin Electrical Association

The fifth annual convention of the Wisconsin Electrical Association will be held at the Hotel Pfister, Milwaukee, Wis., Jan. 15 and 16. The following is a list of the papers to be presented at this convention:

"The Proposed Revision of Standards of Electric Service Now Under Consideration by the Railroad Commission of Wisconsin," by J. N. Cadby, member of the engineering staff of the commission.

"The Decision in the Milwaukee Fare Case," by Edwin S. Mack of the firm of Miller, Mack & Fairchild.

"Building up a Day Load for Small Central Stations," by W. E. Haseltine, secretary and treasurer of the Ripon Light & Water Company.

"Dispatching and Handling Street Cars and Train Crews," by Edward Hammett, superintendent of the railway department of the Sheboygan Electric & Railway Company.

"The Proper Operation and Maintenance of Arc Lamps," by L. H. Lathrop, general superintendent of the Menominee & Marinette Light & Traction Company.

"A Work Order System Adaptable to Public Utilities: Its Purposes and Method of Application," by George W. Kalweit, auditor of The Milwaukee Electric Railway & Light Company.

"Report and Recommendations on Liability Insurance," by the insurance committee, Ernest Gonzenbach, chairman.

"Construction and Maintenance Problems of the Overhead Distribution System of an Electric Utility," by C. R. Phenicie, general superintendent of the Wisconsin Public Service Company, Green Bay Gas & Electric Company.

"The Standardizing Laboratory of the University of Wisconsin," by F. A. Kartak of the University of Wisconsin.

"Resuscitation from Electric Shock, and First Aid to the Injured," by Dr. Charles H. Lemon, chief surgeon of The Milwaukee Electric Railway & Light Company.

On Wednesday evening, Jan. 15, at 7 o'clock, the annual dinner of the association will be held in the Fern Room of the Hotel Pfister.

Financial and Corporate

Stock and Money Markets

January 8, 1913.

Trading on the New York Stock Exchange continues indifferent. The sales to-day totaled only 200,312 shares. From Jan. 1, 1913, the total transactions amounted to 1,512,290 shares as compared with 3,290,977 shares for the same period last year. Trading in the bond list, however, continues active. The sales of bonds to-day totaled $2,746,000, par value. Rates in the money market to-day were: Call, 2¾@3 per cent, with the last loan at 3 per cent; sixty days, 3¾@4 per cent; ninety days, 4@4¼ per cent; four months, 4@4½ per cent; five and six months, 4¼@4¼ per cent.

Trading was broad and active on the Philadelphia exchange to-day, with a goodly volume of sales. Bond transactions totaled more than $60,000.

The Chicago market was broad to-day, but the volume of transactions was small. The only electric railway issue dealt in was Chicago Railways series 2's.

In the Boston market the tone was firm. Boston Elevated Railway stock and rights were in good demand.

Trading in Baltimore to-day was narrow, but the volume of transactions was fair. The bond market continues very active, sales to-day totaling $107,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 31	Jan. 7.
American Brake Shoe & Foundry (common)	95	96
American Brake Shoe & Foundry (preferred)	135½	136
American Cities Company (common)	47½	48
American Cities Company (preferred)	78½	78¼
American Light & Traction Company (common)	400	430
American Light & Traction Company (preferred)	108	108
American Railways Company	41	40¼
Aurora, Elgin & Chicago Railroad (common)	40	40
Aurora, Elgin & Chicago Railroad (preferred)	86	86
Boston Elevated Railway	113	112½
Boston Suburban Electric Companies (common)	10	5
Boston Suburban Electric Companies (preferred)	75	67
Boston & Worcester Electric Companies (common)	7	7
Boston & Worcester Electric Companies (preferred)	40	40
Brooklyn Rapid Transit Company	92⅛	91¼
Capital Traction Company, Washington	122	125
Chicago City Railway	150	150
Chicago Elevated Railways (common)	27	28
Chicago Elevated Railways (preferred)	92	89
Chicago Railways, ptcptg., ctf. 1	86	90
Chicago Railways, ptcptg., ctf. 2	26¼	22
Chicago Railways, ptcptg., ctf. 3	8	6½
Chicago Railways, ptcptg., ctf. 4	3½	3¼
Cincinnati Street Railway	122½	122½
Cleveland, Southwestern & Columbus Ry. (common)	*6½	5⅛
Cleveland, Southwestern & Columbus Ry. (preferred)	*34	33
Cleveland Railway	103½	103½
Columbus Railway & Light Company	55	60
Columbus Railway (common)	82	80
Columbus Railway (preferred)	81	81
Denver & Northwestern Railway	*121	118
Detroit United Railway	70	76
General Electric Company	186	185
Georgia Railway & Electric Company (common)	120	122
Georgia Railway & Electric Company (preferred)	83	83¼
Interborough Metropolitan Company (common)	18½	18½
Interborough Metropolitan Company (preferred)	64	62¼
International Traction Company (common)	*39	38
International Traction Company (preferred)	*92	99
Kansas City Railway & Light Company (common)	18½	18½
Kansas City Railway & Light Company (preferred)	40	40
Lake Shore Electric Railway (common)	*6	9
Lake Shore Electric Railway (1st preferred)	*89	91
Lake Shore Electric Railway (2d preferred)	*25½	25½
Manhattan Railway	129	129
Massachusetts Electric Companies (common)	17	16
Massachusetts Electric Companies (preferred)	75	76
Milwaukee Electric Railway & Light Co. (preferred)	100	100
Norfolk Railway & Light Company	*26	25
North American Company	79	81
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	100	100
Philadelphia Company, Pittsburgh (common)	50	49½
Philadelphia Company, Pittsburgh (preferred)	44	44⅛
Philadelphia Rapid Transit Company	27½	27⅞
Portland Railway, Light & Power Company	*66	68½
Public Service Corporation	117	117
Third Avenue Railway, New York	40½	38¼
Toledo Railway & Light Company	2¼	2¼
Twin City Rapid Transit Co., Minneapolis (common)	105	105
Union Traction Company of Indiana (common)	*6½	4½
Union Traction Company of Indiana (1st preferred)	*80	81
Union Traction Company of Indiana (2d preferred)	*34	34
United Rys. & Electric Company (Baltimore)	24½	23¼
United Rys. Inv. Company (common)	35	34
United Rys. Inv. Company (preferred)	63½	62½
Virginia Railway & Power Company (common)	51	51
Virginia Railway & Power Company (preferred)	90	90
Washington Ry. & Electric Company (common)	88	88
Washington Ry. & Electric Company (preferred)	90	89⅝
West End Street Railway, Boston (common)	80	80
West End Street Railway, Boston (preferred)	96	98
Westinghouse Elec. & Mfg. Company	79¼	78
Westinghouse Elec. & Mfg. Company (1st preferred)	115	119

*Last sale. a Asked.

Receivers' Sale of Chicago & Milwaukee Electric Held Invalid

As a result of the suit brought against the receivers of the Chicago & Milwaukee Electric Railroad by the Investment Registry, Ltd., Judge Landis, of the United States District Court, has rendered a decision declaring the sale of the Illinois Division invalid. Objections were filed by a bondholder who urged that the price bid for the property was inadequate and that the purchasers suppressed competition at the sale. It will be remembered that in 1908, as a result of proceedings by creditor's bill, receivers were appointed in Illinois and Wisconsin. The two receivers were necessary, as the divisions of the road, which operates between Evanston, Ill., and Milwaukee, Wis., had been chartered and built by separate companies.

During 1912 decrees of sale were rendered in both States, and the Wisconsin division was bid in at $1,600,000 and the Illinois division at $1,650,000. The successful bidders represented the reorganization committee, which had deposited, subject to its control, over 95 per cent of the bond issue under foreclosure. As no other bids for the property were offered at the sale, the court recommended acceptance of these.

The objecting bondowner holds twelve bonds of the Illinois company, which he refused to deposit with the reorganization committee. In arguing the case before the court three separate issues were involved, i. e., an alleged suppression of bidding by means of which certain Milwaukee interests were induced, in consideration of the payment to them of $1,122,000, to sell their holdings of bonds in the Illinois company, for which they paid approximately $770,000. As a part of the sale of such bonds, it was alleged that these interests agreed to refrain from competing with the reorganization committee at any foreclosure sale of the property. The second issue was the inadequacy of the price bid, it being contended that the properties were worth at least $5,000,000, whereas the amount bid plus the amount of underlying bonds aggregated only $2,800,000. The third objection raised was to the plan of reorganization, which was considered unfair and inequitable. Judge Landis said:

"The general rule is that the public shall be free to bid for property offered at a judicial sale, and the law prohibits the making of any bargains, or the doing of anything which takes from any part of the public this liberty of action. The term general public, as used in this connection, does not include persons who by virtue of lien or ownership, or otherwise, have an existing interest in the property to be sold. Such persons may combine to protect their interests and may even expressly agree not to bid against each other, in furtherance of a plan mutually agreed upon as calculated to conserve their interests, but in so doing their activities must not operate to exclude any part of the general public as purchasers at the sale. Therefore the first question here is whether or not the agreements mentioned amounted in fact only to a combination between bondholders for the protection of their interests, as such, or whether those agreements kept away from the sale persons who, while they did not have an existing interest in the property as holders of bonds, were in reality so circumstanced that they must be classed with the general public."

The court held that the Milwaukee interests mentioned purchased their securities in the property after the receivers were appointed and that their sole purpose in doing so was to use the bonds as an instrumentality in acquiring the property; that is to say, to turn them in as a part satisfaction of the bid to be made by them at the judicial sale. Their relation to the property was, therefore, that of a prospective bidder. This attitude made it hazardous for other persons seeking the property to bargain with the Milwaukee interests for their elimination. In such case there was a burden on the beneficiaries to show clearly that the parties selling out had altogether lost interest as intending purchasers of the property prior to the beginning of the negotiations resulting in their elimination.

As to the inadequacy of the price bid, Judge Landis said:

"On the question of value of the property the court had evidence as to physical condition, earnings, past, present and prospective, franchise conditions and other matters thoroughly entitled to be considered under this head. It is my opinion, on the showing made, that the Illinois property is reasonably worth approximately $4,500,000. The bid of the company and the obligations which the purchase must assume aggregate in the neighborhood of $2,800,000 as the cost of the Illinois property to the committee. The bids on both divisions, as has been shown, total $3,250,000. Add to this the amount of the underlying bonds and all the other expenses estimated by H. M. Byllesby & Company, on behalf of the reorganization, as necessary to be incurred in adjusting and discharging liens and rehabilitation of the property, including extensions and betterments, and the total cost to this committee of the entire line in Illinois and Wisconsin, including a connection with the elevated road in Chicago, approximates $6,700,000."

In discussing the third point raised, Judge Landis said:

"Now it is declared the purpose of the reorganization committee, if it gets this property, to turn it over to a new company which the reorganization committee proposes to organize. Then it is the committee's plan that this new company shall be authorized to issue securities as follows: First mortgage bonds, $10,000,000; second mortgage bonds, $4,500,000; third mortgage bonds, $6,000,000; capital stock, $6,000,000.

"Of this total of $26,500,000, it is the committee's purpose that the new company shall put out $21,000,000 to use in effecting the reorganization. This appears from the committee's plan which it has distributed to the bondholders. It is very plain from these figures that a great mass of these securities, if issued, really will represent no investment whatever, by anybody, at any time. And this is proposed to be done in the face of the public utility law of Wisconsin and the constitution of Illinois. Fundamental law contains the following provision: 'No railroad corporations shall issue any stocks or bonds except for money, labor or property actually received and applied to the purposes for which such corporation was created.'"

In conclusion, the judge said:

"In the present case this court will enable the members of the committee and its counsel to consider, before the property shall be offered for sale again, whether it would not be well to adopt a program authorized by law. There will be another sale, at which time there will have to be a higher bid."

It is understood that as a result of this unfavorable decision counsel for the reorganization committee will take an appeal.

Reorganization of International Traction System

The details of the plan for the reorganization of the companies included in the International Traction System, Buffalo, N. Y., as approved by the Public Service Commission of the Second District of New York, are now being carried out. As noted in the ELECTRIC RAILWAY JOURNAL of Dec. 14, 1912, page 1210, the commission authorized the merger of the Crosstown Street Railway and the Electric Street Railway, but owing to legal difficulties the Crosstown Street Railway cannot be merged until next April. Pending the actual merger the commission has authorized the lease of the Crosstown Company to the International Railway for 999 years. As soon as the merger takes place this lease will become void. The commission has also authorized the International Railway to make a mortgage for $60,000,000 and to issue bonds secured thereby to the amount of $19,817,500 in accordance with the plans previously noted in the ELECTRIC RAILWAY JOURNAL. In furtherance of this plan the company filed on Dec. 31, 1912, with the county clerk at Buffalo a mortgage for $60,000,000 in favor of the Bankers' Trust Company, New York, N. Y., as trustee. On the same date Thomas Penney retired as president of the International Traction Company and the International Railway, and E. G. Connette, who had been vice-president of the International Railway, was elected to succeed him with that company, and Rodman E. Griscom was elected to succeed him with the International Traction Company. Mr. Connette was also elected vice-president of the International Traction Company. Mr. Penney, however, continues as a director of the company, and T. E. Mitten will continue as chairman of the executive committee.

Nelson Robinson, who has long been a director of the International Traction Company and the International Railway and has had a prominent part in the financial undertakings of the companies, issued the following statement:

"The new mortgage, which has the approval of the Public Service Commission, now provides for the additional capital necessary to the further development of the property. This reorganization, involving the surrender of over $18,000,000, par value, of bonds, has been accomplished without the appointment of a receiver, which very satisfactory result has been largely due to the painstaking and persistent work of the president, Thomas Penney, who was elected to the position some four years ago because of his especial fitness for this work.

"I have now disposed of my interest in the company and am therefore retiring from the situation. Mr. Penney will also sever his connection as president of the International companies at an early date, this being necessary because of the responsibilities devolving upon him in the management of the Near-Side Car Company and other commercial undertakings which are now directed by him. Mr. Penney will be succeeded as president by E. G. Connette, who for some time past has been acting as his assistant in the operation of the property.

"Bertron, Griscom & Company, bankers, New York, N. Y., who represent the new financial interest in control, have a very thorough knowledge of the results secured by T. E. Mitten, both here and in Philadelphia, and have prevailed upon him to remain with the property as chairman of the executive committee, in which position he will continue to direct the operating policy of the company. Mr. Penney has also been prevailed upon to remain with Mr. Mitten as a director of these companies, his intimate knowledge of the companies' affairs making his services especially to be desired in this connection."

Simultaneously with the announcements which were made in regard to the changes in the company, Bertron, Griscom & Company, New York, N. Y., offered for subscription at 97½ and interest $3,832,000 of the refunding and improvement 5 per cent gold bonds of the International Railway dated Nov. 1, 1912, and due Nov. 1, 1962. With this offering of the bonds of the company for subscription there was published the official report of the earnings of the company for the year ended June 30, 1912, and a general statement in regard to the property owned and controlled by the company and the prospects of the territory in which the company operated prepared from a letter from Mr. Penney in regard to the affairs of the company.

New directors have been elected as follows: S. Reading Bertron, Rodman E. Griscom, John S. Jenks, Jr., Marshall J. Dodge, Francis T. Homer and Edward G. Connette. The retiring directors are as follows: G. L. Boissevain, Morris Cohn, Jr., James O. Moore, Oliver H. Payne, Nelson Robinson and George I. Seney.

New J. G. White Companies Organize

The plan to conduct the engineering-construction department and the operating department of J. G. White & Company, Inc., New York, N. Y., separately has been approved and the new corporations, The J. G. White Engineering Corporation and The J. G. White Management Corporation, elected officers and directors on Jan. 6, 1913. The directors of The J. G. White Engineering Corporation are as follows: Harry Bronner, of Hallgarten & Company; James Brown, of Brown Brothers & Company; F. Q. Brown, of Redmond & Company; Douglas Campbell, of Campbell, Harding & Pratt; George C. Clark, Jr., of Clark, Dodge & Company; Bayard Dominick, Jr., of Dominick & Dominick; A. G. Hodenpyl, of Hodenpyl, Hardy & Company; T. W. Lamont, of J. P. Morgan & Company; Marion McMillin, of Emerson McMillin & Company; J. H. Pardee, president of The J. G. White Management Corporation; E. N. Potter, of Potter, Choate & Prentice; Frederick H. Reed, vice-president of J. G. White & Company, Inc.; Charles H. Sabin, vice-president of the Guaranty Trust Company; Frederic Strauss, of J. & W. Seligman & Company; Moses Taylor, of Kean, Taylor & Company; George H. Walbridge, of Bonbright & Company; E. N. Chilson and C. E. Bailey. The officers of the company are: J. G. White, chairman of the finance committee; Gano Dunn, president; E. G. Williams, A. S. Crane, H. A. Lardner, vice-presidents; H. S. Collette, secretary, and R. B. Marchant, treasurer.

The J. G. White Management Corporation announces as directors Cecil Barret, of Spencer Trask & Company; F. Q. Brown, of Redmond & Company; P. M. Chandler, of Chandler Brothers & Company, Philadelphia; Arthur Coppell, of Maitland, Coppell & Company; Gano Dunn, president of The J. G. White Engineering Corporation; George E. Hardy, of Hodenpyl, Hardy & Company; R. G. Hutchins, Jr., vice-president of the National Bank of Commerce; R. L. Montgomery, of Montgomery, Clothier & Tyler, Philadelphia; John T. Pratt, of Campbell, Harding & Pratt: Frederic Strauss, of J. & W. Seligman & Company; H. R. Tobey, of N. W. Halsey & Company, and J. G. White, president of J. G. White & Company, Inc. The officers are: J. H. Pardee, president; F. H. Reed and S. L. Selden, vice-presidents, and T. W. Moffat, secretary and treasurer.

The business of the management company was established some years ago as a department to supervise the operation of properties in which J. G. White & Company, Inc., were interested. This department, which has now been formed into a separate company, was, on Dec. 31, 1912, acting as operating or consulting operating manager of the Manila Electric Railroad & Lighting Corporation, the Helena Light & Railway Company, the Eastern Pennsylvania Railways, Pottsville, Pa.; the United Light & Railways Company, the Associated Gas & Electric Company, the Augusta-Aiken Railway & Electric Corporation, the Pacific Railroad of Nicaragua, the Kentucky Public Service Company and other properties.

The parent organization, J. G. White & Company, Inc., controls the new companies and will continue as an active financing and owning company.

General Merger Proceedings in Chicago

Very little progress was made during the week ended Jan. 4, 1913, toward arriving at the satisfactory valuation of the Chicago elevated properties by the local transportation committee of the Chicago City Council in its negotiations to bring about the general merger of the elevated and surface lines. As noted in the ELECTRIC RAILWAY JOURNAL on Jan. 4, a report was made to the general committee by a sub-committee in which it announced that the statement presented by the representatives of the Chicago Elevated Railways had been verified. At a meeting of the transportation committee held on Jan. 7, the attorneys for the Chicago Elevated Railways advised the committee concerning the purpose of the merger of the elevated lines in July, 1911, the securities which had been issued and the liabilities assumed by the new organization. The representatives of the company and the committee appear to agree that the total amount invested by the new organization is $82,285,750.39. There is still some question, however, as to the itemized statement going to make up this total, as well as certain amounts which must be eliminated from these negotiations. At the conclusion of a very lengthy discussion the committee instructed the company's representatives to prepare statements showing an itemized account of the cost of the properties to the new organization as of July 1, 1911, Jan. 1, 1912, and Jan. 1, 1913. These statements will probably be submitted at an early date.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—The common stock of the Birmingham Railway, Light & Power Company, most of which is held by the American Cities Company, has been increased from $3,500,000 to $3,900,000.

Brooklyn (N. Y.) Rapid Transit Company.—The Brooklyn Rapid Transit Company has filed at Albany a certificate of the increase in its capital stock from $45,000,000 to $90,000,000, the new shares to be issued from time to time prior to July 1, 1914, exclusively for the conversion of the 4 per cent bonds of 1902, dollar for dollar, if presented by the holders for that purpose. Of these bonds $34,750,000 are outstanding in the hands of the public. The New York Municipal Railroad Corporation has applied to the Public Service Commission of the First District of New York for permission to issue $1,000,000 of its $2,000,000 authorized capital stock, the proceeds to be used for working capital. At the same time the New York Consolidated Railroad applied to the commission for permission to purchase the entire capital stock of the New York Municipal Railway Corporation. The New York Municipal Railroad Corporation was formed by Brooklyn Rapid Transit interests entering into a contract with the city of New York to build and operate portions of the dual system of rapid transit. The New York Municipal Railroad Corporation, to carry out its contract with the city, is to make the Central Trust Company trustee of its mortgage to secure its first mortgage 5 per cent sinking fund gold bonds, to be issued from time to time to provide the capital required by the contract with the city. The Consolidated company is to guarantee these bonds. At the same time the Brooklyn Heights Railroad and the New York Municipal Railway Corporation submitted to the commission for approval a contract made between them by which the Municipal company obtains the right to use the lines of the Lutheran Cemetery elevated road from a connection with the Myrtle Avenue line to Fresh Pond road and from that point to Metropolitan Avenue. The contract is for eighty-five years and the New York Municipal Railroad Corporation is to pay $25,000 a year for the privilege.

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—The Chicago, Ottawa & Peoria Railway has increased its capital stock from $500,000 to $1,500,000.

Columbus Railway & Light Company, Columbus, Ohio.—The Columbus Edison Company, the property of which was leased to the Columbus Railway & Light Company in 1903, has applied to the Public Service Commission of Ohio for permission to issue $250,000 of preferred stock and a similar amount of common stock.

Dedham & Franklin Street Railway, Westwood, Mass.—Eugene H. Mather, receiver of the Dedham & Franklin Street Railway and the Medfield & Medway Street Railway, has asked the court for instructions in regard to continuing the roads in operation between Dedham and Franklin. Mr. Mather says that, although the closest economy has been practised, the earnings of the roads have not been sufficient to cover the operating expenses, and he is doubtful whether the roads would pay even if the fares were to be increased. The question of discontinuing operation will come up before the court on Jan. 28, 1913.

Illinois Traction Company, Champaign, Ill.—Notices of increases in the stock of subsidiary companies of the Illinois Traction Company have been filed as follows: St. Louis, Springfield & Peoria Railroad, from $7,850,000 to $8,250,000; Bloomington, Decatur & Champaign Railroad, from $3,525,000 to $3,650,000.

Interborough Rapid Transit Company, New York, N. Y.—To provide funds for the financing of its part in the construction and equipment of the dual subway system, as well as for refunding all outstanding bonds and for funding short term notes, the Interborough Rapid Transit Company has asked the Public Service Commission of the First District of New York to approve a proposed bond issue not to exceed $170,000,000. The petition states that the company has arranged to have J. P. Morgan & Company purchase the entire issue at 93½ and accrued interest, the bonds to be issued in such quantities as will net the company $150,622,900, and the further sum of $174,600 to pay off prior liens or encumbrances. The Public Service Commission has extended to May 1, 1913, the time in which the Interborough Rapid Transit Company may issue $17,123,611 in bonds, permission for which was given in a previous order of the commission.

Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.—The Ironwood & Bessemer Railway & Light Company has filed with the Secretary of State an amendment to its articles of incorporation increasing its capital stock from $700,000 to $900,000.

Irwin-Herminie Traction Company, Irwin, Pa.—There are now being offered for subscription at 99 and interest by the Dominion Trust Company, Pittsburgh, Pa., $250,000 of first mortgage sinking fund gold bonds of the Irwin-Herminie Traction Company. The bonds are dated Nov. 1, 1912, and are due Nov. 1, 1937. They are redeemable all or in part at 105 and interest at the option of the company, except such as shall be paid $6,000 yearly from the sinking fund.

Little Rock Railway & Electric Company, Little Rock, Ark.—Interests identified with the Little Rock Railway & Electric Company are reported to have obtained control of the Garland Power & Development Company, which controls water power on the Ouachita River, 45 miles from Little Rock. It is proposed to extend $3,000,000 in developing power and for transmission lines.

Mansfield Railway, Light & Power Company, Mansfield, Ohio.—S. N. Ford, president of the Mansfield Railway, Light & Power Company, has been appointed receiver of the company and has been instructed by the court to sell the property of the company within four months.

Monongahela Valley Traction Company, Fairmont, W. Va.—An initial dividend of 2 per cent has been declared on the $5,000,000 of common stock of the Monongahela Valley Traction Company, payable on Jan. 11, 1913, to holders of record of Jan. 8.

Norwood, Canton & Sharon Street Railway, Canton, Mass.—The property of the Norwood, Canton & Sharon Street Railway has been acquired by M. A. Cavanagh, Boston, Mass., and Joseph B. Murphy, Thomas F. Cavanagh, James T. Dunn and P. Corr, Taunton. New officers have been elected as follows: M. A. Cavanagh, president; Joseph B. Murphy, treasurer, and Dennis G. Trayers, superintendent.

Railway & Light Securities Company, Boston, Mass.—The Railway & Light Securities Company has declared a semi-annual dividend of 3 per cent on its common stock, an increase of ½ of 1 per cent. The usual semi-annual dividend of 3 per cent has been declared on the preferred stock. The dividends are payable on Feb. 1 to holders of record Jan. 15.

Springfield & Xenia Railway, Springfield, Ohio.—The Springfield & Xenia Railway has declared a dividend of 1½ per cent on its preferred stock and also an additional 1½ per cent, making 6½ per cent, on its preferred stock this year, the same as last year. The 1½ per cent extra is on account of accumulated dividends. There is still unpaid 2¾ per cent accumulated dividends.

Third Avenue Railway, New York, N. Y.—The Third Avenue Railway has issued its annual report for the calendar year 1912. It contains a consolidated income account for the eleven months ended Nov. 30, 1912, which shows a surplus of $1,209.429 over charges, including depreciation of $355,000. F. W. Whitridge, the president, says that estimating December earnings at $110,000, the net for the year ended Dec. 31, 1912, was about $1,319,000. He continues: "The company has sufficient funds on hand to meet all the expenditures for the current year as well as to pay $350,000 on account of the purchase of the New York City Interborough Railway, and it has upward of $100,000 which it will be necessary to expend upon the Mid-Crosstown Railroad in case the owners should conclude to accept our offer to purchase that property. It may be desirable to apply to the Public Service Commission for consent to issue 4 per cent refunding bonds for part of these capital expenditures. It will not be necessary to market such bonds, and it should be our policy, so far as possible, not to increase our fixed charges. Finally, I think it may be said notwithstanding the large expenditures shown in this budget, and which will probably hereafter be shown in similar budgets, that the outlook for the owners of Third Avenue Railway securities is encouraging."

Toledo Railways & Light Company, Toledo, Ohio.—H. L. Doherty & Company, New York, N. Y., will not take over the operation of the Toledo Railways & Light Company until Jan. 15, and possibly not until Feb. 1. The exchange of securities is progressing satisfactorily and most of the stockholders have paid their assessment of $7.50 per share. It is stated that negotiations are pending for the sale of $6,000,000 of first lien 6 per cent five-year collateral trust notes of the Toledo Light & Railways Company, which is to succeed the Toledo Railways & Light Company, to Harris, Forbes & Company, New York, N. Y.

Union Traction Company of Indiana, Indianapolis, Ind.—The directors of the Union Traction Company of Indiana have decided not to pay a dividend at this time on the $3,000,000 of second preferred stock. The net earnings for 1912, with December estimated, are reported as exceeding $75,000, after providing for the dividend on the first preferred stock.

Valdosta (Ga.) Street Railway.—The Valdosta Traction Company has been incorporated in Georgia with a capital stock of $125,000 as the successor to the Valdosta Street Railway.

York (Pa.) Railways.—The York (Pa.) Railways has declared a semi-annual dividend of 2½ per cent on the $1,600,000 of 5 per cent cumulative preferred stock, payable on Jan. 30, 1913, to holders of record of Jan. 20. This payment compares with 2 per cent in July and January, 1912, and the initial payment of 1 per cent in July, 1911.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., 2½ per cent, preferred.

Fort Smith Light & Traction Company, Fort Smith, Ark., quarterly, 1¾ per cent, preferred.

Holyoke (Mass.) Street Railway, 4 per cent.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Monongahela Valley Traction Company, Fairmont, W. Va., 2 per cent, common.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1¼ per cent, common.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil, quarterly, 1¼ per cent.

Sao Paulo Tramway, Light & Power Company, Sao Paulo, 2½ per cent.

United Traction Company, Pittsburgh, Pa., 2½ per cent, preferred.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

York (Pa.) Railways, 2½ per cent, preferred.

Youngstown & Ohio River Railroad, Youngstown, Ohio, quarterly, 1⅛ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, ME.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Nov., '12	$22,756	$22,475	$282	$465	†$183
1 " " '11	21,363	20,428	936	581	355

AURORA, ELGIN & CHICAGO RAILROAD, CHICAGO, ILL.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Nov., '12	$155,313	$96,360	$58,853	$32,050	$26,803
1 " " '11	140,050	86,803	53,247	31,728	21,519
5 " " '12	895,032	497,298	397,734	160,395	237,339
5 " " '11	839,757	456,790	382,977	157,216	225,761

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Nov., '12	$100,446	$59,617	$40,829	$31,746	$9,083
1 " " '11	90,196	54,137	36,059	29,000	7,059
11 " " '12	1,086,456	633,965	452,491	341,047	111,444
11 " " '11	1,042,341	587,373	454,969	329,863	125,106

KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Nov., '12	$1,005,816	$647,363	$356,454	$175,942	$180,512
1 " " '11	862,243	543,812	318,431	177,132	141,299
11 " " '12	10,866,927	7,044,613	3,822,314	1,945,832	1,876,482
11 " " '11	9,518,443	6,009,717	3,508,726	1,943,259	1,565,467

NORTHERN OHIO LIGHT & TRACTION COMPANY, AKRON, OHIO.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Nov., '12	$239,141	$145,324	$93,817	$52,610	$41,207
1 " " '11	214,563	125,304	89,359	43,729	45,630
11 " " '12	2,736,156	1,551,988	1,184,168	520,668	663,500
11 " " '11	2,454,651	1,359,562	1,095,089	487,120	607,969

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Nov., '12	$2,008,400	$1,196,259	$812,142	$761,838	$50,304
1 " " '11	1,881,976	1,136,722	745,254	740,631	4,623
5 " " '12	9,860,294	5,865,245	4,995,049	3,798,281	196,768
5 " " '11	9,380,136	5,690,194	3,689,942	3,688,821	1,121

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Nov., '12	$700,676	$347,885	$352,791	$153,574	$199,217
1 " " '11	633,968	317,628	316,340	148,079	168,261
11 " " '12	7,485,614	3,796,657	3,689,157	1,581,366	2,107,791
11 " " '11	7,141,998	3,530,330	3,611,667	1,548,871	2,062,796

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†Deficit.

Traffic and Transportation

Profit Sharing in Washington, D. C.

The Washington Railway & Electric Company, Washington, D. C., on Jan. 3, 1913, distributed $19,123.02 among 801 employees, including motormen, conductors, starters and depot clerks. Profit-sharing checks were sent to each employee coming under the categories named who had been with the company for one month or more. The profit-sharing plan was suggested to the directors of the road by President Clarence P. King and those associated with him in the management and was adopted by the board. Mr. King last April, while addressing the men in the club rooms of the relief association, said that the adoption of such a plan was being considered by the company, but as no further suggestion of the idea was made, the receipt of the checks, with a personal letter from Mr. King explaining the company's attitude toward its employees, was a surprise. Many of the men who shared in the distribution, having been with the company for a year or more, received checks for $28.72 each. The others received a proportionate amount, based on the length of service. In the letter which accompanied each check Mr. King recalled the fact that he had mentioned the subject before, and said that the company in adopting his suggestion did so with a desire that the conductors and motormen should share in whatever improvement could be effected in the results of the year 1912 over and above the final showing made in 1911. He explained that in 1911 26 per cent of the company's earnings, after the deduction of 4 per cent had been made to meet the District tax, had been expended in wages and the payment of accident claims. With these results as a working basis, he added, the directors agreed to set aside 26 per cent of the receipts, exclusive of the tax fund, to cover wage and accident payments for 1912. If this sum was not required for these purposes, the directors agreed that any balance should be devoted to a profit-sharing plan and distributed among the men at the end of the year. The following table shows the results as disclosed at the conclusion of the year and the manner in which the residuary fund was distributed:

Gross passenger receipts, less 4 per cent government tax		$2,552,479
26 per cent appropriated for trainmen's wages and accidents		663,645
Accidents	$89,337	
Wages	555,185	644,522
Profit-sharing fund		$19,123

This amount was distributed among 801 men, as follows:

584 men in service one year or more, each $28.72	$16,772.48
17 men in service 11 months, each $26.34	447.78
4 men in service 10 months, each $23.94	95.76
6 men in service 9 months, each $21.54	129.24
18 men in service 8 months, each $19.15	344.70
14 men in service 7 months, each $16.76	234.64
20 men in service 6 months, each $14.36	287.20
18 men in service 5 months, each $11.97	215.46
19 men in service 4 months, each $9.57	181.83
26 men in service 3 months, each $7.18	186.68
20 men in service 2 months, each $4.79	95.80
55 men in service 1 month, each $2.39	131.45
801	$19,123.02

The following suggestions, embodied in a folder, have been made to the men as to the best means to be followed by each man to increase the fund for 1913:

"CONDUCTORS

"A large responsibility rests upon the conductor. He has charge of the car, and our common interests are vitally in his hands. While his chief duty is to collect fares he should constantly strive to avoid accidents. A careless signal has frequently caused an accident costing the company thousands of dollars. It is hardly necessary to say that the indifferent, careless or dishonest conductor is our common foe, for either carelessness or dishonesty reduces revenue, and therefore bonus.

"MOTORMEN

"To this end motormen can do much by keeping their cars on time and guarding constantly against accidents. A delayed service forfeits both revenue and good will, while an accident plunges the company into expense, no matter who is at fault. All of us are losers, since an impaired service means a smaller bonus.

"DEPOT CLERKS AND STARTERS

"Results accomplished by conductors and motormen depend largely upon co-operation and concerted effort on the part of depot clerks and starters. Fairness and impartiality in their dealings with trainmen should be their motto. It is the duty of trainmen to keep their cars on time, consequently the most essential thing is to start on time; this cannot be done unless the conductor is promptly furnished by the clerk with tickets, transfers, etc., necessary for his day's work.

"While the conductor is getting his 'traps' the starter should assign a car to the motorman and see that it is clean, properly equipped with fender, sand, etc.; that destination signs, ventilators, head and light switches are in working order and properly adjusted. Start a crew out on time and in a good humor and they will in ninety-nine cases out of a hundred stay that way during their tour of duty. It is needless to say that their work will be much better than that of the crew that starts out with a 'grouch.' Don't think your duties end when the runs have been put out. Far from it. Constant attention to schedules and equipment only will make the day's work end as it was started. If the right man is in the right place, depot clerks and starters can do more than can be estimated toward increasing the profit-sharing fund.

"GOOD WILL

"The great point is to win favor with the traveling public, and aside from good service no more certain factor exists than unfailing politeness."

P. T. Haller, secretary of the Washington Railway & Relief Association, addressed the following communication to the members of the association with the profit-sharing checks:

"Just a word about your check. Don't 'blow it in' hastily because it has come to you almost unexpectedly. How about the 'rainy day' that is sure to come? It may be sickness, injury or death in the family. Your profit-sharing check or at least a part of it would make a nice start toward a savings fund. The relief association has a savings department and will keep your money safely and allow 5 per cent interest, compounded semi-annually."

Grievance Committees in Providence

The Rhode Island Company, Providence, R. I., has recently addressed the following communication to its motormen and conductors in regard to a plan to establish grievance committees to promote a more harmonious feeling among the men:

"On page 5 of the rule book there is a clause which reads, 'Grievances, etc., also suggestions as to betterment of service, will always be received for consideration by the superintendent of transportation or the general manager.'

"It occasionally happens that a suspended or discharged employee, acting in accordance with the above-mentioned clause and being particularly interested in his own favor, is not in a position to take an impartial view of the circumstances responsible for his grievance, and after the interview regarding the same he is not fully satisfied with the final decision.

"Therefore, in order to promote a more harmonious feeling, you are requested to appoint a committee of three from among the employees stationed at your respective carhouses, one member to be selected who has been in the service of the company one year or less, one member to be selected who has been in the service of the company more than one year but less than five years, and the third member to be selected to be one who has been in the employ of the company five years or over, this committee to confer with the superintendent of transportation and the general manager relative to any grievance which a motorman or conductor may have and which he has failed to adjust satisfactorily through his own efforts."

The men in the employ of the Rhode Island Company are not organized, but whenever the wages of the men in the employ of the other systems in New England which are controlled by the same interests are increased the management of the Rhole Island Company raises the pay of its men to correspond. The employees of the company are members of a benefit association, and the company felt that the formation of grievance committees from the various divisions would stimulate greatly the *esprit de corps*. The company has always paid men for their time during the investigation of accidents where the men have been found not to have been at fault. The communication to the men was addressed to them over the signature of R. Roscoe Anderson, superintendent of transportation, with the approval of A. E. Potter, general manager.

Special Dairy Train Proposed.—The Chicago, Ottawa & Peoria Railway, Ottawa, Ill., contemplates running a dairy special over its lines to furnish scientific instruction to farmers in the territory through which it operates.

Automatic Ticket-Vending Machine in Hudson River Tunnel Station.—An automatic ticket-vending machine has been installed in the concourse of the terminal of the Hudson & Manhattan Railroad at Church and Fulton Streets, New York, N. Y.

Merit System in Washington, D. C.—A merit and demerit system patterned after the Brown system was established by the Washington Railway & Electric Company, Washington, D. C., on Jan. 1, 1913. Folders showing merits and demerits were distributed among all motormen and conductors with instructions to carry the booklets while on duty.

Free Coffee to Portland Employees.—Under the direction of Gus Rowden, superintendent of the welfare department of the Portland Railway, Light & Power Company, Portland, Ore., every employee who carries his lunch to work will be served free a cup of hot coffee, cream and sugar at the Hawthorne Building, Hawthorne Avenue and Water Street, Portland, every noon.

The "Webfoot" Route.—L. A. MacArthur, who is assistant general manager of the Pacific Power & Light Company, has been awarded the prize of $25 in gold offered for the best popular name for the Portland, Eugene & Eastern Railway, which is constructing 340 miles of interurban electric railway through the Willamette Valley. The title "Webfoot" won the prize and will be adopted officially by the company.

New Station at Jamaica.—The new station of the Long Island Railroad at Jamaica, Long Island, has been completed and it is expected to move the headquarters of the officers of the company connected with the administration of the general superintendent, most of which are now in Long Island City, to Jamaica on Feb. 22. The only department which will stay at Long Island City will be the Long Island Express Company.

Suspension of Service During the Winter Approved.—The Public Service Commission of the Second District of New York has consented to the discontinuance of a part of the electric railroad of the St. Lawrence International Electric Railroad & Land Company in Alexandria Bay. The portion is from the top of an elevation known as Church Hill, and operation during the winter months is considered dangerous. The president of the village of Alexandria Bay has consented to the granting of permission by the commission.

Increase in Wages by Massachusetts Northern Street Railway.—The Massachusetts Northern Street Railway, operating in the district between Fitchburg and Athol, has announced an increase of wages dating from Jan. 1, 1913. All employees of more than four years' standing with the company will receive 24 cents per hour, and all work will be performed hereafter on a nine-hour basis. Motormen and conductors will receive 20 cents per hour for the first year, 21 cents for the second year, 22 cents for the third, and at the end of the fourth year 24 cents per hour.

Award of Gold at Boston.—The Boston (Mass.) Elevated Railway made its annual distribution of awards on Jan. 1, 1913, to car service men who had been in its employ at least six months and who had made satisfactory records during 1912. In determining the standing of the men the company eliminated all records included during June, July and August, and covering the recent strike period, and based the payment of the awards upon their service during the remainder of the year. About 4000 men received a reward of $15 each, this total exceeding that of 1911 by about 400. The payment was made in gold and distribution was effected as usual at the division headquarters offices throughout the system.

Skip-Stop Idea in Portland, Ore.—At a recent meeting of the special committee of the City Council of Portland, Ore., appointed to take up with the management of the Portland Railway, Light & Power Company the question of improving street railway traffic conditions in the city, the officers of the company expressed themselves as in favor of the suggestion to eliminate certain stops and announced that beginning on Jan. 6, 1913, if agreeable to a majority of the people affected, the plan of stopping cars at every other block, instead of every block, would be put into effect on the Mount Tabor line. The company is also favorably disposed toward the suggestion that hereafter all stops made on paved streets be at the near side of the crossing instead of at the far side.

Increase in Wages in Fitchburg.—W. W. Sargent, president and general manager of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., had the following notice posted recently in the carhouses of the Fitchburg & Leominster Street Railway: "A general raise in pay for conductors and motormen will take effect Jan. 1, 1913, as per schedule below: First six months, 20 cents an hour; second six months, 21 cents; second year, 23 cents; third year, 24 cents; fourth year, 25 cents; fifth year, 27½ cents. A new timetable going into effect on the same day will adjust runs to new requirements for a day's work as passed by the last session of the Legislature. The directors wish to thank the employees for the courteous, careful and efficient service rendered during the past year and trust the same will continue."

Differences Between Management and Employees Adjusted.—The differences between the employees of the East St. Louis & Suburban Railway, East St. Louis, Ill., and the management over the discharge of three motormen concerned in recent accidents have been adjusted. The representatives of the employees demanded that the men who had been discharged should be reinstated in their former positions and should receive twenty days' pay for the time which they lost owing to their discharge. The management of the company insisted that the records of the men involved precluded their re-employment by the company in their former capacities, but offered one of the men a position as a special officer, another a position as a shop worker and the third a position as a lineman, with fifteen days' pay. The men agreed to accept these terms.

Accident on Chicago Elevated Loop.—At 6.50 a. m. on Jan. 8, 1913, as a train of the Chicago & Oak Park Elevated Railroad, Chicago, Ill., consisting of three coaches was rounding the loop curve from Van Buren Street to Fifth Avenue, the rear coach was derailed, mounted the outer third rail and fell to the street. Only a few passengers were on the train and no passengers were in the rear coach. The car fell to the street on the west side of the structure in front of the Fifth Avenue station of the Aurora, Elgin & Chicago Railroad. One pair of trucks left the structure with the coach, but the other pair of trucks remained on the structure although derailed. Pending an investigation into the accident the only explanation for the mishap seems to be that the crew took the curve from Van Buren Street at an excessive speed which whipped the rear coach from the train.

Communication in Regard to "Stop Signals."—On Dec. 30, 1912, the Railroad Commission of Indiana addressed the following communication in regard to "stop signals" to all the steam railroads and the interurban railways which operate in Indiana: "Information has come to the commission that many steam and interurban railroads operating in this State have not required strict compliance with Rule No. 27, Book of Rules, Standard Code for Steam Railroads, and Rule No. 103, Standard Code for Interurban Railroads. These rules are identical and read as follows: 'A signal imperfectly displayed, or the absence of a signal at a place where a signal is usually shown, must be regarded as a stop signal, and the fact reported to the proper official.' The proper construction of this rule is that when switch signal lights are found to be out the train or car shall stop, the switch shall be examined and the light relit. Trains or cars should stop in all cases where the lights are out; not slow down, but stop. The commission recommends that this strict construction of the rule shall be enforced by all companies. These companies will advise the commission within thirty days from the date of the receipt of this circular that they will so construe and enforce the rule."

Personal Mention

Mr. G. A. McNamee, for several years assistant secretary-treasurer of the Montreal (Que.) Tramways, has resigned.

Mr. Rodman E. Griscom has been elected president of the International Traction Company, Buffalo, N. Y., to succeed Mr. Thomas Penney, resigned.

Mr. J. P. Ross, who has been secretary of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has also been appointed assistant treasurer of the company.

Mr. Theodore H. Rabe, who has been treasurer and auditor of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has been made treasurer and assistant secretary of the company.

Mr. J. T. McNamara, Jr., has been appointed auditor of the Jackson Railway & Light Company, Jackson, Miss., to succeed Mr. A. C. Powell, who has become connected with the McClelland Banking Company, Jackson.

Mr. Frank McCoy has resigned as general manager and purchasing agent of the Allegheny Valley Street Railway, Tarentum, Pa., and as manager and contract agent of the Allegheny Valley Light Company, New Kensington, Pa.

Mr. John Cash has resigned as superintendent of city lines and roadmaster of the Evansville & Southern Indiana Traction Company, Lafayette, Ind., after a continuous service of twenty-seven years with that company and its predecessors.

Mr. E. E. Vreeland, who has been assistant to Mr. T. H. Tutwiler, president of the Memphis (Tenn.) Street Railway for the last seven years, has resigned to devote himself to his private interests. Mr. Vreeland went to Memphis from Nashville in 1904.

Mr. Charles E. Fife, who since August, 1910, has been superintendent of the Pittsburgh, McKeesport & Greensburg Railway, Greensburg, Pa., has been appointed general manager of the Allegheny Valley Street Railway, Tarentum, Pa., to succeed Mr. Frank McCoy, resigned.

Mr. M. A. Cavanagh, Boston, Mass., who with his associates has purchased the property of the Norwood, Canton & Sharon Street Railway, Canton, Mass., has been elected president of the company to succeed Mr. Dennis G. Travers, who continues with the company as superintendent.

Mr. J. D. Maxwell has resigned as electrical engineer of the Spartanburg Railway, Gas & Electric Company, Spartanburg, S. C., to become connected with the Anderson Electric Carriage Company, which manufactures the "Detroit" electric vehicles. He will be attached to the Philadelphia office of the company.

Mr. A. D. Furlong, who has been general superintendent and electrical engineer of the Springfield (Ill.) Consolidated Railway, the entire stock of which is owned by the Springfield Railway & Light Company, has been appointed general manager of the company to succeed Mr. A. A. Anderson, resigned.

Mr. V. T. Bary, who has been dispatcher with the Pittsburgh, McKeesport & Greensburg Railway, Greensburg, Pa., has been appointed superintendent of the company to succeed Mr. Charles E. Fife, who has been appointed general manager of the Allegheny Valley Street Railway, Tarentum, Pa.

Mr. Daniel Reidel, Jr., formerly with the Cincinnati & Columbus Traction Company and before that with the Cincinnati, Newport & Covington Light & Traction Company, has been appointed superintendent of motive power and maintenance of way of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio.

Mr. Franklin K. Lane, of California, has been elected by the Interstate Commerce Commission to serve as its chairman for the year beginning Jan. 13. As chairman, Mr. Lane will succeed Commissioner Charles A. Prouty, of Vermont. Mr. Lane has been a member of the commission since 1905, and now is serving his second term.

Mr. Alfred Anderson, formerly purchasing agent of the Panama Railroad, Panama Steamship Line and Isthmian Canal Commission, and later with the Metropolitan Street Railway, New York, N. Y., in the same capacity, has been elected president of the Transit Manufacturing & Materials Company, Inc., recently organized with offices in New York.

Mr. A. A. Anderson has resigned as general manager of the Springfield (Ill.) Consolidated Railway, the entire stock of which is owned by the Springfield Railway & Light Company. Mr. Anderson was formerly general manager of the Indianapolis, Columbus & Southern Traction Company and before that was general manager of the Indianapolis & Louisville Traction Company, Louisville, Ky.

Mr. H. R. Domby has been appointed general storekeeper of the Birmingham Railway, Light & Power Company, Birmingham, Ala., in charge of the department of general stores, which has been established. Mr. Domby has been in the employ of the company since September, 1906, all of his work being in connection with the purchasing and stores department, which he entered as a clerk. Before becoming connected with the Birmingham Railway, Light & Power Company he was with the Birmingham *Ledger,* and before that he was connected with newspapers in Los Angeles, Cal.

Mr. James W. Dunbar, who was superintendent of the Gas, Light & Coke Company, New Albany, Ind., years ago and later accepted a position with the United Gas & Electric Company in that city, affiliated with the Insull interests which own the Louisville & Northern Railway & Lighting Company and other properties in southern Indiana, has been appointed general manager of the New Albany utilities. It is announced by the Insull interests in Chicago that the electric railways of the syndicate in southern Indiana will be managed hereafter from the Chicago office, under the general charge of Mr. F. E. Cole.

Mr. R. O. Launey has been appointed auditor of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to succeed Mr. Theodore H. Rabe, formerly treasurer and auditor of the company and now treasurer and assistant secretary. Mr. Launey has been connected with the company since April 1, 1904. He entered the service as a clerk and occupied various positions in the accounting department until July 1, 1911, when he was appointed assistant treasurer and assistant auditor. Before becoming connected with the Birmingham Railway, Light & Power Company Mr. Launey was connected with the public utilities at Savannah, Ga., where he was born.

Mr. Henry A. Nettleton, manager of the local lines of the Connecticut Company in Manchester, Conn., which include the line to Stafford Springs, and the oldest employee in point of service now connected with the company in Manchester, was presented with a gold watch recently by members of the crews which work under him. Mr. Nettleton has been in the employ of the Connecticut Company as superintendent at Manchester since the Hartford, Rockville & Manchester Tramway was taken over by the Connecticut Company and previous to that was auditor of the Hartford, Rockville & Manchester Tramway. He has been connected with that company and the Connecticut Company for seventeen years.

Mr. Ivy L. Lee has been appointed executive assistant to the president of the Pennsylvania Railroad. Mr. Lee was born at Cedartown, Ga., on July 16, 1877. He was graduated from Princeton University in 1898 with the degree of A. B. and did post-graduate work at Harvard and Columbia Universities. He then engaged in editorial work until his appointment as press representative of the anthracite coal operators, the Pennsylvania Railroad and other corporations. From 1908 to 1909 he was in charge of the publicity bureau of the Pennsylvania Railroad, and since 1910 he has been general European manager of Harris, Winthrop & Company, bankers. Mr. Lee will have his office at the Broad Street station of the Pennsylvania Railroad in Philadelphia.

Mr. E. Lowndes Rhett has been elected second vice-president and a director of the Federal Utilities, Inc., New York, N. Y. Mr. Rhett entered the banking house of Brown Brothers & Company in April, 1891, as a clerk, and remained with that firm for more than ten years, latterly as manager of the bond and stock department. He then engaged in the bond business with his brother, after which he entered the Stock Exchange firm of Dominick & Williams, where he remained for about three years. Mr. Rhett then became manager of the New York office of the Boston bond house of E. H. Rollins & Sons, from which position he resigned in 1911, when he was elected vice-president and a director of the Smith-Tevis-Hanford Company, dealer in public utility securities. He continued with the Smith-Tevis-Hanford Company until he was elected second vice-president and a director of Federal Utilities, Inc., on Dec. 30, 1912.

Mr. Joseph D. Evans, whose appointment as construction manager of the Electric Bond & Share Company, New York, N. Y., was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 4, 1913, was educated in the schools of Lowell, Mass., where he was born, and was graduated as a civil engineer from the Massachusetts Institute of Technology. He went south to do work in the engineering department of the proposed Nicaraguan canal and was subsequently associated with the United States government engineers in the preparation of the original estimates for the Panama Canal. He next engaged in railroad construction in Ecuador. After this Mr. Evans engaged in electric railway work in Pennsylvania, Massachusetts and Connecticut and a little later was appointed general superintendent of construction of the Great Northern Power Company at Duluth, Minn. Subsequently he was connected with the construction of the Buffalo, Lockport & Rochester Railway, which operates an electric railway between Rochester and Lockport. He was then appointed engineer in charge of construction of the Canada Light & Power Company, and at the completion of the plant at St. Timothée he accepted the position of chief engineer of the Montreal Tramways. Mr. Evans will have charge of plants under construction in Utah and Idaho by the Electric Bond & Share Company.

Mr. E. G. Connette, who since May, 1912, has been vice-president of the International Railway Company, Buffalo, N. Y., has been elected president of the company to succeed Mr. Thomas Penney, resigned, and has also been elected vice-president of the International Traction Company, the holding company for the electric railways which are operating in Buffalo, Niagara Falls and Lockport. Mr. Connette has been connected with electric railway properties in Nashville, Syracuse, Worcester and other cities, and previous to his election as vice-president of the International Traction Company he was transportation engineer of the Public Service Commission of the First District of New York. He is very well known in electric railway circles and has taken an active part in the affairs of the American Street Railway Association and its successors, the American Street & Interurban Railway Association and the American Electric Railway Association. He was third vice-president of the American Street Railway Association in 1897-8 and was president of the Street Railway Association of the State of New York in 1903-4. A biography and a portrait of Mr. Connette were published in the ELECTRIC RAILWAY JOURNAL of May 11, 1912. In a statement which he issued at the time Mr. Connette was elected vice-president of the International Railway Company, Mr. Penney said: "The development of traffic in Buffalo and the adjacent cities of Niagara Falls and Lockport and on the interurban lines which connect these cities presents many problems which require broad experience and expert knowledge to solve, and it was, therefore, concluded that it was necessary to procure the very best talent obtainable. The directors believe that they have found a man who will ably assist the president in solving the problems attendant upon the situation."

Mr. Thomas Penney has resigned as president of the International Traction Company and the International Railway Company, Buffalo, N. Y., but will continue as a director of the companies. Mr. Penney intends to devote his time principally hereafter to the management of the Near-Side Car Company and other interests of Mr. Nelson Robinson and his associates. Mr. Penney was elected president of the companies to succeed Mr. Henry J. Pierce in September, 1908. He is a member of the firm of Norton, Penney & Sears, counsel for the International Traction Company, and became intimately acquainted with the affairs of the company through his membership in that firm. Mr. Penney was born in London, England, and came to this country when a boy. He prepared for college at Williston Seminary, East Hampton, Mass., and after completing the academic course at Yale he took a law course of two years, graduating with the degree of bachelor of arts and bachelor of laws and was admitted to the bar of Connecticut. In 1889 he began the practice of law in Buffalo and in 1895 became first assistant to the district attorney, which position he occupied for four years. A vacancy then occurred in the office of the district attorney and Mr. Penney was appointed to fill that office by Theodore Roosevelt, at that time Governor of New York. The following year he was elected to the office for a term of three years. As district attorney of Buffalo Mr. Penney prosecuted the assassin Czolgosz. At the expiration of his term of office Mr. Penney declined a renomination and resigned, having become a member of the firm of Norton, Penney & Sears. Commenting editorially on the retirement of Mr. Penney as president, the Buffalo *Courier* said: "Four years ago Thomas Penney was made president of the company on account of his peculiar fitness for the direction of its affairs in a period requiring the most skilful management. Mr. Penney is a brilliant lawyer and also has the administrative quality highly developed. To his talent is credited the accomplishment of the reorganization without necessity for a receivership. Now he will retire from the presidency in order that he may give time to other large undertakings with which he is identified, but he will continue a director of the company."

OBITUARY

George W. Stoddard, who was president of the Citizens' Railway, Baltimore, Md., died at Atlantic City, N. J., on Dec. 27, 1912, at the age of seventy-three years. Mr. Stoddard was born in Allegheny County, Md., and early in life entered the service of the Baltimore & Ohio Railroad. During the Civil War he was superintendent of the division of the company between Baltimore and Cumberland. Soon after the war Mr. Stoddard took up his residence in Baltimore and subsequently became connected with street railway development work in that city. He retired from the Citizens' Railway following the sale of the property of the company some twenty years ago to the Baltimore Traction Company, which is now controlled by the United Railways & Electric Company. Mr. Stoddard went from Baltimore to Pittsburgh. He had long been a resident of Atlantic City.

Another Communication to Employees in Regard to Holiday Traffic

The Public Service Railway, Newark, N. J., took occasion to address its trainmen recently in regard to the handling of the increased traffic on account of the holidays. The communication, addressed to the men over the signature of Newton W. Bolen, superintendent of transportation, follows:

"In the excitement of holiday shopping some persons are likely to be less careful than usual, or in their hurry take reckless chances in boarding or leaving cars or crossing in front of them. Nobody wants an accident to happen. This is just as true of motormen and conductors as it is of passengers or pedestrians. Accidents are bad enough at any time; they are particularly distressing when, in addition to hurting some one, they spoil the Christmas of many others. Therefore, it is urged that more than the usual care be exercised in the operation of the cars to the end that no suffering shall be caused and that your record shall be clear during the holiday season.

"In addition to being careful, be courteous. Remember that courtesy pays in good will. Do not be grouchy. Help your passengers all you can, especially the aged and infirm and the children. Keep your car as comfortable as the heating and ventilating facilities will permit. Conductors will not fail to call out the names of the principal streets, stores and stations. It annoys one to be carried too far and there will be many visitors in town. Motormen will be extra careful in handling cars in the crowded districts. They can assist conductors, when necessary, by politely asking passengers to move forward in the cars. Everybody keep in mind the motto, 'Safety, Courtesy, Loyalty.'

"I feel satisfied that if the trainmen will follow the above suggestions they will have less trouble, the patrons will be better pleased and both will do their part in making a merry Christmas for all."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Vancouver Island Hydro-Electric & Tramway Company, Ltd., Victoria, B. C.**—Incorporated in British Columbia with a capital stock of $500,000. Headquarters, Victoria, B. C.

***Caseyville Railway, Belleville, Ill.**—Chartered in Illinois to build an interurban railway from Caseyville to East St. Louis. Headquarters: Belleville. Capital stock, $50,000. Incorporators and first board of directors: Joseph E. Gundlach, Aloys Gundlach, A. H. Baer, Louis Opp and William M. Hoppe, all of Belleville.

***Lake Erie & Youghiogheny Railroad, Youngstown, Ohio.**—Incorporated in Ohio to build an electric or gasoline railway between Youngstown and Conneaut. Capital stock, $3,000,000. Incorporators: A. W. Jones, John H. Ruhlman, William H. Ruhlman, George J. Chapman and George M. Brown, all of Youngstown.

***Gananoque, Perth & Lanark Railway, Gananoque, Ont.**—Application for a charter will be made by this company at the next session of the Legislative Assembly of Ontario to build an electric or steam railway between Gananoque and Lanark, with a branch from near Morton through Lundhurst and Delta to Portland. Incorporators: F. A. Henry, R. A. Sibbitt, J. C. Judd, all of Ottawa, and W. T. Sampson, Gananoque; J. A. Donevan, Toronto; F. B. Morton and D. W. Green, Lyndhurst.

***Nashville (Tenn.) Traction Company.**—Incorporated in Tennessee to build 34 miles of electric railway in Nashville. It will also furnish power for lighting purposes. Capital stock, $125,000. Incorporators: Walter O. Parker, Nashville, and George N. Hendrie, Russell A. Alger, Henry Ledyard and W. Howie Muir, Detroit.

***San Antonio, Fredericksburg & Northern Railway, Fredericksburg, Tex.**—Application for a charter has been made by this company in Texas to build an interurban railway from within 4 miles of Waring in a northerly direction to Fredericksburg. Capital stock, $30,000. Incorporators: R. A. Love, Foster Crane, M. H. Trice, F. F. Ludolph, A. L. Cunningham, J. H. Haile, George D. Campbell, W. W. Collier, Frank Richards, H. N. Jones and H. M. Abernathy.

FRANCHISES

Globe, Ariz.—Nathan L. Amster, Boston, and associates have received a franchise in Globe. This is part of a plan to build an electric railway between Live Oak, Globe and Miami. [E. R. J., Dec. 7, '12.]

New Westminster, B. C.—The plans of the proposed yards for the British Columbia Electric Railway in the West End have been submitted to the Council, calling for nineteen separate lines, or 3 miles of track. The city engineer has submitted a report giving his views on the plans and the City Council will visit the site before coming to any decision.

Antioch, Cal.—The Oakland, Antioch & Eastern Railway, Oakland, has received a franchise in Antioch.

Pacific Grove, Cal.—The Monterey & Pacific Grove Railway has received a fifty-year franchise from the Board of Trustees in Pacific Grove.

Stockton, Cal.—The Stockton Electric Railway has received a franchise from the Council for the extension of its Poplar Street line in Stockton.

Canon City, Col.—F. S. Kelsey and F. B. Street, New York, N. Y., have received an extension of time in which to begin the construction of the projected electric line through Canon City and the City Park at the top of the Royal Gorge. [E. R. J., Dec. 30, '12.]

***St. Augustine, Fla.**—The Jacksonville & St. Augustine Public Service Corporation has asked the City Council for a franchise in St. Augustine. The route of this railway has been described elsewhere in this issue.

Ashmore, Ill.—The Central Illinois Traction Company has received a fifty-year franchise from the Council in Ashmore.

***Centralia, Ill.**—G. L. Pittenger, C. E. Stead, Dwight F. Haussler and associates, who propose to form the East Side Electric Railway, have asked the City Council for a twenty-year franchise to build an electric railway on Locust Street, Saline Street and Wabash Avenue in Centralia, Ill.

Hillsboro, Ill.—The Springfield & Central Illinois Traction Company has received a franchise from the Council in Hillsboro.

Shreveport, La.—The Texas-Louisiana Traction Company, Shreveport, has received a franchise from the Council to build terminal properties and use certain streets in Shreveport. This line will connect Shreveport, La., and Jefferson and Longview, Tex. A. B. Blevins, Jefferson, Tex., is interested. [E. R. J., Dec. 7, '12.]

Mount Greylock, Mass.—The Berkshire Street Railway has been grantted an extension of time until Jan. 1, 1914, on its franchise for its Mount Greylock extension. Extensions of time for the construction of certain extensions in Pittsfield and North Adams have also been granted the company by the Railroad Commission.

Kansas City, Mo.—A. L. Berger, attorney for T. A. Bigger, receiver for the Kansas City Outer Belt & Electric Railway, holding company of the terminal property of the Kansas City, Mexico & Orient Railway Company, has asked the Kansas City (Kan.) Commissioners for a three-year extension of time for the completion of work in Kansas City, Kan., as provided in the company's franchise.

St. Joseph, Mo.—The St. Joseph Railway, Light, Heat & Power Company has received a franchise from the Council in St. Joseph on Eighth Street from Messanie Street to Edmund Street and from Felix Street to Francis Street.

Cicero, N. Y.—The Syracuse, Watertown & St. Lawrence River Railroad has asked the Public Service Commission, Second District, for permission to acquire and exercise a franchise from C. A. Lux for the construction of an extension of its railway in Cicero.

Utica, N. Y.—The New York State Railways has asked the Common Council for a franchise to double-track its line over the overhead railroad crossing at Genesee Street in Utica.

Nashville, Tenn.—The Nashville Traction Company, the incorporation of which is noted elsewhere in this department, has asked the Council for a franchise over certain streets in Nashville.

Murray, Utah.—The Utah Interurban Electric Company has received a fifty-year franchise from the City Commissioners in Murray City. The line will connect Salt Lake City, Payson, Lehi, Pleasant Grove, American Fork, Provo, Springfield and Spanish Fork. W. C. Orem, Salt Lake City, president. [E. R. J., Jan. 4, '13.]

Tacoma, Wash.—The Tacoma Railway & Power Company will ask the Council for a franchise for an extension across Tacoma's new steel bridge, which will be finished during January.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—This company plans to spend $6,000,000 for improvements and new equipment in southern California during 1913. The new lines and extensions consist of the following: Los Angeles to San Bernardino via Uplands, 21 miles; Riverside to San Bernardino, 10 miles; Santa Ana to Orange, 3 miles; Los Angeles to San Fernando, 10 miles, and Mendocinn Street, North Pasadena extension to Altadena, affording a new route to Mount Wilson, 1½ miles. Other lines are the Lincoln Avenue line in Pasadena, 1½ miles; the San Pedro Street line to be built for the city and for which the Pacific Electric Railway will bid. A short line of double tracking on Avenue Sixty-four will be completed in the near future. Work has been begun by this company along Colton Avenue on the new line to Riverside.

San Diego (Cal.) Electric Railway.—Surveys are being made by this company to determine the route for a new line through the City Heights section of San Diego.

Ocean Shore Railroad, San Francisco, Cal.—It is reported that this company has surveyed and secured right-of-way for a 10-mile extension from Tunitas to the center of the timber belt. To defray the expenses of the construction of the line the company will apply to the State Railroad Commission for permission to issue $400,000 of bonds.

Virginia Terminal Company, Washington, D. C.—This company will build a double-track electric railway in Washington from a point on Canal Street, near Chadwick Avenue, in Rosslyn, Va., and the Aqueduct Bridge to the Union Station. Among those interested are A. A. Thomas and H. Wardman, Washington, D. C. [E. R. J., Dec. 28, '12.]

***Jacksonville and St. Augustine Public Service Corporation, St. Augustine, Fla.**—This company has been organized to build an electric railway from South Jacksonville in a southeasterly direction to a point to be known as Beach Junction, and then, taking a more southerly course, to run into St. Augustine. From Beach Junction there will be a direct line eastward to the beach and then a line 11 miles along the beach northward to Pablo Beach. Capital stock, $2,000,000. Officers: A. W. Corbett, president; John D. Andrea, vice-president, and Alexander E. Baya, secretary and treasurer.

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Power Company is grading for an extension of its Decatur line to Stone Mountain, a distance of 16 miles.

Elberton & Eastern Railway, Augusta, Ga.—This company has completed 5 miles of its line from Elberton southward on its 21-mile railway to Tignall. Alexander Wilson, chief engineer. [E. R. J., Dec. 30, '12.]

Chicago (Ill.) Railways.—This company has placed in operation its new North Forty-eighth Avenue extension in Chicago, from Chicago Avenue to Milwaukee Avenue, a distance of 4 miles.

Southern Interurban Construction Company, Terre Haute, Ind.—This company was referred to in last week's issue as the Southern Interurban Company, Terre Haute.

Davenport-Muscatine Railway, Davenport, Ia.—This company has placed in operation its line into the downtown section of Muscatine.

Louisiana Traction & Power Company, Lafayette, La.—Surveys have been completed by this company on its Anneville line. Surveys are now being made near Scott on the way to Lake Charles. J. A. Landry, Lake Charles, president. [E. R. J., Dec. 21, '12.]

New Orleans Railway & Light Company, New Orleans, La.—This company has been asked to consider plans to extend its Claiborne line in New Orleans from Kentucky Street down St. Claude Avenue to Delery Street, a distance of 1½ miles.

***Baltimore, Md.**—Plans are being considered to form a company to build a 10-mile electric railway from Overlea to the Harford county line. No names have yet been given of those interested.

***Washington & Great Falls Railway & Power Company, Rockville, Md.**—Right-of-way for the proposed electric railway from the intersection of Bradley Lane and the Georgetown and Rockville Turnpike, near Bethesda, to Great Falls, has been secured, and a deed conveying the right-of-way from the Chevy Chase & Great Falls Land Corporation to the Washington & Great Falls Railway & Power Company has been filed. A deed of trust to secure a $500,000 bond issue from the railway company to the Fidelity Trust Company, Baltimore, has also been filed. It is stated that the construction of the line from Bethesda to Great Falls is now assured.

Boston & Providence Interurban Electric Railroad, Boston, Mass.—The certificate of necessity and the other privileges granted to the Boston & Providence Interurban Electric Railroad by the State of Massachusetts expired on Dec. 31, 1912, but the directors of the company, acting through E. J. B. Huntoon, Russell Robb, Frederick S. Pratt and Richard M. Saltonstall, have petitioned the Legislature for the revival of the certificate and the restoration of the rights.

Bristol & Norfolk Street Railway, Boston, Mass.—This company plans to build an extension from Post Office Square, Holbrook, to the railroad station.

Norwood, Canton & Sharon Street Railway, Sharon, Mass.—M. A. Cavanaugh, Boston; Joseph B. Murphy, Thomas F. Cavanaugh, James T. Dunn and Col. Peter Corr, Taunton, the new owners of this railway, plan to develop and improve the property at once. The lines will be extended on both ends, and it is proposed to extend the Sharon Heights tracks through to connect with Taunton and Mansfield.

Fergus Falls, Minn.—S. O. Bridston and N. A. Huss and associates plan to construct an electric railway in Fergus Falls. Power will be obtained from Hoot Lake. [E. R. J., March 16, '12.]

St. Louis-Kansas City Electric Railway, St. Louis, Mo.—Work has been begun by this company at Independence. The contract for building and equipping the line has been awarded to the National Contracting Corporation, Norfolk, Va. The contract for grading has been awarded to Griffith & McMurray, Kansas City, Mo. This 245-mile line will connect St. Louis and Kansas City, via Jackson, Lafayette, Saline, Howard, Boone, Callaway, Montgomery, Warren, St. Charles and St. Louis Counties. W. L. Allen, general manager. [E. R. J., Nov. 30, '12.]

United Railways, St. Louis, Mo.—This company has received the approval of the Board of Public Improvements to lay T-rails on eight residence streets and avenues in St. Louis.

Monmouth County Electric Company, Red Bank, N. J.—A 1-mile extension will be built by this company from Rumson to Seabright provided the residents of Seabright will obtain the necessary right-of-way.

International Railway Company, Buffalo, N. Y.—It is reported that this company placed in operation on Jan. 4 its new Hoyt-Seneca crosstown line in Buffalo. The extension of the Clinton and William Street lines across Main Street through Swan Street and returning via Erie and South Division Streets will be built at once.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—Plans are being considered by this company for an extension to the Morrow plant and the residential section in that part of Elmira.

Charlotte (N. C.) Electric Railway.—This company plans to build a double-track line on Central Avenue in Charlotte.

Tulsa (Okla.) Street Railway.—An announcement has been made by this company that extensions and improvements of equipment which will be made during 1913 will cost $100,000. A line to Bellview, 2 miles long, double-tracking of a large section of the fair ground line, additional double-tracking of other lines and extensions of the Owens Park and North Cheyenne lines are some of the proposed improvements.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—Grading is being done by this company on its 12-mile extension from St. Catharines to Niagara-on-the Lake. The entire work, including the grading, trestles, track laying, etc., is being carried out by the company's force under E. F. Seixas, general manager.

Toronto (Ont.) Railway.—This company has been asked to consider plans to extend its Church Street line in Toronto across Glen Bridge, up Glen Road, thence west and south to the bridge again, completing the loop.

Toronto & Suburban Railway, Toronto Junction, Ont.—This company has been asked to build two extensions in West Toronto, now known as Ward 7. The total length of the two lines is slightly over 2 miles. The order calls for a single track laid a little to one side of the center line, so as to allow of double-tracking when the traffic warrants it.

Lehigh Valley Transit Company, Allentown, Pa.—Plans are being considered by this company for an extension from Slatington to Palmerton and thence to Lehighton.

Quebec (Que.) Rapid Transit Company.—This company states that it will begin construction in the spring on its 60-mile to 75-mile line to connect Quebec, Beauport, Charlesbourg, Lorette, St. Ambroise, Cap Rouge, St. Grégoire and the Isle of Orleans. Capital stock authorized, $1,000,000. A. Tachereau, Quebec, is solicitor for the applicants. [E. R. J., Dec. 14, '12.]

***Moose Jaw, Sask.**—Plans are being considered to build an electric railway between Moose Jaw and Regina. A syndicate supposed to have the matter in charge has been represented in Regina by a Mr. Friedman, of Seattle, who has had conferences with the Board of Trade and the City Council.

Murfreesboro (Tenn.) Electric Railway.—This company has done a small amount of grading and will begin the construction about April 1 on its 55-mile line to connect Murfreesboro, Readyville, Woodbury, Nashville, La Vergne and Smyrna. The company will obtain power from the Murfreesboro station of the Tennessee Railway & Light Company. J. L. Parkes, Murfreesboro, local representative. [E. R. J., Dec. 28, '12.]

Bryan & College Interurban Railway, Bryan, Tex.—Arrangements have been made and contracts signed for the extension of this company's line into the Brazos section.

Eastern Texas Traction Company, Dallas, Tex.—This company has completed details and has closed contracts for right-of-way franchises for the extension of the Dallas-Greenville Interurban line north from Greenville through Wolfe City to Bonham. The Greenville-Bonham end of the line will be operated for traffic at the same time that the Dallas end is opened, probably not later than Sept. 1, 1913. Three preliminary surveys between Greenville and Bonham will be made soon. J. W. Crotty, general manager. [E. R. J., Nov. 23, '12.]

Denison, Tex.—It is reported that J. R. Cullinan, St. Louis, and associates will begin surveys this month for an electric line between Denison, Tex., and Durant, Okla., via Colbert and Calera. The Field Engineering Company, Denison, will make the survey. [E. R. J., Nov. 30, '12.]

Utah Light & Railway Company, Salt Lake City, Utah.—This company is ready to make track connections with the Oregon Short Line and to extend its Capitol Hill line into the Capitol grounds in Salt Lake City.

Walla Walla Valley Railway, Walla Walla, Wash.—The improvements planned by this company during 1913 will include the construction of new track in Walla Walla and Milton, paving of the right-of-way over Clinton and Whitman Streets and College Avenue, Walla Walla, and a mile extension of the Prospect Heights line as the first step to construct a loop through Russell Creek district, to connect with the East Walla Walla line. An extension to Vincent, a distance of 10 miles, is also being considered by the company.

Tyler Traction Company, Clarksburg, W. Va.—Work is progressing rapidly by this company on its line between Sistersville and Middlebourne. The bridge across Point Pleasant Creek has been completed. H. W. McCoy, president. [E. R. J., Sept. 2, '11.]

Fairmont & Mannington Traction Company, Fairmont, W. Va.—Surveys are being made by this company for a 5-mile electric railway from Annabelle to Mannington. J. O. Watson, general manager of the Monongahela Valley Traction Company, Fairmont, is interested.

Monongahela Valley Traction Company, Fairmont, W. Va.—Announcement has been made by this company that it will build at once its 2-mile line from Gypsy to Lumberport, and that 2 additional miles on the Weston line will soon be placed in operation.

South Morgantown Traction Company, Morgantown, W. Va.—Plans are being made by this company to build an extension of the South Park loop to the Sabraton mills, via Greemont and Marilia.

City & Elm Grove Railway, Wheeling, W. Va.—Plans are being considered by this company to build the View Park loop in Wheeling.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by this company to build a new station in Eburne.

Central California Traction Company, San Francisco, Cal.—The general offices of this company, which are now located in San Francisco, will be moved to Stockton during this month and Stockton will become the center of all the activities of the company.

Washington Railway & Electric Company, Washington, D. C.—This company has opened its new carhouse at Four and One-half Street and P Street, Southwest, Washington. This carhouse and repair shop has been erected to take the place of the former carhouse at Thirteenth Street and D Street, Northeast, which was destroyed by fire last March.

Pensacola (Fla.) Electric Company.—This company plans to build soon new carhouses on the site of the present carhouse between Reus Street and De Villiers Street in Pensacola.

Louisiana Traction & Power Company, Lafayette, La.—This company has purchased property near Lafayette, where it will build its carhouse and repair shops in the near future.

Springfield & Eastern Street Railway, Palmer, Mass.—The offices of this company have been removed to the new quarters in the Holbrook Building in Springfield.

Vicksburg (Miss.) Traction Company.—This company will move its office from the First National Bank Building to the Wilkerson Building at Washington Street and South Street in Vicksburg.

Oregon Electric Railway, Portland, Ore.—This company has opened its new depot in Albany. The structure is 110 ft. x 32 ft. and of brick construction.

Southern Traction Company, Dallas, Tex.—This company has recently purchased property on the north side of the court house square in Dallas to be used for a depot and terminal conveniences for the Dallas-Waco interurban railway. The purchase includes the building on the northwest corner of East Franklin Street and North Waco Street, and this building will be used for a depot for the interurban line.

Walla Walla Valley Railway, Walla Walla, Wash.—This company plans to build new carhouses and a new passenger station at Freewater.

Ohio Valley Electric Railway, Huntington, W. Va.—This company has leased a building on Fifteenth Street in Ashland which is to be remodeled as new offices for the company.

POWER HOUSES AND SUBSTATIONS

Alabama Traction, Light & Power Company, Montgomery, Ala.—Contracts for power-station equipment amounting to approximately $300,000 have been placed with the Westinghouse Electric & Manufacturing Company by this company, which controls important water-power rights in Alabama capable of developing several hundred thousand horsepower. The order just placed is for the initial equipment of the company's plant at Lock 12 on the Coosa River. It calls for four 13,500-kva, 6600-volt, 60-cycle, three-phase, vertical-type generators for operation at 100 r.p.m. With each is a direct-connected exciter. In addition to this equipment the contract includes twenty 4500-kva, single-phase, 6600-volt to 110,000-volt transformers.

Louisiana Traction & Power Company, Lafayette, La.—This company has purchased 10 acres of land adjoining Lafayette upon which it plans to build its new power houses. J. A. Landry, Lake Charles, president.

Shreveport (La.) Traction Company.—This company has awarded contracts for a 1000-kw generator outfit for its power house in Shreveport.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—This company will soon begin the erection of a $2,000,000 power house on a plot of ground near Midland, Pa. The company has secured control of several mines in the district, which will insure a supply of coal. The J. G. White Engineering Company, New York, will supervise the work.

London (Ont.) Street Railway.—This company is installing an Allis cross-compound 20-in. x 38-in. x 48-in. Corliss engine and 500-kw generator and is building an extension to its engine room sufficiently large to accommodate this additional unit.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—This company has awarded a contract to the Allis-Chalmers Company for a horizontal, cross-compound Corliss engine, which will be direct-connected to a continuous-current generator of 850-kw capacity.

Walla Walla Valley Railway, Walla Walla, Wash.—This company plans to reconstruct its substation at Freewater.

Manufactures and Supplies

ROLLING STOCK

North Carolina Public Service Company, Greensboro, N. C., expects to purchase four closed 21-ft. city cars during 1913.

Springfield (Mass.) Street Railway has ordered five 40-ft. express car bodies from the Wason Manufacturing Company.

Cleveland (Ohio) Railway has ordered from the G. C. Kuhlman Company fifty motor cars mounted on Brill 27-FE-1 trucks.

Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., is reported to have ordered 200 box cars from the Haskell-Barker Car Company.

Seattle (Wash.) Municipal Street Railway has ordered twelve car bodies from the Cincinnati Car Company. The trucks will be supplied by the Standard Motor Truck Company.

Illinois Traction System has ordered from the St. Louis Car Company four closed interurban trail cars, ten closed interurban motor cars, one sleeper and one observation car, all mounted on St. Louis trucks.

Pacific Electric Railway, Los Angeles, Cal., announces that it will place orders within the next thirty days for thirty stepless cars and twenty interurban cars. Within ninety days the company expects to place a further order for twenty-five additional interurban cars.

TRADE NOTES

International Steam Pump Company, New York, N. Y., has elected H. E. Moller a director of the company to fill a vacancy.

Ohio Brass Company, Mansfield, Ohio, has become exclusive sales agent for the National railroad trolley guard, effective Jan. 9, 1913.

Curtain Supply Company, Chicago, Ill., announces that S. W. Midgley, formerly Western representative, has been appointed Western sales manager, effective Jan. 1.

C. W. Rhoades, salesman for Valentine & Company in the Western territory, has been appointed assistant manager of the railroad sales department which covers all the territory west of Chicago.

Crane Valve Company, Bridgeport, Conn., has elected A. F. Bennett its vice-president and general manager, to succeed F. J. Mulcahy, deceased. Mr. Bennett was formerly secretary of the Crane company.

Henry Hess, Philadelphia, Pa., has disposed of his interests in the Hess-Bright Manufacturing Company to the Deutsche Waffen und Munitions Fabriken, Berlin, Germany, the manufacturers of DWF ball bearings.

Canadian General Electric Company, Ltd., Toronto, Ont., has elected W. R. Brock, for twenty-five years president of the company, its honorary president and chairman of the board of directors. Frederic Nicholls, vice-president of the company for the same period, has been elected president to succeed Mr. Brock.

Bay State Car Wheel Company, Boston, Mass., has been incorporated under the laws of Massachusetts with a capitalization of $21,000,000, consisting of 90,000 shares of 6 per cent cumulative preferred stock and 120,000 shares of common at $100 a share. The incorporators are James E. Carroll, John B. Pierce and Edward M. Pickman.

International Pay-as-You-Enter Tramcar Company, Ltd., London, England, announces that the Gateshead & District Tramways, Gateshead, England, has decided to equip its entire service with pay-as-you-enter cars as early as possible. The Gateshead & District Tramways has issued official figures showing an increase in receipts amounting to 7 per cent, attributable to the introduction of pay-as-you-enter cars.

Ford & Johnson Company, Michigan City, Ind., which went into bankruptcy last April with assets nominally $1,000,000, has had its property sold for $496,000 at receiver's sale to Harry Wehmer, of Cincinnati. Mr. Wehmer was a trustee for the Second National Bank and Cincinnati Trust Company, bondholders of the Ford & Johnson Company. Its liabilities were $3,000,000. It is stated that the property will be operated by the new owners.

Carnegie Steel Company, Pittsburgh, Pa., has appointed James C. O'Neil credit manager to succeed H. P. Howell, resigned. Mr. O'Neil was assistant to Mr. Howell. John P. Collins, who has been appointed to succeed James Scott as superintendent of the Lucy and Isabella furnaces of the company, has received the title of general manager of the city furnaces of the company, with supervision over the Lucy, Isabella, Edith and Neville blast furnaces.

Wheler Condenser & Engineering Company, Carteret, N. J., has acquired the American license to build turbo-air pumps of the A. E. G. type, as manufactured in Europe by the Allgemeine Elektricitäts Gesellschaft. This air pump is of the rotary water-jet type, for motor or steam turbine drive, air being removed from the condenser by ejector action of a series of small water jets and also by positive entrapment of air between successive small slugs of water. A number of these pumps are now being built.

Western Automatic Fender Company, Seattle, Wash., which manufactures the Nelson automatic fender, will furnish the fenders for the cars for the Seattle municipal railway. The decision to use the Nelson fender was made by the Board of Public Works of Seattle upon the recommendation of A. L. Valentine, superintendent of public utilities. In his report recommending the adoption of the Nelson fender, Mr. Valentine says: "The Public Service Commission for the First District of New York on Oct. 21 and Nov. 5, 1908, test No. 38, gave this fender a rating of 80.3 per cent against all competitors. The qualities required to secure this rating were efficiency and life-saving qualities, cost of maintenance, weight of device, number of parts and materials used in construction. From this and investigations which I have made I feel satisfied that this is the best type of projecting fender on the market, and feeling that the cars of the municipal line should be equipped with the best-known devices for the saving of human life, I recommend that the proposition be accepted."

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y., has issued Bulletin No. A4069, which is devoted to the subject of portable and stationary air compressor sets. Bulletin No. A4063 describes the various types of General Electric polyphase induction motors, and Bulletin No. 4994 describes and illustrates the company's subway transformers.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Leaflet No. 3511, which fully describes and illustrates Westinghouse box-frame commutating-pole railway motors Nos. 317, 317-A and 317-A2. These motors are adapted for high-speed interurban service, and A2 motor is for use with field control. Folder No. 4245, issued by the company, covers the Westinghouse universal blowtorch, which is adapted to all conditions of service.

Babcock & Wilcox Company, New York, N. Y., has just issued a sixty-four-page book describing the well-known Stirling type of steam boiler. Commencing with a brief discussion of the requirements for satisfactory boiler operation, together with a short history of the Stirling boiler, the book then presents a very complete description of its construction, design and methods of operation. Several pages are devoted to a discussion of the care and management of the boiler, both in service and out of service, and the book concludes with the results of a number of tests of Stirling boilers with various fuels, together with photographs of several installations.

John A. Roebling's Sons Company, Newark, N. J., has reprinted in booklet form an article entitled "The Sea Voyage of a Drydock," by William J. Aylward, which originally appeared in *Scribner's Magazine*. This article describes and illustrates the trip of the drydock *Dewey*, which was towed from Sparrow's Point, Md., to the Philippine Islands. Both wire and hemp hawsers were used for the tow. Among these were a number of Roebling wire hawsers, composed of six strands of thirty-seven wires each and a hemp center. These hawsers, which were 2 in. in diameter, 1760 ft. long and heavily galvanized to withstand the action of salt water, were used on automatic towing machines made by the American Ship Windlass Company (now the American Engineering Works).

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JANUARY 18, 1913 No. 3

PUBLISHED WEEKLY BY
McGraw Publishing Company, Inc.
James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.
Chicago Office..............................1570 Old Colony Building
Philadelphia Office..........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

LOCOMOTIVE TYPE DESIGNATIONS

In connection with the descriptions of foreign electric locomotives published from time to time in these columns, it may be of interest to explain the method of type designation used by foreign builders. In this country it is customary to employ a series of small and large circles or a succession of numerals to express the arrangement of the pony and driving wheels. On the Continent the pictorial method is dispensed with, while the purely numerical arrangement, showing the number of each kind of wheel, is replaced by a combination in which a numeral represents the number of pony axles and an initial capital letter the number of driving axles. Thus a locomotive with four driving axles only is merely designated as type D, instead of 0-4-0. Similarly, type 1-C-1 means one leading axle, three driving axles and one trailer axle—a combination which Americans would designate as a type 2-6-2 machine. The plus (+) sign is used to show the division of driving axles on separate trucks. Consequently a C+C locomotive is one with three driving axles in each of two trucks. This method of combining numerals and capital letters is as convenient to express or write as plain numbers, with the additional advantage that the typographical contrast between the numbers and letters emphasizes the difference between the two types of axles almost as effectively as the circles.

MIDYEAR MEETING

With the approach of the time for the midyear meeting of the American Electric Railway Association, it is possible to say that the attendance promises to be larger than at any other previous January convention. One reason for this is the growing practice of association committees to hold meetings at this time. This year the meetings of forty-two committees are scheduled in New York during the last four days of the week ending Feb. 1, and the program of the meeting itself will undoubtedly bring to New York a great many other railway men, so that a large attendance is practically assured. The subjects selected for discussion will make the midyear convention practically a meeting of the association as "a committee of the whole," to consider ways and means for improving the financial status of the companies by an increase in the unit rate of fare. The speakers scheduled to address the meeting are authorities on the topics on which they will treat, and the results of a thorough and free discussion should be beneficial to all. The coming year will be marked with legislative activity in a great many states as well as by a change of federal administration, and the electric railway companies ought to be able at least to suggest some definite program for legislative consideration as a means to make the investment in railway properties more attractive than it is at present. If the meeting shall help to crystallize the ideas of the association as to the form which the increase in fare should take, the result will be of great benefit to the industry.

INFECTION FROM TRANSFERS

In its issue of Dec. 21 the *Medical Record*, of New York, referred to the hygienic aspect of the practice sometimes followed by conductors of moistening their fingers to separate transfers before the transfers are issued to passengers. The discussion was not of an alarmist character, and it was admitted both that there was, perhaps, small likelihood of a street car transfer becoming a means of carrying contagion and that street car conductors, as a whole, were a healthy group of men. But the article said that the fact that millions of the little slips of paper daily pass from hand to hand in the larger cities is sufficient basis for the elimination of all danger, however slight it may be, because a passenger might bring his fingers in actual contact with the moistened area on the paper. It held that railway companies should prohibit this practice and suggested that if the pad of transfers was constructed with a beveled edge a single slip could be easily detached from the others. We heartily agree with the writer that the practice is one which ought to be abandoned for hygienic reasons as well as for those of public decency, whether the slips of paper to be separated are transfers, paper currency, playing cards or the pages of books and magazines. If a person has no regard for his own health, he should have some respect at least for the feelings of others. Hygienically, however, the practice should be less objectionable when applied to a transfer than to a great deal of other paper which passes current in business or in homes, because of the reasons stated and because it is used but once, whereas paper currency and the books and magazines of a circulating library pass through hundreds and perhaps thousands of hands and are carried into many houses where there may be disease. It was undoubtedly a very wise provision of nature that microbes are so small as not to be visible except under the microscope. Otherwise most people would acquire nervous prostration in trying to avoid them; but there is no difficulty in separating padded transfers without placing moisture on the fingers from the mouth, and the practice should be abandoned.

DECORATIVE TREATMENT OF RAILWAY BUILDINGS

A pleasing feature of much of the building construction which has been carried out in recent years by American electric railways is the attention paid to making their utility structures architecturally attractive. This policy would have been very costly in the earlier days of the industry, when so many buildings were remodeled to meet the change from animal to electric traction. In these times, however, such substantial construction is employed for entirely new properties that the elements of attractive appearance can be included at little or no additional cost. In fact, the difference between beauty and ugliness often lies only in the disposition of the available material.

Germany may be regarded as a leader in the practice of treating as civic ornaments railway buildings, in fact, utility structures of all kinds when they occupy a conspicuous position. In that country, for instance, one will find many handsome power plants, substations, carhouses, waiting rooms, shelters and even signal towers. Nevertheless, it would be as unwise directly to copy German models in this country as it is to place an American porch or piazza upon a Queen Anne cottage. Imitation should be chiefly along the line of making the architectural treatment of the railway buildings harmonize with that of the neighboring structures. A switch tower in the Nuremberg mode adds beauty to a Bavarian landscape, but it would be sadly out of place in an American suburb with brick or wooden houses.

Among American combinations which combine graceful appearance and utility may be named the bridges, switch towers and passenger stations of the New York, Westchester & Boston Railway, several substations and the way department headquarters of the Brooklyn Rapid Transit System and the splendid carhouses of the United Railways & Electric Company of Baltimore. In some instances these buildings are even superior to their surroundings. Installations like switch towers and substations offer the least difficulties to artistic treatment because of the absence of smoke and manufacturing rubbish. Generating plants have been beautified by treating the stacks as towers, while the monotony of a long carhouse roof can be concealed by a castellated parapet or other decorative cresting. The dark background of a parapet will also make the overhead work less obtrusive. In some old foreign carhouses their rather inartistic outlines have been skilfully concealed by a foreground of shrubbery between the tracks. In connection with this subject, it may be pointed out that, where conditions permit, an effective advertisement for the company is possible if some characteristic style of architecture is used for all of its buildings. This policy would make the several railway properties as distinctive as are the public schools built by a municipality during a given period.

Wainscoting or paneling of various kinds is quite common for the interior decoration of power buildings, but one would hardly expect to find the walls of shops and carhouses treated with ornamental striping or dado. This has actually been done in the new buildings of the Cologne-Bonn and Hamburg systems. At Hamburg this decoration consists of, say, a 12-in. black or brown border next to the floor line, some lighter shade for a width of 6 ft. to 7 ft. and then a decorative border. The rest of the wall, which is beyond the reach of dirty hands, is plain white. The cost of applying this ornamentation is very little, because the patterns can be transferred by means of stencils. Decorative effects of this kind in a well-lighted building are certainly most pleasing, and they offer the further advantage of reminding the workmen to be neat and orderly in their work and to keep the shop floor clear of débris.

THE MYRIAWATT AS A UNIT OF POWER

The recommendations of a joint committee, composed of members of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers, to the effect that the myriawatt, or 10,000 watts, be adopted as a universal unit for expressing power inputs are recorded elsewhere in this issue. It is intended to apply to measurements of the different forms of power delivered from any source of energy to prime movers of all types. It includes not only a rating for the power of steam delivered by a boiler to its engine or turbine but also for that of water delivered by a penstock to a waterwheel and for that of potential heat in the nineties, supplied by a gas producer to a gas engine.

The adoption of a single standard unit for this purpose has appeared to be inevitable for some time past, although the action of the joint committee is considerably in advance of the expectations of engineers in general. The use of the myriawatt in place of the boiler horse-power is, of course, absolutely logical, and the change from one term to another can be made without the slightest degree of confusion for the reason that the myriawatt is only 2 per cent larger than the older term. At best, the boiler horse-power is a peculiarly arbitrary unit developed at a time when the needs of the present day could not have been foreseen and for a purpose which is to-day practically outgrown. Based as it was upon the steam required to produce 1 hp from an engine of a type which entered into a decline in the early nineties, its actual value expressed something which never was definite and always was difficult of conversion into any other unit. Its adoption was in fact at such an early date in the art of steam engineering that the figure upon which its value was based, namely, 30 lb. of steam evaporated from feed water at 70 deg. and at 70 lb. pressure, was not even reducible to a round number when expressed on the basis of pounds of water evaporated from and at 212 deg. As this later became the universal method of expressing steam boiler capacities, the unsatisfactory figure of 34½ lb. had to be used. Under all ordinary conditions the change from the boiler horse-power to the myriawatt simply means a substitution of words, and the 2 per cent difference is negligible aside from the necessities of the most accurate tests or the largest types of power plants.

For the other uses recommended for the new unit, such as measuring inputs on hydraulic turbines, the desirability of a change may not perhaps be so readily discernible. It is, however, an undoubted fact that the familiarity with one unit and its various factors of conversion is a distinct step in the right direction. The term "water horse-power" is at best a gross misnomer, and the time is certainly ripe for discarding it.

For a satisfactory means of expression to replace it the myriawatt will do as well as any other, and since practically all water power is now converted into electricity it has all the advantages which apply to the opportunity for expressing output and input in terms which are easily converted to each other. In addition, there is the convenient fact in calculations that, roughly, 26,500,000 ft.-lb. equals 1 mw, which applies, of course, in the case of water measurements as well as in any other case.

For gas-engine work the convenience of the myriawatt is again obvious because its conversion factor on the thermal basis is 34,150 b.t.u., a number which can readily be memorized and forms a definite standard method of expression for rating gas producers, a thing which has hitherto been badly needed.

Notwithstanding the fact that the new unit has not been officially adopted as yet by the two societies, there is no doubt that the recommendations of the joint committee will be followed to the letter, in view of the fact that the new unit will afford such great assistance to the engineering profession. When it is once established only a few conversion factors need be remembered by the busy engineer and it is to be hoped that official action will be prompt and thorough.

TURBO-ALTERNATOR DESIGN AND CONSTRUCTION

The paper delivered before the American Institute of Electrical Engineers last week by B. G. Lamme, chief engineer of the Westinghouse Electric & Manufacturing Company, contained much suggestive information. The author explained in simple language the reasons for the use of certain forms and proportions of the parts of the high-speed alternator. He showed that ventilation, limitation of temperature rise and improvement in quality of insulating material are the features in which design progress has been made. Mr. Lamme has been connected with the development of the turbo-alternator from its beginning and has successfully solved difficult problems as they have arisen. Hence his summary of the obstacles overcome and still to be overcome is worthy of careful study.

The problems met in the early designing of turbo-alternators were different from those of the present time. Then the limitations were not those of the materials employed but, rather, were due to lack of experience and skill on the part of the designers. Bearings gave difficulty and generators were noisy, but these troubles were easily eliminated, leaving the designers to struggle with the real problems involving the introduction of new materials and construction methods.

The experience which was gained from low-speed generator practice was of little assistance because these machines were open and naturally well ventilated. The mechanical problems, also, were quite definite. In the high-speed generators heat is generated at a rapid rate in a confined space, and even if the efficiency of the transformation from mechanical to electrical power is high, in large units there is great heat congestion. At the same time the peripheral velocities are so great that only the very best materials, skilfully disposed, can stand the stresses to which they are subjected.

At the present time there is an urgent demand for low-priced, and therefore high-speed, turbines. This condition exists, of course, in connection with all rotating machinery, because a high-speed machine is not only cheap but it is compact, and a reduction in necessary floor space is usually highly desirable. Accompanying the demand for high speed is another for high capacity. It is the combination of these which has brought about the situation existing at the present time.

The problem of ventilation involves several elements, namely, the rate at which heat is developed, the extent of the radiating surfaces from which this heat can be removed and the rate of flow and temperature of the air available for cooling. The losses may not be great in percentage of the total capacity of a machine, say 3.5 per cent out of 15,000 kw, but they are large in relation to the available radiating surfaces, particularly in large units. In the above example the loss is 565 kw, requiring, according to Mr. Lamme's calculation, 50,000 cu. ft. of cooling air per minute to prevent excessive temperature rise. Not only must air pass through the cores and windings at a rapid rate, but it must come in contact with the hot surfaces. Various plans for insuring this contact are in commercial use. Radial and axial ducts are employed, and air is forced in through the air-gap and the ducts by fans on the rotor shaft or by separate blowers.

The rate at which cooling air must be supplied is settled largely by the allowable rise in temperature of coils and cores. There is a limit to the temperature to which insulating material can be safely subjected. The modern mica covering can stand possibly 125 deg. C., but lower values are advisable. The limiting temperature is not that at the radiating surface but that in the buried parts of coils. These are warmer than the exposed parts by the amount of temperature head necessary to maintain the heat flow, which is retarded by many obstructions. As the methods ordinarily used for measuring internal temperatures are unsatisfactory, conservative practice in temperature rise is necessary. It is probable that temperature rises much greater than have been supposed to exist have been common in past practice. Some progress in designing insulating coverings to withstand high temperature has been made, but even with mica, as ordinarily used with combustible binding material, only moderate temperature rises are allowable.

As was pointed out by W. L. R. Emmet in the discussion of Mr. Lamme's paper, the user of a generator should have some conception of the problems which the designer has to meet and should be reasonable in his requirements. Specifications should call for only such standards as are necessary, especially in view of the difficulties which have been described. The study of a paper of this sort should tend to produce a spirit of co-operation, not only because it states the designer's problems clearly but also for the reason that it calls attention to the fundamental laws underlying the solution of these problems.

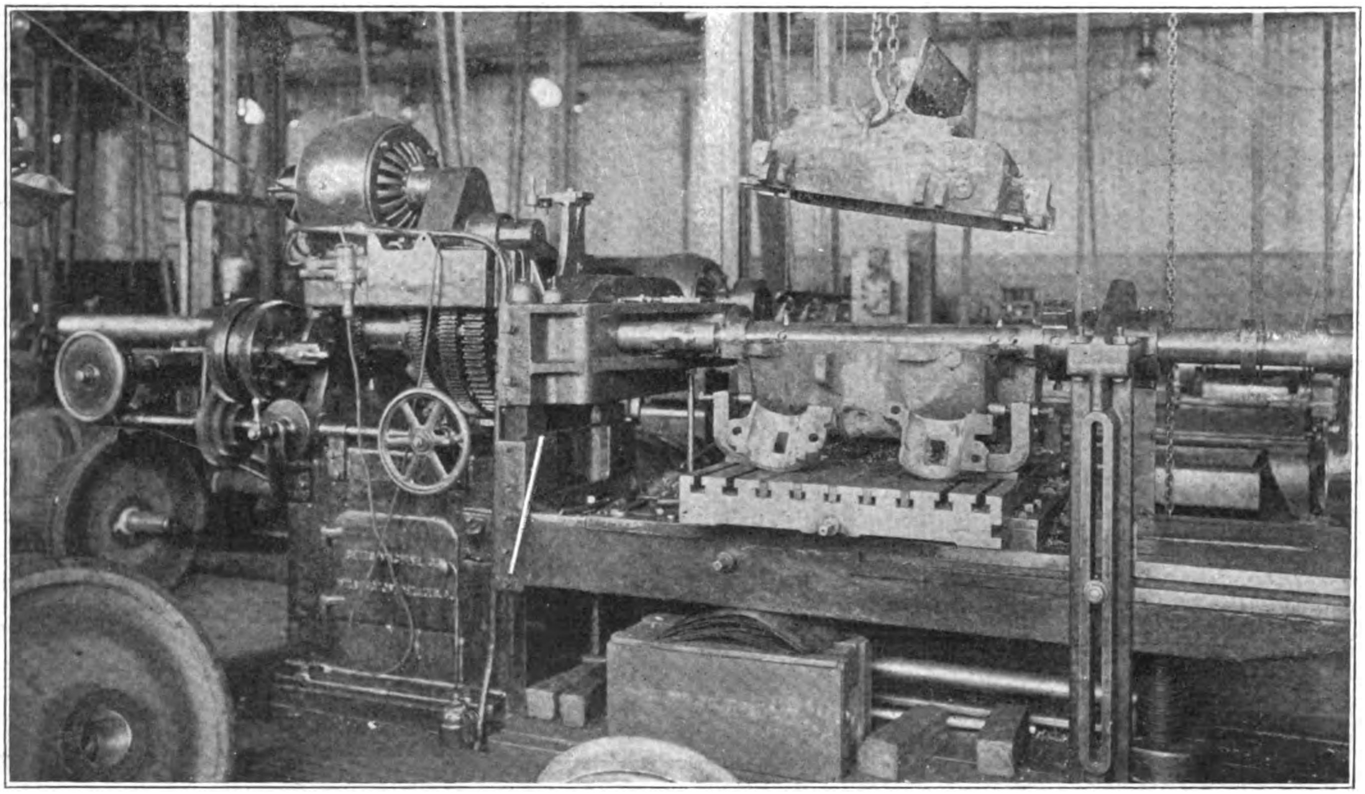
Brooklyn Motor, Truck and Brakeshoe Improvements

Description of Brooklyn Rapid Transit Company's Practice in Reboring Motor Shells—Types of Bearings and Brasses Used—Truck Changes, Brakeshoe Economies, Etc.

The present article, which is the third in this series on some recent interesting work of the mechanical department of the Brooklyn Rapid Transit Company, is devoted to a description of miscellaneous improvements in motor, truck, brakeshoe and other running gear practices.

REBORING OF MOTOR SHELLS AND EFFECT ON OVERHAUL MILEAGE

One of the most important tasks in the rehabilitation and general improvement of electrical apparatus has been the reboring of the older types of motor shells in order to take up the wear in the axle and armature bearing housings and thus prolong the life of the motors. The economy of this practice is apparent from the fact that with the machine in use at East New York four Westinghouse No. 81 shells a day are bored at a labor cost (one man at $2.75 and one man at $1.75 a day) of $1.12 each, whereas a new shell would cost about $100. The Brooklyn company completed the boring of its 1517 Westinghouse No. 68 shells in April of this year, and of the 1820 Westinghouse No. 81 motors approximately 50 per cent had been rebored by Jan. 1, 1913. About two and one-half years more will be required to complete this work, which is carried out in step with the standardization of axle diameters from 4 in. to 4⅝ in. as described elsewhere in these articles.



B. R. T. Running Gear—Two-Spindle Machine for Reboring Motor Housings

As the result of the reboring and other modernization of the Westinghouse No. 81 shells, the overhauling mileage of this motor has been lengthened from a 7000-mile to a 10,000-mile basis, except that for every intermediate run of 5000 miles the rebored motor receives what the company terms a "heavy inspection." This treatment is defined exactly as follows:

"The special inspection and cleaning to be given the motors is to consist of a thorough cleaning of all parts of motors by the use of compressed air in blowing out the dirt accumulated after the top and bottom covers and hand-hole plates have been removed. Then the interior of the motor is to be wiped out with cheese-cloth and special attention is to be given to wiping off the commutators and brush holders and the brush-holder insulation. The brush holder is then to receive a coat of shellac and allowed to become thoroughly dry before the car is placed in service again. The motor covers and hand-hole plates are then to be replaced. Special attention should be given to the armature and axle cap covers, gear castings, etc., to make certain that all are in good condition. This work is to be done on the pits and without removing trucks from under the car body."

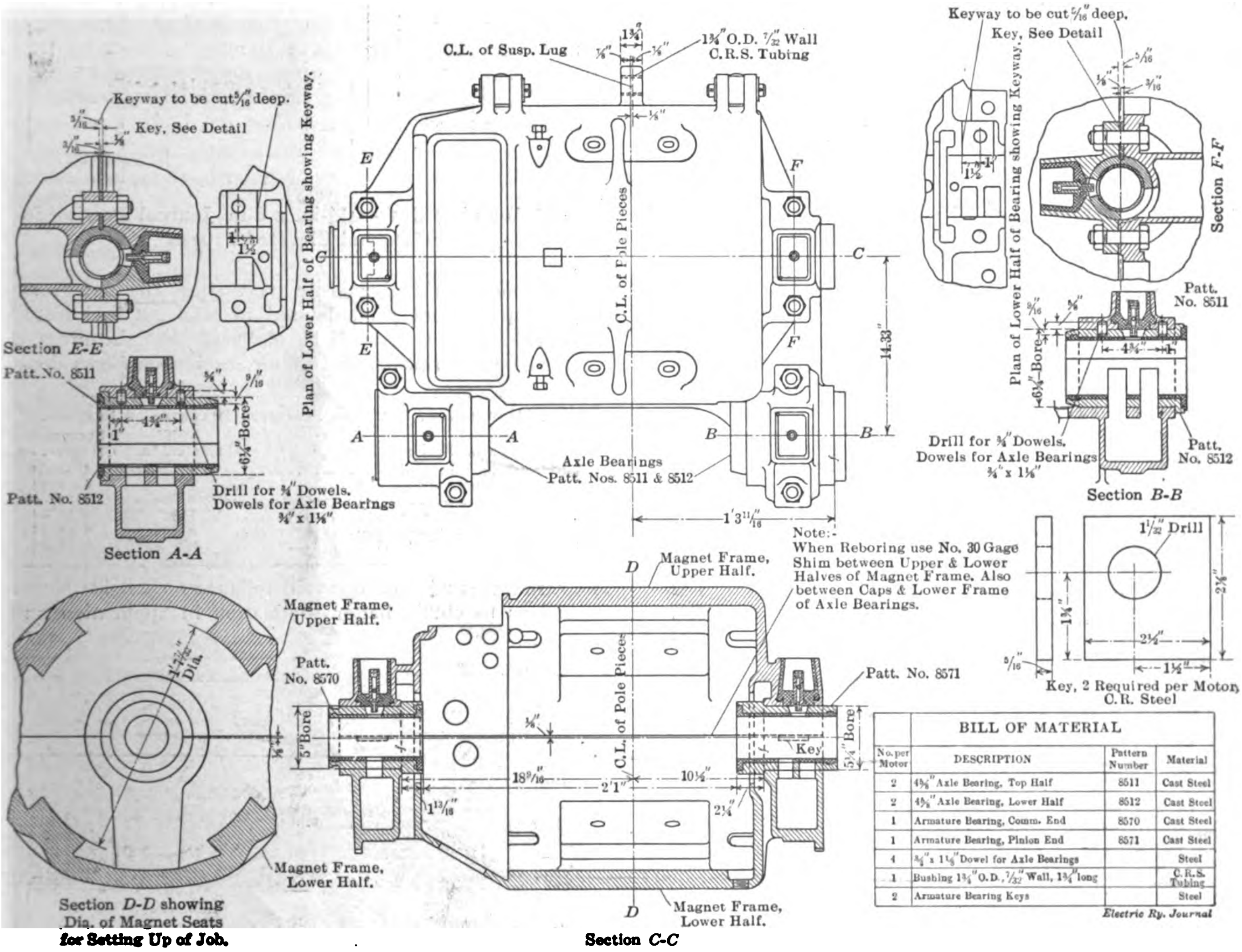
The practice of "heavy inspection" was inaugurated on Nov. 17, 1911. Should it prove generally successful, it is expected that the overhauling period of the Westinghouse No. 81 motor, for instance, will be lengthened to 12,000 miles.

PROCEDURE IN REBORING SHELLS—AUXILIARY IMPROVEMENTS

Reboring of motor shells and the auxiliary changes in connection therewith are conducted at both the East New York and the Fifty-second Street shops. In preparing a shell for reboring, the fields and pole pieces are removed, the motor shell is thoroughly cleaned and then the shell is brought to the boring machine. The next step is to insert a cored drum casting illustrated on page 101. This is used to center the armature bearings accurately for the action of the boring bar. Then the two halves of the shell are bolted together.

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

An engine lathe is used at Fifty-second Street, but at East New York the boring is done on a Betts machine which was changed from a one-spindle to a two-spindle unit during 1911 so that the four housings are bored out at the same time. The cutting tools on the boring bars are adjustable for any variations in the diameter of the bearings. When the boring is finished the drum is removed to permit the facing off of the housing collars. The completed shell is placed in position for ready removal merely by sliding the armature boring bar through the tailstock and removing the axle cap. The new bearings are fitted with the standard tin-base babbitt which has been described elsewhere. The illustration on this page is an assembly of the Westinghouse 81 motor which shows the rebored bearing fits.


Keyway to be cut 5/16" deep.
Key, See Detail
C.L. of Susp. Lug
1¾" O.D. 7/32" Wall C.R.S. Tubing
Plan of Lower Half of Bearing showing Keyway
C.L. of Pole Pieces
Section E-E
Patt. No. 8511
4⅝"
6¾" Bore
Patt. No. 8512
Drill for ¾" Dowels. Dowels for Axle Bearings ¾" x 1⅛"
Section A-A
Axle Bearings Patt. Nos. 8511 & 8512
14.33"
1' 3 11/16"
Section F-F
Section B-B
Note:- When Reboring use No. 30 Gage Shim between Upper & Lower Halves of Magnet Frame. Also between Caps & Lower Frame of Axle Bearings.
1 1/32" Drill
2⅛"
1¾"
2½"
1½"
5/16"
Key, 2 Required per Motor, C.R. Steel
Magnet Frame, Upper Half.
Patt. No. 8570
Patt. No. 8571
5" Bore
5¼" Bore
Key
18 9/16"
2' 1"
10½"
1 13/16"
2¼"
Magnet Frame, Lower Half.
Section D-D showing Dia. of Magnet Seats for Setting Up of Job.
Section C-C
Electric Ry. Journal

B. R. T. Running Gear—Assembly of Westinghouse 81 Motor, Showing Rebored Bearing Fits, Keyways, etc.

BILL OF MATERIAL

No. per Motor	DESCRIPTION	Pattern Number	Material
2	4⅝" Axle Bearing, Top Half	8511	Cast Steel
2	4⅝" Axle Bearing, Lower Half	8512	Cast Steel
1	Armature Bearing, Comm. End	8570	Cast Steel
1	Armature Bearing, Pinion End	8571	Cast Steel
4	¾" x 1⅛" Dowel for Axle Bearings		Steel
1	Bushing 1¾" O.D., 7/32" Wall, 1¾" long		C.R.S. Tubing
2	Armature Bearing Keys		Steel

The same drawing also shows the positions of the 5/16-in. x 3-in. flat bearing keys, which have replaced the original round dowel pins. This change eliminates the breaking through of the casting at the edge of worn-out dowel pin holes. In order to install the keys it is necessary to plane out the motor shells as indicated in an accompanying half-tone and to provide a slot in the armature bearings. The keys can be readily removed while the motor is being overhauled, and they can also be easily replaced if worn to any extent. In fact, they must be taken out by the shopman before he can remove the armature, whereas the dowel pins were often allowed to wear too long because the men would not take the trouble to examine them.

As each rebored shell is returned to the electrical shops, it is fitted with impregnated fields in accordance with the company's latest practice. Incidentally, the arrangement of bringing out the leads is changed to reduce the number of leads at the commutator in accordance with the company's standard instruction prints. The application of the integral type of babbitted oil cup to this motor has been described in the article on lubrication.

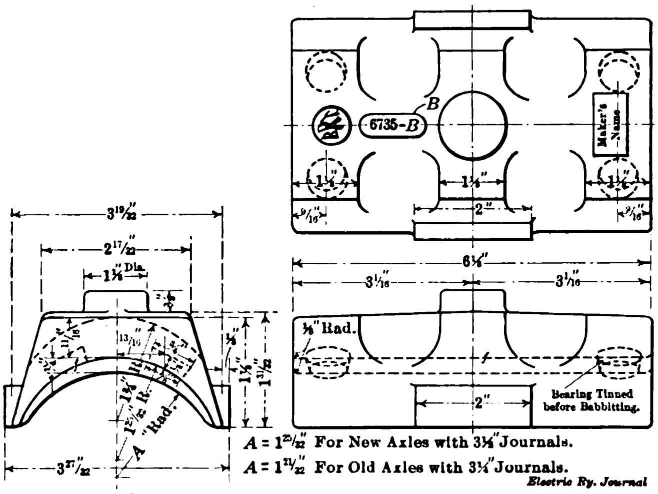
The overhauled Westinghouse 68 and 81 motors, and also GE-57's and GE-68's, are finished with a new form of axle cap, which has an extension over the end of the bearing to protect the bearing from wheel wash. The article on the lubrication practice of the company in the issue of Dec. 7, 1912, described this feature in greater detail. Furthermore, all mild steel axle cap bolts throughout the system have been replaced by high-grade bolts of ⅛ in. larger diameter, which have the high tensile strength of 80,000 lb. per square inch.

Metal shims for armature bearings have been superseded by canvas shims on the Westinghouse 81 and other surface motors whose shells have not been rebored as yet. The canvas shims are filled with white lead and are made in several specified thicknesses according to the amount of wear in the motor shells. The canvas shims were adopted because they make a tighter fit than metal and because they are noiseless even if there is a little lost motion between the motor shell and the armature bearing. Canvas shims are also used occasionally in elevated service.

ELECTRICAL AND MECHANICAL CLEARANCES

Careful attention is given to secure uniform and most efficient practice in the matter of electrical clearances. This is shown in Table I, which gives for each type of motor the total air gap, standard distance between armature and pole piece top and bottom and minimum allowable clearance.

When it is necessary to shim housings of surface armature bearings use is made of the canvas liners which have been previously described. All inspectors and overhaulers are furnished with fiber clearance gages of the thicknesses specified in the foregoing table. Any motor in which the gage cannot be entered between the armature and the pole piece is taken into the overhauling shop for new bearings.


6735-B
B
Maker's Name
3 19/32"
2 17/32"
1 1/8" Dia.
1 3/8"
1 1/8"
2"
9/16"
6 1/8"
3 1/16"
1/8" Rad.
Bearing Tinned before Babbitting.
3 27/32"
A = 1 25/32" For New Axles with 3 3/8" Journals.
A = 1 21/32" For Old Axles with 3 1/4" Journals.
Electric Ry. Journal

B. R. T. Running Gear—Journal Bearing for Elevated Trailer Trucks

Following the inauguration of the reboring of the Westinghouse 68 and 81 motors, special instructions were issued that, as it would be impossible to rebore the shells again, more care should be given to the wear of the outside diameter of the armature and axle bearings in order to prevent loose-fitting bearings and consequent wear of the motor shell at the bearing fits. The foremen were therefore provided with snap gages for use on all Westinghouse 68 and 81 armature and axle bearings sent into the shops for rebabbitting. These snap gages must be 1/64 in. less than the full diameter of the bearings mentioned, and any bearings over which these snap gages can be passed must be condemned and scrapped in accordance with the dimensions shown in Table II.

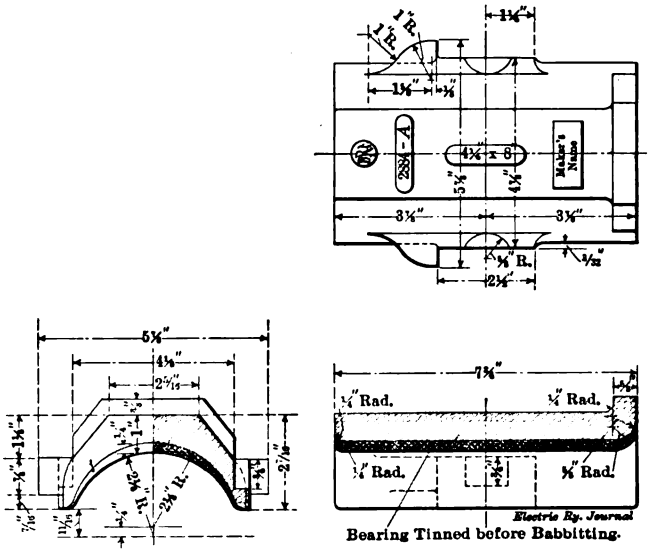
Table I.—Showing Total Air Gap and Other Clearances.

Type of Motor.	Total Air Gap, In.	Standard Distance Between Armature and Pole Piece.		Minimum Allowable Clearance, In.
		Top, In.	Bottom, In.	
GE-64	9/32	1/8	5/32	5/64
GE-80	11/32	5/32	3/16	5/64
GE-800	5/16	1/8	3/16	3/32
GE-212	15/32	13/64	17/64	1/8
W-68	3/8	3/16	3/16	3/32
W-81	5/16	5/32	5/32	5/64
W-93	3/8	3/16	3/16	3/32
W-101	3/8	3/16	3/16	3/32
W-50-B	1/2	1/4	1/4	1/8
W-50-E	7/16	7/32	7/32	7/64
W-50-L	7/16	7/32	7/32	7/64
W-300	3/8	3/16	3/16	3/32

B. R. T. Running Gear—Elevated Motor and Trailer Bearings

Bearings which are found to have any play in the motor shells must be returned to the Fifty-second Street shops for scrapping.

In accordance with the Brooklyn Rapid Transit Company's design, H. B. Underwood & Company, Philadelphia, have built for the surface overhauling shops eight horizontal boring mills of universally adjustable type, which are to be used for the accurate boring of motor journal bearings.


1" R.
1" R.
1 1/8"
1 3/8"
1/8"
2384-A
4 1/4 x 8
Maker's Name
5 1/8"
4 1/4"
3 7/8"
3 7/8"
3/8" R.
3/32"
2 1/2"
5 7/8"
4 1/8"
2 9/16"
2 7/16"
1/4" Rad.
1/4" Rad.
1/4" Rad.
3/8" Rad.
7 3/8"
Electric Ry. Journal
Bearing Tinned before Babbitting.

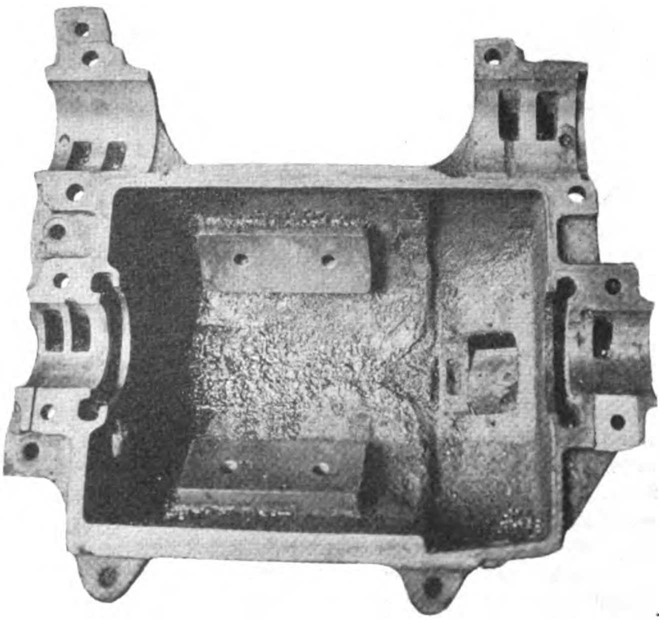
B. R. T. Running Gear—4¼-in. x 8-in. Journal Bearing for Surface and Elevated Trucks

Illustrations on the opposite page show the new form of press which has been devised to take out and install armature bearings. It will be observed that the press is operated by a screw instead of air, as is sometimes done.

Table II.—Showing Full and Scrapping Diameter of Bearings.

Type of Bearing.	Full Diameter, In.	Scrapping Diameter, In.
W-68 armature-pinion end	5	4 63/64
W-68 armature-commutator end	5	4 63/64
W-68 axle	6	5 63/64
W-81 armature-pinion end	5¼	5 15/64
W-81 armature-commutator end	5	4 63/64
W-81 axle	6¼	6 15/64

The screw was adopted to avoid reliance on outside power as well as to obtain better graduation in application and control of pressure. It thus prevents bearings from leaving housings too suddenly when high pressure has been reached.



R. R. T. Running Gear—One-Half of No. 81 Motor Shell, Showing Keyways in Place of Dowels

IMPROVEMENTS IN MOTOR LEADS

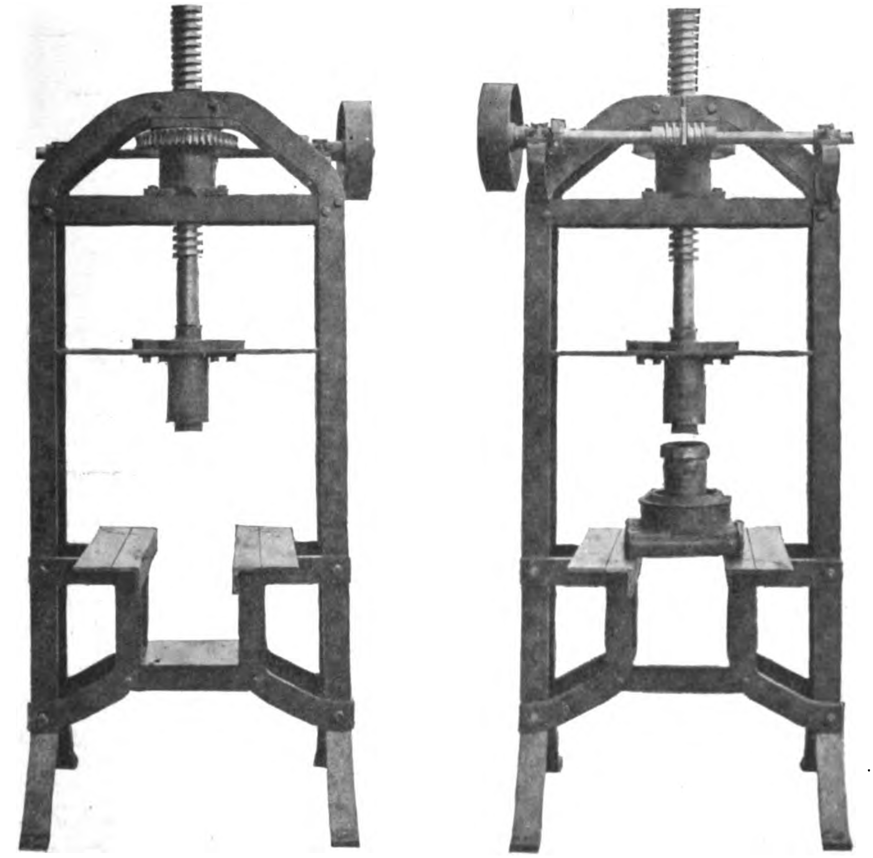
Since November, 1911, Westinghouse 101 and GE-80 motors have been furnished with improved terminals designed and made as shown in two accompanying drawings. Thimbles of No. 21 seamless hard-drawn copper tubing of 5/16-in. outside diameter are furnished with each terminal. The thimbles are soldered to the leads, and then both are installed in the terminals. This change has eliminated trouble due to rough and ready splicing methods. Furthermore, all leads are lettered so that outside men in calling for supplies ask definitely for A-80, B-101, etc.

TRUCK CHANGES

The company has not found it necessary to make any radical changes in truck practice, except that it has decided to discontinue the purchase of side-bearing type maximum traction trucks in favor of center-bearing trucks with cast-steel body bolsters. As there were about 2200 side-bearing trucks on hand, the cost of immediate replacement of all would have been prohibitive. The present practice of the company, therefore, is gradually to introduce the new designs, like the Brill 39-E and Standard 0-45, under the all-year (semi-convertible) cars and to dismantle the displaced trucks as a source of supply for those retained in service. During the first year of this policy eighty-two side-bearing trucks have been displaced, and as this displacement must continue in an even faster ratio, it is likely that at the end of five years every high-mileage car will be equipped with center-bearing trucks on this economical basis.

JOURNAL BRASSES

The great reduction in the number of hot journals in elevated service, to which reference was made in the article on lubrication, was due in large part to a radical change in the bearing metal of the brasses and to various alterations in the style of the brasses. The original bearing metal was a soft-lead-base babbitt which frequently squashed out of the brasses. Since February, 1910, this source of trouble has been eliminated, however, by a new composition which consists of 83⅓ per cent tin, 8⅓ per cent antimony and 8⅓ per cent copper. In ordering this alloy the company permits a variation of 10 per cent in the amounts specified for antimony and copper, but it will not accept the babbitt if the impurities exceed 0.75 per cent of the whole.



B. R. T. Running Gear—Drum Casting for Alignment of Bearings in Rebored Motor Shell—Press Used to Take Out and Install Armature Bearings

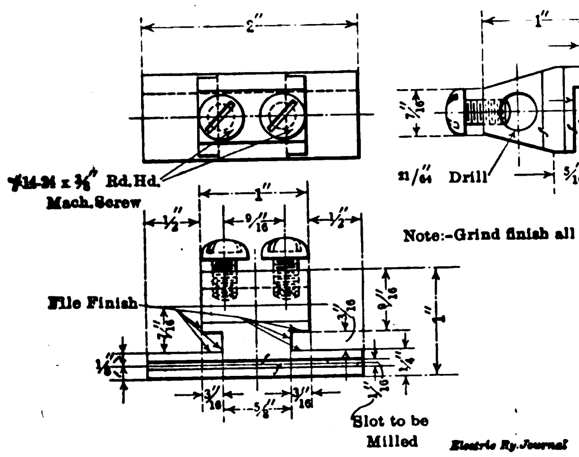
It was not found necessary to change the patterns of the two sizes of elevated motor journal brasses, but the journal brasses for elevated trailing axles were lengthened 7/16 in. at the sides to take the brakeshoe thrust, and the three patterns were reduced to one. All new wedges are now being crowned, and even old wedges when taken out are crowned in a milling machine. Gages are provided to check the inside measurements of the wedges so that they will not bind in the side of the brasses. All brasses and wedges not to gage are machined to the standard dimensions. Brasses are kept with their journals, the number of the corresponding axle being stamped on each brass. In the case of motor axles the letter "G" indicates that the brass belongs at the gear end of the journal, while the figures "1" and "2" are used in stamping trailer axle journal brasses.

In the 4¼-in. x 8-in. motor journal bearings, shown in an accompanying drawing and halftone, it will be seen that the babbitt is held in place by means of six holes which are drilled through the sides of the brass and counterbored on both sides. These anchor holes give the necessary adherence for the tin-base metal. In the case of the journal bearings for the Pullman, Wason and Gilbert elevated trailing trucks, however, the illustrations show only four holes instead of six. Furthermore, the brass is so light that the holes are not allowed to pierce it, but a good grip for the babbitt is secured by boring each hole to a smaller diameter at the bottom than at the top.

After the brasses have been drilled they are taken to the blacksmith shop for tinning and babbitting. One of the illustrations on page 103 shows how two brasses are babbitted simultaneously. First the operator dips the brasses in the babbitt crucible to heat them for tinning, after which he sets them up on the mandrel and clamps them into position by means of the pedal-actuated tongs. He then pours the babbitt rapidly before it can cool. Owing to the sluggish flow of tin-base metal, believed to be due to the cooling influence of the copper, it is necessary to pour the babbitt to a thickness of ½ in. at the center, although the actual service thickness is ¼ in. This characteristic of tin-base metal also makes it necessary for the operator to shift his ladle from one brass to the other instead of pouring the babbitt through a common funnel. As soon as the babbitted brasses have cooled off they are sounded for looseness. If the proper ring or sonority is obtained, the bearing is ready to be bored out to the standard journal diameter. As shown in an illustration, on page 103, a special jig is used whereby two bearings are bored out at one time to an absolutely smooth finish. The edges are beveled to avoid interference with the lubrication of the journal. Old journal brasses are not rebabbitted, but are scrapped as soon as they have worn to a thickness of ⅜ in.

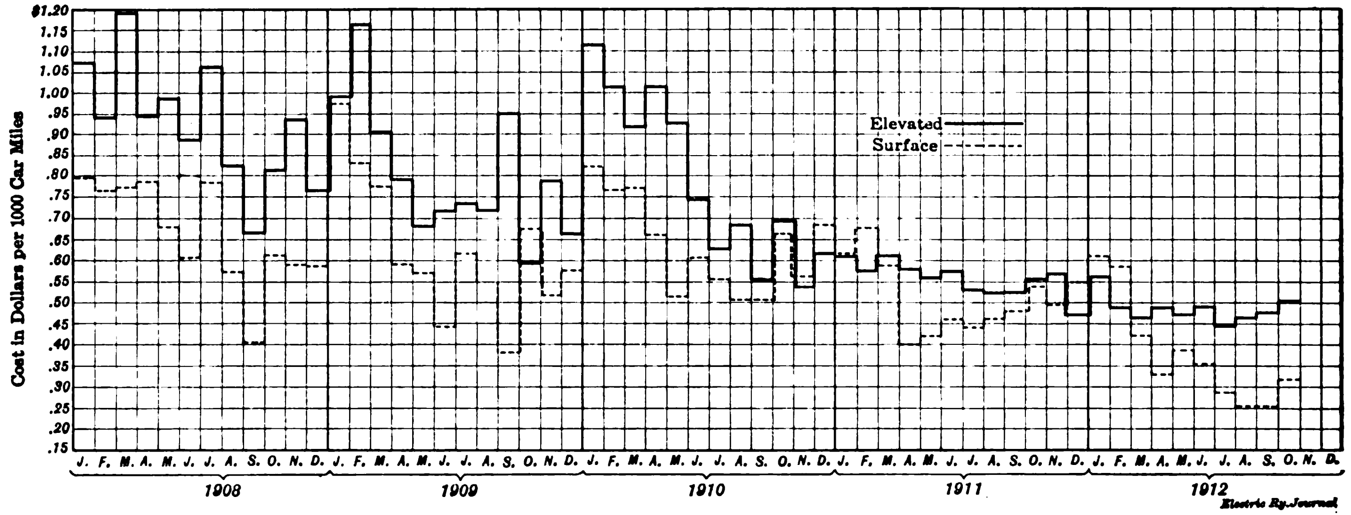
MANGANESE BRONZE AXLE CHECK PLATES

An example of increased reliability as applied to the smaller things is offered by the change in axle check plates. The original bronze composition used for these plates gave much trouble from breakage. After the matter had been discussed by all interested parties during the winter of 1911-1912 it was decided to install Johns-Manville manganese bronze forked check plates for all surface equipments, except on the maximum traction pony axles, where a solid check plate is used. More than 1000 of the new plates are now in service with Westinghouse 68 and 81 equipments, and so far not one has broken. These plates cost 4 cents per pound more than the old type, but the manufacturers agree to replace any that break within one year after installation. In order to check this guarantee, the foremen are instructed to stamp the top of each plate with the date, month and year of installation. Thus "3-8-12" means March 8, 1912.



8-Per Motor

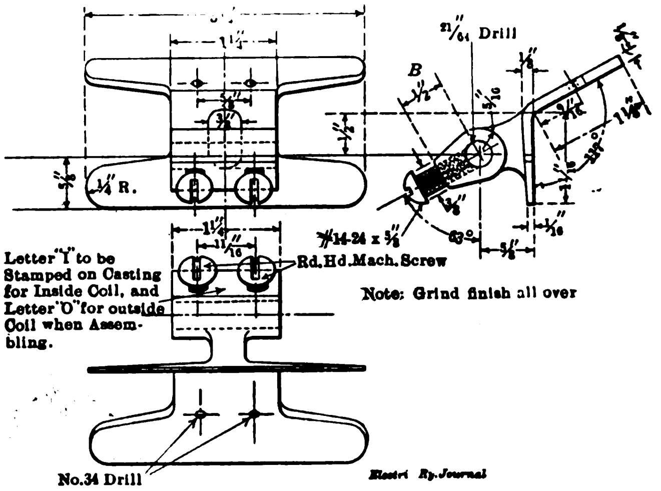
B. R. T. Running Gear—Details of Field Terminal for Westinghouse No. 101 Motor



B. R. T. Running Gear—Graphical Record of Brakeshoe Costs from January, 1908, to October, 1912

BRAKESHOE COSTS

The Brooklyn Rapid Transit system was a pioneer in the movement to standardize brakeshoes, its work in that field having been undertaken as early as 1903, when there were twenty-seven surface and thirteen elevated patterns in use. To-day there are just three styles of brakeshoe patterns, one under the elevated and two, namely, for driving and pony wheels, under the surface cars. The designs of the company and some of the earlier economies effected were described in the Electric Railway Journal for Oct. 24, 1908, and July 10, 1909. Since these articles were published the cost of brakeshoes, which are bought on a mileage basis, has continued to decrease. The early reduction in cost was largely due, of course, to standardization itself, so that the continuance of the decrease can to some extent be laid to the use of steel wheels and to the means adopted to secure the maximum wear consistent with safety. This end has been obtained by transferring partly worn shoes from driving to trailing wheels in accordance with a specified standard practice. The success of this scheme is reflected in percentages of wear, which are believed to be unequaled by any other large city railway operated under like conditions. For example, the average wear of brakeshoes throughout the entire system was 80.25 per cent for June, 1912. The highest surface record during that month was 84.05 per cent and the lowest was 75.54 per cent; the corresponding records for the elevated lines, which include surface running over suburban extensions, ranged from 78.91 per cent to 83.27 per cent. The accompanying curve sheet shows that the costs per 1000 car miles have gone down as follows for like-named months of 1908 and 1912: Surface—January, 1908, 80 cents, and January, 1912, 61 cents; June, 1908, 61 cents, and June, 1912, 35½ cents; elevated—January, 1908, $1.07, and January, 1912, 56 cents; June, 1908, 88½ cents, and June, 1912, 49 cents.


1¼"
21/64 Drill
B
¼"R.
1¼"
11/16"
#14-24 x ⅜
Rd.Hd.Mach.Screw
Letter "I" to be Stamped on Casting for Inside Coil, and Letter "O" for outside Coil when Assembling.
Note: Grind finish all over
No.34 Drill
Electric Ry. Journal

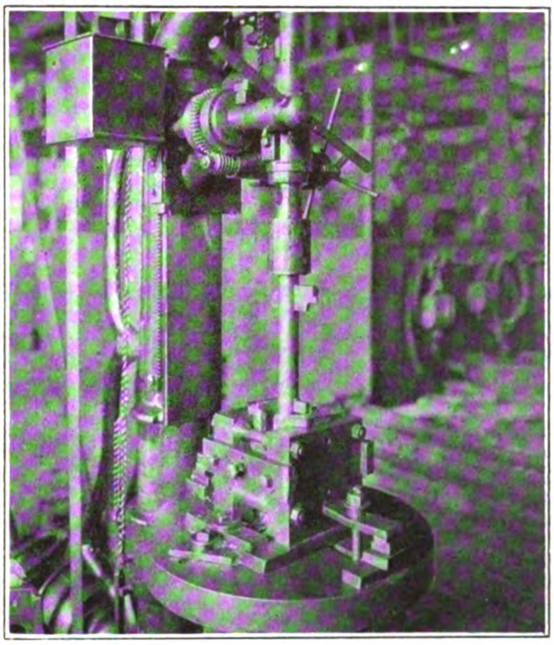
8-Per Motor

B. R. T. Running Gear—Details of Field Terminal for GE-80 Motor

In this chart the cost of the shoes from Jan. 1, 1908, to Nov. 1, 1909, is figured at the actual price paid, which varied with different types of shoes. From Nov. 1, 1909, to Nov. 1, 1910, the cost was figured at a fixed invoice price per net ton for all shoes. From Nov. 1, 1910, to date, the cost was figured in the same way, except that the contract price was $5 less per net ton than during the previous period.

The costs shown upon the chart illustrated in this article, which are figured upon a mileage basis, and the net ton costs are also in direct relation to the set guaranteed car-mile costs. The contracts as carried along for the past three or four years upon the system, being of a somewhat co-operative nature, have resulted in bringing actual costs and guaranteed costs closer and in a further attainment of the benefit of savings thus made to the Brooklyn Rapid Transit system in succeeding contracts.

B. R. T. Running Gear—Babbitting Two Bearings at One Time



B. R. T. Running Gear—Boring Out Two Bearings at One Time

RULES ON CLEARANCES IN CALIFORNIA

The Railroad Commission of California has issued rules specifying the character of construction required for crossings of railroads, street railroads, telegraph, telephone and other lines with each other and on the highways.

When railroads, street railways or streets cross above railroads which transport standard freight cars, the minimum overhead clearance above the top of rails must be 22 ft.; when the crossings are above street railways which do not transport standard freight cars, the minimum clearance is 19 ft., except when the street railways are on streets or highways, when it is to be 14 ft. Telegraph, telephone or signal lines, or all lines not exceeding 600 volts, except trolley wires and feeders, which cross above railroads or electric railways must allow a minimum clearance of 25 ft. When power lines other than trolley wires and trolley feeders transmitting power at from 600 volts to 15,000 volts cross above railroads or street railways, the clearance must be 28 ft. When the power is transmitted at a higher voltage than 15,000 the clearance must be 34 ft. Trolley wires and trolley feeders may cross railroads and street railways at 22 ft.

The minimum side clearance on each side of the center line of railroads and street railways for tunnels and bridges is 7½ ft. and for pole lines and other side structures it is 8 ft., except that double-track electric roads with center-pole construction may have a clearance of 7½ ft., and on roads with narrow gage the side clearance may be 30 in.

The following are rules for power lines other than trolley wires and trolley feeders:

"(a) Power lines, other than trolley wires and trolley feeders, of not exceeding 600 volts shall have a minimum clearance above rails at crossings with railroads and street railroads of 25 ft.; above streets and public highways, 20 ft.; above telegraph, telephone and signal lines, 2 ft.; above or below other power lines of not exceeding 600 volts, unless suitably supported to prevent contact, 2 ft.; above all trolley wires and trolley feeders, 4 ft.; above or below power lines of from 600 volts to 6600 volts, 4 ft.; below other power lines of from 6600 volts to 15,000 volts, 4 ft.; below other power lines of exceeding 15,000 volts, 8 ft., and above all buildings and structures, 4 ft.

"(b) Power lines, other than trolley wires and trolley feeders, of from 600 to 15,000 volts shall have a minimum clearance above rails at crossings with railroads and street railroads of 28 ft.; above streets and public highways, 24 ft.; above telegraph, telephone and signal lines, for power lines of from 600 to 6600 volts, 4 ft., and for power lines of from 6600 to 15,000 volts, 6 ft.; above or below other power lines of not exceeding 600 volts, 4 ft.; above or below other power lines of from 600 to 15,000 volts, 6 ft.; below other power lines of exceeding 15,000 volts, 8 ft., and above all buildings and structures, 6 ft.

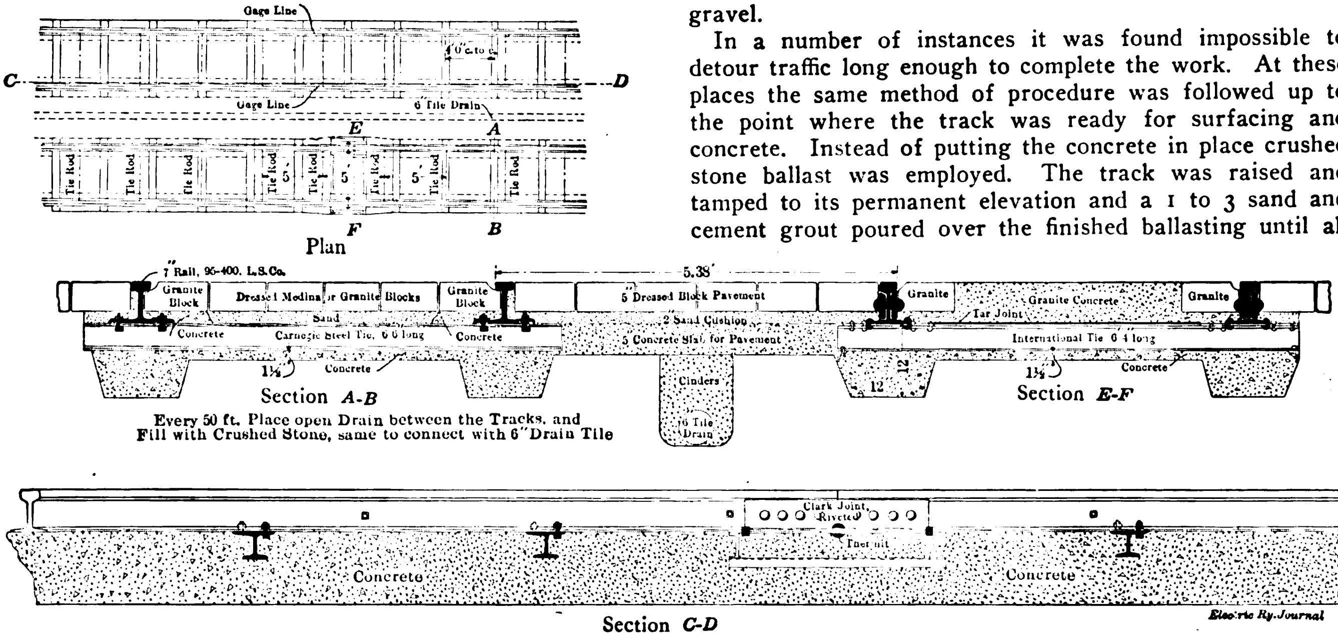
"(c) Power lines of exceeding 15,000 volts shall have a minimum clearance above rails at crossings with railroads and street railroads of 34 ft.; above streets and public highways, 30 ft.; above telegraph, telephone and signal lines, 8 ft.; above other power lines of not exceeding 15,000 volts, 8 ft.; above or below other power lines of exceeding 15,000 volts, 8 ft., and above all buildings and structures, 8 ft."

All of the provisions of these paragraphs are subject to the condition that no line carrying 15,000 volts, should breakage occur, shall come in contact with lines carrying less than 15,000 volts or within 10 ft. of the ground.

The rules also contain a clause on the construction of wire lines, referring to the length of span permitted with lines carrying less than 15,000 volts when they cross railroads and street railways. The report also refers to the specifications for overhead crossings adopted by the joint committee of the American Electric Railway Association and other bodies. These specifications are adopted as at present issued.

TRACK CONSTRUCTION IN CLEVELAND, OHIO, DURING 1912

The maintenance of way department of the Cleveland Railway Company has just closed up its quota of track rehabilitation for 1912. The work completed during the year comprised about 6 miles of track laid with a 7-in., 95-lb., Sec. 400, Lorain Steel T-rail and 10 miles of 103-lb. Cleveland section. The T-rail construction is the first to be used in Cleveland in recent years, and the construction details embody a number of original features which have been planned in detail by Charles H. Clark, engineer maintenance of way. The immediate results obtained from the new track have been so satisfactory that it has become a standard on this property.



Longitudinal and Cross-Sections of Track in Cleveland, Showing Standard Riveted-Welded Joint

Essentially these details include a 6-ft. 6-in. x 4¼-in. Carnegie steel tie, spaced on 4-ft. centers with an International steel tie at the rail joint. The two 4-in. channels forming the joint tie are riveted together by a 36-in x 14-in. x 5/16-in. steel plate, and the base of the T-rail is welded by the Goldschmidt Thermit process. A Clark joint 30 in. long, requiring eight 1 1/16-in. x 5¼-in. rivets spaced at 3-in. intervals and giving a grip of from 2⅞ in. to 2¾ in., is employed. Compressed air is supplied through a 100-cu. ft. National electric air compressor to a Pittsburgh riveting machine for riveting the rail joints.

In purchasing the rails Mr. Clark, who is a member of the American Electric Railway Engineering Association committee on way matters, used the specifications requiring 0.75 to 0.90 per cent carbon adopted as recommended practice by the association, and went one step further by adding to the composition 0.10 per cent titanium. In order to insure a joint which would conform to the rail, the same composition was required for the joint plates. Specifications were also drawn up for rivets. These were of Mayari steel purchased from the Pennsylvania Steel Company at a price above that of ordinary rivets. Besides the special requirements in the specifications for composition of the rail, joints and rivets, it was very rigidly specified that the rivet holes should be drilled so that a driving fit could be obtained. By adhesion to this type of connection all the advantages of both the Thermit and the Continuous rail joints were obtained. After the track was surfaced the ball of the rail at all joints was ground to a true surface with a Kerwin head rail grinder, of which the company has two.

In a general way the construction methods consisted first in abandoning a section of track to traffic, removing the old track and excavating a sub-grade to the level of the base of the ties. After this had been completed the new track was laid in the trench with the steel ties connected and the joints riveted in place. It was then surfaced on wooden blocks and wedges, and trenches were dug under the ties and rail for the concrete. Each tie was incased in a 12-in. square block of concrete and the rail between the ties was carried on a concrete stringer 12 in. wide on top, 18 in. on the bottom and 12 in. deep. The remaining section of sub-grade formed a base for the paving foundation, which was between 5 in. and 6 in. thick. The concrete quantities ran about 0.16 cu. yd. per running foot of track, the proportions of the aggregate being one part of cement to six of clean gravel.

In a number of instances it was found impossible to detour traffic long enough to complete the work. At these places the same method of procedure was followed up to the point where the track was ready for surfacing and concrete. Instead of putting the concrete in place crushed stone ballast was employed. The track was raised and tamped to its permanent elevation and a 1 to 3 sand and cement grout poured over the finished ballasting until all voids were filled. This method had been employed before and found to result in a first quality concrete foundation. The same procedure was followed around all special work, and wooden ties were used at these points exclusively. In order to make it possible to remove the wooden ties easily in case repairs are necessary, they were coated with coal tar before they were installed in the track. This prevents the concrete from adhering to the wood and also fills in depressions in the surface of the tie which might offer a hold for the concrete.

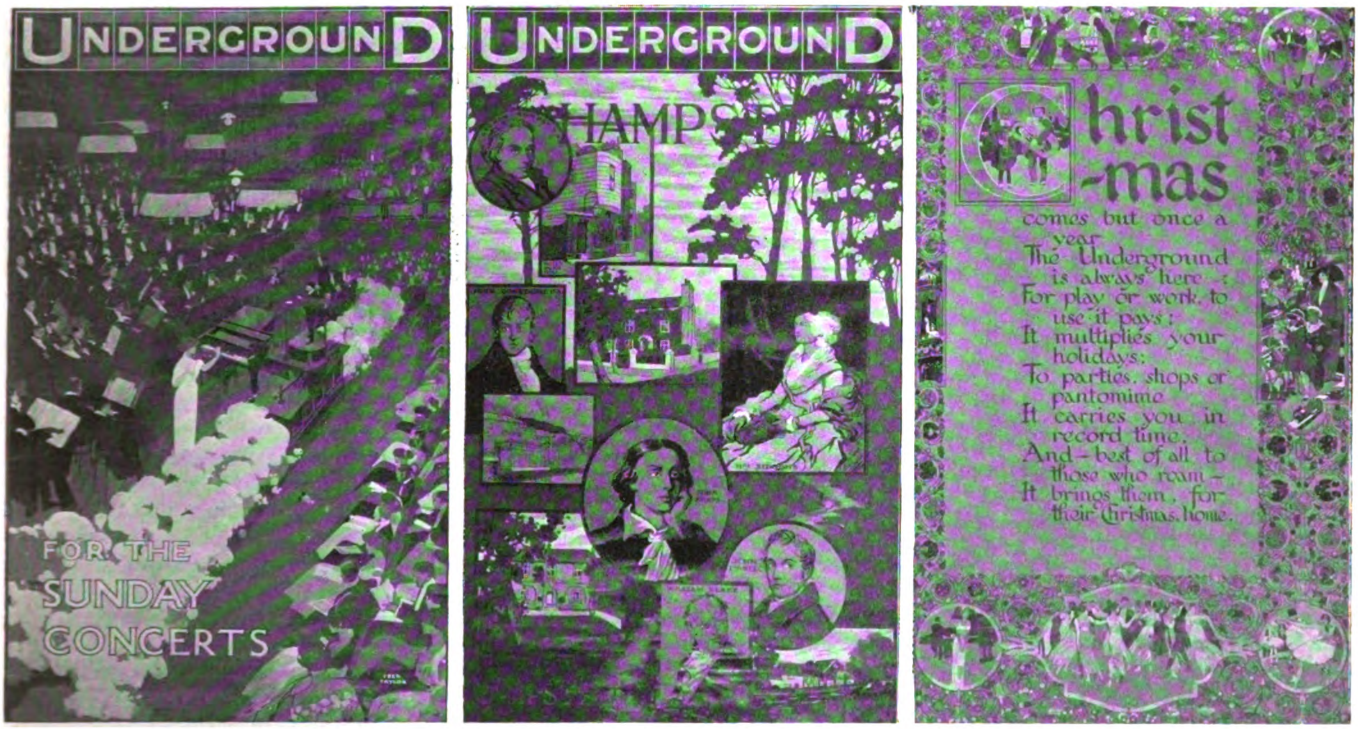
Granite blocks laid on a sand cushion form the surface of the pavement, the blocks which form the flangeway being nosed. The space between the ball, web and base of the rail was filled with a sand and cement mixture which was also used for a filler between the blocks in the pavement. In all cases where the T-rail was used a course of granite block headers has been laid along the rail forming the flangeway and the space between them filled with 1 in. to 2 in. of crushed granite and pure silica gravel mixed to 1:2:4 proportions. This makes a pavement of a solid and substantial kind which has been found very satisfactory by the company.

Although the pavement surface is apparently impervious to water, seepage was anticipated from the lawns and parkways along the edges of the pavement. This water is drained to the city sewer system by means of a 6-in. vitrified tile. The bells of this drain are not sealed, but to prevent silt from collecting in the pipe, each bell is surrounded with cinders to serve as a filter. The top of the drain is 24 in. below the surface, and it is between the two tracks. Outlets are provided at all manholes and catch-basins.

CHRISTMAS TRAFFIC ADVERTISING IN LONDON

Several illustrated articles have appeared in these columns from time to time with reference to the great variety of striking posters and other advertising matter which is issued by the Underground Electric Railways of London to exploit timely excursions to places of public interest, amusement resorts, quaint country villages near London, etc. For Christmas, 1912, the company issued a poster which is probably the most elaborate ever printed for any electric railway.

Although the accompanying reproduction shows the general design of this poster, it cannot convey the rich appearance of the original. The lettering and principal decorative effects, for instance, were printed in gold. The views on the poster are those usually associated with the great festival, but particular attention may be directed to the Christmas "waits" or aubades, as these are a traditional feature of an English Yuletide. It will be observed also that the official poet of the company has contributed a few lines to emphasize the part which the Underground system plays in adding to the joys of the holiday season.


UNDERGROUND
FOR THE SUNDAY CONCERTS
UNDERGROUND
HAMPSTEAD
Christ-mas
comes but once a year
The Underground is always here:
For play or work to use it pays:
It multiplies your holidays:
To parties, shops or pantomime
It carries you in record time.
And—best of all—to those who roam—
It brings them, for their Christmas, home.

Three Recent Posters of the London Underground System, Appealing Respectively to Lovers of Music, of Places of Historical Interest and of the Christmas Spirit

Two other recent posters are reproduced. One shows some historic places at Hampstead Heath and includes the portraits of artists, poets and others who have been associated with them; the second calls attention effectively to the desirability of traveling to concerts via the "Underground." On account of their attractiveness, many of these posters have found the same place in homes and offices as pictures of other kinds.

THE MYRIAWATT RECOMMENDED AS A POWER UNIT

At a joint meeting of the standards committee of the American Institute of Electrical Engineers and of a committee specially appointed for the conference by the American Society of Mechanical Engineers, on Dec. 13, 1912, at the Engineering Societies Building, New York, the use of the "myriawatt" as a standard in place of the boiler-horse-power was taken under consideration. The "myriawatt" was originally suggested by H. G. Stott as a convenient unit of power only 2 per cent larger than the most recently determined value of the boiler-horse-power, and a paper setting forth its advantages in dealing with the performance of steam boilers and various prime movers was read by Messrs. Stott and Haylett O'Neill before the American Institute of Electrical Engineers in June, 1912.

The joint committees at this meeting unanimously adopted the following resolutions and have submitted them to the governing bodies of the two societies:

"(1) That the two committees in joint session recommend to their respective societies the use of the 'myriawatt' as the unit of thermal or mechanical power, as indicated in the above-mentioned paper.

"(2) That the two committees also jointly recommend to their respective societies the exclusive use of the 'myriawatt' in connection with boilers, producers, turbines and engines and to discontinue the use of the term 'boiler-horsepower.'

"(3) That C. O. Mailloux, as representing H. G. Stott on the special committee on prime movers recently appointed by the International Electrotechnical Commission, which committee is scheduled to meet at Zurich, Switzerland, on Jan. 18, 1913, shall be requested to bring these joint resolutions formally to the notice of that body in Zurich.

"(4) That the two committees jointly recommend that in writings and publications the 'myriawatt' and 'myriawatt-hour' be abbreviated to 'mw' and 'mw-hr.' in conformity with the existing abbreviations 'kw' and 'kw-hr.' for 'kilowatt' and 'kilowatt-hour' respectively."

The adoption of the myriawatt provides a simple and satisfactory method of rating the input and output of turbo-generators in terms of the same unit—the international watt. Instead of rating the output of a turbo-generator in kilowatts and the input in boiler-horse-power or other heat units as at present, it becomes very convenient to rate the electro output in kilowatts and the steam input in myriawatts, because the myriawatt is approximately the same as the boiler-horse-power, while it is also exactly 10 kw. By this means the long existing incongruity of stating the input and output in different and disconnected units of power will be eliminated.

The Annual Meeting of the Wisconsin Electrical Association

An Account of the Proceedings of the Milwaukee Meeting—Abstracts of the Papers Relating to Electric Railways Which Were Presented Before the Association Are Included

The annual meeting of the Wisconsin Electrical Association was called to order at the Hotel Pfister, Milwaukee, Wis., on Jan. 15 at 9:35 a. m. by the president, Irving P. Lord, president and general manager of the Waupaca Electric Light & Railway Company.

The secretary and treasurer, George Allison, of Milwaukee, comptroller of the Clement C. Smith properties, read his annual report, showing that the membership had been increased during the year by four active and fourteen associate members. The membership committee had been active during the year. The report was adopted and placed on file. At the request of Mr. Allison the chair announced that he would appoint an auditing committee to go over the books. This committee was appointed later. It consisted of E. H. Hoaglin, Wild Rose, Wis.; W. E. Haseltine, Ripon, Wis., and P. H. Jorst, Janesville, Wis.

PRESIDENT'S ADDRESS

President Lord did not make a formal address, but spoke informally about the work of the association during the last year. He said that the year 1912 was a fairly prosperous one for all of the companies and that the trend was forward if not upward. The central stations were improving their service and business and getting a little better balance sheets. Very much had been done by the Railroad Commission of Wisconsin toward raising standards of service and owners were beginning to appreciate what had been accomplished. Even municipal plants were beginning to concede that the Railroad Commission knew something. The association was well represented in its membership of public utilities. It had the largest as well as the smallest plants.

REPORTS

M. A. Gurnee, a member of the committee on membership, spoke about the work done to bring additional members to the association. The chairman of this committee was Roger N. Kimball, of Kenosha, Wis., who had resigned as second vice-president of the association.

T. A. Pamperin, chairman of the committee on taxation, in reporting for that committee said that a meeting did not take place until just before the annual convention was called to order. He felt that either the old committee should be continued or a new committee should be appointed, in order that the members might be kept in close touch with any action that might be taken affecting taxation matters.

The following nominating committee was appointed: Clement C. Smith, Milwaukee, Wis.; George D. Wheeler, Eau Claire, Wis., and J. S. Allen, Lake Geneva, Wis.

L. H. Lathrop, general superintendent Menominee & Marinette Light & Traction Company, then read a paper on the "Proper Operation and Maintenance of Arc Lamps." He said that more light was used and more was demanded constantly by business men who realized the advantage of it. An extended discussion took place on the paper.

STANDARDS OF ELECTRICAL SERVICE

J. N. Cadby, member of the engineering staff of the Railroad Commission of Wisconsin, then read a paper on the proposed revision of standards of electric service, which is now under consideration by the Railroad Commission. He said in his introductory remarks that improvements in service of every kind were being seen continually. Not only was service being measured more accurately, but safety precautions were taken more than ever before. In the factory, the public building, the street and upon the street cars and railway trains, life, limb and health were receiving more consideration than heretofore. The slogan of "safety first," which the railway men had advocated, should be adopted by the public utility men.

The Wisconsin public utilities law required, Mr. Cadby said, that all public utilities report fatal accidents to the Railroad Commission whenever these accidents occurred through the construction or operation of the utilities or upon the premises used by them. Thus far there had been a few cases where high-tension transmission line construction had been passed upon by the commission and cases where the Railroad Commission and Industrial Commission investigated jointly matters of this kind. The fact that three fatal accidents in different parts of the State were caused by contact with live guy wires may lead to the adoption of further standards by the State commission.

Mr. Cadby said that adequate electric lighting and power service necessitated a practically uninterrupted supply of energy at a constant voltage, safety, ability to secure convenient and efficient utilizing devices and an accurate metering of the energy supplied. He presented the proposed standards, which will be considered at a meeting to be held in the near future and to which the commission will invite interested persons.

The association then adjourned for lunch.

WEDNESDAY AFTERNOON SESSION

The first order of business in the afternoon was a discussion on the decision in the Milwaukee fare case by Edwin S. Mack, of Miller, Mack & Fairchild, Milwaukee. This paper appears in abstract on another page.

The report of the insurance committee was then presented by Ernest Gonzenbach, of Sheboygan, chairman. This report appears elsewhere in this issue. Supplementing the report, Mr. Gonzenbach said that since it was prepared the committee had received a proposition from the concern at Wausau providing that the companies go in as a separate class. As representatives of various insurance interests were present and desired to discuss the matter with the committee, action on the report was delayed until later in order to give the committee an opportunity to confer with representatives of the companies.

George W. Kalweit, auditor of the Milwaukee Electric Railway & Light Company, then read a paper on "A Work Order System Adaptable to Public Utilities; Its Purposes and Method of Application." An abstract of this paper is published elsewhere in this issue.

Edward Hammett, superintendent railway department Sheboygan Railway & Electric Company, then read a paper on "Dispatching and Handling Street Cars and Train Crews." An abstract is published on another page.

HANDLING OF TRAIN MEN

In answer to a question raised in the discussion Mr. Hammett said that so far the relief fund had been large enough to meet requirements. He said the company followed the practice of promoting trackmen to the position of trainmen.

J. C. Justesen, superintendent of transportation Wausau Street Railroad, said that the most difficult thing that a transportation official had to do was to select men for car service. In Wausau an electric club had been formed, and the trainmen were encouraged to attend the meetings and to suggest any subject they wanted to bring up.

George Allison, Milwaukee, suggested the appointment of a committee to consider the subject of dispatching trains and to report at the next meeting. The appointment of a committee was deferred until the following session. The association then adjourned to meet on the following day.

THURSDAY MORNING'S SESSION.

The session on Thursday of the Wisconsin Electrical Association was called to order by President Lord, who announced that the first paper would be one on the Standardizing Laboratory of the University of Wisconsin by F. A. Kartak, electrical engineer of the university. Mr. Kartak explained that the laboratory is to be reorganized on a commercial basis and that any public utility can have its instruments taken there for calibration and inspection. The schedule of fees for this work and a description of the laboratory will be mailed to all public utility companies in the state. Mr. Kartak added that the laboratory will be open at all times to visitors, who will be welcome.

President Lord said that the change in method of conducting the laboratory would be especially welcome to the small companies in the State which have not had the facilities for doing this work themselves possessed by the large companies.

In answer to a question, Mr. Kartak said that the university would probably issue regular certificates of the accuracy of instruments. He thought that the instruments would probably not be sealed, but that the certificate would be an indication of the test which the laboratory had conducted.

Mr. Hoaglin, reporting for the auditing committee of the association, said that the books of the secretary and treasurer had been inspected and had been found correct.

President Lord said that many requests had been received by the secretary in relation to the subject of an electrical show. He said that he would take the responsibility of appointing a special committee to consider all matters relating to this topic. The committee, as appointed by the president, consists of O. M. Rau, C. N. Duffy and H. P. Andre.

W. M. Bradshaw, Westinghouse Electric & Manufacturing Company, suggested that central stations prepare a packing box for shipping meters to the university laboratory.

DAY LOAD FOR SMALL CENTRAL STATIONS

W. E. Hazeltine, secretary Ripon (Wis.) Light & Water Company, then presented a paper entitled "Building Up a Day Load for a Small Central Station." He described the methods used in Ripon, a city of approximately 3800 inhabitants. The first step was to change the electrical system used, which was a 133-cycle single-phase system for commercial use and a direct-current series arc system for street lighting, to a sixty-cycle system. The company then established a rate of 10 cents gross or 9 cents net per kw-hr for the first sixty hours per month of active connected load and half of this amount per kw-hr for the excess. The management then approached the power users in the district and after some difficulty succeeded in securing their adoption of electric power instead of steam or gasoline engines. The speaker described a number of the uses to which the motors were put, and the methods of developing the fan, electric iron and other small appliance business. The effect of one year's active work was that the day-peak had become considerably higher. Although the peak-load had increased but 4 per cent the station output in kilowatt-hours had increased 57 per cent. There had also been an increase in the lighting load.

REPORT ON LIABILITY INSURANCE

The report of the committee on liability insurance presented on Wednesday was then taken up for discussion. Chairman Gozenbach also presented a supplementary report. It recommended that the members of the association, including those engaged in electric lighting, the operation of street and interurban railways and in the gas and water supply business, should form a separate class of employers, as explained in a proposition which he submitted, and should carry their liability insurance both to the public and to their employees in the Employers' Mutual Liability Insurance Company of Wausau, Wis. He added that the committee had investigated a number of propositions and had given a great deal of time to a consideration of the matter and it was the unanimous belief of its members that better results and better protection at lower rates could be secured by accepting the proposition of this company than by any other methods suggested.

In considering this subject the committee heard from W. A. Fricke, president Employers' Mutual Liability Insurance Company, and from Lynton T. Block, president Utilities Service Company, St. Louis, Mo.

In discussing further the supplementary report, Mr. Gonzenbach said he understood that the old line casualty companies intended to increase their rates still further and that these rates would go into effect soon after Feb. 1. An extended discussion of the committee's report then took place. It was finally decided that the report with the discussion would be printed for distribution to the members for their further consideration. The report of the committee was then adopted. This discussion concluded the morning session.

THURSDAY AFTERNOON SESSION

RESUSCITATION FROM ELECTRIC SHOCK

At the beginning of the afternoon session about twenty-five applications for membership were accepted. Dr. Charles H. Lemon, chief surgeon Milwaukee Electric Railway & Light Company, then discussed the subject of resuscitation from electric shock and first aid to the injured. He began by complimenting the National Electric Light Association upon the work which it had done in initiating an investigation by medical authorities into the causes of death following electric shock and to suggest means for resuscitation after the shock. He then described the method of producing artificial respiration as recommended by the National Electric Light Association committee and, with the aid of an assistant, illustrated the method recommended. He also exhibited a Draeger pulmotor, and illustrated its use in case of shock. He gave details of a case in which a man had received a shock of 13,200 volts. Apparently the man was dead, but his fellow workers maintained respiration artificially for five minutes until the pulmotor could be used. In this case consciousness was restored, and the only result of the shock was the severe burns left by the current. Dr. Lemon said that it was very important that everyone in electrical companies should be familiar with the simple movements recommended by the committee. In every case where resuscitation had been begun within ten minutes of shock, it was necessary to persist, however, not less than one hour and in some cases over an hour. The committee's method was simple, practical of application and efficient.

ELECTION OF OFFICERS

George B. Wheeler, Eau Claire, chairman of the nominating committee, then presented the report of that committee and the secretary was instructed to cast one ballot. The names of the elected officers follow: President, William H. Winslow, Superior; first vice-president, William Wallen, Oshkosh; second vice-president, P. H. Korst, Janesville; third vice-president, M. C. Ewing, Wausau; secretary-treasurer, George Allison, comptroller Clement C. Smith properties, Milwaukee.

It was decided, on motion of M. C. Ewing, to hold a three-day session in 1914 if in judgment of the executive committee it could be made successful.

The association then voted to have an advisory committee consisting of five members, including the president to have charge of any legislative matters which might be required by the association.

C. R. Phenicie, general superintendent Wisconsin Public Service Company, then read a paper on construction and maintenance problems of overhead distribution systems of electric utilities. In accordance with Mr. Phenicie's recommendation, a committee of three will be appointed to draft standards of inspection. It was decided on motion of Mr. Pamperin to discharge the committee and to refer its duties to the new advisory committee.

President Lord, in conclusion, thanked the members for the assistance and co-operation he had received in the last year. The association then adjourned.

EXHIBITORS' ASSOCIATION

At the annual meeting of the Wisconsin Electrical Exhibitors' Association the following officers were elected: President, Clarence E. Searles, Allis-Chalmers Company; vice-president, H. E. Andrae, of Julius Andrae & Son's Company; secretary and treasurer, H. F. Bogus, of C. J. Litscher Electric Company.

DISPATCHING AND HANDLING STREET CARS AND TRAIN CREWS

BY EDWARD HAMMETT, SUPERINTENDENT SHEBOYGAN (WIS.) RAILWAY & ELECTRIC COMPANY

In connection with inspection and maintenance of your cars, the failure of cars in service is most annoying, and our company is making a vigorous campaign to reduce these failures to a minimum. We are working along the lines of bonuses to inspectors and carhouse employees, and while we are not able to make definite reports at this time, we are well pleased and feel satisfied that we are encouraging the men to do more efficient work with consequent results in the service.

The next problem in connection with the cars is to dispose of them in such a manner that they are convenient to the greatest possible number of people. This involves a complete study and analysis of the traffic which is being handled and then further study and search for improvement which will make the cars convenient for a greater number of people without increased cost of service to the company.

ANALYSIS OF TRAFFIC

Taking up first the study of city traffic, we find that the usual fare is 5 cents with transfers and possibly strip tickets of six for 25 cents. This fare system will permit one to arrive at a very accurate average cash value per passenger carried, so that a curve may be drawn showing the number of passengers carried each hour on each division, which represents also the revenue in cash. Against this curve a line is drawn which represents the operating cost transposed into number of passengers at the average cash value. We now have a diagram showing expenses and revenue during each hour of the day on each division. At a glance one may learn the hours of each day when the cars earn a profit on operation for the company, and naturally one may also learn that there are periods during each day when the cars show a most distressing loss. With these facts determined, we are ready to take up all possible suggestions for improving the figures shown in the analysis of traffic. Our greatest difficulty lies in knowing exactly where the trouble is located; when that is determined, the solution is half accomplished.

The analysis of traffic on interurban lines is more complicated than it is on city lines, but the general scheme is the same. To learn the cash revenue of different divisions, we divided the line into three sections and instructed conductors to issue cash fare receipts to all passengers who paid cash on the cars. Ordinarily a large number of these cash fares would have been registered on the Ohmer fare register, and accurate tabulation would be impossible. However, with cash fare receipts and mileage and usual card tickets, we were able to determine exactly how many passengers we carried and between which stations.

For purposes of tabulation, we divided the line into three sections, each section ending at a point where there is a natural terminal. Each section received full credit for all traffic which was wholly within its own limits and proportionate credit for all traffic which originated or ended only within its limits.

The interurban schedules, at that time, consisted of one car every hour throughout the operating period so that the cost of operation was uniform in each division. Analysis of receipts and number of passengers carried in each division showed that the first section of road furnished more than 60 per cent of the entire interurban revenue; the second section furnished a little less than 30 per cent, while the third section was contributing only about 10 per cent. The schedule was immediately revised so that one car was used exclusively in the first section, which gave more frequent service and better accommodations in every way. This change made it necessary to cut down the service a little in the second section and very materially in the third section.

EMPLOYMENT AND HANDLING OF TRAINMEN

The train crews represent possibly the most important link in the handling of traffic, and no operating official can afford to overlook any one little thing which has to do with the improvement of the service in this respect. The original selection of men, of course, is very important, but many of the most promising men—men who seem to be promising when they were employed—have turned out worthless. On the other hand, a great many motormen and conductors who do not appeal to one particularly at the time of employment develop, through hard work and faithfulness, into what we may easily call the ideal trainman. The employment of trainmen is a phase of the business which depends entirely upon the superintendent of transportation or other official who has to do with the hiring of men, and his success as a superintendent of operation will depend in a large measure upon his ability to select or reject without hesitation such men as make application for positions. When a man is once hired and is on the company pay-roll, he must be taken care of properly. The most approved method for initial training seems to be a regularly equipped school of instruction, where the candidate is obliged to put in a specific number of hours and accomplish specific results. At the expiration of this period, he must be ready to pass a certain examination as to his fitness for the position which he expects to take. Small roads, however, do not find themselves in a position to maintain schools of this sort, and many times trainmen are allowed to act as motormen or conductors without having specific training of any continued duration. On roads such as these, it is customary to have the applicant work without compensation, either as motorman or conductor, under the direction of some employee in a similar position who can be thoroughly trusted.

One of the most important things to impress upon a new man seems to be the fact that he is subject to the rules and discipline which will be enforced by the officers of the company, and this particular phase of the business seems to cause considerable disturbance among the new men. A man, for instance, who receives 16 or 17 or 18 cents per hour for his servies as a motorman or conductor finds himself in a position which he can duplicate almost any place any time. In other words, day labor is worth as much money these days as we can afford to pay for the earliest service of a new man, and so considerable difficulty is experienced in successfully disciplining men during the first year of service. The older men in the service are always more amenable to discipline and criticism than the new men, and this in many cases has the effect of steadying the new man. With all of us the real incentive for work lies in the hope of reward, and if a new trainman sees that the older trainmen are well taken care of and are prosperous, there will be a powerful incentive for sticking to the job and becoming, in the natural course of events, one of the old men.

The problem of handling men is individual with each operating official. A man must feel right toward his employers in any line of work if his services are to give the best results, and this is without a doubt the ultimate goal of the operating man, for the reason that the company's revenue passes through the hands of its conductors and the passengers' safety is in the hands of the motormen. Hence, the attitude of these men toward the company is reflected very accurately in the attitude of the patrons of the road toward the management. The problem is to keep all of our trainmen in a state of mind which is distinctly friendly toward the management of the company. This friendliness must be aggressive and will not produce the best results until every man believes firmly in the integrity and impartiality and fair-mindedness of his superior officers. The question therefore is, how shall we bring about this state of affairs? Possibly the first thing would be to study the payroll and determine whether the men are receiving enough money for their work to make them think rather well of their jobs as compared with other available jobs in the community. Then, when you are satisfied that your men have just as good a job with you as they would have in any other place, all things considered, it seems to me advisable to go still further and offer some additional remuneration. In one case this additional remuneration was offered in the form of a bonus to be paid under a merit system which was based largely on the experience of other roads and was also re-designed to cover local conditions. The distribution of bonuses under this merit system was as follows:

BONUSES AND MERIT MARKS

Every man in the regular service on Jan. 1 was listed to receive a bonus on the following Jan. 1: $30 for one-year men, $45 for two-year men, $60 for five-year men and $75 for men who had been in the service ten years or more.

Each man received 100 merits on Jan. 1. For a perfect record during any one calendar month, each man received ten merits. For other meritorious service, a trainman might earn additional merits and in the same way demerits were assessed for all infractions of the rules and for any carelessness or other defect in the actions or performance of duty of the men. At the end of the year, each man's account was balanced and awards made to all men who had 100 merits or more. This merit system was freely criticised by the men throughout the first year, but when Jan. 1 came around and they lined up one after another and received from $30 to $75 each, the attitude changed considerably, and now, in the third year that this system has been in operation, we find the men unusually interested.

The next step in the welfare of the men was in the form of a sick benefit relief association. This was organized on a basis that included all employees of the company, and membership in the association is compulsory. An assessment of 25 cents per month is levied against every employee, and the governing board and officers are elected from the rank and file of employees. Sick benefits amount to $7 per week for total disability, with the usual conditions and by-laws which are included in relief associations. Death benefits consist of $75, which has been found in several cases to pay actual funeral expenses and at least furnish a little ready money for the emergency of death, when expenses are necessarily urgent. This relief association has made a fair number of settlements, both in regard to sickness and death, and the present status of the association among all employees is unusually satisfactory. In addition to this assessment of 25 cents for each employee, the company donates an amount equal to 50 per cent of the assessment collections each month.

It has also been found beneficial and pleasant to have some social functions during the year for the exclusive benefit and enjoyment of employees and their families. A number of very successful picnics have been given, and recently a very successful dance was held. The experience along these lines leads me to say without hesitation that the general welfare of your men should receive a great deal of attention, because it brings the men close to you and makes them feel friendly toward you and your efforts to give the best possible service. The best service is not possible without their active interest and co-operation.

DISPATCHING

We now come to the discussion of dispatching, which was formerly a very crude affair on electric roads. The first step in introducing a modern system of dispatching is to establish rigid discipline among the men. The basis of this discipline should be the rule book adopted by our national association. The committee which compiled this book of rules had many conferences with steam railroad officials; therefore, we find a distinct tendency to follow steam railroad practice, which means the best there is. After the rule book and general discipline are in full force, you must issue a regular working timetable for the use of employees only. This timetable will show only sidings, switches and terminals, and will show plainly trains of all classes on the regular schedule, also where and what each train meets. Each train has a number and is known only by this number. Each siding has a name or a number and is known only by such designation.

Great care is required in making up this working timetable to avoid confusion and error, but the chances of error may be entirely eliminated by the use of a board and threads to lay out the complete schedules. Across the top of the board the hours of the entire operating period are placed consecutively. On the left edge of the board all switches and sidings are entered consecutively and spaced with regard to the actual mileage. When this board is prepared it is a simple matter to lay in the trains, and, of course, wherever the threads cross, a meet must show on the timetable.

Modern dispatching permits no verbal orders affecting the movement of trains. We use, therefore, a written order designated in the rule book as Form No. 31. This form of order is issued by the dispatcher directly to the conductor of each train. The issuing of written train orders undoubtedly consumes more time than verbal orders, but there is no comparison in the matter of safety. Hence written orders are used. Supplementing written train orders we have Stromberg selective semaphores, which are controlled in the dispatcher's office and may be dropped at will against any siding.

Working timetables, written train orders and discipline constitute the three outstanding requirements for modern dispatching, but there are, of course, many auxiliary aids in dispatching which each man works out for his own department when he gets to studying the particular proposition. One such aid has been adopted on our line which we find very helpful. It is a printed sheet which provides space for entering all the meets of any train. Space is also provided for making notes of train orders issued. This trip record is filled out and signed by the conductor and the dispatcher and is then placed in plain view of the motorman so that he can learn at a glance whether his train is supposed to meet some opposing train at each siding which he reaches. The advantage of this sheet is that it leaves nothing to the memory of the motorman.

One other device we employ for additional safety is requiring motormen to blow four short blasts of the whistle when approaching any siding. This constitutes a call for signals from the conductor and must be answered by one bell from the conductor if a meet is to be made and by two bells if no meet is to be made. This device serves to insure that both motorman and conductor put their mind on the question of meets at each siding and has proved entirely satisfactory.

A DISCUSSION ON THE MILWAUKEE FARE DECISION

Edwin S. Mack, of Miller, Mark & Fairchild, who presented a paper on this subject, spoke, in his introduction, of the exhaustive character of the decision and said that while it was impossible to discuss all the details he would take up the leading principles which were of practical importance to operators of public utility companies in Wisconsin. In taking up the question of intrinsic reasonableness of the rates, the commission found that commutation rates were in force in a number of cities and it was therefore proper to require them. The same principles enunciated in this respect were carried out also in the Superior case, where the commission ordered the sale of six tickets for 25 cents.

Until 1900, Mr. Mack said, the rate of fare in Milwaukee had been 5 cents. Then an extension ordinance was passed, providing that for five years the company should sell six tickets for 25 cents or twenty-five tickets for $1, good during certain hours. After Jan. 1, 1905, these tickets were good throughout the day. The decision of the commission providing for the sale of thirteen tickets for 50 cents also involved suburbs and extended the fare limits in some cases.

The commission reached its determination from a consideration of the investment or the value of the property, discussion of the operating expenses and allowance for depreciation, a calculation of probable future items of expense not yet realized and, finally, the rate of return to be earned by the company.

Continuing, Mr. Mack said that the first point was the most important one. That was, on what basis of capitalization or on what principle should the rate of return be computed? Originally the city of Milwaukee granted franchises to three horse railways, then to one so-called dummy railway and, finally, to a cable road which was really constructed as an electric railway. About 1890 a movement was made to consolidate the properties. These railways controlled between them practically every down-town street and every bridge crossing the river near the down-town district. It was impossible to have a complete system of lines except by consolidation of the existing properties. The companies were brought together as the Milwaukee Street Railway. This was then consolidated with the lighting companies in the city. The consolidation naturally involved considerable expense above the physical value, perhaps above even the "going" value. The owners of the properties held had franchises with a number of years to run and were making profits. Payment for the properties was made in bonds and stock, but reduced to a monetary basis for the bonds, excluding the stock and plus expenditures for electrification, the cost was $8,885,000. The commission allowed for this value only about $5,000,000. The facts regarding this consolidation were brought out in a suit in 1896. Judge Seaman found in his decision at that time that the appraisal of the property made by W. J. Clark was to be preferred above the city valuation. The court held that the reproduction cost new of $5,000,000 represented fairly the physical property of an investment that might fairly be called $8,885,000, and that the company was entitled in a rate case to a valuation of at least $7,000,000. Judge Seaman held that it was not necessary to decide in that case, and he did not decide, whether the company was entitled to earn a return on $8,885,000.

In the case before the commission the company presented figures of value, taking the $8,885,000 as a basis and adding the various additions made to the capital account subsequently.

The Railroad Commission, Mr. Mack said, took up the matter historically and then appraised the property. It first revised the Clark figures of 1896 and found that they were $600,000 too high in reproduction value. The next step was an examination of the propriety of the investment. The commission held that excessive prices had been paid for this combination of street railways. The net result reached by the Railroad Commission was a figure of $5,000,000. That was determined by a revision of the costs and a revision of the Clark inventory. The changes in the inventory figures were in the overhead allowances and in certain unit prices.

The commission also went into the question of going value. That was computed in two ways.

Under the first plan the cost was based on the losses incurred in building up the plant. Under the second plan, it was assumed that a new company started in business to build up its property to a point of profit corresponding with the position which an existing profitably established company would occupy. The commission computed the going value at $450,000. As of Jan. 1, 1897, the commission found the value of the property as $3,500,000 plus $400,000 for going value and $1,000,000 for loss in property during conversion to electricity. That was the basis taken by the commission as the initial point in its computation.

Mr. Mack said that in making the subsequent additions to the capital investment, the commission made an analysis of division of charges between the railway and lighting departments. For years the company had used the bases of 80 per cent for the railway and 20 per cent for the lighting. As a result of its analysis the commission made a difference of approximately $1,200,000 from the results shown by the books of the company. The railway books showed an addition of $5,400,000 and the commission made the total addition $4,200,000. The net result was that instead of showing a value of $14,000,000 for the railway, as was indicated by the testimony for the company, the commission found the figure of $8,700,000 in 1907. Continued to 1911, this became $10,300,000. The main difference in the figures was due to the fact that the commission allowed less for the original property than the actual expenditure and, second, made a different apportionment of the subsequent additions. In connection with the disallowance of items of cost, the commission seemed to doubt whether the cash costs were as large as were found by Judge Seaman.

JUSTIFICATION FOR PURCHASE PRICE

It was natural, Mr. Mack said, that counsel should differ from a finding and therefore the question whether the decision was right or wrong was not one that he cared to discuss. The point which he wished to emphasize, however, was that if operators of public utility properties were to make an investment of any size in order to buy or consolidate plants, they must do so with their eyes open. They might be placed in the position in a rate case ten or fifteen years after the purchase or consolidation of being required to establish the reasonableness of the price paid and the value of the property. Transactions must be conducted with the understanding that they would have to be justified afterward.

In view of the fact that the commission made an analysis of cost and that most companies conducted two or more kinds of business with one organization, the officials must bear in mind the fact that the commission may review the division of capital expenditures. For instance, a power plant may generate current for commercial and railway purposes. The ordinary method of dividing the investment in property used in common is to divide it according to the proportionate use. If a company finds that this proportionate use gives one result in one year, and at the end of two subsequent years the lighting business has been developed largely and is twice its former volume, the proportions of investment change. While this method of apportionment was perhaps the only practical one to adopt, operators must bear in mind the fact that as the volume of use for one purpose may change, the apportioned capitalization, which changes also in accordance with this plan, may be subject to review for rate-making purposes.

Taking the mass of cases as they had been decided before the commission, it was found, Mr. Mack added, that the sum of all elements considered in making a decision as to value usually became the same as the reproduction value new, and this is about the result reached in the Milwaukee fare case. Overhead charges had been allowed by the commission ranging from as low as 10 per cent in some cases to as high as 15 per cent in other cases. In the Milwaukee street railway case the allowance was 12 per cent.

In connection with the appraisal of the physical property, the commission also had to make an appraisal of suburban and interurban property. The outlying and city lines were operated in common and the same cars were used for much of the business.

There was also a question regarding the value to be allowed for paving. The commission followed the rule which it had used in a number of cases and allowed only the actual expenditures of the company. In some cases the railway had laid track at a time when the city was paving, and the commission did not allow anything for paving in these instances, although if the railway had to be reproduced the company would have to pay for this element of cost.

In taking up the question of earnings where a company conducted several kinds of business, it was necessary first to divide between the railway and light departments, and second to segregate the city, suburban and interurban expenses. The company had divided the railway and light on the basis of the actual current consumed. The commission did not interfere with the division made by the company. A more important question was that of the division between the city and the interurban branches. The analysis of the commission was exhaustive and each item was considered by itself. The result, Mr. Mack thought, was as logical as it could be made. It would be difficult, however, for a smaller property to carry out so detailed a method of accounting as that described in the decision of the commission. The wise thing to do would be to make a study at a particular time on the basis used by the commission and to come as nearly as possible to that, or else to make a computation and use that until the management felt that it should be revised. It was not practicable for a small company to make an annual, a monthly or a day-to-day apportionment in as much detail as the commission used.

Continuing, Mr. Mack said that the net result of the consideration of the subject of depreciation was an annual reservation of a little less than 4½ per cent. On the question of the rate of return the commission commented on the excellent credit of the company and therefore determined on interest of 5 per cent to 6 per cent plus profit of 1½ per cent to 2 per cent, making finally a return of 7½ per cent on the value. The value as of Jan. 1, 1911, $10,300,000, to represent the reproduction value of the physical property, was determined to be the actual justifiable investment in the property on a cash basis. The commission also made allowances for probable future increases in expenditure, such as additional municipal burdens, extensions of fare limits, repaving of streets, improvements in service, etc. After making these allowances and computing a return of 7½ per cent, the commission found that it could make a reduction in the rate of fare to provide for the sale of thirteen tickets for 50 cents. It was figured that this would cause a reduction of $170,000 a year.

One other element that involved a new investigation was a careful consideration of what the commission called a maximum paying haul. It divided cost between movement and terminal cost. The company made an investigation of this subject at about the same time that the commission made its study, and the results were very close. The difference was less than 0.2 mile, and showed an average haul of about 2.7 miles. Mr. Mack felt that this study of the commission was one of the most valuable features of the decision, and that it would be well worth the while of every man interested in electric railways to read this portion.

Mr. Mack said that the results in his opinion would be that so low a rate of return as that indicated would probably be a serious deterrent on extensions on interurban lines or any others. He thought the present cessation in construction of public utility properties was due largely to the fact that people felt that they could not have a sufficient return. It was the opinion of Prof. M. E. Cooley, expressed as a witness, that the reproduction value of public utility property ordinarily approximated two-thirds of the investment. The commission felt that when properties were financed on a cash basis the method which it had followed in its regulation of the companies would provide for an ample return. The principal funds in its opinion could be provided by the sale of bonds. However, as John I. Beggs had testified in the Milwaukee case, it was necessary, in order to secure development, to provide for a speculative profit on the deal. No man went into an enterprise for the construction of a public utility plant without feeling that he had found an opportunity that someone else had not seen, and in order to make an investment, there had to be some chance of a profit with development. Mr. Mack believed that the northern part of the State of Wisconsin would have its settlement retarded until higher returns could be offered. He thought that the commission would allow larger returns in smaller cities than it provided in Milwaukee.

Mr. Mack said that the commission did not say that the company could not earn over 7½ per cent, but it did say that it reduced the rate of fare because it figured that the company could establish a lower rate, provide for probable future increases in expenditure and still pay 7½ per cent.

REPORT OF LIABILITY INSURANCE COMMITTEE

BY ERNEST GONZENBACH, CHAIRMAN; M. C. EWING AND T. A. PAMPERIN.

The subject of insurance is of the greatest importance to central station and public utility operators, and particularly so at this moment in the State of Wisconsin, where a workmen's compensation law became effective on Sept. 1, 1911. The provisions of this law have not as yet been fully tried and tested, nor are they universally understood.

Prior to the introduction of the workmen's compensation law it was customary for companies in the electric lighting business to carry two forms of liability policies, namely:

(1) Insuring the company against claims and verdicts for damages sustained by employees in the performance of their duties.

(2) Insuring the company against claims and verdicts for damages sustained by the public through coming in contact with electric light wires and fixtures.

In addition to these two forms of insurance, public-service companies engaged in the electric railway business were also in the habit of carrying employers' liability insurance:

(3) Insuring the company against claims and verdicts for damages sustained by railway employees in the performance of their duties.

Up to about five years ago the limit of liability on this insurance was $5,000 for any one single individual claim and $10,000 limit for claims or verdicts resulting from any single accident, no matter how many were injured. About that time a change in the laws necessitated a higher insurance limit, and thereafter liability policies, as a rule, were written with $10,000 and $20,000 limitations.

The carrying of liability insurance was considered a necessary part of the public utility business and was supposed to be a great protection to stockholders and bondholders; in fact, it was often looked upon as affording as much protection to the company as fire insurance. This impression, however, was entirely erroneous, and the liability insurance which was carried by practically every public service company in the State up to the passage of the workmen's compensation law was more or less a delusion and a snare. In the first place, it was impossible to insure up to the limit of accident liability, whereas in fire insurance one can insure to the limit of possible damage. Every small company was liable to have an accident resulting in damages and verdicts against the company amounting to considerably more than its limit of liability insurance, and therefore the company was by no means insured against ruin from that source. It may, of course, be argued that the majority of accidents are not catastrophes and are covered by the limits of liability which are in force and generally accepted by policy holders. On the other hand, the absence of liability on the part of the companies and the shifting of the burden upon the insurance companies introduced a personal or moral hazard in the form of temptation to the insured to get as much as possible for the injured employee and work together with him to get as big an adjustment as possible from the insurance company. In this way injured and insured were working together against the insurer. The natural result of this state of affairs was that the insurance companies in one form or another fought practically every claim that was brought against them, and they did not discriminate between legitimate injury claims and those which were strictly "strikes" or "hold-ups." Under the provision of the liability policies it was practically impossible for a company to settle an injury with an employee without losing his good will and services. It was a case of give and take, adjusting and haggling until a sum was finally agreed upon which was satisfactory to neither side and which may have made a permanent enemy of the man who up to that time had been a valuable and loyal employee. Not only did it make an enemy of him, but of all his relatives, friends and acquaintances—a consideration which increases in proportion as the size of the community in which one does business diminishes.

The rates which were paid for this liability insurance were based entirely on the total amount of the payroll and consisted of a certain percentage of it. This again was a fruitful subject of disssension between the insured and the insurer. The policies as a rule stipulated certain exemptions from the payroll, such as the office force, and the policy did not cover construction, but stipulated "ordinary extensions and construction." The interpretation of this "ordinary extensions and construction" was one of the fruitful sources of dispute. Again, companies doing a combination electric light and street railway business had one rate insuring street railway employees, the premium for which usually amounted to less than 1 per cent of the payroll, whereas the premium payable for insuring employees in the lighting department usually ranged from 2 to 3 per cent. The division of the power station payroll in a combination power station also was pregnant with possible friction—all of which was aggravated by the fact that the various insurance companies were active competitors with each other and were in the habit of making private treaties apart from and outside of the stipulations provided in policies, which treaties were in force privately, although at variance with the provisions of the contract and in direct opposition to the statement on the face of the contract that all agreements other than those on the face of the policy were "null and void." As a matter of fact, numerous agreements were lived up to outside of those written on the face of the policy, and the only value that clause of the contract had was that it acted as a club for the insurer and prevented the insured from having any redress at law for private bargains made with company agents in the way of special discounts or rates.

On the whole, the committee feels that it can consistently state that the old form of liability insurance was not satisfactory to the insured, that it gave a minimum of protection at a maximum of expense, and it left the settlement of claims in the hands of a third party wholly regardless of the interests of the injured and insured. The situation even before the enforcement of the workmen's compensation law became intolerable and was ripe for remedy in some form or other.

ADVANCES IN INSURANCE RATES

About the time that the workmen's compensation law went into effect in the State of Wisconsin the various liability insurance companies seemed suddenly to have discovered the scientific principles underlying their business, and the rates of every one of them on the same day became exactly the same as the rates of every other company. We assume, of course, that the gentlemen of the insurance companies are not violating the Sherman anti-trust law and that they are not a trust, but the uniformity of rates and policies is a coincidence which is at least remarkable. The liability companies seemed to have a violent grudge against the workmen's compensation law and by means of pamphlets and other more or less legitimate means they sought to induce public service companies not to avail themselves of the provisions of this law and at the same time keep in force the liability policies which had heretofore been used—at an advance in premiums as high as 570 per cent. To be insured against losses under the workmen's compensation law the rates in one case went up 1100 per cent, as may be seen in the table herewith submitted. This shows a list of premiums in force before and after the establishment of uniform liability rates and the enforcement of the workmen's compensation law. The figures marked "old rate" are the premiums actually paid by one of your member companies. A little study of these premiums is interesting, although somewhat expensive for the man behind the cash ledger.

Rates of Liability Insurance

	Old Rate	New Rate	Per Cent Increase	Under Workmen's Compensation Law	Per Cent Increase
Employees of electric lighting companies ...	3.75	4.80	28	8.40	124
Employees of street railways, city service.....	0.93⅓	3.75	301	7.00	650
Employees of street railways, interurban service	0.93⅓	6.25	570	11.20	1100

It, of course, goes without saying that no sensible public service company in the State was willing to pay the rates demanded by the liability companies when it could avail itself of the provisions of the workmen's compensation law, with its stipulated amounts to be paid for accidents and with a more or less open knowledge of what the risk would be, and in view of the further fact that by taking advantage of the workmen's compensation law all of the money which would be paid by the company would be given to the injured employee instead of having one-half or two-thirds of it absorbed by attorneys' fees, as was usually the case under the old insurance plan. Settlement with an injured employee under the workmen's compensation law was very apt to leave the employee a good friend of the company; hence his friends, acquaintances and relations also remained friends, and in some cases that means the whole of a small town. Naturally, almost every company in the State surrendered its employers' liability insurance and accepted the provisions of the workmen's compensation law.

Thereupon the stock companies writing liability insurance in Wisconsin played their trump card. They demanded that any company surrendering its employers' liability insurance should also surrender its public liability policy, and they refused absolutely to write any public liability policies in the case of companies that were not carrying employers' liability insurance. Through sheer force of intimidation and the fear of serious accidents on their lines, many of the smaller companies were "bluffed" into continuing the carrying of employers' liability policies at the exorbitant new rates demanded. In the case of combined lighting and railway companies, the additional risk assumed by the company in carrying its own public liability risk in the lighting department was only a small fraction of the risk which is already carried for public liability from accidents in its railway department, a risk which no insurance company in existence to-day will assume. Therefore the "bluff" was not successful in the case of companies operating both classes of service, but many a lighting plant that can ill afford it is to-day carrying employers' liability simply on the strength of the threat that the public liability policy will be canceled.

SUGGESTED PLANS OF ACTION

Your committee was appointed for the purpose of finding some escape from the exactions of the liability insurance companies. Let it be stated here that this committee is in no way hostile to the insurance companies, whether stock or mutual; the companies, *per se,* have rendered and in many cases are still rendering valuable services to the insured. We do not protest against companies of any kind or nature, but against the rates which it has been attempted to force upon us in a manner which could not possibly be used were insurance companies subject to the same restrictions and regulations which apply by law and commissions to the companies engaged in the public service business in Wisconsin. In order to overcome the present situation, there would seem to be three possible methods.

Plan 1—To form a mutual insurance or co-operative insurance corporation, constituting practically all of the membership of the Wisconsin Electrical Association.

Under this plan the membership of a mutual or co-operative insurance corporation would be carried by the Wisconsin Electrical Association itself, and the amount of premium which has heretofore been paid to the liability companies would be paid into the treasury of the association, and the association would write employers' and public liability insurance for its members only. The objection to this plan is that it would necessitate a complete organization for the purpose of carrying on the business. There would necessarily have to be an expert insurance man, an adjuster and an auditor, whether combined in one person or in several.

Plan 2—Joining of several members in some of the mutual or co-operative liability insurance concerns of good standing which make a business of writing liability insurance of lighting and street railway companies, telephone and other public service companies.

Your committee has listened to a proposition made by such a concern located in St. Louis, and in many ways the proposition is to be recommended. But there are a few objections to this plan also, the principal one being that the concern charges an initial premium equal to the premium to be paid to the stock companies under the "new rates," and charges 30 per cent of that premium to "administration," paying losses and claims out of the remaining 70 per cent. While 30 per cent of the premium is not a high amount to pay for administration, provided the premium is reasonable, at the same time this 30 per cent payable under the premium as now demanded would be in many cases several times the amount of insurance heretofore paid to the liability companies, and to this first 30 per cent must be added the actual losses incurred and paid. While this plan produces a lower net rate than that which can be obtained from stock companies, we do not believe that it is of sufficient advantage to be recommended for adoption by the association.

Plan 3—Insurance in a mutual company such as has been organized at Wausau for the purpose of carrying the liability insurance of Wisconsin manufacturers under the provisions of the workmen's compensation law.

The company located at Wausau is still quite young and in some quarters, which are open to suspicion, however, it has been much criticised. However, this concern offers an opportunity which our association cannot afford to ignore and which may give us reliable liability insurance at reasonable rates. This company is ready to write our employers' liability insurance, but it is not prepared at this time to take up the writing of our public liability insurance. If this concern were prepared to accept public liability insurance risks, your committee would feel inclined to recommend unanimously that we insure with this concern. Until provision can be made, however, whereby both employers' liability and public liability risks can be accepted we shall suspend recommendation.

There is a fourth plan which possibly might be worked out, and that consists in having the member companies organize a mutual insurance association among themselves and pay the usual premiums and then make some arrangements with some old-line company or with an agent representing several old-line companies to handle all of its business and to reinsure all risks above a certain amount, say above $500 or $1,000. In this way companies composing the mutual association would carry their own risks up to say $500 or $1,000, thereby eliminating a very large share of the fixed charges charged by stock companies against insurance premiums and reinsuring only the larger risks.

Your committee feels that it would be inadvisable at this time and in view of the importance of the subject to formulate definite conclusions and submit them as recommendations, especially since no really acceptable plan has been submitted so far. A much better plan, in our opinion, is to have this report thoroughly digested by the member companies and have ample time set aside for its discussion. After due consideration of the subject, we earnestly request that the association take some positive action having for its purpose the betterment of the liability insurance conditions of the members of this association.

WORK ORDER SYSTEM ADAPTABLE TO PUBLIC UTILITIES

BY GEORGE W. KALWEIT, AUDITOR THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

The "work order system" of The Milwaukee Electric Railway & Light Company has proven practicable in its application and satisfactory in accomplishing the purposes previously outlined. The company has made it a practice to issue "specific work orders" for each piece of work undertaken covering charges to capital expenditure accounts or reserve fund expenditure accounts, or special charges in operating expense accounts (work order charges), unless such charges would be covered by "general work orders."

The company's classification of accounts prescribes:

Capital expenditure accounts (work order charges) should include charges constituting expenditures for construction and equipment, additions and betterments, including intangible capital expenditures properly chargeable to "property and plant." These charges are to be carried on work orders either through a "specific work order," or a "general work order," issued to cover charges properly chargeable to capital expenditure accounts. Charges and credits to capital expenditure accounts must be in accordance with the classification of capital expenditure accounts (work order charges).

Reserve fund expenditure accounts (work order charges) should include charges constituting expenditures for reconstruction, re-equipment, betterments, or uncurrent and extraordinary expenditures, properly chargeable against "maintenance and depreciation reserve fund," as distinct from construction and equipment, additions and betterments, or intangible capital expenditures, properly chargeable to "capital expenditure accounts" or current ordinary maintenance charges, properly chargeable to "operating expense accounts." These charges are to be carried on work orders either through a "specific work order" or a "general work order" issued to cover charges properly chargeable against "maintenance and depreciation reserve funds." Charges and credits to reserve fund expenditure accounts must be in accordance with the classification of reserve fund expenditure accounts (work order charges). Operating expense accounts (work order charges) should include work order charges properly chargeable to operating expenses, separated from regular charges to operating expenses, for the purpose of ascertaining the cost of a specific job, the cost of the job to be transferred monthly to the appropriate operating expense accounts.

CLASSIFICATION OF WORK ORDERS

Work orders are divided into two classes: (1) Specific work orders. (2) General work orders.

A "specific work order" should carry the charges for a specific job, for example:

Construction of 1.00 mile of double track in Twenty-seventh Street from North Avenue to Burleigh Street, 7-in. 95-lb. T-rail; 350 cast welded joints, 205 splice joints; necessary special work; brick and granite paving; necessary electric line construction work.

A "general work order" should carry the charges for certain general work during a current year, for example:

Extensions in 1912 of the overhead electric light and power system in Milwaukee.

WORK ORDER REQUISITIONS

For the guidance of departmental heads, the accounting department issues the following instructions regarding work order requisitions covering capital expenditures or reserve fund expenditures:

All work properly classified as a "capital expenditure," or a "reserve fund expenditure," as distinct from a "maintenance charge" (properly chargeable in "operating expense accounts"), must be authorized through "work order requisitions."

"Work order requisitions" should describe the work to be done, the reason for doing it and the estimated cost of same in detail. "Work order requisitions" should be sent to the accounting department for the proper distribution and charge, to be in turn passed to the properly authorized official for approval, and then returned to the accounting department for the issuing of the "work order notification."

"Distribution of estimated cost" must be drawn up to conform with the distribution prescribed by the classification of accounts. This distribution is carried by the accounting department for all "capital expenditure work orders" but not for other work orders, unless a request is embodied in the "work order requisition" to do so.

"Details of estimated cost" must be drawn up in accordance with classification of capital expenditure accounts (work order charges) or reserve fund expenditure accounts (work order charges).

WORK ORDER NOTIFICATION

When the approved "work order requisition" reaches the accounting department it is carefully scrutinized and the calculations of "details of estimated cost" checked. If found to be properly drawn, the serial number is assigned, the "work order notification" issued, and a copy of same sent to all the departmental heads.

The "work order notification," with proper identification number assigned, shows the department from which the "work order requisition" originated, the title of the work order, the description of the work and the estimated cost, as well as the distribution and charge.

WORK ORDER INDEX

The accounting department's copy of the "work order notification" is entered on the work order index, which shows the date issued, work order number, description, distribution and charge, sub-index page and date completed.

The work order index thus combines a ready reference and record.

WORK ORDER DISTRIBUTION SHEET SHOWING COST OF EACH JOB

The accounting department's copy of the "work order notification" is entered on a loose-leaf distribution sheet, to which charges are posted from day to day as the work is in progress, the charges being carried according to the distribution and charge prescribed, separated as between "labor" and "sundries."

"Labor," according to the classification of accounts, is defined as: "'Pay roll charges,' covering manual labor, clerical work, engineering and superintendence."

"Sundries," according to the classification of accounts, is defined as: "'Sundry charges,' other than 'pay roll charges,' covering material and supplies, tools and expenses."

The charges segregated as between vouchers or journal entries, the latter including charges for material and supplies disbursed from stores, charges from special account reports, such as horse and vehicle service, cast welding, gravel pits, etc., are carried in a controlling account on the general ledger called "work orders."

RECAPITULATION OF WORK ORDER CHARGES FOR JOURNAL ENTRY

A recapitulation is made at the end of the month summarizing the total charges to each work order and a journal entry is prepared transferring the work order charges to the proper general ledger accounts.

All charges to the controlling account "work orders" on the general ledger are closed out monthly.

CLASSIFICATION OF WORK ORDER CHARGES

The charges to each work order are recapitulated in accordance with the classification of "capital expenditure accounts," "reserve fund expenditure accounts," or "other accounts," as previously described. The totals of these charges to the respective accounts affected are then transcribed on the "monthly financial report."

MONTHLY WORK ORDER STATEMENT

All work orders are scheduled monthly, showing the work order number, date issued, description, charges current month, year to date, total to date, separated as between "labor" and "sundries," estimate, company and account as between "capital expenditure account," "reserve fund expenditure accounts," etc.

The monthly work order statement is forwarded to all departmental heads, thereby giving them an opportunity to follow the work as to charges and costs.

CLOSING OF WORK ORDERS

When the work covered by a given work order is completed, the coupon attached to the "work order notification" is sent to the accounting department by the department in which the "work order requisition" originated, as a notification to close said work order.

Upon receipt of the notification the accounting department makes an investigation of the work order charges on the books, compares same with the estimate, and if found to be in order, the work order is closed. Differences between actual cost and estimated cost are sometimes accounted for by reason of balances to be paid on contracts or certain credits to be applied which have not been taken on the books and which the other departments may not know of. If the cost does not vary from the estimated more than 5 per cent, the work order is closed, otherwise the accounting department holds the work order open, notifying the department drawing the work order to investigate the charges and furnish an explanation. The accounting department sends out a notice in the form of a letter to all departments, listing the work orders that have been closed. Work orders are always closed out as of the end of the month.

OVERHEAD CHARGES

Prior to Jan. 1, 1911, it was not the practice of The Milwaukee Electric Railway & Light Company to include in its "work order system of accounts" anything for "overhead charges," other than a percentage charge added to "labor" for the use of tools.

The practice since Jan. 1, 1911, has been to add to the actual work order charges covering only "labor" and "sundries," as prescribed by the classification of accounts previously explained, an apportionment of certain charges in operating expense accounts, grouped under "general" and "undistributed," respectively, as well as interest on "current capital expenditures," at the rate of 6 per cent per annum. These items usually approximate about 6 per cent of the "capital expenditure charges" for physical property, or about one-half the amount of the percentage charges used by the Railroad Commission of Wisconsin in making valuations of physical property, including engineering and superintendence 4 per cent, organization and legal expenses 2 per cent, interest 3 per cent, contingencies 3 per cent.

It is not the intention here, in explaining this "work order system of accounts," to deal with the question of overhead charges, further than to refer to it briefly and its relationship to a work order system of accounts, regardless of the question as to what schedule of percentages should be used.

GENERAL

In considering the various features of the work order system explained, it is apparent that the system can be adapted to fit any proposition. Such cost analysis should include comprehensive and practical unit costs.

These unit costs will be found of great value in estimating costs of new work to be undertaken, and also in valuation work, both of which make the keeping of a "work order system" for any business not only desirable but absolutely necessary.

ANNUAL BANQUET

The annual banquet of the Wisconsin Association was held at the Hotel Pfister on the evening of Jan. 13 and was a very successful affair. The number of attendants was 185. C. N. Duffy, vice-president The Milwaukee Electric Railway & Light Company, acted as toastmaster. An address of welcome was made by the Mayor. Irving P. Lord, president of the association, responded to the toast of "Public Utilities and the Public." He said that he preferred the term "public service companies" to "public utility companies," because these companies were formed primarily to serve the public.

Humphrey J. Desmond, editor *Catholic Citizen*, of Milwaukee, responded to the toast "Public Utilities and Sociability." His remarks were received with favor. Charles L. Benjamin, advertising manager Cutler-Hammer Company, in replying to the toast of "Public Utilities and Publicity," said that the reason why public utility corporations should advertise was that they might overcome ignorance. They ought to tell their stories to the public.

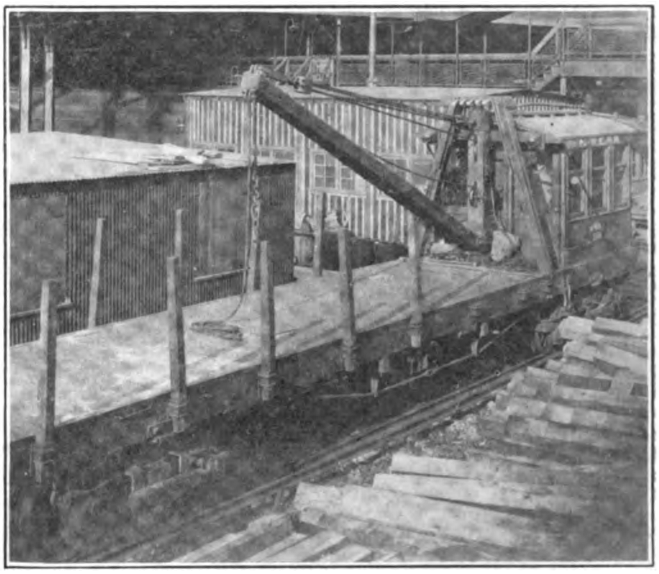
Herbert N. Laflin, assistant counselor Northwestern Mutual Life Insurance Company, in discussing "Public Relations and the Citizen," showed the importance of a right attitude toward public questions. August E. Stadelbauer, of Julius Andrae & Son's Company, responded for the supplymen in a witty speech. Sam A. Hobson, Western manager *Electrical World*, spoke on the subject of cooperation.

CHICAGO ELEVATED RAILWAY NEW TRACK AND ROADWAY DERRICK CAR

A new derrick car for service in the track and roadway department of the Northwestern Elevated Railroad, Chicago, has been placed in service. It was designed and built by the mechanical department of this company and embodies a number of novel features. In general the car is 46 ft. in over-all length and 8 ft. 6 in. wide, with a cab of the same width as the body and 9 ft. in length at one end. The underframe is of heavy timber construction, well trussed with six 1¼-in. truss rods, giving a maximum capacity of 60,000 lb. The motor equipment is exactly similar to that used on standard passenger cars, namely, two 75-hp GE type 55 motors with type L-2 controller. These large motors under the derrick car permit it to run at speeds in excess of the standard passenger train. The high speed was considered essential so that this equipment could operate between regular trains running on the Northwestern Elevated system, it being necessary to resort to the permanent cross-overs at passing sidings. Most of the track and roadway work on the elevated structures is done during the day, but there are times during heavy maintenance periods when it is necessary to handle this class of work during twenty-four hours of the day.

The car is wired throughout in conduit and is equipped with automatic air brakes, headlights and markers. Third-rail shoes and overhead trolley pole are provided, so that the car may be used on the surface lines or on the elevated structure. The car is also provided with standard drawbar equipment, to permit its use in switching or handling cars of material. A full set of stakes and stake pockets is provided in the car body, so that timber may be piled for transportation.

The derrick proper has been installed as near the cab as operating conditions will allow, leaving a maximum amount of car floor space for loading material. The boom is 20 ft. in length and of timber construction reinforced with steel. In order to reduce the space occupied by the cab to a minimum, a single-drum Lidgerwood hoist was installed with a capacity for lifting at a speed of 175 ft. per minute with 1 ton weight on the end of the boom. A 12-hp motor operates the hoist through a set of reduction gears. This arrangement makes it necessary to elevate the boom and swing the load manually, but usually it is kept at a permanent angle with the car floor and may be raised with a load if necessary by attaching a line to the niggerhead which extends beyond the sides of the cab. This niggerhead is also used for snaking loads to a point where they can be handled readily by the line connected to the boom. A hand-operated brake is also included in the hoisting equipment to control the drum in lowering a load.



Chicago Derrick Car for Track and Roadway Department

The motor-control equipment is arranged so that the motorman faces the derrick end of the car in moving it over the road. Windows are provided on all four sides of the cab, however, and permit operation in either direction. The regular derrick crew consists of a motorman and men enough to load and unload material. The motorman not only runs the car over the road, but operates the hoist. Two of these cars are now in service on the Chicago elevated lines.

NOTES ON THE MIDYEAR MEETING

The annual banquet extended by the American Electric Railway Manufacturers' Association to the American Electric Railway Association will be held in the large ballroom of the Astor Hotel, Friday, Jan. 31, at 7 p. m. There will be addresses by General Harries, president American Electric Railway Association, on "The New Partnership;" by Hon. Charles A. Bookwalter, ex-Mayor of Indianapolis, who will consider the treatment which should be accorded to public-utility companies by municipalities, and by Colonel H. P. Bope, first vice-president Carnegie Steel Company, who will discuss the requirements of modern manufacturing. The association expects also to have present a prominent government official, who will speak on the political conditions confronting the new administration at Washington. President Heulings of the Manufacturers' Association will preside as toastmaster, and will make a brief address regarding the outlook for the Manufacturers' Association during the new year, commenting also on the events during 1912, the most successful year in the history of the association.

The dinner committee has had so many requests to permit the wives and daughters of the representatives and guests attending the dinner to occupy boxes in the ballroom during the addresses that it has decided to grant this request. In consequence the Manufacturers' Association has extended an invitation to all representatives of the member companies, as well as their guests, to have their wives and daughters present at this time. The boxes will be open at 9 o'clock, and special tickets for ladies who wish to take advantage of this opportunity to hear the speeches will be furnished upon request by the secretary of the Manufacturers' Association.

The advance sale of tickets for the banquet itself to members of the Manufacturers' Association has been unusually heavy, and applications for dinner tickets as well as for box seats for ladies are still being received in large numbers. Thus far 300 dinner tickets have been purchased by companies and individuals.

During the dinner special music is to be furnished, and this will no doubt add very materially to the many enjoyable features of the banquet. The dinner will, of course, be up to the high standard which has been set at the previous banquets of the association, and it goes without saying that all of those in attendance will have an unusually enjoyable evening. Several special features are to be introduced by the dinner committee, but as these are in the nature of surprises they will not be made public prior to the banquet.

It is absolutely necessary that the Manufacturers' Association shall have the names of all representatives and guests who will attend the dinner, as well as requests for reservation space in the boxes for ladies, on or before Jan. 25, and applications for dinner tickets and box seats should be sent to the American Electric Railway Manufacturers' Association at Suite 1002, 165 Broadway, New York, as soon as possible.

COMMITTEE MEETINGS

A large number of committees of the American Electric Railway Association and its affiliated associations will hold sessions at about the time of the midyear meeting. The sessions begin on Wednesday, when there will be a meeting of the classification committee of the Accountants' Association and the executive committee of the Claim Agents' Association. The executive committee of the American Association will meet Thursday afternoon, Jan. 30, and the executive committee of the Transportation & Traffic Association on the same afternoon, but later in the day. The following is a list of the committees which will meet some time during the midyear period:

American Association: Committees on subjects, insurance, education, welfare of employees, federal relations, compensation for carrying United States mail, public relations, determining proper basis for rates and fares, relations with sectional associations, *Aera* advisory and company sections.

Accountants' Association: Executive, classification, education and all joint committees.

Engineering Association: Power generation, equipment, heavy electric traction, buildings and structures, and all joint committees.

Transportation & Traffic Association: Rules, passenger traffic, express and freight traffic, construction of schedules and timetables, fares and transfers, training of transportation employees, train operation, uniform definitions and all joint committees.

Claims Association: Executive, subjects.

C. L. Henry, chairman of the committee to consider relations with sectional associations, has extended an invitation to the presidents of all of the sectional associations and other national associations on this continent to be present at the meeting of that committee or to send a representative to discuss matters within the scope of the work of the committee.

HEARING ON HEATING ORDER IN NEW YORK

A hearing was held on Jan. 13, 1913, before the Public Service Commission of the First District of New York on the application of the New York (N. Y.) Railways for an extension until April 1 of the time within which the order adopted by the commission on April 26, 1912, for the adequate heating and ventilation of vestibuled cars should become effective. J. S. Doyle, superintendent of car equipment of the company, testified that the pay-as-you-enter cars had furnished a most difficult problem, and that if an unlimited amount of fresh air were provided it was doubtful if the present power houses could supply enough power to maintain a minimum temperature of 40 deg. Fahr. Many devices had been tried. The devices which the management considers best have been installed on the stepless cars now in service and will be used in the 175 stepless cars that have been ordered. Clifton W. Wilder, electrical engineer to the commission, said that it would be physically impossible to install the new apparatus on all of the cars of the company this winter without crippling the service. The commission took the matter under advisement.

INSPECTION OF GOVERNMENT FUEL PURCHASES

The inspection of coal purchased for the government is conducted from the headquarters of the Bureau of Mines in Washington, where the engineer in charge of inspection is stationed and the laboratory for analyzing samples of deliveries is situated. On coal contracts the bidders guarantee the quality of the coal they offer, and the quality guaranteed by the successful bidder becomes the standard of his contract. A large part of the coal used by the government for its power plants, public buildings and naval stations is purchased under contracts that specify the ash and moisture content, the heating value, the limits of the volatile matter, and the sulphur content. The analyses of samples of deliveries determine whether the quality of the coal is up to the standards guaranteed by the contractor. If it is not, the price to be paid is decreased in proportion to the lower value of the coal. If the coal is of higher quality the price is increased proportionately.

In the fiscal year 1912 the purchases of coal by the government, under specifications providing for payment according to the quality of the coal delivered, amounted to approximately 1,500,000 tons, costing $4,750,000. The purchases of 1912 show an increase over those of 1911 of approximately 408,600 tons, costing about $1,666,000, the increase in tonnage being 37 per cent.

A SUGGESTED LIGHT SIGNAL SYSTEM

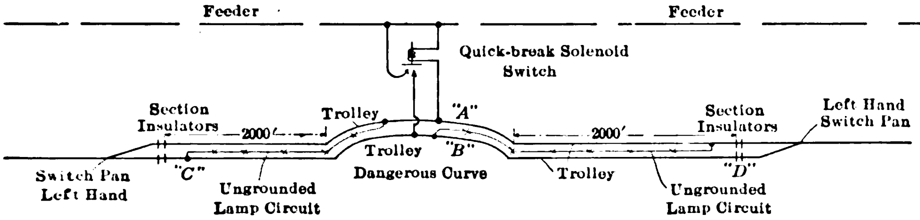
A novel light signal system has suggested itself to Gaylord Thompson, chief engineer of the Ohio Electric Railway. As Mr. Thompson has no idea of patenting this system, he is anxious to obtain criticisms and suggestions from different engineers interested in it, and a description is presented herewith.

If two trolley wires were arranged as shown in the diagram and insulated by means of line section insulators, one wire being fed through a tap containing a solenoid and the other containing a broken circuit which is closed by the de-energized solenoid, it will be seen that when current is being taken from trolley *A*, shown in the diagram, the solenoid will open the feeder tap of trolley *B*, and consequently *B* will be dead. If a series of lights was "floated" between trolley *A* and trolley *B*, the instant that the two cars came into the block these lamps would light, thus warning each car of the approach of the other.

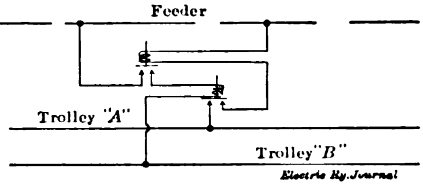
APPLICATION

While the system could be made continuous over any mileage, its special use would be in the prevention of head-on collisions at dangerous curves. With such protection, the device would, in effect, make the operating division where it will be employed the equivalent of a straight line from one end to the other.

Cars overrunning their orders, or for any reason trespassing on this section of track, would be advised of the approach of other cars in time to stop. The circuit-breakers should be installed, each at a distance of about 2000 ft. from the curve to be protected. This would make 2000 ft. the minimum distance apart at which the approaching cars could see each other. Ordinarily *C* and *D* should be placed about 1 mile apart, or the system could be made to embrace a 3-mile section between passing points in which the view is obstructed. In either case the feeder tap should be located at about the middle of the protected section so as to reduce the drop in voltage to a minimum.



Proposed Method of Protecting Dangerous Curve



Double Switch Scheme

It is obvious that to make the system effective, both cars must draw current or have their controllers on at the same time. To insure this result on a continuous block system the live wire should be placed for the car ascending the grade and for isolated installations. In addition special instructions should be issued to the motormen. In actual practice, however, with points *C* and *D* 1 mile or 1½ miles apart, the condition of the controllers that could give the warning flash of the lights would be certain to occur before a dangerous condition was reached by the two cars in their approach toward each other.

As the light circuit is not a grounded circuit it would not be subject to derangement or the troubles of ordinary grounded light wires. The maintenance cost would be practically nothing, and the cost of installation for two No. 000 trolley wires and fixtures would be between $1,200 and $1,500 per mile.

One question which arises is whether the energy should be taken from one trolley wire only, or whether a double switch should be used. This would take the current away from the transgressing car at the entrance to a protected section. A sketch showing the arrangement of the feeder taps and solenoids with a double switch is also included.

GREAT NORTHERN RAILWAY ELECTRIFICATION IN MONTANA

BY EDWARD P. BURCH, MINNEAPOLIS

The recent news item in Eastern papers that the Great Northern Railway is to electrify its proposed Montana Eastern Railway, a prairie road between New Rockford, N. D., and Lewistown, Mont., a distance of 530 miles, is not based, so far as known, on any real decision of the railroad directors. The roadbed, tunnel and other construction contracts have been awarded, but it may be two years before the road is completed. The reasons why this new competitive road could be electrified to its financial advantage are not apparent, but it is surmised by those in touch with the general situation that some definite and controlling situation or opportunity may be involved.

In the case of the Denver, Rio Grande & Western Railroad, which has recently decided to electrify two complete engine divisions, one 115 miles long and one 85 miles long, the reasons were clear. A mountain range had to be crossed, grades were severe, traffic was heavy, capacity was limited and fuel was expensive. The directors appropriated funds for the electrification, and Vice-president Brown has stated: "Our plans are in the interest of economy in operating expenses." It is evident that capacity would be increased, and the use of water power for electric traction would provide a cheaper motive power.

These reasons do not seem to apply to the case of the proposed Great Northern electrification of the Montana Eastern. There are, however, at least two economic reasons why the proposed electrification might prove advantageous:

The fuel which is now used in Dakota and Montana has increased greatly in price during recent years. However, vast beds of brown lignite are found in Dakota and Montana, and the development of this great natural resource now requires a greater demand for the fuel as well as the backing of a strong corporation. Brown lignite crops out at many points along the proposed right-of-way. This lignite cannot be burned in locomotive boilers, but it is easily handled in stationary boiler plants equipped with mechanical stokers. This lignite can be used also by gas producers and gas engines with great economy. The energy from lignite heat can be converted into electrical energy and sent 100 miles east and west from many central power stations without great loss and in a most reliable manner.

The railroads which operate the most extensive electric systems in America claim that in the electrical operation of main-line traffic 50 per cent of the fuel bill is saved, and in switching operations or for classification yards 60 per cent is saved. Based on the relative cost of the steam fuel now used and brown Dakota lignite, the use of electric power on the Great Northern might reduce the fuel expense even more than 50 per cent.

In Europe it was the matter of economy of fuel which stimulated the great interest in railroad electrification, especially in Prussia, France, Switzerland and Italy.

One of the heaviest railroad operating expenses in the Dakotas and in Montana is that incident to the high cost of boiler flue repairs. These repairs are occasioned by the water, which is detrimental. The alkali and also acid waters, and combinations of the two, found within a single engine stage cause a great amount of pitting and also incrustation of fire boxes and flues. The efficiency of the boilers is lowered, and the cost of fuel is thus considerably increased. Then, in the boiler repair shops the maintenance and repair account is excessive because of the deterioration of the boiler from the bad water and also because of the high wages paid to locomotive repair men.

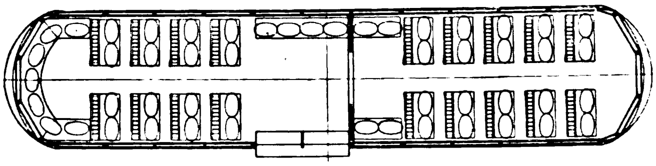
With electric power water for boilers can be obtained at the best sites or can be treated at a single point and then used over and over again in the condensing operation of steam turbines or as cooling water for gas engines.

The Great Northern Railway at the present time owns or controls many important electric railroads, including the Spokane & Inland Empire Railroad, which uses electric power on 248 miles of track; the Oregon Electric Railway, from Portland to Eugene, 121 miles; the United Railway system at Portland and other electric railways. The Cascade Tunnel track, which was electrified several years ago, handles heavy traffic under severe conditions. Electrification of main lines for heavy freight and passenger service is not a new matter with the directors.

It is surmised that the proposed road from Lewistown, Mont., to Rockford, N. D., is but the beginning of electrical operations, and that when the traffic density has increased the road from Lewistown to Great Falls, Mont., may be electrified to utilize the water powers already developed along the Missouri River.

NEW DENVER TRAIL CAR

The Denver City Tramway, one of the pioneer operators of side-entrance cars, has placed in service a new type of one-way trailer which follows closely the design of the company's standard side-entrance car. As shown in the accompanying plan, a partition now incloses the forward section of the trailer, leaving the rear compartment open for the passengers who prefer fresh air, with the usual reservations for smokers. On former trailers the opening was 100 in. wide. On the new type, however, the opening for entrance and exit has been reduced to 67 in., which distance has proved ample. The lower step is only 13½ in. above the rail without allowing a further ½ in. for settlement. The double sliding doors which open into the closed compartment afford a passage of 36 in. in the clear.



Seating Plan of Denver Side-Entrance Trailer

The seating capacity has been increased from forty-six to fifty-one, partly by the addition of a circular seat at the rear. Greater riding comfort has been assured by using as many transverse seats as practicable and by furnishing the closed compartment with thermostat-controlled electric heaters.

With the exception of Brazilian government roads, the principal railway enterprises in Brazil have been built with English money and are controlled and operated by English companies and managers. However, many railways recently constructed and now under construction by companies controlled by American and Canadian syndicates are being financed in France, where $100,000,000 was invested during the past three years in Brazilian railways. Most of the equipment, rolling stock and rails for these roads has been purchased in Great Britain, Germany, the United States and Belgium.

COMPARATIVE EARNINGS OF PUBLIC UTILITIES

White, Weld & Company, New York, have recently compiled and issued a chart comparing the increase of gross and net earnings during the past ten years of ten steam railroads, ten gas companies, ten electric light and power companies and ten electric railway companies which might be considered as fairly representative of the industry and, with the possible exception of the gas companies, fairly well distributed throughout the country. In the gas group of public utilities, owing to the lack of generally published statistics covering the ten-year term, a larger number of companies had to be selected from Massachusetts, where these figures are available, than would otherwise have been the case. The chart is reproduced herewith. The names of the companies selected for this comparison follow:

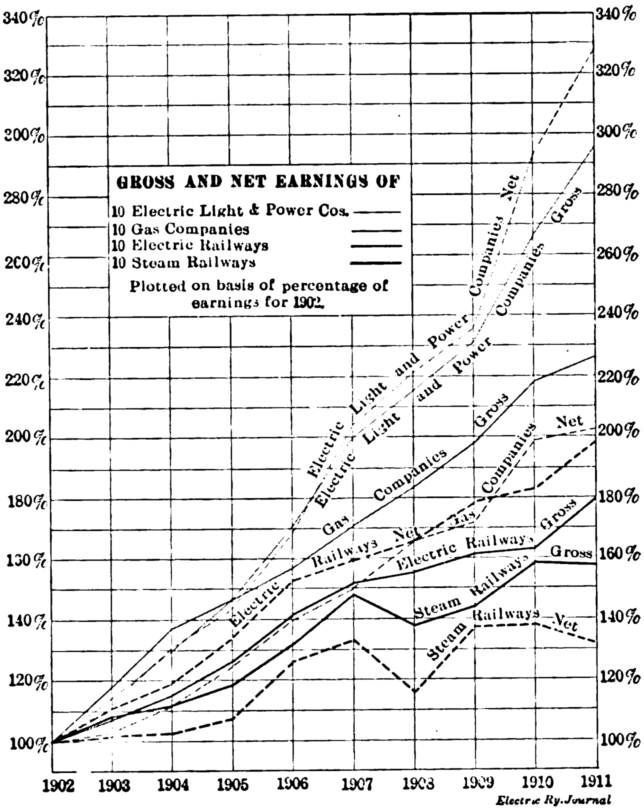


Chart Showing Statistics of Forty Public Utility Companies

Steam railroads: Atchison, Topeka & Santa Fé; Chicago, Milwaukee & St. Paul; Chicago & Northwestern; Erie; Northern Pacific; Pennsylvania; Union Pacific; Southern Pacific; Norfolk & Western; New York Central & Hudson River.

Gas companies: Consumers' Gas, Toronto; Hartford City Gas, Hartford, Conn.; Portland Gas & Coke, Portland, Ore.; Laclede Gas, St. Louis, Mo.; Aberdeen (S. D.) Gas; Worcester (Mass.) Gas; Springfield (Mass.) Gas; Haverhill (Mass.) Gas; Cambridge (Mass.) Gas; Peekskill Lighting & Railway (gas department).

Electric light and power companies: Cleveland Electric Illuminating; Washington Water Power, Spokane, Wash.; Minneapolis General Electric; Lowell Electric Light; Edison Electric Illuminating, Brockton, Mass.; Kings County & Edison Companies, Brooklyn; United Electric Light, Springfield, Mass.; Edison Electric, Los Angeles; Duluth Edison Electric; Edison Electric Illuminating, Boston.

Electric railway companies: Brooklyn Rapid Transit; Twin City Rapid Transit; Denver City Tramway; Capital Traction, Washington, D. C.; Indiana Union Traction; Louisville Railway; Detroit United Railway; Lake Shore Electric Railway; Memphis Street Railway; Boston Elevated Railway.

It is interesting to note the relative direction of the lines for gross and net for the different classes of properties, especially their direction during the past years as illustrative of general conditions. The steam railway group shows the least percentage of increase, both in gross and net, and during the past two years the line showing the net increase has been falling rapidly below the gross increase.

In the electric railway division, which shows the next higher increase for both gross and net during the past ten years, the net earnings have grown more rapidly during the past five years than the gross earnings, but most of this gain was in 1908 and 1909, and since that time the lines have kept at about the same distance apart, showing that there has been no improvement in the operating ratio.

The two lines representing the earnings of the gas companies come next and for the past six years show a fairly constant ratio between the two classes of earnings.

The electric light and power figures are especially notable because of the increase of the gross earnings shown of 294 per cent since 1902, while the net earnings increase is 328 per cent. The net earnings began to increase more rapidly than the gross earnings about 1907, and since that time have grown very much more rapidly, especially during the past two years, as the divergence between the two lines shows. Their position in relation to each other and to the other classes of public utilities is good evidence of the reason for the popularity which this class of securities possesses.

SOCIETY FOR ELECTRICAL DEVELOPMENT

At a meeting held in New York, Jan. 14, the following officers were elected by the Society for Electrical Development: President, Henry L. Doherty; vice-presidents, Ernest Freeman, A. W. Burchard, W. H. Johnson, J. R. Crouse and W. E. Robertson. The above, with L. A. Osborne, Gerard Swope and J. R. Strong, compose the executive committee. The complete board also includes the following: A. C. Einstein, W. W. Low, J. E. Montague, F. S. Price, J. F. Gilchrist, Roger Scudder, A. W. Burchard, E. McCleary, P. N. Thorpe, B. M. Downs, W. A. Lyman and G. M. Sanborn. J. M. Wakeman was appointed general manager and Philip S. Dodd, secretary and treasurer. Both Mr. Wakeman and Mr. Dodd are well known in the electrical industry and have a very intimate acquaintance with publicity problems of the kind involved in the present propaganda on behalf of electrical development.

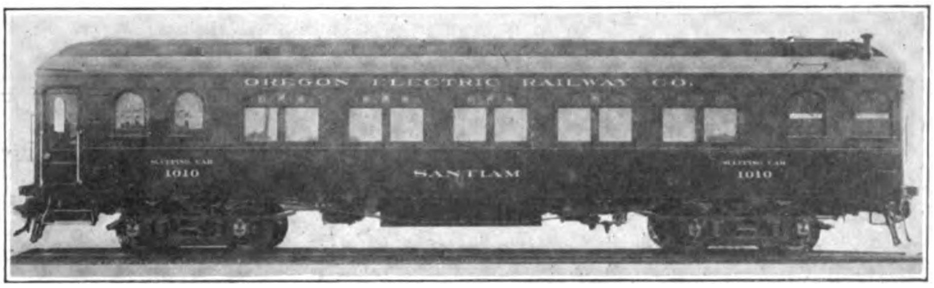
The work of the society will be devoted to various lines of effort for the greater development of the electrical industry at large, and will be carried out along broad-gage lines aiming to increase in every way the uses of electricity, especially for lighting, heating and motor service.

The membership of the society, as stated in the by-laws, is open to every interest in the electrical industry, and the subscriptions, based upon a small percentage of the gross business, are so small individually that it is believed that the full co-operation of every concern in the electrical industry can be secured.

The society has the indorsement of the executive committee of the National Electrical Contractors' Association, the National Electrical Supply Jobbers' Association, the executive and public-policy committees of the National Electric Light Association, together with the support of a large number of manufacturers, both large and small. With such indorsement there can be very little question of its practicability and value to the industry at large.

SLEEPING CARS FOR OREGON ELECTRIC RAILWAY

The Oregon Electric Railway Company, which is developing an extensive electric railway system in the Willamette Valley in Oregon, has recently added to its passenger equipment two very handsome new trailer sleeping cars, which were built at the works of the Barney & Smith Car Company, Dayton, Ohio. The new cars are 57 ft. long over buffers and 9 ft. 4¾ in. wide over side sills. They have composite wood and steel underframes, with wood superstructure, and are mounted on all-metal four-wheel trucks with rolled-steel wheels. The sleeping compartment contains ten standard sleeping-car sections.



Sleeping Car of Oregon Electric Railway

The general layout is similar to that of regular steam railway sleeping cars. Adjoining the sleeping compartment at one end of car is the men's lavatory and smoking room and at the other end of the car is the women's toilet, both having ample toilet facilities, including dental bowls. The floors of the lavatories are covered with inlaid rubber, and in the smoking room is a large sofa upholstered in Spanish leather. The cars have a Smith hot-water heater and are electrically lighted by means of storage batteries, the lighting fixtures being of a very attractive pattern. For ventilation they are supplied with ten automatic ventilators per car. They will be operated as trailers.

The cars are finished inside in handsomely figured mahogany with inlaid lines and marquetry figures in neat design. The floor covering in the main compartment is Wilton carpet, the seats are upholstered in figured frieze plush and the trimmings throughout the car are statuary bronze. The ceilings are decorated in green and gold.

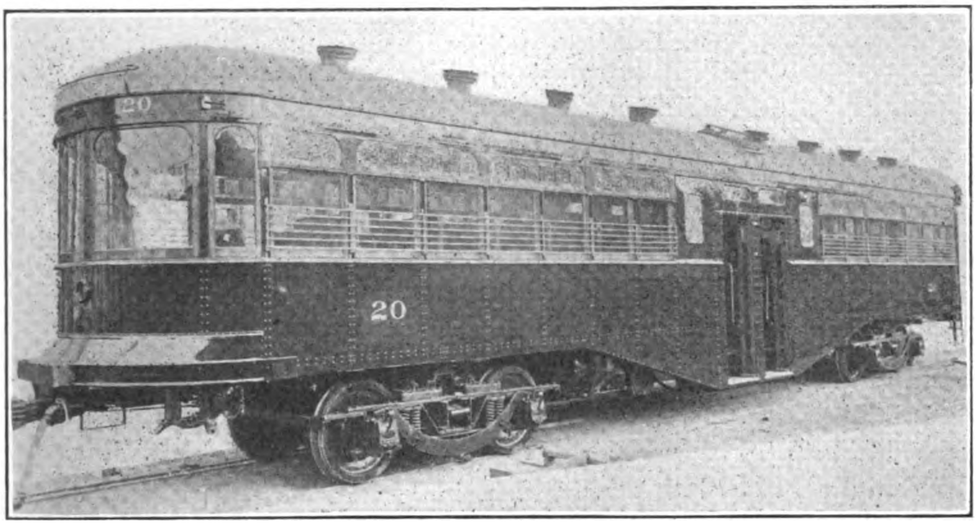
These cars are equipped with Westinghouse schedule A.T.R. air brakes, Railway Company's type of radial draft rigging, steel trap doors—in short, they are well supplied with modern special equipment and possess every convenience and comfort of a high-class steam railway sleeping car. The accompanying photo-engraving serves to give a good general idea of the appearance of these cars.

The pioneer electric railway to put sleeping cars in service was the Illinois Traction System, whose sleeping cars are of a special type with windows for the upper berths. The sleepers of the Oregon Electric Railway, as described, are not different in design from those used on steam roads but are of interest because of their use in electric service.

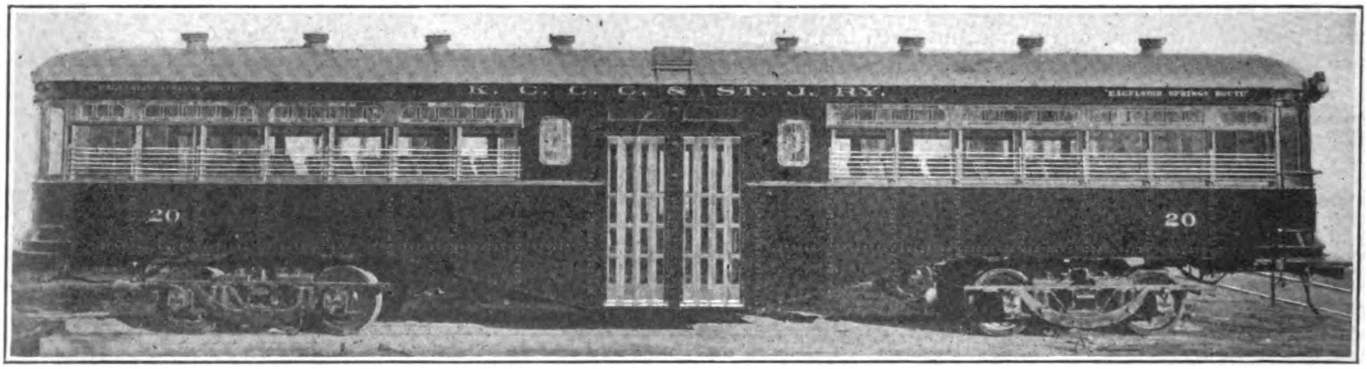
The second annual report of the director of the Bureau of Mines states that the results of the bureau's investigations show that peat, if properly prepared and well dried, has a greater heating value than wood, and that if its freedom from ash, clinkers and sulphur is considered, as well as its giving off little smoke and burning up completely, it compares favorably with anthracite. In addition, it is stated to be possible in many places to put peat on the market near the point of preparation at less than half the present prices of the better-known fuels. However, many attempts at peat utilization in this country during the past decade have proved impracticable.

CENTER-ENTRANCE INTERURBAN CARS FOR THE KANSAS CITY, CLAY COUNTY & ST. JOSEPH RAILWAY

By March, 1913, the most important electric railway project in the Central West will be completed and in operation, namely, the Kansas City, Clay County & St. Joseph Railway. This line was designed and is being built for high-speed passenger and freight service between Kansas City and St. Joseph, Mo., a distance of 53.7 miles, and between Kansas City and Excelsior Springs by way of a branch 26.2 miles in length, leaving the main line just outside of Kansas City. By constructing along the bluffs bordering the Missouri River, instead of following the river valley, as did the steam roads, both the main and branch lines are more than 10 miles shorter than the steam road routes. Excelsior Springs is a popular health resort of about 12,000 population. St. Joseph is a city of 100,000 people, and it is touched by a number of steam road trunk lines which do not have their own connections into Kansas City. The two cities are the objective points of the enterprise, together with the fact that the road taps a rich farming district not served by steam roads. When complete the line will be one of the best built and equipped electric railways in the Central West.


Center-Entrance Interurban Car—View Showing Open Doors and Interior Steps

The cars with which the new line will be equipped are of the center-entrance, drop-side type, similar in many respects to the car of this type which was exhibited by the Cincinnati Car Company at the Chicago convention and created much favorable comment. The initial equipment will consist of sixteen cars and these are now in process of construction by the Cincinnati Car Company.


Center-Entrance Interurban Car—Side View Showing General Appearance of Exterior

The over-all length of the car is 58 ft. measured from the inside face of the couplers. The extreme width over the eaves is 9 ft. and over the sills it is 8 ft. 10 in. At the center portion of the car is a vestibule or well 7 ft. long which is used for an entrance space and is furnished with interior steps so that no obstruction at any time extends beyond the side of the car.

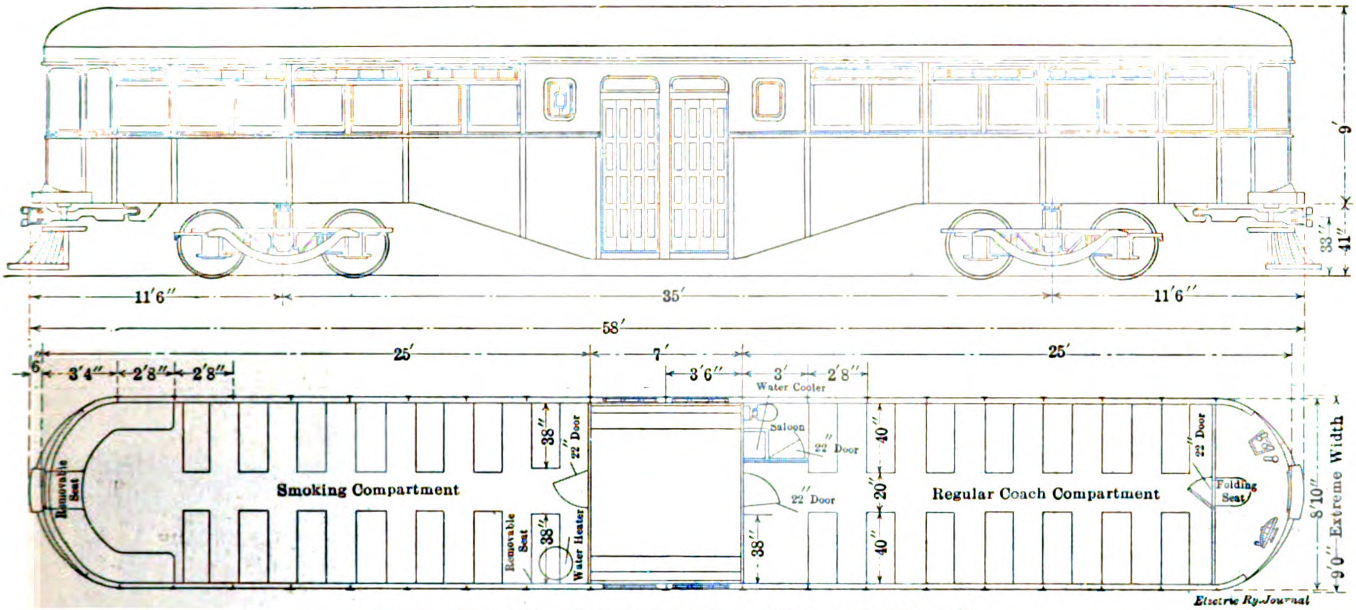
In general the car is designed for single-end operation and a permanent motorman's compartment is located at the front end. However, in case of an emergency it is planned to use the cars for double-end operation, and at the rear a removable section of the semicircular end seat is provided. Under this are located a controller and brake valve so that by removing the seat the car can be satisfactorily operated from the rear end. The car is also provided with two trolley poles in order to facilitate regular double-end operation in case it should become necessary.

The entrance space at the center of the car is separated from the two ends by bulkheads with swinging doors. The front portion of the car is used as a standard coach compartment and in this section is a saloon about 3 ft. square, in one corner of which is a water cooler. The rear end of the car is used as a smoking compartment and includes a semicircular space at the extreme rear end surrounded by a seat and affording an unusually desirable arrangement as an observation space. At one of the front corners of the smoking compartment a Peter Smith hot-water heater is installed during cold weather. It takes the place of one of the seats, which is replaced in the summer time when the heater is removed.

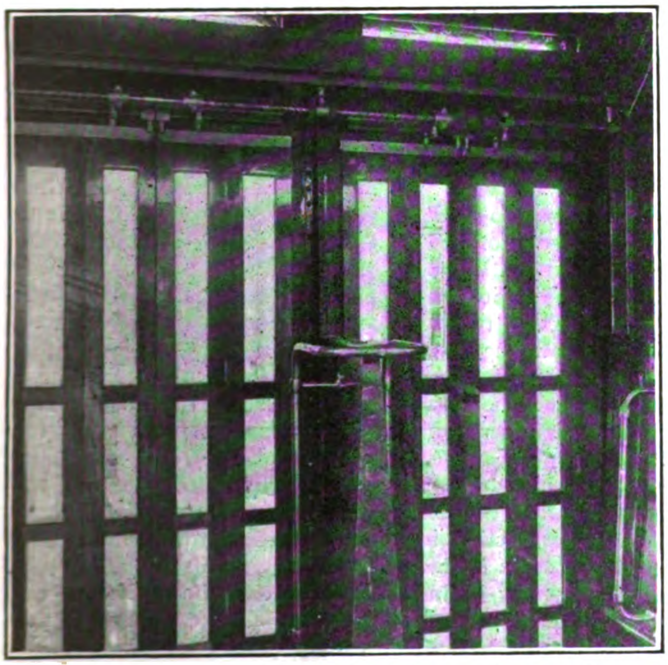
The seating capacity of the car is sixty-six, all of the seats being transverse except the four longitudinal seats which are part of the semicircular seat at the rear end. Contrary to the arrangement originally developed by the builders for this type of car, no folding seats are provided in the entrance compartment for use on the side of the car opposite to the entrance door. In this case both of the entrance doors are always available.

The car is built of steel practically throughout. The frame is of T-bar construction similar to that used with the car exhibited at Chicago. The new car has, however, a differently shaped roof and ends, and it is of considerably heavier construction. The roof and siding are made of steel plate, the underside of the roof being finished in white enamel. The car is insulated throughout with sheets of cork, 1 in. thick, which are cemented to the steel plating which forms the sides and roof.

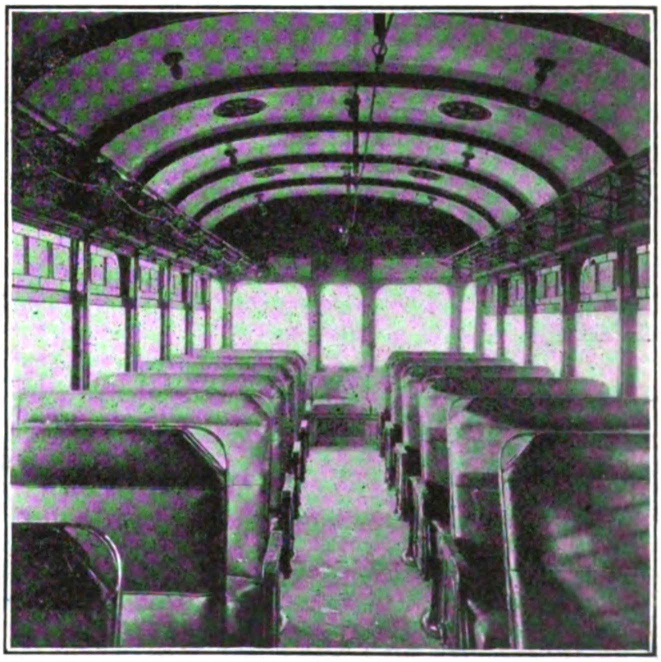
The windows slide in pressed-brass grooves which are riveted to the side posts, the latter being made up of T-shaped sections. The sash fittings are constructed so that they can be removed by withdrawing two bolts located at the upper end of each sash, permitting the car to be completely stripped for overhauling without removing any of the woodwork, the interior finish used throughout the car including the covering of the side posts consisting of mahogany. The ends of the car are inclosed by semicircular plate-glass windows. The narrow window in the center at the front end, shown in the accompanying halftone, is double-sashed and arranged so that the upper sash drops and the lower one can be raised. In consequence, the motorman when standing can drop the top sash, or when seated he can raise the lower one in order to give an unobstructed vision with a minimum of exposure to the weather.



Center-Entrance Interurban Car—Plan and Elevation



Center-Entrance Interurban Car—Door and Door Operating Mechanism



Center-Entrance Interurban Car—Interior View Looking Toward Rear

Two narrow windows are located at the corners of the car and these are mounted on hinges and open inwardly to permit the motorman to handle signal lights and telephone plugs without leaving the car. The rear end has permanent plate-glass windows with a narrow one at the center corresponding to the arrangement at the front end. This center window is, however, fitted with a stationary lower sash, the top sash being arranged to drop in order that the conductor may be able to handle the trolley pole.

As previously mentioned, an entrance space is provided at the center of the car. No other doors of any description are installed, the motorman having access to his cab only through the body of the car and handling signal lights and markers through open windows. The entrance space has a floor depressed 9 in. from that of the two main compartments at each end of the car, the main floor being 41 in. from the top of the rail. This total rise is divided into four steps, including the 9-in. rise from the drop platform to the main floor level. From the rail to the first step the rise is 17 in. and the second and third steps each have a rise of 12 in. The steps are interior and are carried by the drop siding which is provided at the center of the car.

Access to the car is effected through folding doors which when closed are practically flush with the car siding. Two Edwards steel double doors are provided on each side of the car, the pair of double doors on each side being separated by a permanent post, which divides the doorway into two parts each about 3 ft. wide. Each half of the double door which extends across this 3-ft. doorway is hinged in the middle so that the door is divided into four sections, each of which is about 9 in. wide. This subdivision into narrow sections permits the doors to be folded up over the first step and against the sides of each doorway so that the full width is available for entrance. While the separation of the doorway into two 3-ft. passages permits the use of a separate entrance and exit if desired, the cars are to be operated for the present on the "exit first" principle.

The operation is manual, the doors being folded up by means of pull rods actuated by a screw with a very high pitch. The screw is revolved by a chain which is led back to the operating handles near the center of the entrance space. This arrangement, which is patented by the Cincinnati Car Company, is exactly similar to that which was installed on the car exhibited in Chicago, except that no folding seats are provided to be extended along the unused door.

EQUIPMENT AND FITTINGS

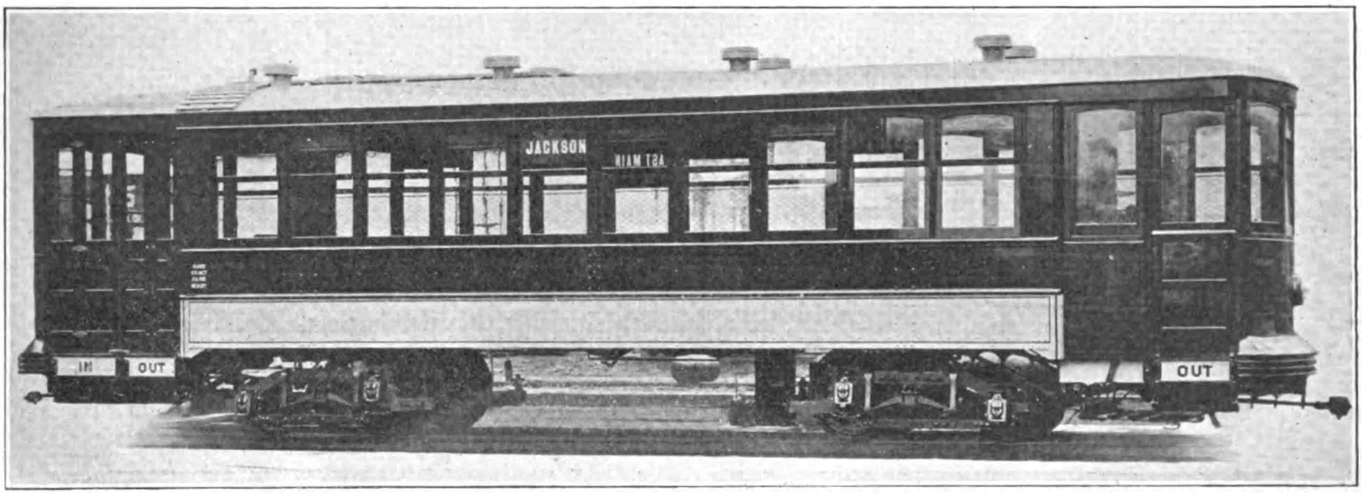
The road is to be operated on a 1500-volt overhead-trolley system, and each car is equipped with four GE-225 1500-volt motors, which are rated at 125 hp. Air brakes of the General Electric type are provided. The trucks are of the Baldwin M. C. B. type and are spaced on 35-ft. centers, the car being carried at a considerable elevation to obtain easy-riding qualities.

The interior fittings of the car consist of Hale & Kilburn "walk-over" seats which are covered with upholstered leather in the smoking compartment and with plush in the regular passenger compartment. The mahogany used in the interior is finished in the natural wood and the metallic fittings are made of light statuary bronze, so that the interior appearance of the car is unusually luxurious. Each car is ventilated by sixteen of the Cincinnati Car Company's "Utility" ventilators of improved Globe type. These are adjusted by hand through dampers set in the ceiling.

The record of passenger train performances on the steam railroads of New York State for October shows that during the month the number of trains run was 66,929. Of the number of trains run 81 per cent were on time at the division terminal. The average delay for each late train was 26.4 minutes, and the average delay for each train run was 5 minutes. In November the average delay for each late train was 25.9 minutes and for each train run 4.6 minutes, 82 per cent of all trains being on time.

A NEW PAY-WITHIN CAR FOR THE MICHIGAN UNITED TRACTION COMPANY

The Michigan United Traction Company has recently had built by the G. C. Kuhlman Car Company twenty pay-within cars with a novel arrangement of platforms and seats. The cars are intended strictly for single-end operation, and the front platform, 6 ft. 4 in. in length, is occupied by a glass-inclosed motorman's compartment, a space for the heater and an exit passenger way. The front platform is, however, not separated from the body of the car by the customary partition, the space normally occupied by the bulkhead being open for practically the entire width of the car, except for two vertical posts used as hand-holds. The motorman's compartment, which has a clear length longitudinally of approximately 3 ft., contains, in addition to the controller and brake, boxes for sand and coal. The glass partition does not completely inclose the compartment, and on one side, that next to the entrance door, isolation of the motorman is effected by a removable rail. This feature permits the motorman to have an unobstructed view of the front exit door and permits him in case of emergency to reach the doorway promptly.



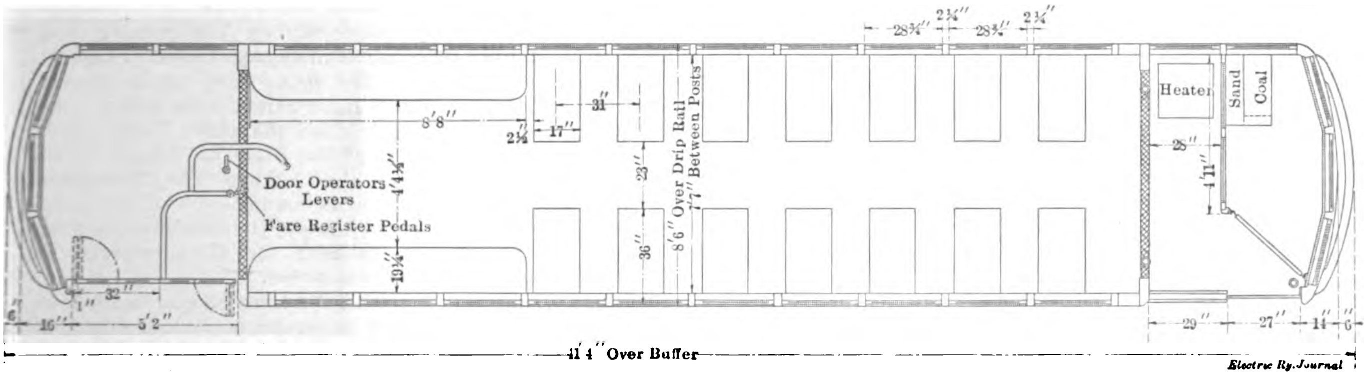
Michigan United Traction—Single-End Pay-Within Car

The whole rear platform is available as floor space for entering and leaving passengers, the space for the latter being reduced to a minimum. This platform is 7 ft. long as measured from the posts to the extreme end of the bumper, and with a 26-in. exit door this permits the entrance to be 32 in. wide. The position of the conductor is in the center of the car body just inside the rear bulkhead. He stands facing toward the rear end, and when in this position he can operate the doors and an International cash register, the latter being worked by two foot pedals, one of which is provided for cash fares and the other for transfers.

As shown by the accompanying plan of the car, the arrangement of the railings on the rear platform is unusual. The shorter section inclosing the standard for the door-operating levers is so arranged in order that in the future a fare box may be installed. The cars, however, are not at present equipped with fare boxes. The extension of this railing into the body of the car is for the purpose of separating the entering passengers from the conductor when he is standing in his normal position. As is the case at the front end of the car, no partition is provided between the rear platform and the car body and the opening is made practically the full width of the platform. The step is, however, set in from the edge of the side sill about 10 in.

Folding doors are provided at the rear end, the exit door folding up outside of the step line and the entrance door folding inside over the floor of the platform. These two doors are operated independently by hand levers carried up in a standard just back of the normal position for the conductor and readily accessible for him. The exit door on the front platform is of the sliding type 27 in. wide and is operated by the motorman.

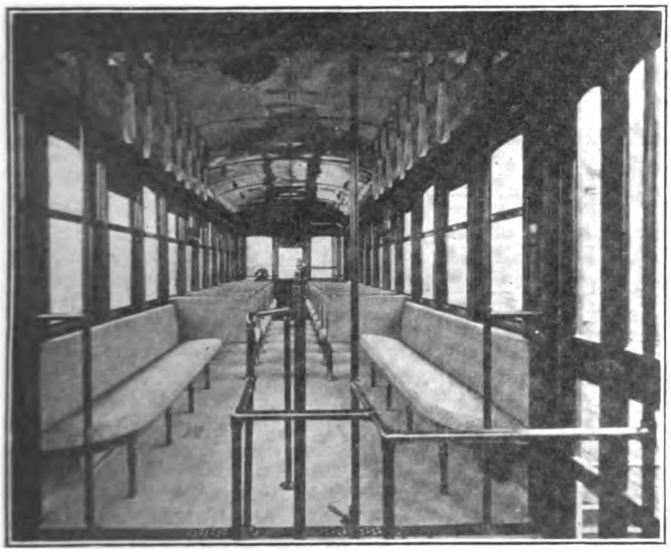
A combination of longitudinal and cross seats is provided, the longitudinal seats being at the rear end in order to provide additional standing space at that point. They are 8 ft. 8 in. long and 19¼ in. wide, seating, on both sides, twelve passengers. The cross seats, which are 32 in. in length and give a 23-in. aisle in the center of the car, are spaced on 31-in. centers, each seat being 17 in. wide. These give a seating capacity of twenty-eight, so that the total number of seated passengers for which the car provides is forty. No seats are provided on the front platform, as the available space there not occupied by the heater or the motorman's compartment is intended to provide an easy and convenient exit.



Michigan United Traction—Plan of New Pay-Within Car

The principal dimensions are as follows:

Length of car body	28 ft. 0 in.
Length of front platform	5 ft. 10 in.
Length of rear platform	6 ft. 6 in.
Length of car over vestibule sheathing	40 ft. 4 in.
Length of car over bumpers	41 ft. 4 in.
Seating capacity	40
Bolster centers	19 ft. 0 in.
Centers of side posts	2 ft. 7 in.
Width of body over sill plates	8 ft. 2 in.
Width over side posts above belt rail	8 ft. 2 in.
Extreme width of car over belt rails	8 ft. 6 in.
Height from rail to under side trolley base	11 ft. 2¾ in.
Height bottom of sill to top of roof	8 ft. 5¼ in.
Height from floor to under side of ceiling	7 ft. 6 in.
Height of vestibule door openings	6 ft. 11 in.



Michigan United Traction—Interior of Pay-Within Car from Rear End

The cars are constructed with steel underframes and steel sides up to the belt rail, the sides being straight between the eaves and the sills. The steel underframe is made up of 5-in. x 4-in. x ⅜-in. angles riveted to the bottom edges of the side plates, which are of ⅛-in. steel 36 in. high. The latter are made in two pieces with splices at the center of the car. Along the top edge of each plate is riveted a 2-in. x 1-in. x ¼-in. angle. The center sill consists of one 8-in. channel weighing 11¼ lb. per foot laid flat with the flanges downward. This is framed into the end sills, which are made of 10-in. channels weighing 15 lb. per ft. and are set with the flanges extending outward.

The roof is of the plain-arch type supported on wood purlins and finished on the inside with the customary headlining. Globe ventilators are installed in the roof along the extreme outside edges. The floor is made of composition, ⅝ in. thick at the thinnest point, and supported with Keystone corrugated galvanized iron of No. 20 gage. No trap doors are installed. The body bolsters are of built-up design, consisting of 1-in. x 8-in. steel plates, and are riveted to the angles which form the side sills. The bumpers are 7-in., 10¼-lb. Hedley anti-climbers installed so that they come flush with the top of the platform floor. The platform flooring is made of 1-in. hard maple with V notches at the joints.

The weights of the car and its equipment are as follows:

Car body, including seats, heater and cables	18,000 lb.
Electrical equipment	6,752 lb.
Trucks	10,520 lb.
Air brakes	1,235 lb.
Total weight	36,507 lb.

The heater is of the Peter Smith 2-P type, which furnishes hot air to the car by a fan blast. Coal is used for fuel. Standard Motor Truck Company's 036 trucks are installed with Griffin cast wheels and Midvale heat-treated axles designed in accordance with the A. E. R. A. standard. The trucks are equipped with Baltimore ball-bearing center plates. Other items included in the equipment are National air compressors and engineers' valves, Electric Service Supply Company's air gong and sanders and Consolidated Car Heating Company's buzzers. Hunter illuminated car signs are installed at the front and sides of the car. The motor equipments, which were installed by the railway company, are of the four-motor type with GE-210 motors, the controllers being of the K-36-F type. All wire for power circuits was laid in conduit.

A coal company which, according to the monthly vehicle publication of the Denver Gas & Electric Company, has had exceptional opportunity for studying its electric delivery service employs a car which hauled 435 tons of coal in one month. It covered 63 miles in a day and the record number of trips was seven. The truck was in service 229 hours, but it was engaged in hauling only 126 hours, 103 hours being required to load and unload it. The total mileage for the machine for the whole month was 1005 miles. It took 119 trips, averaging 8½ miles each, to accomplish that distance.

News of Electric Railways

Subway and Other Questions in Cleveland

J. J. Stanley, president of the Cleveland (Ohio) Railway, stated recently that the company would be willing to build a subway and begin the work at once if the city so desires and is willing to grant a franchise that will enable it to finance the proposition. Mr. Stanley said that underground terminals for the surface cars are badly needed. He favors beginning work under the Public Square and extending the line east and west.

In the dispute between the company and the street railway men's union in regard to punishing men for not making schedule time and for running past people at the regular stops, the arbitrators decided in favor of the company on Jan. 9. The union had already withdrawn its complaints in three cases.

A voluntary organization known as the "Mufs" has come into existence in Cleveland through the requests made by conductors to move up forward when cars are crowded. A badge is placed on all persons who agree to affiliate with the "Mufs," and it is hoped that taking positions as far up in the cars as possible will come to be a habit. Mr. Stanley approved the idea and had posters reading "Please move up forward" printed and placed in all the cars. The Cleveland *News* started the movement. The labor organizations have taken it up and Peter Hasenpflug, organizer for the Cleveland Federation of Labor, is acting as organizer for the "Mufs."

In his semi-annual report to the City Council Street Railway Commissioner Peter Witt said that he had proposed to the Chamber of Commerce a plan to relieve the rush in the evenings. He asks that organization to take the matter up with the manufacturers and have them dismiss their employees at various times between 5.15 p. m. and 5.45 p. m., so that the rush traffic would be distributed over a greater period.

E. B. Haserodt, chairman of the street railway committee of the City Council, is at work on a plan to give better service for the manufacturing district near the Union Station, where thousands of women and girls are employed.

Report of the New York Public Service Commission, First District

The New York Public Service Commission, First District, presented its sixth annual report to the Legislature of Jan. 13. A considerable part is devoted to the new dual subway system in New York, the total cost of which is estimated at $325,000,000. The commission reports that the Fourth Avenue subway in Brooklyn, a four-track line about 4 miles long, and the Centre Street Loop line in Manhattan, a four-track subway about 1½ miles long, are about completed; that construction work is well advanced upon the Lexington Avenue subway, to be operated by the Interborough Rapid Transit Company, and that work has been well started on the Broadway subway, to be operated by the New York Consolidated Railroad Company (Brooklyn Rapid Transit).

For the year ended June 30, 1912, the public in New York City paid for street railway transportation $83,684,799. This is equivalent to about $16 per capita. For gas and electricity for the year the public paid $60,581,760—equal to about $12 per capita. This makes a grand total of $144,266,539 paid in the city of New York in one year for local transportation, gas and electricity.

The total number of passengers carried on the street and electric railroads in New York City (including subways and elevated lines) was 1,680,914,025, an increase of 77,000,000 passengers over the preceding year and an increase of 365,000,000 over the year 1907-8, the first year of the commission. These railroads used 1666 miles of track and operated 11,688 passenger cars. The total capitalization, including capital stock and funded debts outstanding, of all companies subject to the jurisdiction of the commission amounts to $1,104,993,683, of which $691,373,872 applies to street and electric railways, $210,952,600 to gas companies and $136,968,751 to electric light and power companies. The commission calls attention to the present law in regard to bus lines and recommends that it be changed so as to permit the organization of additional bus lines in New York City.

Decision in Milwaukee Paving Case

The Supreme Court of Wisconsin on Jan. 7, 1913, held that The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., must pave the space between its outside tracks and 1 ft. beyond on Walnut Street with asphalt, the same material that the city laid on the rest of that street recently. The case was that of the State of Wisconsin on relation of the city of Milwaukee against The Milwaukee Electric Railway & Light Company, and involved the question of whether the city could compel the company to pave the space between the tracks with the same material as the city used on the rest of the street.

The first tracks were laid on Walnut Street in 1887 by the Milwaukee Railway under an ordinance which required the company to keep and maintain in good and thorough repair all that portion of the street between the outside rails of its tracks "of the same material as that of which said street shall be composed at any time when such repairs shall be necessary." The company claimed that under the original ordinance of 1887 it was required only to repair the old pavement, and that by the consolidated street railway ordinance passed by the Common Council in 1900 the company was relieved of any duty to repave the street. The Supreme Court holds against both of these contentions. The Walnut Street case was taken to the Supreme Court as a test case to determine the relative positions of the city and company in regard to the other streets on which the city had put in paving different from the material between the tracks of the company, on those streets.

Special Message in Regard to Water Power Development

In a special message sent to the Legislature on Jan. 13, 1913, Governor Sulzer of New York urged the repeal of the charter granted to the Long Sault Development Company in 1907, and bills to carry out the recommendations in the message have been introduced by Senator Wagner and Assemblyman Levy. In his message the Governor says in part:

"Investigations made by the engineers of the State Conservation Commission demonstrate, among other things, that a full economic development at the Long Sault Rapids will produce 1,000,000 hp, of which, by treaty arrangement with Canada, it is to be expected that New York will receive no less than one-half. This immense power, so valuable to our people, is at a transmission distance of 340 miles from New York City, or about 40 miles nearer than Niagara Falls. In order that we secure for all our citizens the many and the lasting beneficial results of the proper development of our natural resources, particularly of our unused water powers, in accordance with our constructive policy in these matters, to which our State now stands committed, I respectfully recommend that Chapter 355 of the Laws of 1907—the Long Sault Development Company's charter—be immediately repealed."

Mayor Praises Philadelphia Rapid Transit Management

Rudolph Blankenburg, Mayor of Philadelphia, Pa., referred in part as follows to the improvement of transit conditions in Philadelphia, in his review of his first year at the head of the city government:

"The improvement of rapid transit and transportation facilities between the heart of the city and outlying districts, so necessary to the comfort of all, was one of the problems referred to in my inaugural message. It is a matter of common knowledge that, through the efficient and businesslike management of the Philadelphia Rapid Transit Company, under Messrs. Stotesbury and Mitten, the city is to-day better served than ever before in its history. All this has been accomplished in the face of handicaps that would have appalled most men. Improvident management and overcapitalization are being overcome in this effort at rehabilitation, and it has been a pleasure for me, as a city director and member of the executive board, to help in every way at my command to bring about this remarkable improvement. Among the most gratifying results of sensible and sincere co-operation, are the pleasant relations now established between the company and its employees. The wage increase, much earlier than expected, and the prospect of the carmen being, in the near future, the best paid in the country, is most satisfactory."

Referring to the high cost of living the Mayor said:

"Investigations of the high cost of living have been made. It is our purpose to follow up the data gathered with arrangements of such relief as are possible under our laws and with the co-operation of the Philadelphia Rapid Transit Company and other agencies."

Report of New York Public Service Commission, Second District

The report of the New York Public Service Commission, Second District, was submitted to the Legislature on Jan. 16. The commission reports that the total capitalization of the corporations under its jurisdiction is $4,822,228,727. Of the corporations reporting to the commission, 125 are electric railways, with 1009 miles of track.

The operating reports of the electric railways show that from the fiscal year ended June 30, 1907, to the fiscal year ended June 30, 1912, there has been an increase in operating revenues from $19,293,052 to $28,305,720, or 47 per cent. For the same period the increase in operating expenses has been from $12,471,755 to $17,974,813, or 44 per cent. The net revenues have increased from $6,821,197 to $10,330,907, or 52 per cent. The passengers carried have increased from 418,622,000 to 575,430,381, or 37 per cent. Comparing 1912 with 1911, there has been an increase of 4.90 per cent in operating revenues, of 7.70 per cent in operating expenses, of 0.40 per cent in net revenues and of 6 per cent in the number of passengers carried.

The report states that during the year the commission has made extensive investigations into street railway service in the cities of Buffalo, Rochester, Yonkers and Newburgh, and important and substantial improvements are to follow each of these investigations.

The recommendations to the Legislature include, among other things, the re-passage of the law vetoed by the Govnor last year empowering the commission to suspend increases in railroad rates pending investigation as to the reasonableness of such advances. The Interstate Commerce Commission now has such power. As the law now stands no investigation of increased railroad rates in New York State can be undertaken until those rates have become effective.

Report of Public Utilities Commission of Connecticut

The Public Utilities Commission of Connecticut has submitted to Governor Baldwin its first annual report for the fiscal year ended June 30, 1912. From Sept. 9, 1911, to the latter date, fifty-six petitions were presented and heard by the commission and 2312 accidents were reported, of which 102 were investigated. In thirty-six of these cases recommendations were made. Forty-three informal complaints were made. The commission says in part:

"The public service companies have shown a commendable spirit of co-operation, have promptly complied with all orders of the commission and have expressed a willingness to carry out any suggestion or recommendation that the commission may make, and we are of opinion that much more good has been accomplished this first year in a quiet and semi-official way than was ever hoped for by the advocates of the law creating the commission.

"Safe and efficient service at reasonable rates is the essential requirement from public service companies, and it is the purpose of this commission to insist upon such proper service as may be necessary. At the same time it may be found in some instances that a readjustment of rates is required. To give such service requires the vigilant attention of the officers and employees of the companies in handling the increased volume of business. The plant and equipment of any public service company should be maintained at a standard in keeping with modern improvements as far as the financial condition of the company will permit.

"We believe that the net income and profits of any public service company, after the payment of reasonable dividends, should be used for the improvement of the plant and equipment of such company, rather than in unwarranted expansion, or the acquisition, management and control of business and property more or less foreign to the chartered purposes of the parent company."

In 2312 accidents reported 168 persons were killed and 2144 injured, distributed as follows:

	Killed.	Injured.
Electric light, gas, water and other companies..........	17	142
Bristol & Plainville Tramway..........................	..	1
Central New England Railway..........................	..	51
Central Vermont Railway..............................	6	6
Connecticut Company	37	876
Danbury & Bethel Street Railway......................	..	5
Hartford & Springfield Street Railway.................	2	13
New York & Stamford Railway..........................	..	1
New York, New Haven & Hartford Railroad............	105	1000
Shore Line Electric Railway...........................	1	48
South Manchester Railroad............................	..	1

Among the recommendations made by the commission are the following:

"That every corporation, company, association, joint-stock association, partnership or person, or lessee thereof, hereafter organized, formed or appointed, which by the provisions of Chapter 128 of the Public Acts of 1911 is designated as a public service company, shall forthwith, upon such organization, formation or appointment, give notice thereof to the Public Utility Commission. This provision should be made that the commission may have due notice of new companies coming under its jurisdiction and of the companies ceasing to come within the jurisdiction of said act.

"That a law should be passed which will effectively prohibit the merger or consolidation of public service companies without first obtaining the approval of the Public Utility Commission."

Theodore P. Shonts on the Signs of the Times

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., contributed to the New York *American* of Sunday, Jan. 12, 1913, an article more than two columns long at the request of the editor for an expression of his views in regard to the cause of the changing relations in this country between employer and employee. Mr. Shonts said that the change is a natural result of evolution. Every age has had its economic problems. Ours may seem more difficult than those of preceding periods, but history refutes such an inference. Readjustment periods are simply an effort to reconcile the actual with the ideal. The necessity will always exist for recurring readjustment periods. In the end they make for good. Those who think they have found a remedy for the prevention of these periods have not viewed the past with sufficient reflection to enable them to look forward with proper perspective. The spread of superficial education has been one of the prime causes of the prevailing dissatisfaction. In this connection Mr. Shonts said:

"Misunderstandings have been allowed to accrue without correction, and as one misunderstanding more frequently than otherwise begets another, the resultant confusion and misconception of things have steadily multiplied until nothing short of a general readjustment period, such as we are now experiencing, will afford an adequate remedy, which remedy simply means a more perfect understanding of each other and of conditions generally. Our national life is continually becoming more involved. The activities of this growing country are becoming so numerous and so vast that few, if any, of us have the time to study and understand our relations with all other classes of citizens. Owing to the diversification of activities we encounter diversification of views on matters pertaining to the general welfare of the community, even among the most thorough students of sociology."

Mr. Shonts concluded the article in part as follows:

"The captains employed by capital to conduct its business were slow in recognizing and informing their employer of the needs and rights of labor. Consequently we are now reaping the harvest of this past misunderstanding. Will the captains of labor organizations profit from this experience and fully recognize the principle that true justice rests on a willingness to do justice to all, whether it concerns unionized or non-unionized labor or capital? Or will they, through the newly found power of organized labor, commit moral suicide in attempting to evade drawing a distinct line between justice and injustice? Organization involves certain obligations upon itself as well as certain rights to others. There are instances in the past where the rights of others have been ignored. This constitutes one of the chief reasons for whatever opposition capital may to-day advance against the unionization of labor. Capital, by its very organization and incorporation, legally covenants itself to the fulfilment of all contracts. Organized labor, unincorporated, enters into an agreement with capital, and sometimes observes its provisions and stipulations only to the extent that they work to its advantage. And there are no means of legally restraining repudiation of its covenant. This constitutes an unequal advantage to which capital feels it should not be obliged to submit. It is not a business proposition, because there is too great a difference between simply a 'moral' obligation and a 'legal' obligation, and in all fairness labor should direct its energies toward wiping out this undue advantage which it now persistently seeks.

"Labor is entitled to the full value of its hire. But the time is at hand when it would seem well for business ability at the head of capital organization to slow down, accepting the inequalities and limitations now imposed by various wage schedules as a cautionary signal, prepared, however, when labor assumes the same responsibility as capital, to proceed at once under full control.

"The encouraging indications of the time are not only the adoption of voluntary relief insurance by individual corporations, but also the creation of welfare committees whose function is to get in close personal contact with the men in their business, home and social life, and devise ways and means looking toward their betterment. Through these committees the directors of big business to-day will eventually be kept as well posted on the social conditions of the employees as was the employer of small business of days gone by through his daily personal contact with the men. This step on the part of corporations also goes to show that they are taking a look 'within' for causes contributing to present disturbances, which is a most encouraging phase of the situation. Labor must also take a look 'within' tor the same causes. After adjusting their internal selves, both capital and labor can take a look 'without' for external causes; and then by getting together, after reaching a thorough understanding of themselves, they can, with much less trouble, iron out the difficulties as they exist between each other, and in the attainment of this much desired end no other medium can command quite as great influence for good as the press. In all matters of public interest it should stand firm in the maintenance of a position of neutrality, which policy necessarily must rest upon a foundation of truth and justice."

Service Resumed in Yonkers

On Jan. 16, 1913, the employees of the Yonkers (N. Y.) Railroad accepted the concessions recommended by the Public Service Commission of the Second District, to which Frederick W. Whitridge, president of the company, had agreed. As a result service was resumed at 2.15 p. m. The men met at 10.30 o'clock in the morning to consider the proposal for a settlement as brought about by the Public Service Commission. The agreement, as drawn up by Chairman Frank W. Stevens of the board, was read, and the men discussed the minutes of the meeting of the previous afternoon at the hearing before the commissioon. When the matter was put to vote the men decided unanimously to return to work at once.

The meeting at which the understanding was reached under which the men returned to work was held in the office of the Public Service Commission of the Second District of New York in the Metropolitan Life Insurance Building in New York. Among those who attended the meeting were Mr. Whitridge, Leslie Sutherland, general manager of the Yonkers Railroad; Mayor Lennon, of Yonkers; Corporation Counsel Thomas P. Curran and Alderman John S. Lavis, of Yonkers, and the representatives of the men. Chairman Stevens, of the commission, expressed the attitude of that body as follows:

"I want to assure you that this commission is not here to exercise any power, to make any order or any appeal, except an appeal to you, as men and citizens who want to see the right thing done. We are not here to discuss the controversy, or to enter upon the right or wrong of the things involved. We want to see the wheels start and that rests with the company and the men. We put the responsibility squarely up to you.

"In December work was going on, and the only way to solve this problem is to restore the status existing at that time. Every man should be at his post to-morrow morning. There is no reason why a man who has not been in the service before should be hired. When the cars are running, then differences can be thrashed out. Once resume operation and there is no reason why all differences should not be settled with honor to all concerned."

The following statement given to the men for their consideration and signed by Mr. Stevens is the one upon which they voted to return to work:

"At a meeting of the Public Service Commission of the Second District of the State of New York, held on Jan. 15, 1913, for the purpose of endeavoring to secure an immediate resumption of service upon the lines of the Yonkers Railroad, the commission made several proposals which it asked both the employees and Mr. Whitridge, the president of the company, to assent to. Such propositions and the response of all parties thereto were taken down verbatim by the official stenographer of the commission and are a public record accessible to every one, and a copy of which will, as soon as the minutes are transcribed, be furnished to the person designated by the employees to receive the same.

"Such minutes show clearly what Mr. Whitridge agreed to on behalf of the company. The following is a correct statement of the propositions of the commission:

"1. The operation of the road shall be restored immediately under the employment conditions prevailing on Dec. 31, 1912, with all men then employed restored to duty without prejudice to them.

"2. That the company and the men shall consider all matters in difference, and that any matters upon which they shall be unable to agree shall be submitted to arbitration by arbitrators selected in the usual manner.

"3. If any matters are claimed by either party not to be arbitrable, the question whether such matters are properly the subject of arbitration shall be arbitrated.

"Mr. Whitridge clearly assented to the first and second propositions, but as to the third made the statement that some questions are not arbitrable. He finally said that he would abide by the decision of the chairman of the commission as to what questions are arbitrable, and after some further colloquy stated that the position of the chairman that the question of what questions are arbitrable should be submitted to arbitration was correct. The commission understands, therefore, that Mr. Whitridge assents to the third proposition, which was read in his presence."

The Tendency of the Times

J. H. Pardee, vice-president of J. G. White & Company, Inc., and president of The J. G. White Management Corporation, New York, N. Y., has contributed to *Public Service* for January an article, "The Tendency of the Times," in which he reviews public utility conditions in the United States briefly. Mr. Pardee concludes his article in part as follows:

"I am a strong believer in State regulation and the protection of the public and public utility companies by commissions, and I am of the opinion that the present drastic laws will be so modified in the future that proper growth, expansion and operation can be had and the companies protected by the right of appeal to the courts on any unfair decisions.

"There are two important problems in the public utility situation to be solved by the companies and the people, viz., 'valuation' and 'rate of return.' It is not my intention to enter into a discussion of what is a proper method of valuing properties or determining the rate of return, for those questions have been discussed at much length by able men and no two commissions agree. One thing, however, is certain and that is that the rate of return should vary with the hazard of the undertaking and should be sufficiently high to attract private capital. The power of some commissions through their control of valuation and rate of return is stupendous. What we suffer from now more than anything else is uncertainty, and I believe the tendency is toward some fixed basis.

"The labor situation is a trying one and has a more important bearing on industry in general than ever before. The better the times the higher the wages and the more strikes. The Railway Arbitration Board has suggested compulsory arbitration, but neither employees nor employers are entirely favorable and the future is not very bright. Possibly we have all been too intent on making things go, and then on making things go cheaply, and have lost sight of tendencies which are unimportant at first but which, unless checked, acquire a momentum almost irresistible. We must all be efficiency engineers, but I believe our greatest service to our companies is in being publicity engineers. The most effective publicity engineers are the men who can, not by set and brilliant speeches, but by persistent everyday conversations, so present the facts and arguments on all our questions as to impart real information to thoughtful citizens. Such efforts must necessarily create a fair and just public opinion and build up a civic force for justice that will overwhelm the vicious forces of demagogism."

New Lamps in Albany-Schenectady Cars.—Mazda lamps are to be installed by the Schenectady (N. Y.) Railway in the cars which it uses in the service between Albany and Schenectady.

Three-Cent Fare Ordinance in Toledo.—Councilman Starner of Toledo, Ohio, has introduced a resolution in the City Council providing that the fare on all cars at all hours of the day shall be 3 cents. The matter has been referred to the committee on railroads and telegraphs.

Improvements in Cincinnati.—Walter A. Draper, secretary of the Cincinnati (Ohio) Traction Company, has announced that the company has arranged to spend $1,000,000 in improvements during the coming year. Of this sum $450,000 will be spent in laying new tracks and the remainder in developing the re-routing plan in accordance with the suggestions contained in the Harris report.

Recommendations of the Railroad Commission of Indiana.—In its annual report the Railroad Commission of Indiana recommends that a law be passed to prevent trespassing on railroads, to provide for the elimination of grade crossings, especially all obstructed crossings, and to make it a misdemeanor punishable by fine and imprisonment for persons to pass under or over railway gates at highway crossings when the gates are down.

Action Against Duluth Street Railway.—Declaring that the Duluth (Minn.) Street Railway has forfeited its franchise by failure to comply with the provisions of the grant, a delegation of Duluth citizens appeared before Attorney-General Smith of Minnesota at St. Paul recently and prayed for the privilege of instituting a forfeiture suit in the name of the State. The Attorney-General's department takes the stand that it is necessary for the Duluth citizens to prove they have a *prima facie* case before the State will lend its name to the proposed suit.

New Elevated Station in Rapidly Growing Business Section of New York.—The Interborough Rapid Transit Company, New York, N. Y., has informally expressed its willingness to build a station on the Sixth Avenue line of the Manhattan Elevated Railroad in the vicinity of Thirty-ninth Street and has intimated that it will be influenced more or less by the attitude of property owners in agreeing to give their consents and in waiving the matter of damages. There is no station on the line now between Thirty-third Street and Forty-second Street. The station is demanded by the movement toward uptown New York which has been going on for some time among the department stores and lately among other business establishments.

Report on Rails of American Railway Engineering Association.—The American Railway Engineering Association has recently published the report of its committee on rails. It contains the results of the study on the revision of the specifications for carbon steel rails made during committee meetings in 1912 on April 10, July 24, Sept. 20 and Nov. 18. The report is contained in the November *Bulletin* of the association and is upon the following subjects: specifications for carbon steel rails, transverse or internal fissures, method of producing sound ingots, on a new method of revealing segregation in steel ingots, the testing of rails, influence of silicon on open-hearth ingots and rails, stremmatograph tests of track under service conditions.

Construction Figures of the Geary Street Municipal Railroad.—Some total figures on the cost of construction of the Geary Street Municipal Railroad in San Francisco, as compiled by the Board of Works of San Francisco, were published in the ELECTRIC RAILWAY JOURNAL of Jan. 11, 1913, page 80. Figures worked out on the basis of each mile of double track are as follows: Trolley poles and overhead wires, labor and material, $5,100; track construction, $48,100; track materials, $27,100; paving right-of-way, $29,100; underground conduit and conductors, $17,500; engineering and inspection, $6,500; total, $133,400. The 2.15 miles of track construction done by day labor cost $45,400 per mile, while the 3.35 miles built by contract cost nearly $50,000 per mile, but it included tearing out the old cable structures on Geary Street.

Plan to Resume Franchise Negotiations in Kansas City.—Ford F. Harvey, one of the receivers of the Metropolitan Street Railway, Kansas City, Mo., and Clyde Taylor, an attorney for the receivers of that company, called on Mayor Jost of Kansas City on Jan. 8, 1913, and were informed by the Mayor that the city would be ready on Jan. 27 to resume the franchise negotiations. The Mayor is reported to have said: "The details as to the physical valuation of the company's property and its financial condition have not advanced sufficiently to make them public, but by Jan. 27 they will be sufficiently developed for me to know what kind of an arrangement I will be willing to make with the receivers. I told Mr. Harvey and Mr. Taylor that no procrastination would be tolerated, that in ten days after we meet we ought to know whether we can come to terms."

Scope of National Employment Exchange Widened.—The National Employment Exchange, which was founded a few years ago by a group of well-known business men in New York to act as a clearing house between employers and employees, has decided to establish a technical department devoted solely to the needs of men with technical training. This department has been placed in charge of H. C. Spaulding, who was graduated from the Massachusetts Institute of Technology in 1887 and has been connected with the Thomson-Houston Company, the Siemens & Halske Electric Company, the Blake & Knowles Pump Company and the Yale & Towne Manufacturing Company. The commercial and technical departments are located at 30 Church Street, New York, and the manual branch for skilled and unskilled labor at 56 and 58 Cooper Square, New York.

Signal Situation in Indiana.—On Jan. 6 proposals covering the quota of block signals to be installed on the interurban lines in Indiana in 1913 were received by M. H. Hovey, consulting engineer for a number of the companies affected. Owing to changes in the original plans it was found necessary to request revised proposals, which will be due about Jan. 22. All the contracts will probably be let about the same time in order that the construction work may be handled by the same forces and all installations completed at about the same time. Some of the roads have shown preference for the positive block signaling, while others will use the permissive signal system. There has been no definite decision as to the design of signal to be used by the different roads, but each is selecting one which will be satisfactory for its operating conditions. It has been decided that a part of the roads will use light signals, while one or two of them prefer to use a semaphore type.

Measure Aimed at Proposed Washington Merger.—The Commissioners of the District of Columbia have sent to Congress a favorable report on the measure introduced by Senator La Follette "to make it unlawful for foreign corporations to own or control the capital stock, bonds or other indebtedness of local public utility corporations in the District of Columbia." The report of the commissioners follows in part: "There has recently been organized under the laws of the State of Virginia a holding corporation known as the Washington Utilities Company. This corporation was formerly known as the Washington, Alexandria & Mount Vernon Railway, and is now known as the Washington-Virginia Railway. It is understood that the Washington Utilities Company already has obtained a large block of stock and probably a control of the Washington Railway & Electric Company. The commissioners are of the opinion that an emergency exists which can best be met by the prompt passage of the bill under consideration. As strongly as they are able they urge the enactment of this bill during the present session of Congress."

Engineers Visit Northwest Station, Chicago.—On Jan. 8 a party of about 100 members of the Western Society of Engineers, under the guidance of employees of the Commonwealth Edison Company, paid a visit to the company's new Northwest station at California Avenue and Roscoe Street, Chicago. The party left the downtown district on the Chicago & Northwestern Railroad, proceeding to the junction with the private elevated electric railway of the central station company, near Mayfair. Here the steam locomotive was uncoupled and the cars of the special train were attached to an electric third-rail locomotive. The visitors were taken in this manner to the generating station, which was inspected in all departments, guides being provided by the electric service company. The occasion marked, perhaps, the first time a train of standard passenger coaches was drawn by an electric locomotive in Chicago, or possibly in the Middle West. W. L. Abbott, chief operating engineer; P. Junkersfeld, assistant to the vice-president, and R. F. Schuchardt, electrical engineer, were in charge of the party for the Commonwealth Edison Company.

Bids for Construction of Section of First Queens Line.—Bids for the construction of a section of the first rapid transit line to be built in Queens Borough have been called for by the Public Service Commission for the First District of New York to be opened on Jan. 28. This section is Section No. 2 of the Astoria, Woodside and Corona rapid transit route, which runs from the Queens end of the Queensboro Bridge north through Second or Debevoise Avenue to Ditmars Avenue, Astoria. Section No. 2 covers that part of the line north of Beebe Avenue. The road is to be an elevated railroad and the contractor will have eighteen months in which to complete the work. The engineers of the commission are finishing plans for the rest of this line and bids for its construction will be called for soon. Under the dual system of rapid transit this road will be operated jointly by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. The Interborough company will connect with it by trains from the Steinway tunnel and the Second Avenue elevated railroad, and the Brooklyn Rapid Transit Company by trains through the proposed Broadway, Seventh Avenue and Fifty-ninth Street subway.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

The Massachusetts Legislature convened on Jan. 1 at Boston, with the prospect of a busy session, including the discussion of many matters of interest to public utilities. In his inaugural address Governor Foss emphasized the need of a closer state control over the steam railroads serving the Commonwealth and recommended the dissolution of the Boston Railroad Holding Company, by which the New York, New Haven & Hartford Railroad Company exercises a controlling influence in the management of the Boston & Maine Railroad system. The special commission named at the last session to investigate the subject of public utility holding companies has submitted a report to the Legislature recommending the closer control of such organizations by the Commonwealth. The members of the Railroad Commission, the Gas & Electric Light Commission and the Attorney General served on the joint board. The report recommends the passage of five bills for the further regulation of holding companies. The first provides that no business corporation shall hereafter hold, directly or indirectly, more than 10 per cent of the stock of a Massachusetts public utility corporation. The second bill would confer upon the Railroad Commission and the Gas & Electric Light Commission authority to examine the books and papers of holding companies. The other bills provide for greater publicity of holding company affairs. The commission recommends an extension of the jurisdiction of the present regulating boards in respect to the relations between the public utility companies and holding companies associated with them. The joint special committee on the transportation facilities of western Massachusetts has issued an exhaustive report favoring the development of electric railways in that section by the New York, New Haven & Hartford Railroad subject to restrictions to be imposed by the Railroad Commission, including the fixing of rates, supervision of stock issues and construction and the power to order further extensions. About 300 miles of additional electric railway are suggested for early construction in western Massachusetts. A bill has been introduced into the House providing for the electrification of all the standard-gage steam railroads within the Boston metropolitan park district.

INDIANA

Representative Keegan has introduced into the Legislature a public utilities bill which provides that the Railroad Commission of Indiana shall be abolished and the Public Utilities Commission be created in its stead, to be composed of three commissioners to serve for four years each at salaries of $7,500 a year. All the power of the present Railroad Commission would be conferred on the new commission and the new body would have general supervision over all public utilities. The measure which has been introduced accords with the recommendation of Governor Ralston.

MISSOURI

Senator Busby, Carrollton, Mo., has introduced into the Senate a public utility bill drafted in accordance with the recommendations made to the Legislature by Governor Major. Provision is made for a commission of three members, each to draw a salary of $5,500 a year. The Governor would have the power to make appointments to the commission, and appointments after the term of office of the original commissioners had expired would be made for six years. The commission would have authority over practically all classes of public service corporations, with supervisory power over the issuance of all stocks and bonds and other evidences of indebtedness.

OHIO

Representative Herbert S. Bigelow, of Cincinnati, has prepared a bill which he purposes to introduce in the General Assembly. It provides for the revocation of all public service franchises granted for a period of more than twenty-five years. There is no intention, however, Mr. Bigelow says, of revoking all franchises, the bill being intended to provide for the revocation only of special privilege grants given for a period of more than twenty-five years, on the principle that each generation has the right to make its own laws. The message of Governor Cox to the Legislature contained recommendations in regard to public utility legislation.

PROGRAM OF ASSOCIATION MEETING

New England Street Railway Club

The regular monthly meeting of the New England Street Railway Club will be held in the new mahogany room of the American House, Boston, Mass., on the evening of Thursday, Jan. 23, 1913. Dinner will be served at 6.30 p. m. William C. Bamburgh, advertising manager of the New England Telephone & Telegraph Company, will be the speaker. His subject will be "The Telephone: Some History and the Operation." There will be a special musical program.

Financial and Corporate

Stock and Money Markets

January 15, 1913.

There was a much better tone to the trading on the New York Stock Exchange to-day. The recovery was small compared with the recent fall in prices, but the advance was regarded generally as presaging a general recovery, particularly as the pressure of liquidation had apparently been diminished considerably. Some traders still take a very gloomy stand on the outlook, however. Rates in the money market to-day were: Call, 2¾ to 3 per cent, with the last loan at 3 per cent; sixty days, 4 to 4¼ per cent; ninety days to six months, 4 to 4½ per cent.

Trading in Philadelphia to-day was broad and there was a goodly volume of transactions. The traction issues were quite active.

The Chicago market was narrow to-day. A feature of the market was the trading in the Chicago Railways issues. There was a good demand for bonds.

The trading in the railroad issues in Boston to-day was quite active. There was very little demand for bonds.

Trading in Baltimore to-day was narrow but active. The demand for bonds continues, the total sales for the day exceeding $99,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 7.	Jan. 15.
American Brake Shoe & Foundry (common)	96	92
American Brake Shoe & Foundry (preferred)	136	131½
American Cities Company (common)	48	47½
American Cities Company (preferred)	78¾	78½
American Light & Traction Company (common)	430	410
American Light & Traction Company (preferred)	108	106½
American Railways Company	40¾	40½
Aurora, Elgin & Chicago Railroad (common)	40	43¾
Aurora, Elgin & Chicago Railroad (preferred)	86	87
Boston Elevated Railway	112½	112¼
Boston Suburban Electric Companies (common)	5	5
Boston Suburban Electric Companies (preferred)	67	67
Boston & Worcester Electric Companies (common)	7	7
Boston & Worcester Electric Companies (preferred)	40	40
Brooklyn Rapid Transit Company	91¾	89½
Capital Traction Company, Washington	125	121½
Chicago City Railway	150	150
Chicago Elevated Railways (common)	28	30
Chicago Elevated Railways (preferred)	89	89
Chicago Railways, ptcptg., ctf. 1	90	91½
Chicago Railways, ptcptg., ctf. 2	22	24½
Chicago Railways, ptcptg., ctf. 3	6½	8
Chicago Railways, ptcptg., ctf. 4	3¼	3½
Cincinnati Street Railway	122½	*122½
Cleveland, Southwestern & Columbus Ry. (common)	5⅛	*5⅛
Cleveland, Southwestern & Columbus Ry. (preferred)	33	*33
Cleveland Railway	103½	*103½
Columbus Railway & Light Company	60	60
Columbus Railway (common)	80	80
Columbus Railway (preferred)	81	81
Denver & Northwestern Railway	118	118
Detroit United Railway	76	76
General Electric Company	185	182
Georgia Railway & Electric Company (common)	122	122½
Georgia Railway & Electric Company (preferred)	83¾	82½
Interborough Metropolitan Company (common)	18½	17⅞
Interborough Metropolitan Company (preferred)	62¾	60¼
International Traction Company (common)	38	*38
International Traction Company (preferred)	99	*99
Kansas City Railway & Light Company (common)	18½	18¼
Kansas City Railway & Light Company (preferred)	40	40
Lake Shore Electric Railway (common)	9	9
Lake Shore Electric Railway (1st preferred)	91	91
Lake Shore Electric Railway (2d preferred)	25½	25½
Manhattan Railway	129	130
Massachusetts Electric Companies (common)	16	16½
Massachusetts Electric Companies (preferred)	76	75
Milwaukee Electric Railway & Light Co. (preferred)	100	100
Norfolk Railway & Light Company	25	25
North American Company	81	80½
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	100	100
Philadelphia Company, Pittsburgh (common)	49½	49¾
Philadelphia Company, Pittsburgh (preferred)	44½	44¼
Philadelphia Rapid Transit Company	27⅞	27½
Portland Railway, Light & Power Company	68½	68½
Public Service Corporation	117	117
Third Avenue Railway, New York	38¾	37½
Toledo Railway & Light Company	2¾	2¾
Twin City Rapid Transit Co., Minneapolis (common)	105	105¾
Union Traction Company of Indiana (common)	4½	4½
Union Traction Company of Indiana (1st preferred)	81	81
Union Traction Company of Indiana (2d preferred)	34	34
United Rys. & Electric Company (Baltimore)	23¾	24
United Rys. Inv. Company (common)	34	32
United Rys. Inv. Company (preferred)	62½	60¼
Virginia Railway & Power Company (common)	51	51
Virginia Railway & Power Company (preferred)	90	90
Washington Ry. & Electric Company (common)	88	85½
Washington Ry. & Electric Company (preferred)	89⅝	87½
West End Street Railway, Boston(common)	80	80½
West End Street Railway, Boston (preferred)	98	97
Westinghouse Elec. & Mfg. Company	78	73¾
Westinghouse Elec. & Mfg. Company (1st preferred)	119	115

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*Last sale.

Refinancing the Hudson & Manhattan Railroad

Announcement has been made of the formation of a syndicate of bankers headed by Kuhn, Loeb & Company and Harvey Fisk & Sons, New York, N. Y., and Robert Fleming & Company, London, Eng., to readjust the debt of the Hudson & Manhattan Railroad, New York, N. Y. The plan for the readjustment is dated Jan. 14, 1913, and has been approved by the holders and the representatives of a majority of the first mortgage 4½ per cent bonds and of the preferred and the common shares of the company. The plan provides for the surrender of the existing first mortgage 4½ per cent bonds in exchange for one-half of the principal amount of the bonds in new 5 per cent first mortgage bonds and the other half in new 5 per cent adjustment income bonds and for the payment by stockholders of $8.50 for each share of stock, for which payment the latter will receive new 5 per cent first mortgage bonds at the rate of $900 for each $1,000 paid. The bankers have further agreed to purchase from the Hudson Companies the new first mortgage bonds and adjustment income bonds which it will receive upon the consummation of the readjustment, in order that it may be in a position to take up its outstanding collateral trust notes and participate in the plan of readjustment.

A call has been issued for the deposit of Hudson & Manhattan Railroad stock and bonds with the Guaranty Trust Company, New York, N. Y., on or before Feb. 14, 1913. The announcement of the bankers to the holders of the securities of the Hudson & Manhattan Railroad is prefaced as follows: "At the request of holders and representatives of a large majority of the first mortgage 4½ per cent bonds and the shares, the undersigned have caused an examination of the properties, earnings and financial condition of the Hudson & Manhattan Railroad to be made by independent competent experts. These reports show that the Hudson & Manhattan Railroad has not earned, and is not now earning, the full interest upon its outstanding first mortgage 4½ per cent bonds. It, therefore, cannot market securities to provide funds to pay the cost of improvements and betterments, nor has it the funds to pay such of its car trust obligations as are approaching maturity, and, unless its fixed charges are reduced through the action of the bondholders and the needed funds are furnished by the stockholders, it will be impossible to avoid the foreclosure of the mortgage securing the first mortgage 4½ per cent bonds."

The Hudson Companies, the holding company for the Hudson & Manhattan Railroad, has $10,000,000 of notes which mature on Feb. 1, 1913. These notes are secured by the pledge of $15,000,000 of Hudson & Manhattan Railroad 4½ per cent mortgage bonds. Other notes of the company to the amount of $9,500,000, similarly secured, mature in October and November of this year. On Feb. 1, 1914, $1,437,000 of 5 per cent gold bonds mature. The Hudson Companies has outstanding $5,000,000 of common stock and $16,000,000 of 7 per cent preferred stock.

William G. McAdoo, president of the Hudson & Manhattan Railroad, made the following statement on Jan. 15 in regard to the refinancing:

"The proposed readjustment is made necessary because the traffic of the system has not developed with sufficient rapidity to meet the fixed charges. The burden of taxation has become exceedingly heavy, amounting for the last year to $502,459. While the business has shown steady growth, it has not been enough. Almost the entire Hudson tunnel system is located below water level. This made the cost of the work exceedingly heavy and also compelled the construction of a system of much greater capacity than present needs, in order that the future might be cared for, because it is not possible to enlarge such tunnels after they have been built. For instance, the total capacity of the Hudson tunnels is something like 200,000,000 passengers per annum, whereas the present business is about 60,000,000 passengers per annum. Hence, a large part of the investment must be carried as dead capital until the traffic grows up to it. We, therefore, are confronted with the necessity of doing one of two things: first, to increase the fares again, or, second, to readjust the bonded debt so as to reduce the fixed charges and put the company's credit upon a solid foundation.

"We have decided not to ask the public to assume the burden of another increase in rates. Aside from the load that this would put upon our patrons, it might tend to arrest the development of New Jersey and to check the growth of business. Looking at the matter broadly and taking into consideration the future of New Jersey and of this company, we have decided against increasing rates. A large majority of our bondholders believe that the proposed readjustment of the debt is the best solution of the problem. The effect of the reorganization on the 4½ per cent bonds will be temporarily to reduce the interest to 3½ per cent, but after a few years this will be more than compensated for by an increase from 4½ per cent on the old bonds to 5 per cent on the new. This change will establish the credit of the company upon a permanently sound foundation, and put it in position to finance the Grand Central extension and other improvements and additions."

National Properties Company Takes Over Wilmington Property

The National Properties Company, of which Van Horn Ely, Pittsburgh, Pa., is president, has purchased the property of the Wilmington & Philadelphia Traction Company through H. B. Hollins & Company, New York, N. Y., and Newburger, Henderson & Loeb, New York and Philadelphia, in association with Scott & Company, Wilmington, Del. This gives the National Properties Company control of the electric lighting business of Wilmington, Del., and the important electric railway systems of Wilmington, Del., and Chester, Pa. The electric railway lines of the company also connect Wilmington and Chester with Philadelphia. Mr. Ely will be president of the Wilmington & Philadelphia Traction Company. T. W. Wilson, now assistant to the president, will become the vice-president and remain in active local control. William A. Heindle, manager of railways of the company, and his corps of operating assistants will remain. The new officers of the Wilmington & Philadelphia Traction Company are as follows: Van Horn Ely, president; T. W. Wilson, vice-president and general manager; W. T. Spring, secretary and treasurer; Van Horn Ely, B. N. Busch, H. P. Scott, A. C. Robinson, J. J. Henderson and T. W. Wilson, directors. The officers and directors of the National Properties Company are as follows: Van Horn Ely, president; William F. Havemeyer, vice-president; B. N. Busch, secretary and treasurer; H. D. Anderson, auditor; Van Horn Ely, H. B. Hollins, B. N. Busch, William F. Havemeyer, J. J. Henderson, Alfred Newburger, H. O. Scott, A. C. Robinson and T. W. Wilson, directors.

Application to Issue Bonds in Connection with New York Subway Work

Brief mention was made in the ELECTRIC RAILWAY JOURNAL of Jan. 11, 1913, in regard to the applications for the approval of mortgages made to the Public Service Commission of the First District of New York by the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company, which are to operate the dual system of rapid transit and contribute to the cost of construction of the new lines under the proposed contract with the city of New York. The Interborough Rapid Transit Company proposes to issue bonds not to exceed $170,000,000. Its petition states that the company has made a contract with J. P. Morgan & Company for the purchase of the entire issue at 93½ and accrued interest. At this rate the company wants permission to issue bonds, under date of Jan. 1, 1913, bearing interest at 5 per cent and payable in 1966, sufficient to raise $150,797,500. Of this amount the company will use $74,000,000 in cash for its contribution toward the construction of new subways and subway extensions and the purchase of equipment for the same; $16,154,000 to pay for the extension and $10,800,000 for third-tracking of its elevated lines; $34,668,900 to refund all outstanding bonds; $15,000,000 to pay off outstanding short-term notes, and $174,600 to be reserved to pay off outstanding liens on real estate.

The Brooklyn Rapid Transit Company, through the New York Municipal Railway Corporation, which was formed to enter into the proposed contract with the city, has applied to the commission for the approval of a mortgage to secure an issue of not to exceed $100,000,000 of first mortgage 5 per cent sinking fund gold bonds, and of this amount asks for permission to issue immediately $65,000,000. Of the proceeds the company is to apply $13,500,000 toward the cost of construction of new subways and subway extensions. $1,000,000 to pay for the proposed connection between the Fourth Avenue subway and the Broadway subway at Canal Street, $26,000,000 for the purchase of equipment for the new system and the old lines to be operated in conjunction therewith, $6,500,000 for the construction of additional tracks on its elevated railroads, $8,000,000 for the extension of such elevated railroads and $10,000,000 for the reconstruction of these lines. The commission will set an early date for a hearing on this application.

The New York Municipal Railway Corporation has also applied for permission to issue $1,000,000 of its capital stock, of which $2,000,000 is authorized but none issued. It has also applied for the approval of a contract it has made with the Brooklyn Heights Railroad for the use of a portion of the Lutheran Cemetery line needed for a connection in the new system. The New York Consolidated Railroad, which owns and operates the Brooklyn elevated railroads which are to be part of the new system, has applied for the approval of the commission to its proposed acquisition of the stock of the New York Municipal Railway Corporation.

American Light & Traction Company, New York, N. Y.—A meeting of the stockholders of the American Light & Traction Company has been called for March 17, 1913, to vote to increase the authorized common stock of the company from $15,000,000 to $40,000,000. It is stated that the proposed increase in the common stock is for the purpose of providing sufficient stock to permit the company to continue its regular quarterly dividend payments of 2½ per cent in stock, or at the rate of 10 per cent per annum. The company has declared a dividend of 2 per cent on the $14,236,200 of 6 per cent cumulative preferred stock to cover the period of four months from Sept. 30, 1912, to Jan. 31, 1913, payable on Feb. 1 to holders of record of Jan. 15. The regular quarterly dividend of 2½ per cent cash and 2½ per cent in stock has also been declared on the $12,304,920 of common stock, both payable on Feb. 1, 1913, to holders of record of Jan. 15.

Athol & Orange Street Railway, Athol, Mass.—The Railroad Commission of Massachusetts has approved the purchase of the franchises and property of the Templeton Street Railway by the Athol & Orange Street Railway for the sum of $435,000 as agreed upon in the contract of the two companies dated July 1, 1912.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has petitioned the Railroad Commission of Massachusetts for authority to issue 8,000 additional shares of first preferred stock, having a par value of $800,000, to be offered to stockholders at $115 per share, and bonds amounting to $429,000. The proceeds of the stock are to pay for expenditures already made and of the bond issue are to retire floating indebtedness.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Judge Landis of the United States District Court at Chicago entered a decree on Jan. 15, 1913, setting aside the sale of the Illinois Division of the Chicago & Milwaukee Electric Railroad under foreclosure to the reorganization committee, of which George M. Reynolds is chairman. Attorneys for the committee immediately took an appeal to the United States Circuit Court of Appeals. As noted at length in the ELECTRIC RAILWAY JOURNAL of Jan. 11, 1913, the court recently rendered a decision to the effect that bids had been suppressed and that the purchase price of $1,600,000 was below the value of the road.

Cleveland (Ohio) Railway.—Harris, Forbes & Company, New York, N. Y., announce that they have been authorized by the Cleveland Railway to anticipate payment on the 5 per cent gold bonds of the Cleveland Electric Railway due on March 1, 1913, and are prepared to pay par and accrued interest to the date of delivery for such bonds as may be presented for payment until March 1, 1913. As noted in the ELECTRIC RAILWAY JOURNAL of Sept. 21, 1912, page 465, the Public Service Commission of Ohio on Sept.

16, 1912, approved the application of the Cleveland Railway for permission to issue $3,015,000 of common stock, the proceeds to be used for improvements and extensions, and to retire the $1,522,000 of Cleveland Electric Railway 5 per cent bonds maturing on March 1, 1913, which are now to be paid through Harris, Forbes & Company.

Columbus (Ohio) Railway.—At the annual meeting of the Columbus Railway on Jan. 9, E. R. Sharp was elected a director to fill the vacancy caused by the resignation of George Hardy some months ago. The other directors were re-elected. C. M. Clark of E. W. Clark & Company, Philadelphia, Pa., presented the reorganization plan that has been under consideration for some time. D. Meade Massie, president of the company, opposed the plan and a deadlock finally resulted. Mr. Massie said that the Columbus Railway & Light Company, which leases the Columbus Railway, should assess its stockholders to raise the funds which it needs.

Electric Bond & Share Company, New York, N. Y.—The Electric Bond & Share Company has authorized the issuance of $1,500,000 of additional preferred stock and $1,500,000 of additional common stock. The directors have also voted an extra cash dividend of $1,500,000 to common stockholders, payable to holders of record of Jan. 14. The $1,500,000 preferred stock will be offered for subscription at par and accrued dividends to holders of preferred stock of record at the close of business Jan. 14. Common stockholders have agreed to purchase at par and accrued dividends all preferred stock not subscribed for by preferred stockholders on or before Feb. 1 next. The $1,500,000 common stock will be offered at par and accrued dividends to holders of common stock of record at the close of business Jan. 14. With the issuance of the new stock the company will have outstanding a total of $5,000,000 of preferred stock and $5,000,000 of common stock.

El Paso (Tex.) Electric Company.—Henry B. Sawyer, treasurer of the El Paso Electric Company, has addressed a letter to the holders of the $450,800 of 6 per cent convertible gold coupon notes of the company due Jan. 15, 1913, in regard to the conversion of the notes. Mr. Sawyer calls attention to the fact that the right to convert these notes ceases on Jan. 15, 1913, and that all notes not converted will be paid upon presentation at the office of the trustee. The notes are convertible at the office of the State Street Trust Company, Boston, Mass., prior to maturity, into common stock, dollar for dollar, with an adjustment of interest and dividend. Dividends are now being paid at the rate of 7 per cent per annum on the common stock of the company.

Harrisburg (Pa.) Railways.—Articles of merger of the Central Pennsylvania Traction Company and underlying companies, as the Harrisburg Railways Company, recently chartered by the Governor with a capital stock of $10,000, were filed at the State Department on Jan. 13. The capital stock of the Harrisburg Railways Company will shortly be increased from $10,000 to $5,000,000. The final transfer of the property to the owners, represented by H. D. Walbridge & Company, New York, N. Y., will take place about Feb. 15. The new company will have $2,000,000 of preferred stock and $3,000,000 of common stock, and it is understood that the present stockholders will receive $50 in bonds of the new company, $50 in preferred stock and $50 in common stock for each share of stock of the Central Pennsylvania Traction Company now held, the par value of which is $50. The new company has authorized $10,000,000 of bonds, of which the sum of $2,200,000 has been issued. The subsidiary companies included in the merger are the Citizens' Passenger Railway, Harrisburg & Hummelstown Railway, East Harrisburg Passenger Railway, Linglestown & Blue Mountain Railway and the Middletown, Highspire & Steel Railway. Edward Bailey, who has been president of most of these companies; A. G. Knisely, president of the Harrisburg & Hummelstown Railway; B. F. Meyers, president of the Citizens' Passenger Railway, and F. B. Musser, president of the Central Pennsylvania Traction Company, will be succeeded by H. D. Walbridge, New York, who will be president of the new company, while Mr. Musser will be vice-president and general manager.

Highland Park & Lake Burien Railroad, Seattle, Wash.—Judge R. B. Albertson has ordered the sale under foreclosure of the property of the Highland Park & Lake Burien Railroad, which extends south from the lines of the Puget Sound Traction, Light & Power Company at the west end of the Spokane Avenue bridge, West Seattle, to Lake Burien, a distance of 9 miles. The road was placed in operation in June, 1912.

Indianapolis, New Castle & Eastern Traction Company, Indianapolis, Ind.—The terms of the lease of the property of the Indianapolis, New Castle & Eastern Traction Company to the Union Traction Company of Indiana, of which mention was made in the ELECTRIC RAILWAY JOURNAL of Nov. 2, 1912, page 973, are now given as follows: The rental covers interest on the bonds, also dividends on the 5 per cent preferred stock, payable 2½ per cent semi-annually on June 1 and Dec. 1, beginning Dec. 1, 1912, and dividends on the common stock as follows: One-half of 1 per cent each on April 30 and Oct. 31, 1913 and 1914, 1 per cent on said dates in 1915 and 1916, 1½ per cent in 1917 to 1920, and 2 per cent semi-annually thereafter; also $500 yearly for organization expenses. The lease is dated Oct. 25, 1912, is for 999 years and includes the extension under construction from New Castle to Muncie.

Ithaca (N. Y.) Street Railway.—Justice Gladding at Binghamton, N. Y., has authorized the receivers of the Ithaca Street Railway and the Ithaca, Auburn & Lansing Railroad to issue $10,750 of receivers' certificates on account of the former company and $15,000 of receivers' certificates on account of the latter company.

Morgantown & Dunkard Valley Railway, Morgantown, W. Va.—The Morgantown & Wheeling Railway is reported to have arranged to take over the Morgantown & Dunkard Valley Railroad and to build a line from Cassville to Wheeling, which would make its route from Morgantown to Wheeling 73 miles in length. The Morgantown & Wheeling Railway was incorporated in West Virginia in May, 1912, with an authorized capital stock of $1,000,000, as noted in the ELECTRIC RAILWAY JOURNAL of June 1, 1912. Further reference to the company was made in the ELECTRIC RAILWAY JOURNAL of Sept. 28, 1912, in "Construction News."

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—The Omaha, Lincoln & Beatrice Railway has applied to the Railroad Commission of Nebraska for permission to issue $2,250,000 of bonds and $850,000 of common stock to provide funds to complete the construction of the line from Lincoln to Omaha. In the application of the company to the commission the statement is made that the Northern Construction Company has agreed to complete the line as stated in consideration of the delivery to it of the securities previously mentioned.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—The South Carolina Light, Power & Railways Company has been incorporated in Massachusetts to acquire the properties of the Spartanburg Railway, the Gas & Electric Company and the Electric Manufacturing & Power Company, Spartanburg, the control of which passed to Ussing, Scoville & Company, Philadelphia, Pa., as noted in the ELECTRIC RAILWAY JOURNAL of June 1, 1912, page 945. The company has outstanding the following securities: $500,000 out of $1,500,000 of 6 per cent cumulative preferred stock, $2,500,000 out of $3,500,000 of common stock, and $3,000,000 out of $5,000,000 of first mortgage 5 per cent sinking fund gold bonds. A. B. Leach & Company, New York, N. Y., are placing privately $3,000,000 of the first mortgage 5 per cent sinking fund gold bonds, dated Nov. 1, 1912, and due May 1, 1937, but redeemable at 105 and interest on any interest date. The trustee under the mortgage securing the bonds is the New York Trust Company, New York, N. Y.

Third Avenue Railway, New York, N. Y.—Negotiations are reported to have been concluded in behalf of the Third Avenue Railway for the purchase of the property of the Belt Line Railway Corporation, the successor to the Central Park, North & East River Railroad, the property of which was sold under foreclosure recently to Edward Cornell, of Davies, Auerbach, Cornell & Barry. The directors of the Third Avenue Railway have voted to pay on April 1, 1913, 1¼ per cent on the $22,536,000 of 5 per cent adjustment income bonds for the six months ended Dec. 31, 1912. This is the initial payment on the income bonds, no interest having been paid for the six months ended June 30, 1912. The interest became cumulative on Dec. 31, 1912.

Valley Railways, Lemoyne, Pa.—The Valley Railways has certified to the Secretary of State of Pennsylvania that $1,950,000 of common stock and $500,000 of preferred stock have been issued in part payment for the capital stock of the Valley Traction Company, the full purchase price being $3,450,000, represented by $1,000,000 of first mortgage bonds, $500,000 of 6 per cent cumulative preferred stock and $1,950,000 of common stock.

Dividends Declared

Brooklyn City Railroad, Brooklyn, N. Y., quarterly, 2 per cent.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; 1 per cent, common.

East St. Louis & Suburban Railway, East St. Louis, Ill., quarterly, 1¾ per cent, preferred.

International Traction Company, Buffalo, N. Y., 2 per cent, preferred; 4 per cent on account of accumulated dividends.

Mexico (Mex.) Tramways, quarterly, 1¾ per cent.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

New Hampshire Electric Railways, Haverhill, Mass., 2 per cent, preferred.

Public Service Investment Company, New York, N. Y., quarterly, $1.50, preferred; $2, common.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., 33 1/3 cents, common.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

Union Railway, Gas & Electric Company, Rockford, Ill., 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Nov.	'12	$61,681	*$27,368	$34,313	$17,239	$17,074
1 "	"	'11	50,234	*21,068	29,166	12,682	16,484
5 "	"	'12	325,536	*137,916	187,620	84,108	103,512
5 "	"	'11	277,082	*119,509	157,573	64,672	92,901

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA TENN.

1m.,	Nov.	'12	$91,293	*$55,362	$35,931	$22,678	$13,253
1 "	"	'11	78,711	*47,512	31,199	20,552	10,647
11 "	"	'12	969,220	*577,531	391,689	242,066	149,623
11 "	"	'11	859,645	*503,514	356,131	218,684	137,447

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m.,	Nov.,	'12	$584,515	*$325,588	$263,027	$131,396	$132,531
1 "	"	'11	506,309	*277,410	228,899	106,506	122,393
11 "	"	'12	5,739,477	*3,335,492	2,403,985	1,377,146	1,026,839
11 "	"	'11	4,969,118	*2,857,770	2,111,348	1,152,875	958,473

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE.

1m.,	Nov.,	'12	$176,866	*$98,068	$78,798	$56,510	$23,288
1 "	"	'11	163,105	*98,168	64,937	49,866	15,071
5 "	"	'12	993,636	*517,287	476,349	276,391	199,958
5 "	"	'11	950,567	*538,687	411,880	249,111	162,769

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.

1m.,	Nov.,	'12	$29,542	*$15,706	$13,836	$9,993	$3,843
1 "	"	'11	27,403	*16,466	10,938	8,541	2,397
11 "	"	'12	356,570	*193,752	162,818	109,222	54,596
11 "	"	'11	337,970	*186,202	151,679	91,608	60,071

EAST ST. LOUIS & SUBURBAN RAILWAY, EAST ST. LOUIS, ILL.

1m.,	Nov.	'12	$224,023	*$118,852	$105,171	$48,598	$56,573
1 "	"	'11	198,966	*110,856	87,110	46,058	41,052
11 "	"	'12	2,224,246	*1,242,730	981,516	530,452	451,064
11 "	"	'11	2,076,445	*1,185,333	891,112	501,910	389,202

GRAND RAPIDS (MICH.) RAILWAY.

1m.,	Nov.,	'12	$100,776	*$58,883	$41,893	$14,363	$27,530
1 "	"	'11	94,323	*53,144	41,179	14,490	26,689
11 "	"	'12	1,126,610	*634,622	491,988	160,973	331,015
11 "	"	'11	1,060,784	*600,111	460,673	164,831	295,842

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO.

1m.,	Nov.,	'12	$104,789	*$60,867	$43,923	$35,083	$8,840
1 "	"	'11	95,828	*67,103	38,726	34,625	4,101
11 "	"	'12	1,213,814	*691,236	522,578	384,584	137,994
11 "	"	'11	1,156,685	*622,207	543,478	381,651	161,827

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*Include taxes.

Traffic and Transportation

Traffic Problems at Springfield, Mass.

In a recent interview E. J. Dickson, superintendent of the Springfield (Mass.) Street Railway, outlined the traffic conditions now facing the municipality and urged early action by the authorities in relation to the location of the proposed new union station and suggested bridge improvements on the Connecticut River. Mr. Dickson said that the company desires the union station plans settled so that car schedules in the downtown district of the city can be rearranged in the interests of better and more economical service. During the rush hours of the day 200 cars per hour pass through the most congested section of Main Street, making 1800 stops. In case a new bridge is built to replace the old Connecticut River toll structure from twenty to thirty cars per hour can be diverted from Main Street, including interurban service to and from Hartford via the West Side line, Holyoke, Feeding Hills, Agawam, Riverside Park summer service and possibly Westfield. At present some of the interurban runs are abnormally long in order to remedy the traffic congestion on Main Street. The Chicopee-Longmeadow and Dickinson-Worthington Street services are operated through the city between suburban centers on either side in order to save four cars per hour in each direction on Main Street during the period of heaviest travel. Regarding the popular demand for a waiting station in the heart of the city at Court Square, Mr. Dickson said that the company's action would depend upon the finding of the Massachusetts Railroad Commission, following a hearing on the subject. The United States authorities have recently conferred with the company on behalf of the establishment of electric railway express and freight service in and out of the Springfield Arsenal grounds.

Change from Zone to Mileage Basis Recommended in Pennsylvania

Among the principal recommendations in the annual report made to the Governor of Pennsylvania by the State Railroad Commission on Jan. 14, 1913, is that fares on interurban electric railways be placed on a mileage basis instead of the present fare zone basis. The report treats this subject as follows:

"What are known as fare zones on our suburban and interurban electric railways have been a source of constant friction between these carriers and their patrons. This contention will continue as long as the attempt is made to base the rate of fare collected upon divisions or zones that are made of varying lengths according to the density of the population of the adjacent territory, or in any way modified in length or extent to meet peculiar local conditions. The commission is of the opinion that some statutory provision should be made which would require all electric railways which operate outside of our larger centers of population to place the fare charged upon a measured mileage basis, with respect to which there can be no difference of opinion. This could be done very readily by dividing the road into blocks or sections of uniform length and fixing a uniform rate as the legal fare for each such block, or fraction thereof, thus putting the whole system of fares upon our rural lines on practically a mileage basis."

Traffic Agreement Between Pennsylvania Lines.—A traffic agreement has been arranged between the Northern Cambria Street Railway, Johnstown, Pa., and the Altoona & Logan Valley Electric Railway, running out of Altoona. Several miles of connecting line remain to be built.

Inquiry Into Rates of New Haven Railroad Out of New York.—The Interstate Commerce Commission on Jan. 8, 1913, decided to inquire into the action of the New York, New Haven & Hartford Railroad in increasing rates on passenger commutation fares between Connecticut points and New York City. The commission proposes to hold a hearing in New York at an early date and one in Washington later.

Wages Increased on Warren, Brookfield & Spencer Street Railway.—Thomas T. Robinson, receiver for the Warren, Brookfield & Spencer Street Railway, Brookfield, Mass., has granted an increase of wages to car service men dating from Jan. 1, 1913. For regular work 22.5 cents per hour is to be paid, spare men receiving 21.25 cents per hour. New men will be given 20 cents per hour at the beginning of their service.

Fishing Time Along the Interurban Line.—The *Tangent*, published by the Galveston-Houston Electric Railway, Galveston, Tex., contains an announcement in its issue for January, 1913, of the formation of the Anglers' Club by members of the Houston Electric Company and the Galveston-Houston Electric Railway. The announcement was made in the form of a full-page advertisement headed "It's Fishing Time Along the Interurban Line."

Change in Fare Zones Requested.—The Public Service Commission of Maryland has been asked to order the United Railways & Electric Company, Baltimore, Md., to readjust the fare zones on its Sparrow's Point line. No objection has been raised in regard to the first fare zone out of Baltimore, but the complainants have asked that the second zone be established at the Highlandtown carhouse instead of ending at Dundalk. The commission has held a hearing on the application and has taken the matter under advisement.

Changes in the Legal Staff of the Louisville Railway.—Changes in the legal staff of the Louisville (Ky.) Railway were announced recently following the resignation of Attorney Fred Focht. W. W. Crawford has resigned and will devote his attention to the work of Gibson & Crawford. Huston Quin, formerly first assistant city attorney of Louisville, and Eugene R. Atkinson have become members of the staff, associated with Frank P. Straus, Alfred Selligman and Howard Lee. These five men will handle the legal business of the company in the future under the direction of Alexander P. Humphrey.

Newspaper Men on Tour of Inspection in Richmond.—C. C. Johnson, assistant general manager of the Virginia Railway & Power Company, Richmond, Va., entertained a party of newspaper men as his guests recently. He took the members of the party over the lines of the company, and pointed out to them the work which the company is carrying on to make the cars clean and sanitary and to better conditions of their use during the rush hours. Mr. Johnson told the representatives of the press about the means which the company is taking to meet the peculiar traffic conditions which are encountered in Richmond and referred to similar problems in other cities.

Commutation Rates Asked on Road in New York State.—The Public Service Commission of the Second District of New York has received a complaint from commuters traveling daily over the lines of the New Paltz, Highland & Poughkeepsie Traction Company, New Paltz, N. Y., asking for the establishment of commutation rates for daily riders. The complaint alleges that the rates, running in some instances to 40 cents a day with an additional 10-cent ferry fare, are prohibitive. Others are obliged to pay 30 cents and 20 cents per day, which complainants allege are out of proportion to the distance traveled. The complaint has been served on the company and an answer required within twenty days.

Service Complaints in Pennsylvania.—The Valley Traction Company, Lemoyne, Pa., has answered complaints made against it before the Railroad Commission of Pennsylvania. Citizens of Lemoyne asked that transfers be granted by the company in the various towns along the west shore. The company states that transfers cannot be given on account of the exceptionally low rate of fare to Enola, allowed to promote the growth of that town. The Wilkes-Barre Railway denies that its train service is insufficient and contends that a station near the Wilkes-Barre hospital is not necessary for the convenience of the traveling public. Complaint against the service of the Bucks County Electric Railway at Langhorne has been filed with the Railroad Commission by residents of that borough who contend that the schedule of the company does not fit in with the schedules of the steam railroads and that the traveling public is seriously inconvenienced thereby.

Nashville Company Distributes Prizes.—The Nashville Railway & Light Company, Nashville, Tenn., distributed $1,800 in cash prizes to conductors, motormen, division superintendents and gatemen at a meeting held on Christmas Eve. The prizes were awarded according to the number of hours worked and based on term of service with the company. In computing the hours of service deductions were made for accidents in which the men were involved. Additional prizes were given men long in the service of the company. Each man who had served more than five years received $5. The list shows that four conductors and ten motormen have been in the employ of the company more than ten years—one of the motormen having been in the service for twenty years and one month. These awards were in addition to the turkey which was presented to every employee at Christmas.

Modification of Subway Service Order.—The Public Service Commission for the First District of New York has modified its orders of December, 1910, covering train service in the subway. The order of 1910 provided that the company during the rush hours should operate as many trains as is physically possible, and during the non-rush hours enough trains to provide during every fifteen-minute period as many seats as there are passengers offering during such period. The modified order is along the same lines, but makes the period twenty minutes instead of fifteen minutes. This will allow the company a little more leeway in obeying the order, it having complained that the previous order compelled it to operate trains with many empty cars for long distances outside of the congested district in order to comply with the terms of the order in that district. The modified order was adopted by a divided vote, Chairman William R. Willcox and Commissioners John E. Eustis and George V. S. Williams voting for it and Commissioners Milo R. Maltbie and J. Sergeant Cram voting against it.

Milk Service on New York Road.—The Public Service Commission of the Second District of New York has required the Wallkill Transit Company to provide a so-called freight service on milk and cream between Goshen and Middletown and intermediate points leaving Goshen on each week day at 6.30 a. m., and that the rate charged on milk and cream for such service shall not exceed 10 cents per can of forty quarts. The order further provides that during the busy milk shipping season beginning April 15 and ending Oct. 1 one or more freight cars shall be placed in this service. Complaints were filed with the commission as to the increase of rates on milk and cream between Goshen and Middletown from 15 to 20 cents per forty-quart can and the discontinuance of the freight service previously provided by the company, on which service a rate of 10 cents per can was charged. The company has agreed to restore the freight car service during the busy season and will raise no further objection if a gross revenue of $7 per day is derived from such service. If the revenue does not reach a satisfactory point it will have leave to file an application for amendment to the order.

Near-Side Stops in Toledo.—The Toledo Railways & Light Company, Toledo, Ohio, has issued the following statement in regard to the plan of the company to stop its cars on the near side of the street commencing Jan. 20, 1913, in accordance with the ordinance passed recently by the City Council: "Any time there is an interference in the established customs there is bound to be complaint, so the company is giving long notice beforehand in order to prepare people for the change. The company believes the ordinance will help in reducing the danger of accidents, will add to the speed of the cars and will give more general satisfaction to the patrons. To help work it out and to pave the way for the introduction of the pay-as-you-enter system which must soon be put in vogue, the company is asking everyone to enter only at rear door and leave by the front. If this were generally done, it would do away with long stops at street intersections, eliminate much confusion in crowded cars and make traveling much more comfortable for passengers. Such a thing can be accomplished only by co-operation between the company and its patrons, and the company hopes by street car posters and newspaper advertisements to show its patrons that they will greatly benefit by the plan."

Personal Mention

Mr. J. W. Warren has been appointed superintendent of transportation of the Waco (Tex.) Street Railway.

Mr. F. W. Insull has resigned as general auditor of the Arkansas Valley, Railway, Light & Power Company, Pueblo, Col., to accept another position.

Mr. W. D. Skinner has been appointed traffic manager of the Oregon Electric Railway, United Railways of Portland, the Oregon Trunk Railway and the Spokane, Portland & Seattle Railway, Portland, Ore., to succeed Mr. W. E. Coman, resigned.

Mr. T. A. Pitcher, formerly assistant claim agent of the Dallas (Tex.) Electric Corporation and prior to that purchasing agent of the local companies at Dallas controlled by Stone & Webster, has resigned to engage in real estate business in Dallas.

Mr. E. A. Burrill, who resigned as vice-president and general manager of the Peoria Railway Terminal Company Sept. 1, has been appointed vice-president and general manager of the Toledo, Port Clinton & Lakeside Railway, Toledo, Ohio.

Mr. Harvey B. Ross, who has been acting superintendent of the Waco (Tex.) Street Railway since the resignation of Mr. A. D. Brinckerhoff last July, has been appointed superintendent of the company. Mr. Ross was formerly claim agent of the company.

Mr. J. E. Mahaney has been appointed purchasing agent of the Oregon Electric Railway, the United Railways, the Spokane, Portland & Seattle Railway and the Oregon Trunk Railway, with headquarters in Portland, Ore., to succeed Mr. F. A. Bushnell, resigned to accept service with another company.

Mr. A. M. Lupfer has been appointed chief engineer of the Spokane & Inland Empire Railroad, with headquarters in Portland, Ore., vice Mr. R. Budd, resigned. Mr. Lupfer has also been appointed chief engineer of the Spokane, Portland & Seattle Railway and the Oregon Trunk Railway to succeed Mr. Budd.

Mr. Oscar T. Crosby has disposed of his interest in the Wilmington & Philadelphia Traction Company, Wilmington, Del., to the National Properties Company, as noted elsewhere in this issue, and has resigned as president of the company and expects at an early date to travel in Asia and Africa.

Mr. Van Horn Ely, president of the National Properties Company, Pittsburgh and New York, has been elected president of the Wilmington & Philadelphia Traction Company, Wilmington, Del., to succeed Mr. Oscar T. Crosby, who has disposed of his interest in the company to the National Properties Company.

Mr. J. H. Pardee, who as vice-president of J. G. White & Company, Inc., New York, N. Y., has been in charge of the operating department of that company, has been elected president of The J. G. White Management Corporation, which has been organized in accordance with the plan to conduct the engineering-construction department and the operating departments of J. G. White & Company, Inc., separately.

Mr. J. M. Wakeman, formerly general manager of the McGraw Publishing Company, has been appointed general manager of the Society for Electrical Development, Inc., New York. The object of the Society for Electrical Development is to promote the use of electrical energy and to further the interests of lighting companies, manufacturers, jobbers, contractors and dealers through a vigorous cooperative campaign of publicity, etc., to guide which Mr. Wakeman is eminently fitted.

Mr. F. W. Abbot, construction manager of the Electric Bond & Share Company, New York, N. Y., and vice-president and general manager of the Yadkin River Power Company, has resigned both positions to become construction manager of the Ebro Irrigation & Power Company, incorporated by the F. S. Pearson Engineering Corporation to construct two hydroelectric plants, one of 30,000-hp and one of 80,000-hp capacity, on the Ebro River, in Spain. As noted in the ELECTRIC RAILWAY JOURNAL of Jan. 11, 1913, Mr. Abbot has been succeeded as construction manager of the Electric Bond & Share Company by Mr. Joseph D. Evans.

Mr. Frank R. Brosius, whose resignation as supervising engineer of the Columbus Railway & Light Company, Columbus, Ohio, was noted in the ELECTRIC RAILWAY JOURNAL recently, has been appointed supervising engineer of the power stations of the Cincinnati and Covington traction interests of A. B. Leach & Company, New York, N. Y. Mr. Brosius is a graduate of the State School for Soldiers and Sailors' Orphans at Xenia. He has been active in the organization of the local branch of the National Association of Stationary Engineers, and at its last meeting that organization adopted resolutions expressing the esteem of its members for Mr. Brosius and their regret that he is now to withdraw from the local organization.

Mr. J. M. Dewberry, who has been vice-president of the Birmingham, Ensley & Bessemer Railway, Birmingham, Ala., the first section of which was placed in operation recently, has severed all his official relations with the company, which is commonly known as the Tidewater line, but has not resigned from the Tidewater Power Company or retired from participation in the development of the other features of the general Tidewater enterprises, which include the construction of a power plant on the Warrior River to furnish electricity for light and power purposes in Birmingham and the construction of a railway from Birmingham to the Warrior River. Mr. Dewberry will hereafter devote his time largely to the affairs of the J. M. Dewberry Company, banker.

Mr. T. W. Wilson, who has been assistant to the president of the Wilmington & Philadelphia Traction Company, Wilmington, Del., has been elected vice-president and general manager of the company, the property of which has been taken over by the National Properties Company, Pittsburgh and New York. Mr. Wilson was formerly general manager of the International Railway, Buffalo, N. Y. He was born in New York City in 1872 and was graduated from Lehigh University in 1894. He was formerly connected with the Pennsylvania Steel Company and the Charleston (S. C.) Street Railway, of which latter he became chief engineer. He entered the service of the International Railway in 1897 as assistant engineer. He is a past-president of the New York Electric Railway Association. Mr. Wilson is a director of both the Wilmington & Philadelphia Traction Company and the National Properties Company.

OBITUARY

Henry De Forest Hubbard, aged fifty-two years, for a number of years general manager and chief engineer of the Manchester Traction Company, Pittsburgh, Pa., died in his home in Avalon, Pa., on Jan. 11, 1913. After the consolidation of the Manchester Traction Company with the Pittsburgh Railways, Mr. Hubbard entered other business as a consulting engineer.

Joseph P. Ord, a director of the General Electric Company, Schenectady, N. Y., and formerly comptroller of that company, died at his apartment in the St. Regis Hotel, New York, on Jan. 9, 1913. Mr. Ord was born in Pasadena, Cal., in 1852 and was graduated from Yale with the class of 1873. He was admitted to the bar and entered the firm of Alexander Green, New York, and became an assistant to Mr. Ashabel Green in the receivership of the West Shore Railroad. Mr. Ord was for a time connected with J. P. Morgan & Company, New York, N. Y.

S. D. Coykendall, who was president of the Kingston (N. Y.) City Railroad, now a part of the Kingston Consolidated Railroad, died at Kingston on Jan. 14 at the age of seventy-five years. Mr. Coykendall was president of the Ulster & Delaware Railroad, the First National Bank of Kingston, the Cornell Steamboat Company, the Rhinebeck & Kingston Ferry Company, the Kingston Coal Company and a number of other companies. He retired from the Kingston City Railroad following the consolidation of that company with the Colonial City Traction Company, Kingston, in December, 1901, as the Kingston Consolidated Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—Application for a charter has been made by this company in Florida to build a 55-mile electric railway to connect South Jacksonville, Pablo and St. Augustine. Capital stock, $2,000,000. Officers: A. W. Corbett, president; John Andreu, vice-president; D. L. Dunham, secretary; A. E. Baya, treasurer, and Joseph Lynn. The other directors are C. J. Perry and R. L. Campbell. [E. R. J., Jan. 11, '13.]

***Universal Traction Company, Indianapolis, Ind.**—Incorporated in Indiana with a capital stock of $50,000. Incorporators: Truman B. Funk, William D. Myers and James E. Kepperly.

***Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.**—Incorporated in Missouri to build a 12-mile interurban railway between Moberly, Huntsville and Randolph Springs. Capital stock, $500,000. Directors: C. H. Dameron, W. T. Dameron, G. P. Dameron, W. M. Evans and others, all of Huntsville, Mo.

***Flathead Valley Interurban Railway, Kalispell, Mont.**—Incorporated in Montana to build an electric railway to connect Kalispell, Whitefish, Somers and Bigfork. Capital stock, $50,000. Incorporators: Robert P. Austin, Walter H. Griffin and Robert J. Benn.

***General Elevated Railway, Philadelphia, Pa.**—Incorporated in Pennsylvania to apply for any and all rights, inventions, improvements, etc., for elevated railways. Capital stock, $1,000,000. Incorporators: Frank A. Butler, Henry N. Montgomery, W. H. Doeble, J. George Schemff, Frank K. Stahl, U. G. Yoder, George B. Young and C. U. Martin.

***South Carolina Light, Power & Railways Company, Spartanburg, S. C.**—Incorporated in Massachusetts to acquire the properties of the Spartanburg Railway, Gas & Electric Company and the Electric Manufacturing & Power Company, Spartanburg.

***Welsh Colony Railroad, Buckhannon, W. Va.**—Chartered in West Virginia to build an interurban railway from Avondale to Pendro. Headquarters, Buckhannon. Capital stock, $5,000. Incorporators: Matthew Perkins, Samuel Davies, John P. Williams, Davil S. Thomas, Shenandoah, Pa.

FRANCHISES

Birmingham, Ala.—The Birmingham, Ensley & Bessemer Railroad has asked the Council for a franchise to extend its lines in Birmingham.

Birmingham, Ala.—The Birmingham Railway, Light & Power Company has received a thirty-year franchise from the Council to extend its Owenton line in Birmingham to Tuxedo.

Edmonton, Alta.—The City Council has approved of plans submitted by the Edmonton Radial Railway for radial railways having a total length of 120 miles. The plan provides for lines all over the city limits of Edmonton. It is intended to begin working out this plan early this year, during which it is proposed to add 18 miles to the existing lines and to begin making permanent improvements upon all the streets on which it is proposed to build lines.

Little Rock, Ark.—The Little Rock & Hot Springs Electric Railway has asked the Council for a franchise in Little Rock.

Los Angeles, Cal.—The Los Angeles Railway has asked the Council for a franchise for a double-track line on Mission Road from Keith Street northeasterly in Los Angeles.

Bridgeport, Conn.—The Connecticut Company has received the approval of the Public Utilities Commission for location of tracks on Park, North, Brooklawn, Seaview, Stratford and Noble Avenues and East Main Street in Bridgeport.

Lewiston, Idaho.—F. L. Sturm, representing the Lewiston Electric Railway, has received a franchise from the Council in Lewiston. Work will be begun at once by the company on the line to connect Lewiston, Clarkston and Asotin. [E. R. J., Jan. 4, '13.]

Baton Rouge, La.—The Baton Rouge Electric Company has accepted the franchise offered by the city for the extension along Florida Street and down East Boulevard to Railroad Avenue in Baton Rouge.

Bangor, Maine.—The Bangor Railway & Electric Company has asked the City Council for a franchise to extend its line across the Bangor bridge to Brewer.

***Fort Garry, Man.**—Application is being made to the Manitoba Legislature for an act authorizing the Fort Garry municipality to build an electric railway with terminals in Winnipeg. R. A. C. Manning is interested.

Butte, Mont.—The Butte Electric Railway has received a franchise from the Council for an extension in the southwestern section of Butte.

Cicero, N. Y.—The Public Service Commission, Second District, has authorized the Syracuse, Watertown & St. Lawrence River Railroad to exercise a franchise granted by the town of Cicero for the operation of its railroad through Cicero.

California, Pa.—The Pittsburgh Railways has asked the Council for a franchise in California. The company has also asked the Council in Coal Center for a franchise for a line through Coal Center.

Centralia, Wash.—The Washington Electric Railway has asked the Council for a franchise for a right-of-way along the county road from the fair grounds to Centralia. This line will connect Vancouver and Tacoma via Chehalis, Centralia and Olympia. [E. R. J., Nov. 23, '12.]

Port Angeles, Wash.—The City Council has been asked to grant two fifty-year franchises to two different concerns to build electric railways in Port Angeles. John H. Dalton, Chicago, et al. were petitioners in one case and the Olympia Power Company in the other.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—During 1913 this company plans to spend over $1,300,000 for betterments. The improvements will include four extensions. The Owenton line is to be extended from Owenton to Tuxedo, the East Lake line is to be extended to Roebuck Springs and beyond, while the Avenue F line will be extended to Elmwood Cemetery if the City Commissioners give the company a right to use that avenue as requested. The Gate City line is also to be extended to Irondale.

Arkansas Interurban Construction Company, Little Rock, Ark.—This company will soon be in the market for rails, bridges, etc., for the construction of its 56-mile electric line between Little Rock and Hot Springs. L. Garrett, 321 Main Street, Little Rock, general manager. [E. R. J., Dec. 28, '12.]

British Columbia Electric Railway, Vancouver, B. C.—This company has been asked to extend its lines to Sydney.

Los Angeles (Cal.) Railway.—This company has placed in operation its new Vernon Avenue crosstown line in Los Angeles.

Pacific Electric Railways, Los Angeles, Cal.—This company has received permission to construct twenty-eight grade crossings and one under-grade crossing on public highways on its proposed extension between Highgrove and San Bernardino; to cross at grade nine streets intersecting Mendocino Street, near Pasadena; to construct an under-grade crossing under the tracks of the Atchison, Topeka & Santa Fé Railroad near the south line of San Bernardino County, and to construct three crossings in Hermosillo, Los Angeles County. The Southern Pacific Company was granted permission to construct a passing track at grade across Clearwater Road, Downey, Los Angeles County.

***San Francisco, Cal.**—Preliminary steps for a municipal railway in Van Ness Avenue from Market Street to Bay Street to furnish transportation facilities to the Panama Pacific Exposition and act as a crosstown line for the Geary

Street Municipal Railway were taken by the Board of Supervisors recently.

Central California Traction Company, San Francisco, Cal.—Positive plans for the extension of its line to Hollister from San Juan have been made by this company. Plans are being considered to extend its line into the San Joaquin Valley, with Fresno as a terminal point.

Santa Barbara (Cal.) Consolidated Railway.—Work has been begun by this company on the reconstruction of its lines in Santa Barbara. It is planned to expend $250,000 on reconstruction work and $250,000 on extensions and improvements to its lines. One of the extensions will be from the old Mission to the site of the new Normal School in Santa Barbara.

Vallejo & Northern Electric Railway, Vallejo, Cal.—The roadbed from Boynton Junction south to Vallejo is being completed by this company.

***Athens, Ga.**—A company is being organized by local capitalists in Athens to build an electric railway through Athens.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—It is announced that this company will convert its 10-mile gasoline railway to an electric line at once.

Waycross Street & Suburban Railway, Waycross, Ga.—An extension will be built by this company to Hebardville after its line to Gilchrist Park is completed.

***Pekin, Ill.**—W. A. Ebbert and associates are considering plans to build an electric railway in Pekin.

Illinois Traction System, Peoria, Ill.—This company is negotiating to make connections with the Alton, Granite & St. Louis Traction Company and the East St. Louis & Suburban Railways at Edwardsville.

Springfield (Ill.) Consolidated Railways.—This company plans to build a double track on Monroe Street, from Eighth Street to Tenth Street, in Springfield.

Union Traction Company, Coffeyville, Kan.—This company has placed in operation its line between Parsons, Cherryvale, Dennis and other nearby towns.

Owensboro (Ky.) City Railway.—This company has completed an extension to the new plant of the Universal Stenotype Company, in Owensboro.

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—This company will begin the construction of its line from Paducah to Fancy Farm in the spring.

***Assiniboia, Man.**—At a meeting of the Council of this municipality a resolution was passed favoring the building of a municipally owned electric railway in Assiniboia.

Winnipeg (Man.) Electric Railway.—This company has been asked to consider plans to build a line to Portage la Prairie.

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—An 11½-mile extension to Ashby and Ashburnham will soon be built by this company. Other extensions planned are a line from Clinton to Ayer, a distance of 14 miles; from Clinton to Sterling, 5 miles, and from West Boylston via Oakdale, West Sterling and East Princeton to South Westminster, a distance of 13½ miles.

Benton Harbor-St. Joe Electric Railway, Benton Harbor, Mich.—Surveys are being made by this company for an extension from Coloma to Hartford. Work will be begun in the spring on the extension to Watervliet.

Laurel Light & Railway Company, Ellisville, Miss.—A contract has been awarded by this company for the ties for its line between Laurel and Ellisville. Guy M. Walker is interested. [E. R. J., Nov. 30, '12.]

Manchester Traction, Light & Power Company, Manchester, N. H.—This company has placed in operation its McGregorville and Bridge Street line in Manchester.

Liberty & Callicoon Railroad Corporation, Liberty, N. Y.—The Public Service Commission, Second District, has granted to this company a certificate of public convenience and necessity. The company proposes to build a railroad from a point near the New York, Ontario & Western Railroad station in Liberty to Jeffersonville. The line will pass through Liberty, Loomis, White Sulphur Springs, Youngsville, Jeffersonville and Callicoon, all within Sullivan County. The length of the line will be approximately 14 miles. The commission has also authorized the company to issue its common capital stock to the amount of $200,000 and its first mortgage twenty-five-year 5 per cent gold bonds to the amount of $250,000, the latter to be sold at not less than 85. The proceeds of the stock and bonds are to be used for the construction of the railroad. The charter of the railroad provides that it may be operated either by steam or electric power. [E. R. J., Oct. 26, '12.]

Yadkin River Railway, Raleigh, N. C.—It is reported that this company has completed 4 miles of track from North Wilkesboro toward Elkville. About 13 miles of the line is graded. W. J. Grandin, Boone, N. C., president. [E. R. J., March 2, '12.]

***New Hanover Transit Company, Wilmington, N. C.**—This company is having surveys made by Walter G. MacRae for the construction of an electric railway from Wilmington to Carolina Beach, a distance of about 13 miles. A. W. Pate, president.

Rainy River Radial Railway, Ottawa, Ont.—Engineers are at work making surveys for a line from Fort Frances to the Lake of the Woods as the first section of this projected railway. [E. R. J., Sept. 11, '09.]

Portland, Eugene & Eastern Railway, Portland, Ore.—Work will be begun in the spring by this company on its line from Portland south for 40 miles.

Lebanon & Campbelltown Electric Street Railway, Lebanon, Pa.—This company has completed and will soon place in operation its 10-mile line between Lebanon and Campbelltown.

Hagerstown, Greencastle & Mercersburg Railway, Middleburg, Pa.—This company will begin construction about March 1 on its 22-mile line to connect Hagerstown, Morgansville, Md., State Line, Greencastle, Upton and Mercersburg, Pa. The company's repair shops will be located at Greencastle and power will be purchased from the Security plant in Hagerstown. The company will operate eighteen cars. Capital stock authorized, $600,000. Bonds authorized, $600,000. Capital stock issued, $100,000. Officers: John E. Ensign, Greencastle, president; A. H. Hamill, vice-president and treasurer; C. M. Hoffman, Greencastle, secretary, and J. B. Ferguson, Hagerstown, chief engineer. [E. R. J., Jan. 4, '13.]

Phoenixville, Valley Forge & Strafford Street Railway, Phoenixville, Pa.—Among the extensions planned by this company during 1913 will be an addition to the line in Phoenixville, over the Gay Street bridge, through the North Side to Cromby, from there to Black Rock to Royersford and to Collegeville, completing the line at Pottstown and Valley Forge.

Pittsburgh (Pa.) Railways.—This company plans to extend its Charleroi branch to Roscoe, the present terminus being at California, Pa. Ordinances have been presented in the Councils of Coal Center and California, asking for extensions to the present grants. It is said that the line will be extended to Brownsville as soon as possible.

Sunbury & Susquehanna Railway, Sunbury, Pa.—New lines planned by this company will extend into Snyder County and from Northumberland to Lewisburg, Milton, Watsonville and Williamsport.

***Saraguay Electric & Water Company, Saraguay, Que.**—This company has asked the Quebec Legislature for authority to change its title to the Light & Power Company of Montreal, or the Montreal Public Service Corporation, and for power to acquire franchises for electric railways, etc.

***Lynchburg, Tenn.**—W. G. Cummings, manager of the Stone Fort Power Company, Manchester, Tenn., is preparing plans for an electric railway from Tullahoma to Lynchburg. Preliminary surveys will soon be made.

Nashville & Gallatin Railway, Nashville, Tenn.—This company plans an extension of the line which it has in course of construction at present between Nashville and Gallatin. The Gallatin division is to be extended into Kentucky and further plans for new lines into Illinois and as far north as Indiana are in hand with the company.

Eastern Texas Traction Company, Dallas, Tex.—This company, which is building an electric railway between

Dallas and Greenville, has filed for record a first mortgage securing an issue of $2,000,000 of 5 per cent bonds with the Guaranty State & Trust Company, Dallas, as trustee. The plan is to issue $1,300,000 of the bonds at once. The bonds are dated Dec. 1, 1912, and are due on Dec. 1, 1942.

Rio Grande Valley Traction Company, El Paso, Tex.—Preliminary arrangements are being made by this company for the construction of a 16-mile electric line between El Paso and Socorro. The Stone & Webster Engineering Corporation has received the contract for the entire work, and bids will be asked from the local contractors for grading and right-of-way work, which will be sublet. C. W. Kellogg, El Paso, general manager. [E. R. J., Aug. 3, '12.]

SHOPS AND BUILDINGS

Los Angeles (Cal) Railway.—This company has opened its new carhouse, division No. 5, in Los Angeles, in which it will house about 350 cars.

Pacific Electric Railway, Los Angeles, Cal.—A passenger station will soon be built by this company in El Segundo.

Central California Traction Company, San Francisco, Cal.—Work has been begun by this company to enlarge its office building in Stockton. The addition will be 18 ft. x 30 ft.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has purchased a site in Rantoul on which it plans to build a new station in the spring.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company has leased a three-story building at Main Street and Limestone Street in Lexington and will remodel it for a passenger and freight station.

United Railways & Electric Company, Baltimore, Md.—This company has awarded a contract to John Cowan, Inc., 106 West Madison Street, Baltimore, to reconstruct its station at Fairmont Avenue in Baltimore.

Ottawa (Ont.) Electric Company.—This company is building a new addition to its carhouse in Ottawa, which will add four to the six tracks already there and give accommodation for thirty more cars.

Bryan & College Interurban Railway, Bryan, Tex.—This company will build a new carhouse on Regent Street and Anderson Street in Bryan.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company has been asked to consider plans to build a new depot on Los Angeles Street, in the rear of the company's station, in order that traffic congestion on Main Street may be relieved.

Denver (Col.) City Tramway.—This company has awarded a contract for the construction of a new substation at Delaware Street and Courtland Street in Denver. The capacity of the plant will be 2500 hp.

Ottumwa Railway & Light Company, Ottumwa, Ia.—The installation of mechanical stokers under the boilers has been completed at this company's power house in Ottumwa, also the construction of ash pits and ash tunnels.

Berkshire Street Railway, Pittsfield, Mass.—This company is now building a new substation south of Great Barrington.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—This company will make improvements to the plant of the Beaver County Light Company, the estimated cost of which will be $60,000. Orders for a new 1850-kw turbo-generator and other material for the Fallston power plant between New Brighton and Rochester, Pa., have been placed with the Westinghouse Electric & Manufacturing Company. It is hoped to have the machinery installed by April 1.

Grand Valley Railway, Brantford, Ont.—This company plans to use power secured from the Hydro-Electric Commission for its line between Galt and Paris.

Tennessee Eastern Electric Company, Greenville, Tenn.—This company is rushing work of construction upon a $500,000 power house which it is erecting on the Nolachucky River near that city and is preparing plans for an interurban railway system to connect Greenville, Newport, Johnson City and Sevierville.

Manufactures and Supplies

ROLLING STOCK

United Traction Company, Albany, N. Y., has prepared specifications for the purchase of fifteen double-truck cars.

Denver (Col.) City Tramway has ordered twenty-four trail cars from the Woeber Car & Manufacturing Company.

Monongahela Valley Traction Company, Fairmont, W. Va., is reported to be in the market for four interurban cars.

Stone & Webster, Boston, Mass., is reported to be considering the purchase of sixty cars for use on its various properties.

Ohio Valley Electric Railway, Huntington, W. Va., it is reported, will purchase several new cars at once to replace the equipment which was burned last week.

Valley Traction Company, Lemoyne, Pa., has ordered from The J. G. Brill Company four 30-ft. 8-in. prepayment car bodies mounted on Brill 27-MCB-2-X trucks.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb., has indicated in an application which it has made to the Railroad Commission of Nebraska for permission to issue securities to complete the line from Lincoln to Omaha that it will require six high-speed interurban cars, eight city cars, four express cars, one construction car and two snow plows.

TRADE NOTES

Dearborn Chemical Company, Chicago, Ill., has changed the address of its office at Indianapolis, Ind., to 919 Hume Mansur Building.

International Acheson Graphite Company, Niagara Falls, N. Y., has appointed Richard Cary sales manager of its lubricant department, which handles the lubricants known as oildag, aquadag and gredag.

St. Louis Car Company, St. Louis, Mo., has appointed Nic Le Grand its general sales manager, effective Jan. 1, 1913. Mr. Le Grand has been manager of the supply department of the company for several years.

Southern Wheel Company, Atlanta, Ga., has been organized with a capital stock of $2,500,000 to manufacture iron and steel castings, car wheels, etc. Application has been made for a charter. The company proposes to build a factory or factories in the South.

Bay State Car Wheel Company, Boston, Mass., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 11, 1913, as having been incorporated with a capital stock of $21,000,000, will take over the assets and the business of the Griffin Wheel Company. When this has been effected the name of the Bay State Car Wheel Company will be changed to the Griffin Wheel Company.

Galena Signal Company, Franklin, Pa., has called a special stoockholders' meeting for March 19 for the purpose of authorizing an increase of $4,000,000 in the common stock, of which there is now $8,000,000. The company proposes to issue the new common stock against the surplus and undivided earnings out of which a 50 per cent stock dividend is to be paid.

Edward J. Hunt, Newark, N. J., has received from the following companies among others orders for Hunt oil drying and purifying outfits: Public Service Corporation, Newark, N. J.; Indiana & Michigan Electric Company, South Bend, Ind.; Toronto Power Company, Niagara Falls, Ont.; Pearson Engineering Corporation, New York, N. Y.; York Haven Water & Power Company, York Haven, Pa.; Savannah River Power Company, Anderson, S. C.

Stonehouse Enameled Steel Mine Signal Company, Denver, Col., has placed on the market the Universal danger sign for crossing warnings, cattle passes, third-rails waterways, bridges and culverts. This sign is made of charcoal rolled steel, the lettering of enamel being fused thereon under 1600 deg. of heat. The word "Danger" appears in white letters on a cardinal-red oval surrounded by a jet-black background. The company is also prepared to furnish enameled signs for span wire suspension, station or car signs.

Vulcan Engineering Sales Company, Chicago, Ill, selling agent of the QMS Company's products, reports several recent sales and shipments of QMS car wheel grinders. A grinding machine has just been shipped to the Virginia Railway & Power Company, Richmond, Va., and a similar machine is now under construction for the Ottawa (Ont.) Electric Railway. The Public Service Railway, Newark, N. J., and the British Columbia Electric Railway, Vancouver, B. C., have just ordered additional grinders.

General Electric Company, Schenectady, N. Y., at a recent meeting of the board of directors elected J. R. McKee and O. D. Young vice-presidents of the company. Mr. McKee was chairman of the sales committee of the General Electric Company for several years, and Mr. Young was formerly connected with Stone & Webster, Boston, Mass. At a previous meeting of the board Anson W. Burchard, of New York, was elected a vice-president of the company. Mr. Burchard was for many years assistant to the president of the General Electric Company.

General Pipe, Bending & Erecting Compay, Pittsburgh, Pa., has been incorporated under the laws of Pennsylvania by James W. Prenter, W. L. James and Walter McMinn, who were formerly connected with the Best Manufacturing Company. The company is prepared to manufacture and fabricate piping materials of every description, including pipe bends, welded headers, Van Stone joints, valve fittings and flanges, and as piping engineer is prepared to furnish and install complete high and low pressure piping systems for every purpose. James W. Prenter, president and sales manager of the General Pipe, Bending & Erecting Company, has been connected with the sales department of the Best Manufacturing Company for several years. W. L. James has been erecting engineer for the same company for the past ten years. Walter McMinn was formerly shop superintendent of the Pittsburgh Piping Equipment Company, and was connected with that company for years. During the past year he was connected with the Best Manufacturing Company. The new company's plant is located at No. 3020-3026 Liberty Street, Pittsburgh.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has developed a new product known as Westinghouse commutator cement, particularly for repairing pitted commutators and for filling slots of undercut commutators. The cement is composed of a liquid and a powder furnished in separate containers to be mixed as used. It contains no phosphoric acid or sodium silicate or other material deleterious to mica plate. The cement is easily and quickly applied and sets without baking in one hour. It is durable under the most severe conditions of expansion and contraction due to the heating of the commutators, and it possesses high insulating qualities. The Westinghouse Electric & Manufacturing Company has received the following orders for railway motors: St. Petersburg (Fla.) Investment Company, five double equipments of No. 306 motors and K-36-J control; Santa Barbara (Cal.) Consolidated Railway, ten double equipments of No. 337-C-3 motors and HLF control; Brunswick & Yarmouth Street Railway, Portland, Maine, three double equipments of No. 101-E-2 motors and double-end K-28-E control; Long Island Railroad, New York, N. Y., twenty-seven equipments of No. 308 motors and type AB control; Davenport & Muscatine Railway, Davenport, Ia., eight Westinghouse double equipments, consisting of No. 323-A motors and double-end K-36-J control; Oakland, Antioch & Eastern Railway, San Francisco, Cal., one quadruple equipment of No. 308-B-6 motors and type HL control for use on an electric locomotive.

ADVERTISING LITERATURE

Electric Railway Equipment Company, Cincinnati, Ohio, has issued Catalog D, which illustrates its combination railway and lighting poles, mast arms and brackets.

Vulcan Engineering Sales Company, Chicago, Ill., has published several leaflets in binder form describing and illustrating the various types of QMS cold-metal sawing machines.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 34F, which contains a mechanical description of the design and construction of class G Chicago pneumatic compressors.

Carbo Steel Post Company, Chicago Heights, Ill., has printed a thirty-two-page booklet which describes and illustrates its complete line of carbo steel posts for every kind of fencing. A post card issued by the company calls attention to carbo steel transmission poles.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Leaflet No. 3540, which covers Westinghouse type G synchronous motors for sixty cycles, two-phase and three-phase circuits at various voltages and from 30-hp to 250-hp capacity. Thorough descriptions of the various parts, together with illustrations, are given.

General Fire Extinguisher Company, Providence, R. I., has issued the *Grinnell Automatic Sprinkler Bulletin* for January, 1913, which discusses the necessity of installing automatic sprinklers and cites numerous instances in which the Grinnell automatic sprinkler operated successfully. Particular attention is called to two carhouse fires, one of which occurred at the Broad Street carhouse of the Rhode Island Company, and the other at the State Street carhouse of the New York State Railways.

N. W. Halsey & Company, New York, N. Y., announce the publication of a revised edition of their copyright booklet, "The Most Satisfactory Bonds." This booklet will prove of considerable value to the investor who wishes to secure accurate information concerning the desirability of the various standard types of bonds. The pamphlet also contains an exhaustive treatise upon the development of public utility bonds, citing as an example the records made by representative properties. The progress of these properties from year to year is graphically shown by charts. Copies of this book are distributed gratis.

NEW PUBLICATIONS

Fortschritte der Elektrotechnik, 1912 (Electrotechnical Progress, 1912). By Dr. Karl Strecker, Berlin. Julius Springer. Paper, 1410 pages. Price, 14 marks ($3.50).

This is the fourth quarterly issue for 1912 of this well-known review and covers all important articles within its scope to the end of the year 1911. The value of this publication for electric railway research is indicated by the fact that this issue contains the following numbers of references on the railway topics named: Twenty-one on general operation, six on management and legal, five on electrolysis and other troubles, one on causes of the grade accidents, forty-one on lines under construction in Europe and 133 on details of line, track and car equipment construction.

Extension of the Dewey Decimal System of Classification Applied to the Engineering Industries. By L. P. Breckenridge and G. A. Goodenough, University of Illinois, Urbana, Ill. 117 pages. Price 50 cents.

Some years ago the University of Illinois published an extension of the Dewey decimal system of classification applied to the engineering industries. Four editions of this classification have been published and exhausted, and the university has taken this opportunity to revise the classification again when publishing a new edition. Since the establishment of the Dewey system extensions have been prepared on the application of the system to a number of different branches of literature, but only two, so far as we knew, have been published of its application to railway literature. One of these was by the International Railway Congress and the other by the University of Illinois. The former, which was devoted almost entirely to steam railroad engineering, was incorporated with some slight modification in the third edition of the classification published by the university. The different entries covering electric railway engineering in the book under review occupy about a page. We should have been glad to see them expanded in view of the small amount of space given to this subject in the international railway list, but this is a work which can be taken up later. The classification has been revised in accordance with the 1911 edition of the decimal classification by Melvil Dewey.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JANUARY 25, 1913 No. 4

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.

Chicago Office........................1570 Old Colony Building
Philadelphia Office........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. **Foreign subscriptions may be sent to our European office.**

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

A NEGLECTED FEATURE IN REBUILT CARS

On cars which have been reconstructed to include the pay-as-you-enter feature it is distinctly surprising to find that in some instances the mutually operated half-doors which used to be customary in the old-style designs have been retained, notwithstanding the fact that the stanchion separating the entrance and exit passages on the platforms completely obviates the necessity for the wide doorway. The prime object, of course, of the pay-as-you-enter design is to eliminate confusion through the segregation of incoming and outgoing passengers into two orderly single files, and under these circumstances the necessity for a clear opening of great width becomes nil. When the device for making the two half-doors operate in conjunction is left in the car after its transformation into one of the pay-as-you-enter type, it results in the first place in a burden upon the passenger in compelling him to open two doors when the movement of one would be sufficient, and in addition it involves a certain amount of expense in maintaining the utterly useless mechanism for effecting the mutual operation. These points may perhaps seem obvious, but the fact that cars in just this condition are now being operated is evidence that in some cases at least the subject has been completely overlooked.

REDUCING SHOP ACCIDENTS

The methods of accident prevention used in European electric railway shops should furnish ample guidance for others in countries where this subject is beginning to attract much attention. A railway shop is far from being as hazardous as a mine or foundry, but it necessarily contains some avoidable dangers. One plan followed abroad is to give the shop foremen a yearly premium in proportion to the freedom from accidents in their departments. When the plan was inaugurated the foremen were advised that the management had set aside a certain percentage of the annual payroll, based on previous experience, to allow for accident costs. Thereafter every foreman was to receive at the end of the fiscal year one-third of any remainder from the amount reserved for his department. This offer proved so great an incentive that the annual cost of accidents was more than halved. The same company has also fitted up a "Red Cross" room, where there are surgical and medical facilities to care for shop accidents. Even the slightest wounds are treated here because proper antiseptic dressings will remove all danger of blood poisoning and hasten healing. It is true that the development of such methods abroad has been due largely to the laws relating to the compulsory compensation of disabled employees, but more than one American company has found that the expense of litigation may be even greater than where the law provides a fixed compensation for each kind of injury. In either case prevention should prove better than cure.

WORKINGMEN'S COMPENSATION LAWS

An examination of the activities of the legislatures now meeting in most of the states shows that in many of them questions in connection with the establishment of public service commissions and the passage of workingmen's compensation laws hold a most prominent place. The latter subject, so far as liability insurance is concerned, was one of the topics most actively discussed at the recent meeting of the Wisconsin Electrical Association, as reported in the last issue of this paper. Altogether, workingmen's compensation laws are in force in seventeen states, and the approval given to proposed bills of this kind in the messages of the different governors indicates, we believe, that the passage of some sort of legislation of this kind will be as widespread among the states in the near future as the passage of legislation establishing some kind of public service commission rule. The principle of the substitution of some statutory plan of employers' liability for the wasteful remedies and in many respects inadequate remedies now open to the employee under the common law has much to commend it. The principal danger is in the direction of radical legislation, and the fear of this on the part of employers has considerable foundation because of the lack of experience with the practical working of the workingmen's compensation laws now in force. It is not too much to say of all of them that they are still in an experimental stage, and they leave many questions to be solved. As yet, we believe, all of the existing laws are of an elective character, owing to the general constitutional provision against compulsory compensation, as required in England and Germany. As with commission regulation, we do not think that such a radical feature can be grafted on our system of government easily, and the real benefits to be derived by both employer and employee are yet to be determined. However, out of this confusion and experiment some main principles will be evolved which may prove to be worth all of the trouble required to bring them forth.

CORPORATIONS AND THE COMMUNITY

The difficulties encountered when a company tries to do business on a contract basis with the public are illustrated by the attempt being made at this late date by certain politicians in New York to upset the status of the present agreement in regard to new subways. Every attendant circumstance indicates that the clamor now made is for political purposes only, but politics are practically sure to enter into the conduct of the affairs of any large community, especially in its relation to its public utility companies, and this is one reason why its affairs cannot be conducted with the economy and wisdom of those of a private corporation. Briefly, the agreement between the city and the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company was reached some nine months ago after years of negotiations and concessions on both sides. It is a matter which could have been settled in one-fifth the time if the rapid transit interests of the city had not been made a football to be kicked around first in the interests of one candidate for political preferment and then in those of another. Since the preliminary agreement was accepted by both sides, the attorneys representing each party have been preparing the formal contracts for signature. Undoubtedly during the reduction of this contract to written form differences of opinion in regard to the construction to be placed upon some of the minor parts of the agreement have developed. That such differences exist is indicated by a recent statement of the chairman of the Public Service Commission and the president of the borough of Manhattan. It is unfortunate that they could not have been discovered earlier, but they are not on the basic agreement and do not affect the dual plan, the system of preferential payments and other foundation features of the original agreement. An adjustment on these points could easily be reached by both sides.

The other protest, which is being made on the main principles, should fail, because the companies have expressed a willingness to live up to their part of the agreement and the city has sunk many millions of dollars in construction work which would be almost useless without an operating agreement with one of the existing companies. But the incident possesses wider significance than that illustrated by its local aspect. It shows the readiness with which persons with political aspirations will attempt to defeat the best interests of a city if by doing so they think they will be better able to pose as defenders of the community against corporations—an attitude which current events make every politician believe to be a very popular one at present. It also proves how easily such men can secure a large following among the thoughtless among the community. It often seems strange to a person who has given a great deal of thought to an important and greatly needed public improvement that many of his fellow citizens will regard it lightly. The facts are, however, that few people really give very much consideration to any matters other than their own immediate affairs. Occasionally, as at the time of a political upheaval, they will become aroused and will put one party out and another in. The question of their own personal interests or business, however, will soon again occupy their entire attention and cause them to lapse into a condition of indifference in regard to public matters.

This characteristic of most American citizens emphasizes the importance of definiteness in any contract made between a public utility and a city. If all points upon which disputes may arise in the future are not covered clearly and definitely at the start, the company will be apt to find that little respect will be paid later to questions of abstract justice in which the rights of the company are involved. In this respect the plan under which the new subways are to be built is well drawn. The terms under which the profits will be apportioned, the amount of capital which each party to the contract is to supply and the terms of recapture of the system by the city at definitely stated intervals are clearly set forth. In too many cases in the past, however, and even very recently, there has been the tendency on the part of companies to ignore these essentials of a franchise and to trust that, in the future, the sense of fairness of the community or the protection of the courts will be amply sufficient to insure all of the rights which a company should have. Hence a great deal of attention will be given to minor details in such a franchise and little or none to the essentials, which are the rate of return to be allowed on the capital invested and the disposition at the termination of the franchise of that part of the property which cannot be removed or turned to other uses. It has been owing to neglect of a clear understanding upon these points in the past that most of the ills to which public utilities have been subjected have occurred, and this experience should be a warning for the future. No one will believe, for example, that the original investors in most or any of the present older public utility enterprises in this country expected that the return to be allowed to them would be calculated upon the physical value of the property or even upon the actual investment in the property, or that the rate of such return on either valuation would be limited to the 6 per cent, 8 per cent or 10 per cent which is now claimed by many as adequate in the case of a successful enterprise.

The other refuge upon which the companies have depended against injustice in connection with ambiguous contracts, the protection of the courts, has also proved a weak defence. The reason for this is that the only protection which the courts can give against the forced establishment of low rates is that the rate must not be so low as to amount to a "confiscation" of property. But a non-confiscatory rate is by no means synonymous with a remunerative rate or even with a "fair" rate, any more than the auction value of a house so located that but few people can use it is equal to the real value of such property. People are encouraged to make investments in new enterprises by promises of large returns, not by the cold comfort that if the enterprise should be successful the capital invested will not be confiscated. The courts do not even seem ready to throw their cloak of protection about the investment, but apparently are disposed to construe the term "property" in its narrowest sense, although "property" in any other enterprise, according to the generally accepted meaning of the word, is not limited to the investment but is the opportunity to earn 20 per cent, 50 per cent or 100 per cent in that enterprise. We realize that such an idea is contrary to modern political thought in connection with public utility enterprises, but we firmly believe that the original investors in most of the older public utilities whose rates are now being regulated were encouraged to make their investments because of their understanding that their property was their right to earn such an unlimited return.

For these reasons we believe that a public utility franchise to be granted in the future will be defective unless the permissible rate of return on the investment is specified so that a company shall not be obliged to reduce its rates until this rate of return is obtained, unless the meaning of the term "investment" is clearly defined, and unless there is some clear statement as to the disposition of the property if the term of the franchise is limited in any way. We also believe that in any laws establishing rate-making bodies some similar limits to any action of the commissions in reducing rates or terminating franchises should be embodied.

THE ALTERNATE-STOP PLAN IN CLEVELAND

Although a great many suggestions have been made as to the desirability of reducing the number of stops made for passengers on street railway lines, most American companies cling to the old plan of stopping at every corner. Cleveland is one exception. There the alternate stop plan has been developed and has been found to have a number of interesting advantages and disadvantages. The purpose of the alternate stop, which is now effective over about one-half of the city, was to increase the speed and thus offer more service in a given period without increasing the platform expense. When the alternate-stop schedule was arranged instructions were issued to the crews that stops would be made every two blocks on the inbound trip and at the intervening corners on the outbound trip. Thus a passenger would board at one street intersection and alight a block either side on his return. There has been practically no complaint on the part of the public relative to this method of operation, and it has served to increase the schedule speed, thus resulting in economies in operation and increased service. It is now proposed to extend the alternate-stop service over the entire city.

Although the increased service and operating economies obtain when single-car trains are operated, the addition of trailer service has tended to do away with the benefits when all trains are not provided with trail cars. A natural result of trail-car operation is to increase the average number of stops on a given route, thus lengthening the schedule time. Consequently there is a continual piling up of single-car equipment following the two-car trains in the rush hours. From this it is evident that the entire schedule is retarded on lines where single cars and two-car trains are run. In some cases it has been found that the total time on a given run is increased as much as one-third.

Another result noticed is that passengers do not distribute themselves well between the cars during the rush hours. They will insist upon boarding the first car which arrives, and if this happens to be a two-car train it will become crowded and will delay the schedule. The company hopes, however, that as the number of trail cars is increased people will recognize the probability of their securing a less crowded car by a wait of a few minutes and this trouble will disappear. Altogether the experiment is a very interesting one, and while we would not recommend trailer operation in a city with steep grades on account of the slow acceleration, or where the street congestion requires many stops, we believe it worth consideration under favorable conditions of grade and traffic, especially when it can be combined with the alternate corner stop plan.

PAINTING CARS WITH BAKING ENAMEL

The new method of car painting introduced upon the Hudson & Manhattan Railroad, which is described elsewhere in this issue, is a development of distinct value in the maintenance of equipment. By the use of baking enamel instead of the customary linseed-oil paint or air-drying enamel, and by subjecting this enamel to a mild heat, the process of drying is accelerated to a remarkable degree, and in consequence cars can be put through the paint shop in two days instead of in anywhere from six to fourteen days, as is required with the usual methods.

It is, of course, true that the use of baking enamel is in itself no novelty, as it has been used for some years for automobile bodies, and on some electric railways small parts which could be readily baked in a kiln of moderate size have been treated in this manner. The application of the method to complete electric railway cars, however, has not been attempted heretofore, although the difficulties in the way of experiments along this line have been by no means serious. In consequence its introduction by Mr. See on the Hudson & Manhattan Railroad is a matter of much importance to the electric railway industry.

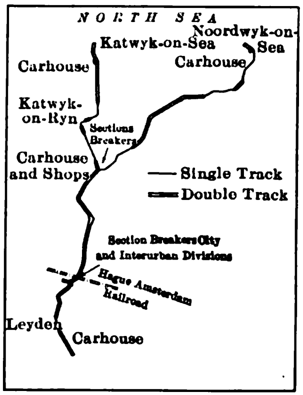
While the peculiar conditions on this railway make its painting problems apply only to the interiors of the cars and have resulted in the application of the new process to interiors only, the method has now been firmly established as a practical standard, and in order to extend the application to car exteriors there remains only the necessity for partitioning off a space large enough to hold one car in any paint shop and heating it with five or six batteries of heater coils. It would indeed seem that the negligible cost of such an arrangement would be an exceedingly small price to pay for the release for service of the 2 or 3 per cent of the car equipment which under ordinary circumstances is now held in the paint shop while the different coats of paint are drying.

In comparison with standard paints, the finished surface given by baking enamel is undoubtedly of a harder and more glossy character than that usually obtained under ordinary methods, although it is also true that an equal finish can be obtained with air-drying enamel, provided proper care is exercised. With regard to permanence under ordinary circumstances there appears to be but little difference between the baking enamels and the air-drying enamels, as this has been a much agitated question in the automobile industry for some time past. The gain, however, which is obtained through the use of the new method in its ability to save time is really remarkable, and when cars can be put through the paint shop in one-fourth or one-fifth of the time required by the ordinary systems the consequent advantages not only of increased mileage of cars but also in saving of shop space are too obvious to require emphasis.

A 1200-Volt D. C. Line in Holland

A Description of the Leyden-Katwyk-Noordwyk Railway, Which Has Been Electrified for 1200-Volt D. C. Catenary Operation with Field Control Motors—The Entire Overhead Construction Is of Copper or Bronze Because of Atmospheric Conditions

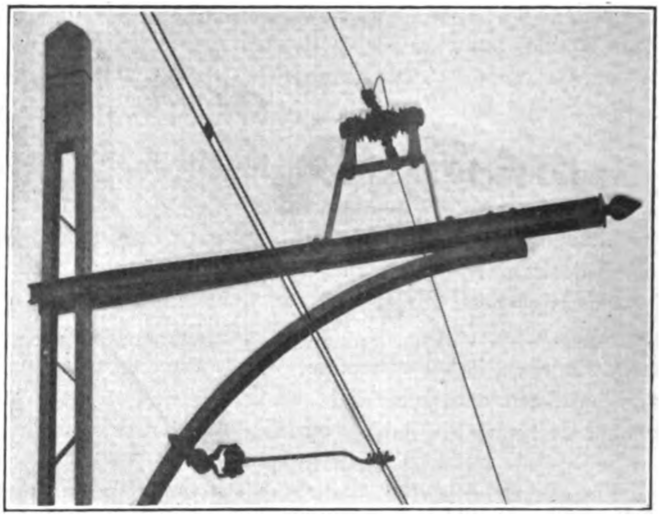
The Noord-Zuid Hollandschen Tramweg Maatschappij (North-South Holland Tramway Company) operates an extensive steam railway system in southern and northern Holland. Among the more important parts of the system was a road from Leyden to Katwyk, including a branch from Rynsburg to Noordwyk. Both lines have now been electrified owing to the heavy increase of travel from Leyden to the sea baths at Katwyk and Noordwyk. The electrification also included a horse car line in Leyden so that the Katwyk and Noordwyk lines could pass through that city. Direct current at 1200 volts was chosen for use on both the city and country divisions. The complete overhead line, including transmission and return cables, and the through service motor cars were furnished by the Siemens-Schuckert company. The Katwyk division was placed in electrical operation in the fall of 1911, and the Noordwyk line began service in 1912.



Electric Ry. Journal

Leyden-Katwyk-Noordwyk Railway—Map

The electrified section is a standard-gage line, most of which is double-tracked. There are no grades of any consequence, with the exception of a bridge approach at Leyden, but there are many sharp curves, some of them of only 65-ft. radius. At present the city and interurban sections are operated with different rolling stock, the former using small motor cars and the latter the larger rolling stock hereinafter described. The interurban section begins at the Leyden station of the Hague-Amsterdam railway and thence runs to Rynsburg junction, whence it branches to Katwyk and Noordwyk, as shown in the accompanying map. The city section is 1.86 miles long, the Katwyk division 5.27 miles long and the Noordwyk division 7.13 miles long. The Leyden-Katwyk division is laid principally on the highway, upon which a maximum speed of 24.8 m.p.h. is attained. A train consists of one motor passenger car and two passenger trailers, but freight cars are also added as required. The service is half-hourly.



Leyden-Katwyk-Noordwyk Railway—Loop in Copper Catenary, and Idle Trolley Wire Clipped to Active One

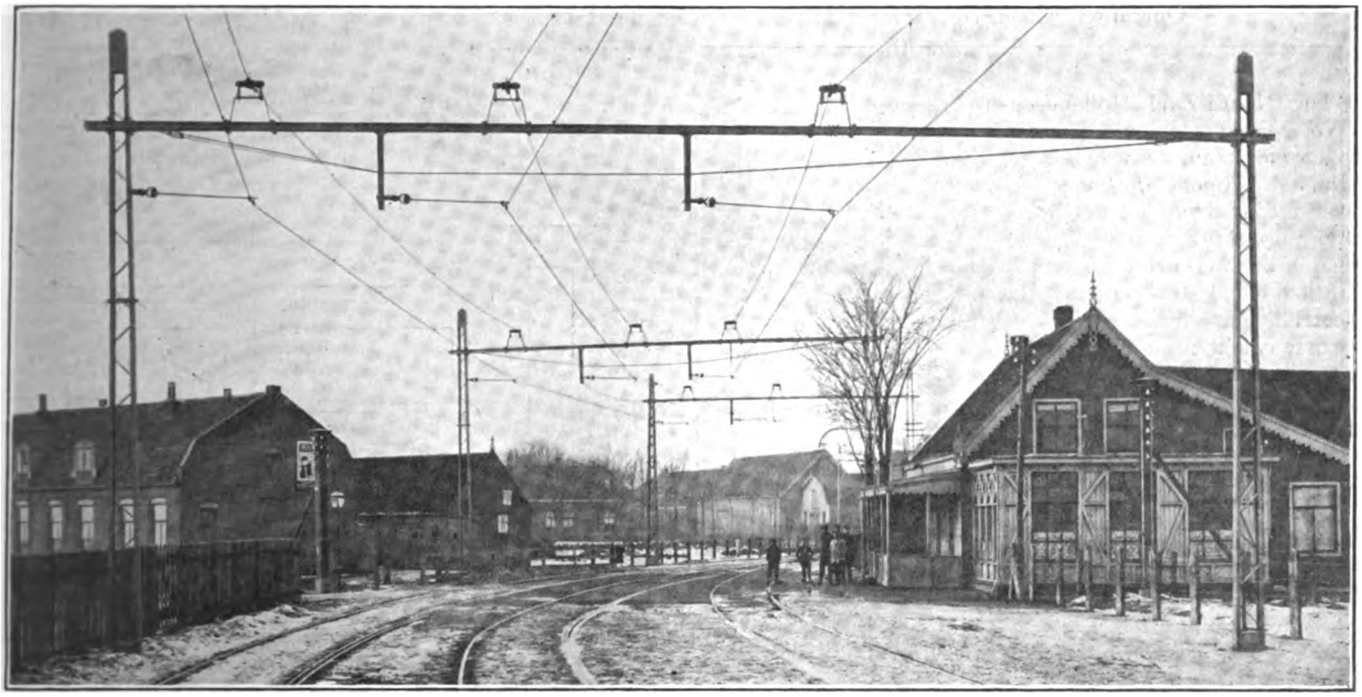
COINTREAU
TRIPLE-SEC

Leyden-Katwyk-Noordwyk Railway—Line Interruption at a Drawbridge in Leyden

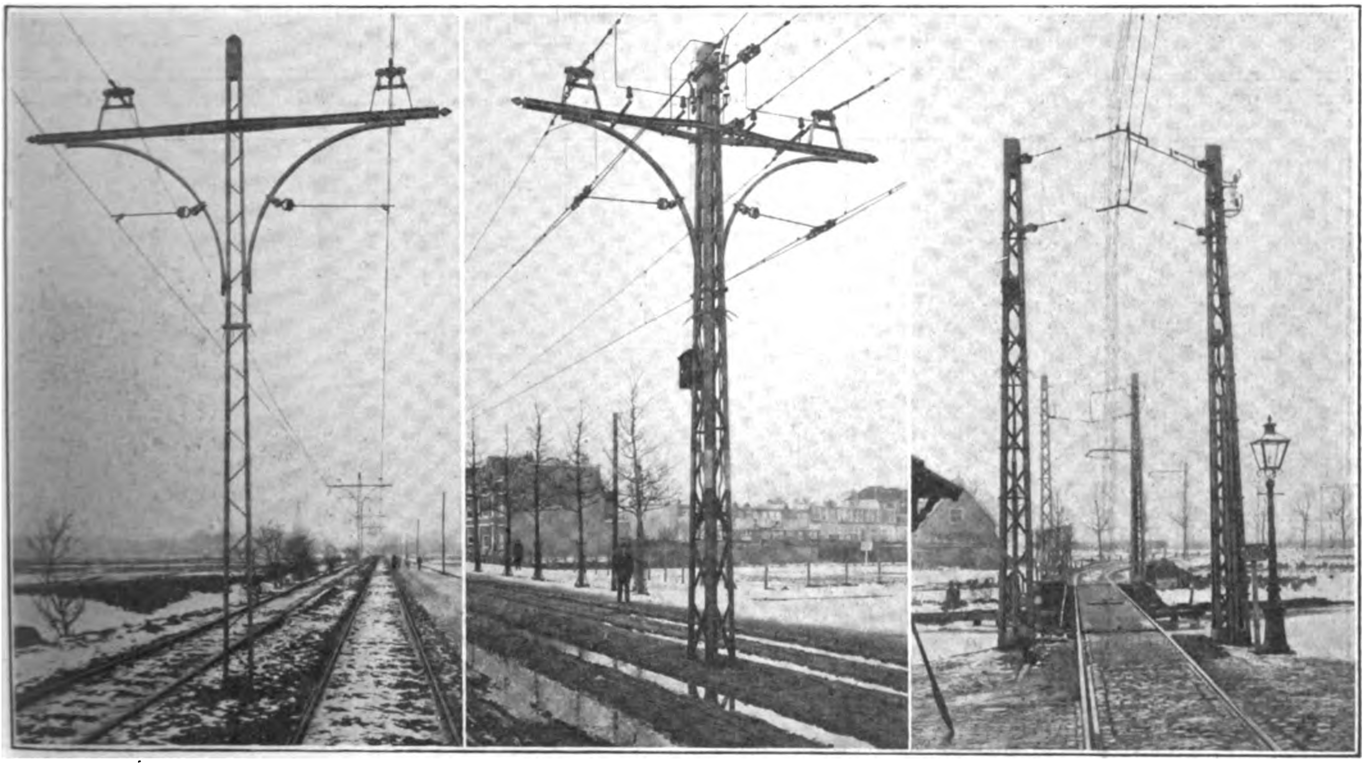
MOTOR CARS

From the views of the standard motor car on page 145 it will be seen that it is mounted on a single truck of plate frame design and supported on each side by means of four semi-elliptic springs. The monitor roof has been eliminated in favor of a flat-arch roof with ventilators. The car body has an open central platform which leads to the two passenger compartments by means of sliding doors. This central passage has standing room for six passengers, the smokers' compartment seats eleven passengers and the non-smokers' compartment fourteen passengers. The motorman's compartment at one end is large enough to serve also for a baggage room with separate exit as shown. As the car is operated double-ended, a second place for the motorman is provided in one corner of the non-smoking compartment. Air brakes are used for regular operation, but hand and short-circuiting brakes are available for emergencies. Current collection is by means of a single pantograph, which is controlled directly by the motorman.

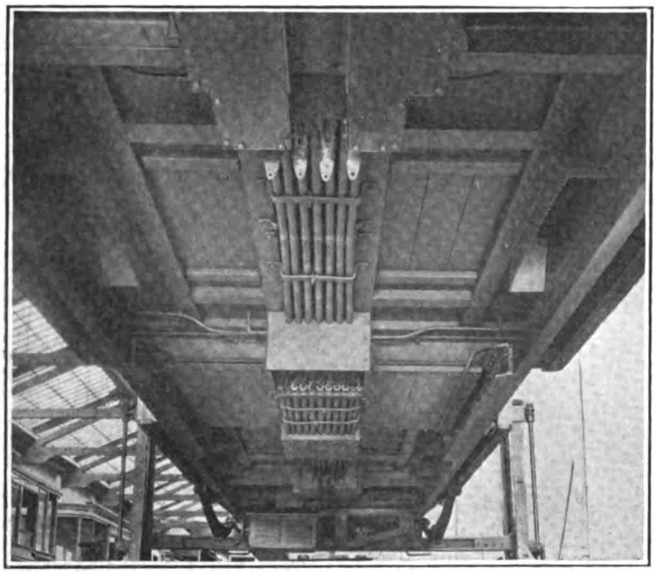
Each car is equipped with two 90-hp commutating-pole motors, mounted one on each axle. An interesting constructional feature of these motors is the use of a single-piece frame, as the builder believed that the motors would not require overhauling except at very rare intervals, particularly on account of the commutating-pole design and the ample dimensions and liberal insulation of the commutator housing. The motors are operated from the usual form of street car controller, although they are wound for field control whether connected in series or parallel. However, the shunt resistors for the weakening of the fields are brought into circuit by means of contactors. As indicated in



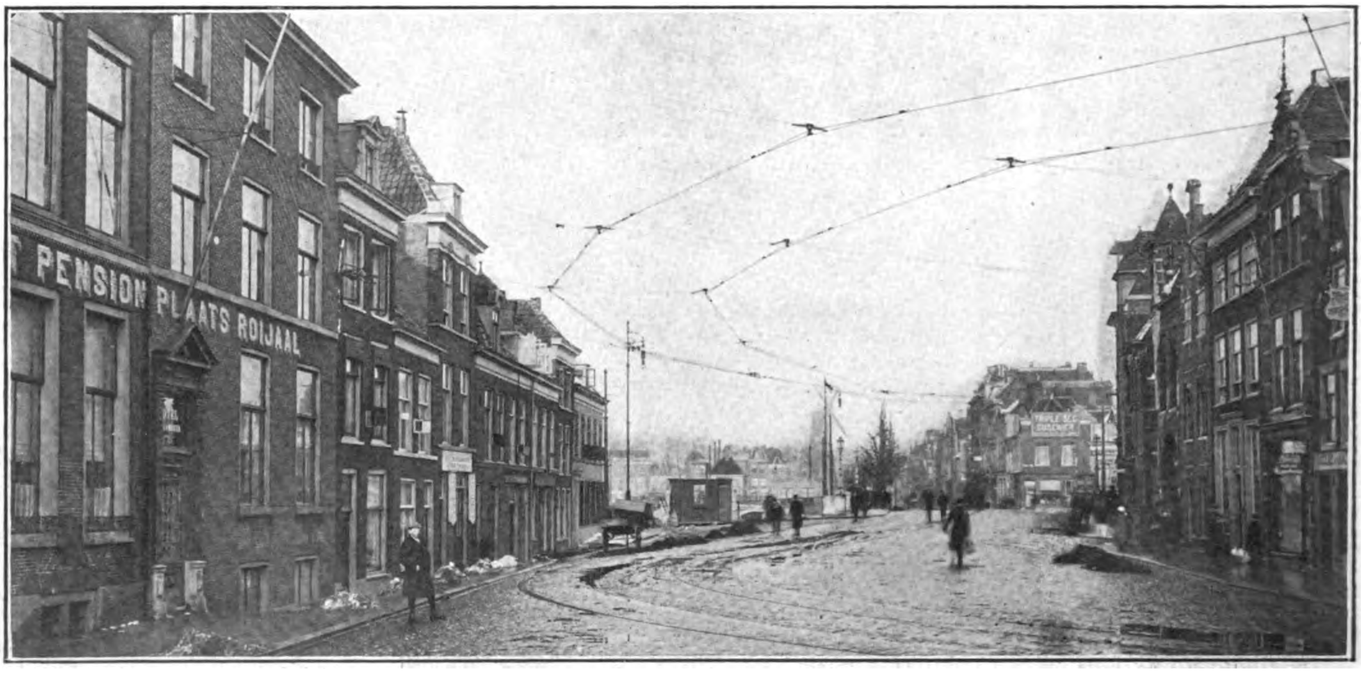
Leyden-Katwyk-Noordwyk Railway—Channel Beam Span Construction Over Three Tracks at a Station



Leyden-Katwyk-Noordwyk Railway—Center Pole Construction on Right-of-Way, Section Break and Line Interruption at a Drawbridge the wiring diagram on this page, the cutting in of the contactors is accomplished by the momentary controller contact *x*, just before the shunt connections are made. However, the control current for maintaining contactors *h*-1 and *h*-2 in circuit is not held by the controller, the contact *b*-2 being locked to contactor *h*-2. If the main current to the motors is broken, as, for instance, in passing a section insulator, the contactors do not close upon the re-energizing of the circuit and the shunt connection to the field winding of the motors is not restored. Therefore, unlike the cutting in of a shunted motor, no short-circuit across the commutator is possible. The weakened field is restored merely by reversing the controller handle to the point where the contact *x* can be closed momentarily, thus permitting contactors *h*-1 and *h*-2 to get into circuit again. The field is weakened one step when the motors are in series and two steps when the motors are in parallel.



Leyden-Katwyk-Noordwyk Railway — Steel Conduits of Motor Cars

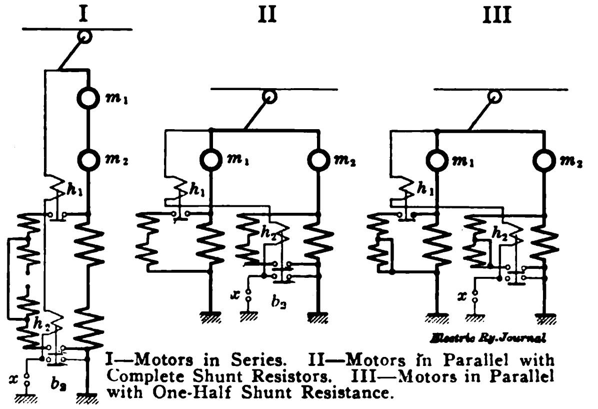


Leyden-Katwyk-Noordwyk Railway—Span Suspension on a Curve in Leyden, Showing Also the Protective By-Pass for Trolley Wire at the Hanger

The automatic circuit breaker and the fuses are secured to an insulated metal plate on the roof of the car. All wiring is carried in steel conduit. Twenty-one tantalum lamps, divided into three circuits, are used for the illumination of the car, car signs and signal lamps.

OVERHEAD CONSTRUCTION

The overhead construction on the interurban sections is carried by latticed poles, which are set about 200 ft. apart. Ordinarily these poles are furnished with channel-iron brackets set back to back as shown in one of the accompanying illustrations. One line is carried from each side of the pole. At the Rynsburg station and the Katwyk yards the overhead line is carried from light channel beam spans.



I—Motors in Series. II—Motors in Parallel with Complete Shunt Resistors. III—Motors in Parallel with One-Half Shunt Resistance.

Leyden-Katwyk-Noordwyk Railway—Changes in Motor Construction for Field Control

The line construction on the interurban section is of plain catenary type with a maximum distance of 39 ft. between the hangers. The contact wire is of hard copper of 80 sq. mm (approximately No. 000 B. & S.) cross-section and is zigzagged in the usual manner in order to equalize the wear due to the bow collector. The average height of the contact wire is 19 ft. 8 in. above the tops of the rails. On single-track sections it is customary to attach the idle contact wire directly to the contact wire by means of short vertical clips, so that this part of the construction resembles the copper-steel combination of the New York, New

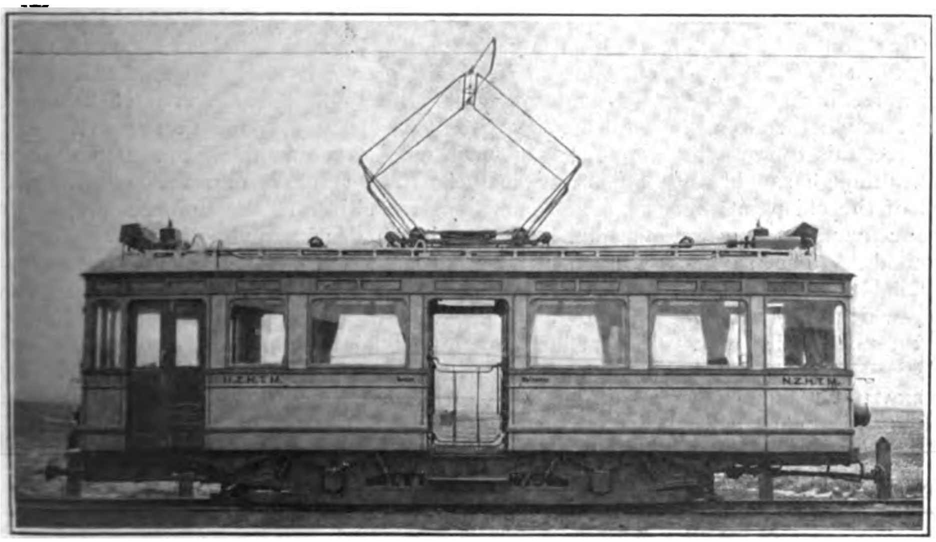
Haven & Hartford Railroad. An example of this kind is illustrated on page 142.

The catenary is of bronze, 50 sq. mm (approximately No. 0 B. & S.) cross-section. It serves also as a feeder. The hangers are of copper. Owing to the proximity of the sea, it was found desirable to use copper or tough bronze for all auxiliary wires and cables. Double porcelain insulation is the standard construction on all of the interurban sections.

In Leyden the wires are usually carried from tubular poles, although in some instances rosettes are attached to the houses. While the ordinary form of single-wire suspension is used in that city and other built-up sections, protection against the high voltage is insured by using double insulation of vulcanite for all suspension points and grooved porcelain insulators for the span wires. One of the accompanying illustrations of a non-catenary section shows that at all span hangers the trolley wire is connected to an auxiliary or by-pass wire which is carried along the insulators for a foot or more on each side. Hence the entire span will not come down if the contact wire breaks at the suspension points. This construction has been used elsewhere in Europe in connection with plain 500-volt suspensions, and in some cases it is made compulsory by municipal regulation. The insulation at all dead ends in city construction also consists of double vulcanite insulation and one porcelain insulator in series.

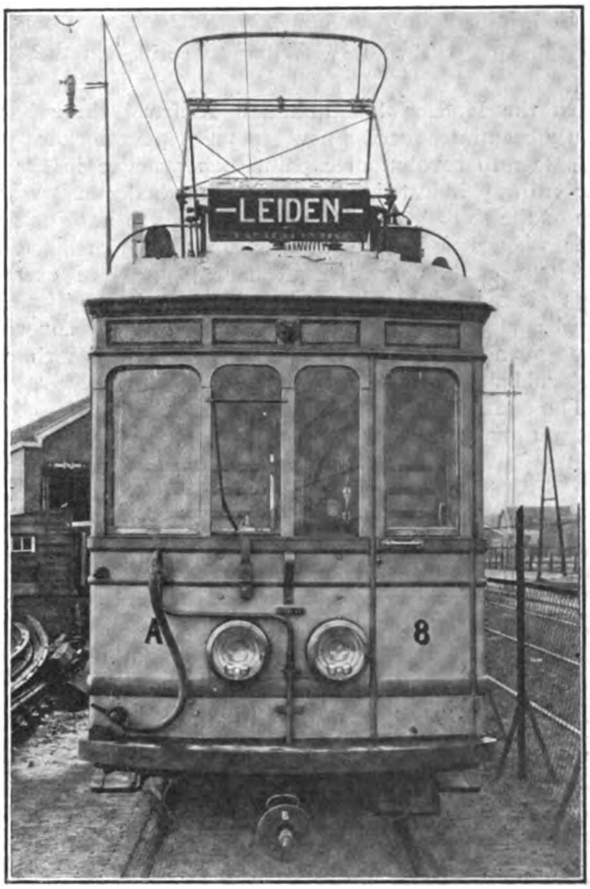
The city and interurban sections are isolated by means of section breakers, but can be connected by means of horn switches. Additional section insulators are used for the electrical separation of the contact wires on two-track divisions so that one track may be kept in service in case the other one is not available. Furthermore, all village sections may be cut out and the crossings over steam railroads can also be made dead when desired. In general, the anchorages or dead ends of the line coincide with the positions of the section insulators. Tension take-up devices are installed at intervals of 1000 ft.

The use of the catenary as a feeder made it undesirable to interrupt its conductivity by attaching insulated tension take-up devices. To avoid this, a short loop of the catenary wire was formed between two clamps at each saddle or suspension point, whereby the catenary becomes self-adjusting. Short anchored connections are attached to the loop clamps to prevent possible injury to the catenary from the side sway of the entire overhead line. The contact line is protected at intervals of 3280 ft. by horn-type lightning arresters. Further protection against lightning is provided at Rynsburg, where each of the three divisions has a separate protection equipment.



Leyden-Katwyk-Noordwyk Railway—Center-Entrance, Single-Truck Motor Car

The feeder system consists of two outgoing cables from Leyden to the city line and two other feeders for the interurban sections. The latter may be interrupted at a switchboard in the Leyden railway station and also at the Rynsburg carhouse, where they feed directly to the overhead line of each branch. The Rynsburg-Katwyk, Rynsburg-Leyden and Rynsburg-Noordwyk divisions can thus be fed separately. The Leyden line has one return feeder and the interurban section has two. On account of the high trolley potential, no substations were required.



Leyden-Katwyk-Noordwyk Railway—Motor Car for Through Service

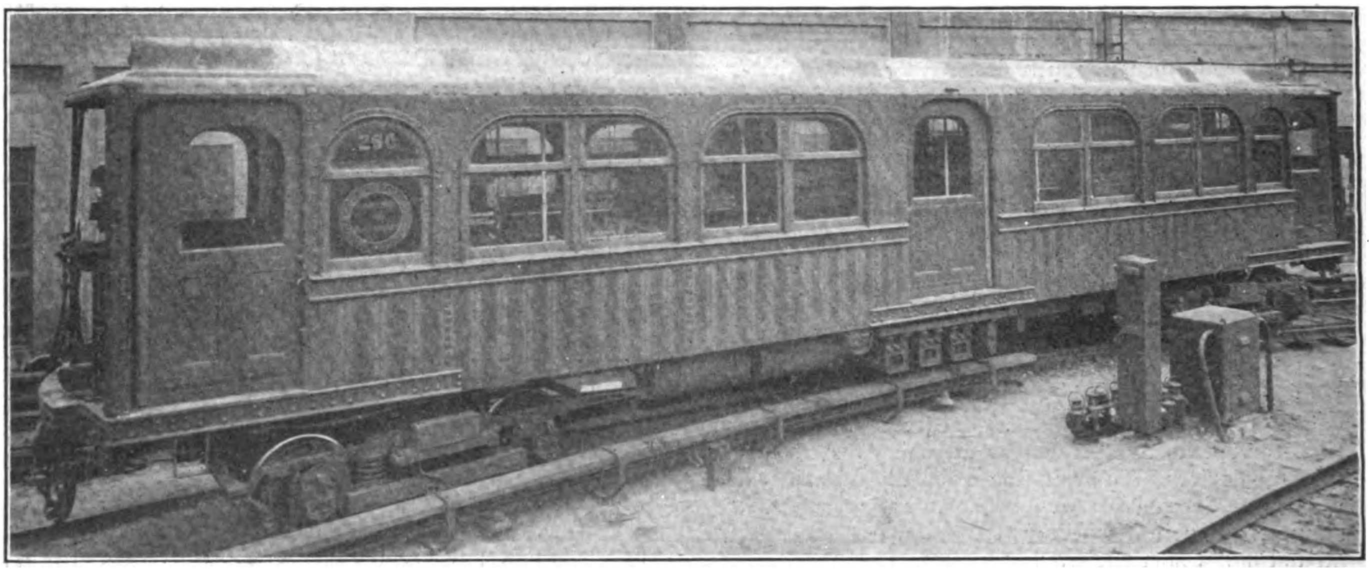
The New England Section of the Electric Vehicle Association of America and the Electric Motor Car Club of Boston held a joint meeting at Boston on Jan. 10. Arthur Williams pointed out that there are now about 30,000 electric vehicles in use in the United States, 6000 electric pleasure cars and 4000 commercial machines having been manufactured in 1912. The early machines, which date back about twenty years, were clumsy, expensive and not always dependable, the batteries being heavy and useful only for short-distance service, besides requiring expert handling. In spite of these difficulties several models built in 1899 are still giving good service, as is a truck in Philadelphia which was built in 1893.

Baked Enamel Painting on the Cars of the Hudson & Manhattan Railroad

A Description of a Revolutionary Method of Car Painting by Which Cars Can Be Put Through the Paint Shop in Two Days Without Sacrifice in the Appearance or Durability of the Protective Covering

On the Hudson & Manhattan Railroad there has recently been introduced a new system of painting cars which bids fair to revolutionize paint-shop practice in the electric railway industry. Briefly, the method consists in the use of the so-called "baking enamel," which hardens within a few hours under the influence of a mild artificial heat. By its use a finish of great hardness and of extremely high gloss is obtained, so that the appearance of the finished surface is not only equal but in general superior to that given by the best grades of air-drying coach colors and rubbing varnishes.

The most important feature of the process lies in the extraordinary rapidity of the work. The baking on of a coat of enamel, instead of taking one or two days for drying as required by air-drying paints, is completed in about three hours. The four coats used on the Hudson & Manhattan cars therefore involve a loss of but twelve hours' time, and, with a liberal allowance of time for application, it becomes easily possible to get a car through the shop in two days. With a sufficiently large force, this time might even be made to include cleaning off, although should an extra day be allowed for the removal of the old paint the cars need be held hardly more than one-fourth as long as they would be under standard methods. The saving through the increase in equipment available for service is obvious. In fact, the coat of varnish which is given annually to surface cars could by this means be applied practically between rush hours.



Hudson & Manhattan Painting—Exterior View of Car, Showing Ventilators Covered with Paper Pasted to the Roof

DEVELOPMENT OF BAKING ENAMELS

As understood in the varnish-manufacturing industry the term enamel applies to that class of covering composed of pigment ground in varnish, just as the term paint is applied to pigment ground in linseed oil. In this application the material is in no respect similar to the enamel which is applied to metal by fusing and is used in that manner as a permanent protective covering for metals, as in the case of the sanitary white-enameled hand-holds recently introduced for use on surface cars. The latter class of enamel is in effect a glass which is fusible at low temperature. It is usually applied by sprinkling the material in the form of powder over the surface to be covered and then subjecting the metal to a gentle heat, just sufficient to fuse the powdered enamel into a homogeneous covering.

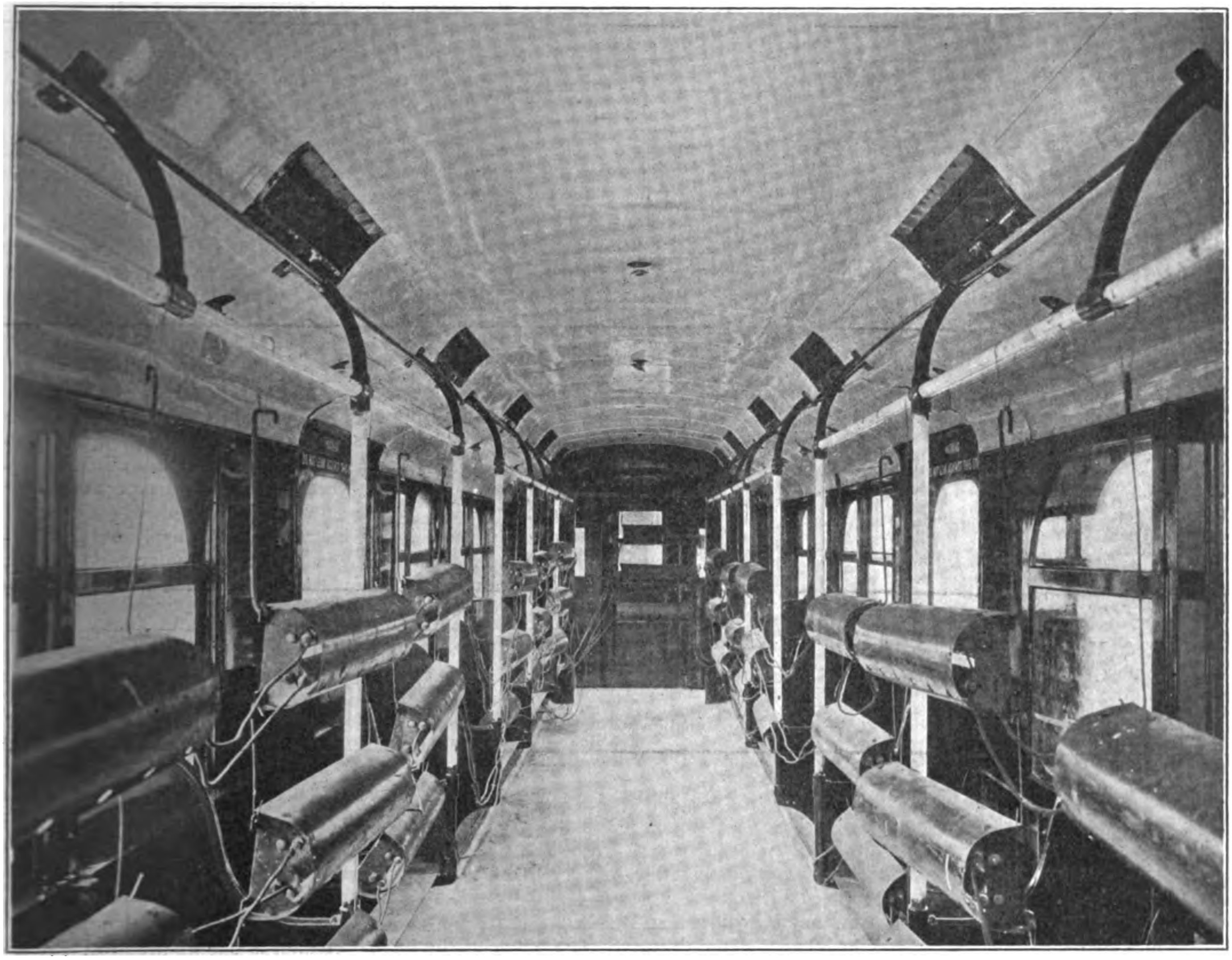
In the case of varnish makers' enamel no fusing of any description takes place. The action of hardening after application is produced by the evaporation of the turpentine, or "thinner," and by the oxidation of the oils used in the enamel exactly as in the case of paint, except that with enamels the hardening action is assisted by the fossil gum content. Baking enamels differ from air-drying enamels only in the details of treatment. They are made from the same gums, the same oils and the same classes of pigments; but because they are artificially dried at a rapid rate considerably more leeway is permitted in the composition, and this in turn permits the use of combinations of ingredients which give a hard, tough surface.

The astonishingly high gloss which is a characteristic of baked enamel is due largely to the fact that it can be applied in a much more freely running condition than the air-drying enamels. The result is that the material when applied is much more subject to the influence of surface tension, and the brush marks and other irregularities smooth themselves out. Carried to a hypothetical extreme, an example of this action would be found in the case of a paint with a consistency equal to that of water. If such a covering could be applied, it would obviously give an absolutely perfect surface. It would, of course, be impossible to leave brush marks in a film of water, and the microscopic irregularities in the wood or metal beneath it would manifestly have no influence on the perfect smoothness of the exterior surface of the film.

All varnishes, in order to be applied, have to be thinned with more or less turpentine. This ingredient is practically inactive and evaporates from the film during the process of drying. In the case of air-drying enamels it is necessary to have an even rate of hardening to avoid the formation of a hard surface film which would delay the drying of the varnish underneath it, and it is also necessary to meet the condition of eliminating the turpentine content by evaporation. In consequence but little turpentine can be added, and the spreading effect, or the thinness of the material during application, is limited. The use of enough turpentine and a sufficiently freely flowing oil varnish to produce extremely easy running and a thin film involves difficulty both by increasing the time of drying and by tending to make a hard surface form while the interior layers of the coat are still soft. With baking enamel, however, the matter of time of drying is unimportant. The high temperature promptly eliminates the surplus turpentine content in practically any amount, and the material can be applied in almost any condition of thinness desired. In practice this is shown by the fact that approximately half as much baking enamel is required to cover a given surface as would be needed if air-drying enamel was used.

Baking enamels were first used commercially on a large scale in the automobile industry. Here the question of output was a serious one from the early days, and the rapidity of the baking process was a great advantage. In the general introduction of the process, however, there was the incidental advantage that, for the first six months at least, the baked enamels were found to possess very much more ability to resist not only the abrasive action of flying dust but also the corrosive action of lubricating oil which might be splashed onto the enameled surfaces of the body. Its use has also been extended to small fittings on cars which could be placed in small kilns, and a number of railways have in fact made use of it in this manner.

About two years ago attention was directed to the application of the baking process to complete cars, and some very extended experiments were undertaken. Some of these proved to be unsatisfactory, possibly because the manufacturers did not realize the vital differences in handling air-drying and baking enamel and offered exactly the same material for baking which they had been furnishing for air-dried coverings. One reason for this is that since the priming coat is required to stand two or three heats in addition to its original drying heat it should be capable of becoming perfectly hard; in other words, it should take its permanent set before the other coats are applied, and this condition does not obtain with air-drying enamels.



Hudson & Manhattan Painting—View of Interior of Car After Completion of Baking Process, Showing Electric Heaters Hung from the Hand Rods

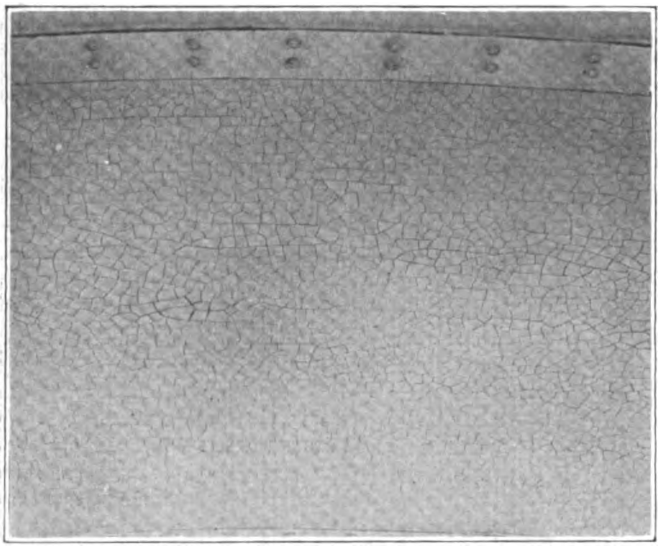
METHODS OF APPLICATION

In general, however, three successful methods of baking have been developed for use with railway cars. These are to bake the primer and first enamel coat at a moderate temperature and to air-dry the subsequent varnish coats, to bake the whole car inside and out for all four coats through the use of a kiln of sufficient size to inclose the car and to bake the interior only by sealing the car and introducing electric heaters.

The latter method is the first to be adopted as standard on any railway and is the one which is described in this article. It has been developed by P. V. C. See, superintendent of car equipment Hudson & Manhattan Railroad.

On this line the cars are operated in a subway practically all of the time. For this reason the question of exterior appearance is immaterial, and the exterior painting is done only to keep the steel bodies from rusting. However, the interiors of the cars are carefully finished in white and green, the ceiling being a high-gloss white enamel to give the cars the clean and cheerful effect so desirable in tunnel service. In fact, the bright surface acts as a mirror, reflecting and diffusing the light so that the general illumination of the car is better than could be produced with brighter lights and a dark background.

The company has had considerable difficulty trying to find an enamel suitable for this work. Enamels that would stay white in the artificial light displayed a tendency to flake off and crack on account of the rapid changes in the temperature when the cars were taken from the open storage yard and run into the tunnel, as this remains at a constant temperature of 65 deg. regardless of climatic changes. On the other hand, white enamels that would stand these rapid expansions and contractions without checking had a tendency to turn yellow under the continual artificial light.



Hudson & Manhattan Painting—Typical Ceiling, Showing Cracks in Old Air-Drying Enamel

In the search for a remedy to overcome this difficulty Mr. See noticed that the steel doors, which had been purchased complete and painted separately from the cars and not from the same manufacturer, did not deteriorate in appearance. Although the air-dried enamel on the vestibule sides alongside of the doors became discolored and cracked, the doors themselves retained their color almost indefinitely. An investigation brought out the fact that the doors had been baked in a kiln, and the result was, naturally, a trial of baking enamel.

An extensive test was made with small panels to find out whether baking enamels could be made to flow smoothly on the under surface of the metal when in a horizontal position. After this was completed the panels were placed in a light-proof box which was then given to the shop fireman with instructions to put it near the boiler for two hours and then put it out of doors for two hours. These rapid temperature changes were kept up for over a month, in the middle of winter. When the panels were removed from the box they were all found to be either darkened to a yellow or brown or else were more or less cracked. The test was carried still further by bending each piece through 180 deg. until the edges met. Although none of the panels came out of this very severe test in very good shape, it was definitely shown that the baking enamels were far superior to those of the air-drying type.

Experiments were then made to find out what temperatures could be secured in a car without damage to the electric wiring, and it was demonstrated that 200 deg. Fahr. was not injurious. By suspending three extra equipments of electric car heaters from the hand rods this temperature was easily maintained, the consumption of power being at the rate of about 50 kw.

Three manufacturers have supplied enamels to the Hudson & Manhattan Railroad that have produced excellent results, but about the most thorough and comprehensive system which was tried was that of Flood & Conklin, of Newark. The details of this system of application are as follows:

After cleaning, the car is first heated to 200 deg. and allowed to remain at this temperature for one hour, as heating the clean surface before the application of the priming coat has been found by the manufacturers to be necessary to drive off moisture and to equalize as far as possible the injurious action of surface expansion and contraction.

After this the heat is shut off and the car is cooled down to about 115 deg., the priming coat being applied while the metal is hotter than the surrounding air to prevent condensation on the metal. The temperature is then raised again to 200 deg. and the enamel baked for three hours. The second and third coats are baked at 140 deg. for three hours and the last coat at 130 deg. for three hours. The first coat is the only one that is applied under heat, the others being applied with the air in the car cooled to about 70 deg.

In case the temperature of 200 deg. specified as necessary for baking on the priming coat cannot be obtained either through lack of facilities for heating or through other unusual conditions it is possible to obtain satisfactory results by baking the first coat at 165 deg. temperature for four hours.

The condensed list of instructions for applying the different coats issued for use in the paint shop on the Hudson & Manhattan Railroad is as shown in the accompanying table:

INSTRUCTIONS FOR APPLICATION OF BAKING ENAMEL

	Deg.	Hours
GREEN BAKING ENAMEL		
No. 1 brown metal primer	200	3
No. 2 green baking enamel	140	3
No. 3 green baking enamel	140	3
No. 4 clear baking varnish	130	3
WHITE BAKING ENAMEL		
No. 1 metal priming enamel	200	3
No. 2 flat white	140	3
No. 3 high-gloss baking enamel	140	3
No. 4 high-gloss baking enamel	130	3

NOTE.—After cleaning car thoroughly, heat car 200 deg., put heat down to from about 110 deg. to 115 deg. and apply priming coat. Sand between all coats. All coats after priming coat applied at ordinary painting temperature, 70 deg. to 80 deg.

The preparation of the surface of the metal before the application of the baking enamel is one of the most important features of the process. On the Hudson & Manhattan Railroad it has been found that the most satisfactory results are obtained by scraping off the old enamel by hand to remove the bulk of the covering. The surface is then gone over with a standard form of varnish remover carefully applied so that all of the old enamel is removed from the pores of the metal surface. This procedure leaves a surface which is absolutely free from paint, but in order to remove every trace of the varnish remover the surface is carefully rubbed again with waste and gasoline, thus freeing the pores of the metal from any foreign material which might serve as starting points for flaws in the paint film.

The heating of the metal prior to the application of the priming coat and the method of applying the priming coat at the high temperature of about 110 deg. are also important features necessary to assure permanency for the coats of enamel. It will be noticed from the preceding instructions for application that each coat following the primer is put on at a lower temperature so that no possibility exists for renewed chemical action in the priming coat after it has been covered by the enamels.

As shown by the accompanying illustration, the high temperatures are obtained by hanging three equipments of electric heaters inside of the car, the temperature being controlled by a man who watches a thermometer inside of the car through one of the windows, the current being turned on and off from the heaters in accordance with the changes in temperature. The doors and windows are, of course, closed tight and all ventilators are covered with several thicknesses of newspaper pasted to the roof surface by layers of tar. This is shown in the illustration of the exterior of the car.

COSTS

The cost of application may be said in general to be about equal to that of high-grade painting. It is, however, impossible to make use of cheap materials with the baking process nor is it desirable to have the enamel applied carelessly. The results are, however, superior in general to those obtained with the best grade of air-dried enamels, for, as has been previously mentioned, the surface of the baking enamel is very much harder and more flexible than it is in a case of air-dried material.

On the Hudson & Manhattan Railroad the cost of application of a car interior is shown in the accompanying table.

Cost of Baking Enamel on Hudson & Manhattan Railroad.

WHITE WORK	Material	Labor
Heat at 0.6 cent per kw-hr		$3.60
Connecting heaters		1.00
Removing paint from ceiling		7.00
First ceiling coat, 1½ qts	$1.38	1.25
Sanding same		0.75
Second ceiling coat, 1½ qts	1.38	1.25
Sanding same		0.60
Third ceiling coat, 2 qts	1.84	1.35
Fourth ceiling coat, 2 qts	1.84	1.35
	$6.44	$18.15
GREEN WORK		
Removing paint from sides		$15.00
First coat green, 2½ qts	$2.30	1.75
Sanding		0.80
Second coat green, 2 qts	1.84	1.80
Sanding		1.50
Third coat green, 4 qts	3.70	1.75
Sanding third coat		0.75
Fourth coat, 2½ qts	2.30	2.00
	$10.14	$25.35

These costs apply to a car 41 ft. long between bulkheads, 8 ft. 10 in. wide over the sills, the roof being of the monitor-deck type with ventilators spaced between alternate carlines. The cost of material for baking enamel in general appears to be about one-half of that for air-drying enamel. This is due to the fact that the baking enamel covers about twice as much surface with a given volume as air-drying enamel, the costs of the two per gallon being the same. On the Hudson & Manhattan Railroad the ceiling of the car has an area of approximately 400 sq. ft. and it has been found through considerable experience that approximately 1 gal. of air-dried enamel is required for each white ceiling coat. When baking enamel is used, however, as will be seen by referring to the list of material given in the statement of costs, only 1¾ quarts of enamel is used for the average white ceiling. As the costs of the two classes of enamel are exactly the same, this makes the baking enamel, at least for white coverings, equal to about half of that for the air-dried material.

APPLICATION TO WOODEN CARS

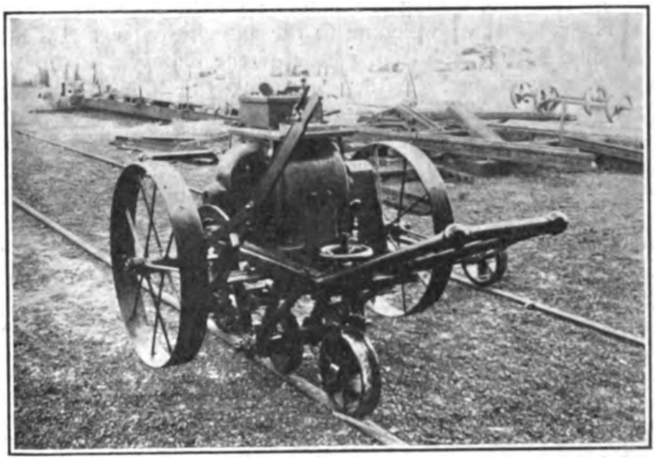
While the use of baking enamel on the Hudson & Manhattan Railroad applies only to all-steel cars, since that company operates no wooden cars of any description, it has been demonstrated in the automobile industry that baking enamel can be applied to wood with perfect satisfaction and without injury to the wood. In fact, on the Hudson & Manhattan cars the wooden sashes are treated exactly as if they were made of steel, except that the old paint, having become thoroughly hardened, is not removed before the application of the new enamel.

In applying the enamel to new or cleaned wooden cars, it is only necessary to use an oil primer to fill the pores of the wood and provide a proper surface for the enamel coats. It is possible, as has been proved by experiment, to apply the enamel to clean wood with only three coats, the oil primer being considered as the first coat, and yet produce a satisfactorily smooth white surface. In the case of an old wooden car upon which the paint had become thoroughly dry and hard with age it would be quite practicable to apply baking enamel over the old paint after a thorough rubbing down.

The removal of baking enamel may be effected with any varnish remover capable of removing air-drying enamels. The surface is, however, harder, and for that reason the varnish remover has to be applied with more care as the chemical reaction takes a longer time to do its work. Standard removers will, however, serve for the purpose of removal in a commercially practical manner.

PORTABLE RAIL GRINDERS USED BY THE OMAHA & COUNCIL BLUFFS RAILWAY

The engineering department of the Omaha & Council Bluffs Street Railway has built a portable rail grinder of novel design. Heretofore all joints on both new and old track have been ground by hand. The portable grinder, as shown in the illustration, is provided with two sets of wheels, three for use on the track and two when it is desired to wheel it about on the pavement. Either set of wheels may be put in service by releasing the dog and shifting the large lever beside the motor from front to back or the reverse. Two of the wheels for use on the track may be easily detached, thus reducing the weight of the device and permitting it to be moved about a paved street with less effort.



Omaha & Council Bluffs Portable Rail Grinder

The grinding mechanism includes a 5-hp motor, which the company considers too large but which was available for this purpose, a rheostat and a single-pole knife switch. The motor is connected to the 2-in. x 10-in. emery wheel by a set of sprockets and chain, which also serve to reduce the motor speed at the grinding tool. Energy is supplied to the motor through a flexible cable and pole connection to the trolley wire. The depth of the cut may be adjusted by a hand wheel and screw, the lower end of which forms the fork carrying the permanently attached wheel used in moving the grinder along the track. The grinder is operated by two men who push it back and forth over the work. One man, however, has complete control of the machine and regulates the cutting and the speed of the motor. It has been successfully operated on track where a three-minute headway is maintained, as only forty seconds is required for two men to remove it to clear a car.

American Wood Preservers' Convention

Abstracts Are Given of the Four Papers Presented at This Meeting of Most Interest to Electric Railway Companies—An Account Is Also Published of the Proceedings on the First Day

The ninth annual convention of the American Wood Preservers' Association was held at the Hotel Sherman, Chicago, Jan. 21 to 23, inclusive. The Tuesday morning session opened with E. A. Sterling, forest and timber engineer, Philadelphia, Pa., presiding and about seventy-five members in attendance. It was confined largely to matters of interest to the association. Following the roll call and reading of the minutes Professor Sterling made his annual address to the association. After complimenting the members on their hearty co-operation during the past year he called their attention to the fact that the association had grown from about 100 members in 1912 to over 150 this year. He also said that the ways and means committee of the House of Representatives was considering a 10 per cent import duty on creosote. He recommended that the association draft a resolution which could be presented to the ways and means committee offering objections to the proposed duty on creosote and presenting arguments showing the effects of the proposed increase on forest conservation.

Following the president's address, the secretary and treasurer, F. A. Angier, superintendent timber preservation Baltimore & Ohio Railroad Company, Baltimore, Md., presented his annual report. He also read a communication inviting the association to hold its annual convention in 1915 at San Francisco, during the Panama Pacific Exposition.

The address of welcome to the association was made by Bolling Arthur Johnson, editor of the *Lumber World Review*, of Chicago. After discussing the lumber trade in general and calling attention to its close relation to the wood-preserving industry, he said that the business had shown a wonderful growth but the industry had not improved materially in its methods. He thought that this was probably due to the fact that the lumber industry had not concentrated its interests in a single association, for a large number of associations existed in this country. He also said that it was probably due to a failure to give proper publicity to the work of the association. Concluding, he urged the spirit of publicity upon the association and said that co-operation and not competition was the life of trade.

The Tuesday afternoon session of the association opened with E. A. Sterling's paper on the production and supply of coal-tar creosote. As this subject was handled in a masterly way it left little room for discussion.

The next paper was that by H. F. Weiss, assistant director forest products laboratory, Madison, Wis. In commenting on his own paper Mr. Weiss said that the increasing shortage of hard wood for timber preservation purposes makes it absolutely necessary that the longest possible life be obtained from the timber employed at this time. As Mr. Weiss' paper was written with a view to starting discussion on the various subjects handled, several of the members had prepared written discussions which were then presented.

E. B. Fulk, chemist American Creosoting Company, Chicago, discussed several of the points presented, particularly in relation to the creosote preservation method. He took exception to Mr. Weiss' statement as to the toxicity of creosote when compared with zinc chloride. He said that his experience was that one-eighth of 1 per cent of creosote prevented the growth of certain fungi which zinc chloride retarded only after 1 per cent had been used. He said that the toxic value in both preservatives was high, and he did not want it understood that zinc chloride was better than creosote in all cases. The next point discussed was that of permanency of the preservative in the timber. He said that Mr. Weiss' comment on this seemed to indicate that evaporation would continue until all creosote disappeared. He said this was not true, as the oldest examples of creosoted timber showed that plenty of it still remained in the wood. The rate of evaporation depends largely on the surrounding medium. It accelerates with surface exposure, and then only the more volatile constituents evaporate. If one attempted to remove these constituents from the solution up to a certain point, the cost of the preservative would be increased so that it would be prohibitive.

As to the mixing of refined tar with the creosote solutions, Mr. Fulk said it was not added as an adulterant but to reduce evaporation from the treated stick of timber. This evaporation takes place in timber in service over the outside and ½ in. deep. The addition of tar to the preservative coats this exterior surface and prevents evaporation. He also said that tar itself was a preservative in that it was toxic, but not to so great a degree as creosote, as creosote was a concentrated solution of the toxic properties of the tar.

Following this discussion, W. F. Goltra, president W. F. Goltra Tie Company, Cleveland, Ohio, discussed the probable reasons for the increase in the use of creosoted timber and the apparent standstill in the quantity of zinc-chloride-treated timber used. He said that he agreed with Mr. Weiss as to the relative merits of the preservatives as regards toxic properties; that is, zinc first, creosote next and petroleum products and crude oil last. He said that the quantity of material treated with any preservative was no criterion as to its ability to preserve timber. In explaining the great increase in the quantity of creosoted timber used, he said that prior to 1905 zinc chloride was practically the only preservative for timber used in this country. At about that time several large steam roads made ten-year contracts with a creosoting concern, based on information they had obtained from foreign countries. Following the closing of these large contracts other steam roads fell in line, and consequently those companies which had not been convinced as to the preservative qualities of zinc chloride did not attempt to compare it with creosote but took the decision of the larger roads for granted. He said he did not believe that the preservative which possessed toxic properties was necessarily the best preservative. The primary requirement was to prevent decay but not to destroy the fungi. Any antiseptic which will prevent decay would make a good preservative. In summing up the situation he said, after all, it resolved itself into a question of cost of the timber or tie in the track. He did not believe we had been able to obtain as long life in this country as was the case in Europe, because the European method of treating was more thorough than ours. In his judgment, which he based on curves showing the average life of all treated timbers, about the same life could be obtained from zinc chloride as from creosote treatment, namely, ten to twelve years.

Continuing the discussion, F. S. Pooler, of the Chicago, Milwaukee & St. Paul Railroad, said that he was not interested so much in how long a life the treated timber would give as in obtaining a preservative which would give a life as long as the mechanical life of the timber in service. From his present experience he said that treated ties were not being removed because of decay but because they shattered and split in the track. The long life of ties obtained by the French, he said, was due to the extreme amount of care exercised in protecting the treated tie against mechanical wear.

J. H. Waterman, superintendent timber preservation Chicago, Burlington & Quincy Railroad, Galesburg, Ill., said that in 1900 his road had treated 550 red-oak ties with zinc chloride for test purposes. These were laid in track in Colorado under heavy traffic, and it was necessary to remove only eighteen on account of decay at the end of twelve years. He said he had also treated yellow-pine ties in the same way in 1900 and placed them in main line track in the Black Hills. Traffic at this point was exceedingly heavy, but at the end of twelve years it was necessary to remove only 3 per cent. The pine ties were installed with tie plates only on the curves, but the oak ties were plated throughout. In reply to a question, he said that these ties were treated with 1/3 lb. of zinc chloride per cubic foot.

In rebuttal, Mr. Weiss explained the position he had taken on a number of points. As to the relative toxic properties of creosote and zinc chloride, he said that his test was based on the fungus most common in decaying ties. The vitality in the different species of fungi varies, however, and this probably would account for the difference found by Mr. Fulk. In explaining his reason for objecting to tar in creosote, he said that its introduction into creosote was new, and it was well to try it out, but so far as he was concerned he had no data on which to base an opinion. He did say, however, that he believed that the tar would prevent penetration and at the same time leave a surface undesirable for workmen to handle.

As a further comment on the question of the relative merits of the two preservatives from the corrosion standpoint, Mr. Angier, of the Baltimore & Ohio Railroad, said that he had made a test at Sheridan, Wyo. He said that he had treated a certain number of ties with zinc chloride, another lot with water, and a third lot were not treated at all. After seven years in service the spikes, which had been carefully measured at the beginning of the test, were taken out and again measured. It was found that the spikes in the untreated tie showed 1/24 in. corrosion, those in the tie treated with water 1/28 in. and those in that treated with zinc chloride 1/20 in.

Following this discussion, L. B. Shipley, of the Barrett Manufacturing Company, presented his paper on "Notes on Analyses in Testing of Coal-Tar Creosote." This paper dealt with experimental work on the following subjects: distillation tests of oils, comparative volatility of oils and extraction of oils from treated wood. Following considerable discussion of this paper, the meeting adjourned until Wednesday morning.

A COMPARISON OF ZINC CHLORIDE WITH COAL-TAR CREOSOTE FOR PRESERVING CROSS-TIES

BY HOWARD F. WEISS, ASSISTANT DIRECTOR FOREST PRODUCTS LABORATORY, MADISON, WIS.

Although a great many preservatives have been tested to preserve cross-ties, zinc chloride and coal-tar creosote are now by far the ones most extensively used in the United States. The author has frequently been called upon to compare these two preservatives. This paper aims to present the information which has thus been collected and to invite discussion. Please note, however, that only cross-ties are considered, and the data which follow should not be thought to apply to poles, piling or other products.

According to statistics gathered by the federal government, the number of cross-ties treated with zinc chloride in the United States shows no increase in the past four years, while the number treated with creosote has increased rapidly. (See Table I.)

This in itself might be looked upon as an answer to the query, "Which is the better of the two?" But after a careful investigation it appears that this question cannot be so easily dismissed.

The factors which I have considered in comparing the two preservatives under discussion may be grouped as follows:

(1) The toxicity of the preservative—namely, its ability to prevent decay.

(2) The ability of the preservative to penetrate the tie.

TABLE I—NUMBER OF TIES TREATED WITH ZINC CHLORIDE AND CREOSOTE IN THE UNITED STATES.

	Year				
Preservative	1907	1908	1909	1910	1911
Zinc chloride	9,864,765	8,640,230	8,051,054	9,195,861	9,445,961
Creosote	5,750,874	9,629,420	9,943,360	14,841,843	16,510,721

(3) The permanency of the preservative in the tie.

(4) The effect of the preservative on the strength of the tie.

(5) The effect of the preservative on the corrosion of spikes and plates, and the operation of block signals.

(6) The financial saving due to the use of the preservative.

Of somewhat lesser importance are:

(7) The uniformity in composition of the preservative and ease of securing it.

(8) The combustibility of the preservative.

(9) The ease of handling the preservative and ties treated with it.

(10) The ease with which the penetration of the preservative can be determined.

TOXICITY OF THE PRESERVATIVE

Zinc chloride relies upon its toxic properties solely to protect ties from decay. Creosote, in addition to this, has a more or less waterproofing effect, which also acts as a protection against decay. According to the toxic tests made by Malenkovic, zinc chloride offered about twice the resistance to fungous attack (penicillium) as coal-tar creosote free from phenol. Tests made at the Forest Products Laboratory showed that ordinary coal-tar creosote had about the same toxicity as zinc chloride, four-tenths of 1 per cent being sufficient in each case to prevent fungous growth (Fomes annosus).

THE ABILITY OF THE PRESERVATIVE TO PENETRATE WOOD DURING TREATMENT

This is a feature of tie preservation which in practice receives too little consideration. All toxicity data show that both zinc chloride and coal-tar creosote are powerful fungicides, and that small quantities of them will inhibit decay. It is good practice, therefore, to diffuse the preservatives thoroughly through the tie so that as many of the wood cells as possible will be poisoned. A tie might contain 10 lb. or 12 lb. of creosote per cubic foot and yet be poorly treated if the oil was not well diffused; in fact, not nearly as well preserved as a tie having only 4 lb. to 5 lb. of the oil per cubic foot, but with the oil uniformly and deeply distributed.

It is well known that water solutions will penetrate wood more easily and thoroughly than oils; for example, in making what are called the "penetrance tests" at the Forest Products Laboratory it took about three minutes to force zinc chloride solutions through 6 in. of hemlock parallel to the grain, while creosote took over thirty minutes. Again, under similar conditions in treating red oak and maple ties we forced about 50 per cent more by volume of zinc chloride into them than we did coal-tar creosote. Any process which aims to impregnate ties with only a certain amount of preservative irrespective of the penetration secured is operated on an incorrect basis, and any specification which will enable ties to be treated in this manner is a poor specification. In treatments with zinc chloride a strong preliminary vacuum should be drawn and the solution admitted to the cylinder without breaking the vacuum, after which pressure should be applied and held to "refusal." The absorption of dry salt can then be controlled by varying the concentration of the solution rather than by varying the amount of solution forced into the ties. Unfortunately, this simple treatment cannot be used with creosote (except with certain resistant ties) because too much oil would be absorbed and the treatment would become too expensive.

THE PERMANENCY OF THE PRESERVATION IN THE TIE

Permanency, as applied to preservation, involves two phenomena: (a) volatilization; (b) leaching.

Zinc chloride under conditions of use is non-volatile. Creosote, on the other hand, evaporates from the tie. The rate at which it evaporates depends on many conditions, such as its composition, method of injection, atmospheric conditions during seasoning, etc.

This objection to creosote has led in some cases to the use of tar as an adulterant, the idea being that such a mixture will withhold in the tie the more volatile constituents of the oil. It is quite probable that tar will do this, but there are strong objections to such practice, and its adoption should take place only after much more convincing data than we now have have been obtained.

Creosote is practically insoluble in water, while zinc chloride is readily soluble. From tests made in the Forest Products Laboratory it appears that certain amounts of zinc chloride cannot be leached out of wood even by very severe soaking. Just how much of the zinc chloride thus remains is not known, but tests on this point are now under way at the laboratory. It is claimed that the leaching of zinc chloride in ties can be retarded by air-seasoning them after treatment or by coating them with an oil, but no conclusive data on either of these claims have been obtained.

EFFECT OF THE PRESERVATIVE ON THE STRENGTH OF THE TIE

With decay largely eliminated from properly preserved ties, and with the tonnage of our roads constantly increasing, the problem of prolonging the life of ties from rail and spike cutting is becoming more and more acute. Obviously, a preservative which will decrease the strength of ties when injected will be subject to serious criticism. Tests made by the Forest Service some six years ago on loblolly pine ties indicate that the presence of zinc chloride did not weaken the wood under static loading but tended to make it brittle under impact, while no decrease in strength was noted for ties treated with creosote. Tests made since then indicate that both preservatives weaken the wood, although, if properly injected, the weakening thus caused is too small to be of practical importance.

THE EFFECT OF THE PRESERVATIVE ON CORROSION OF SPIKES AND PLATES AND THE OPERATION OF BLOCK SIGNALS

Some pieces of flange steel of equal dimensions, weight and quality were immersed, respectively, in coal-tar creosote and a 6 per cent solution of zinc chloride for three weeks and constantly heated at 98 deg. C. At the end of this time the steel in the creosote lost 0.0064 gram, while that in zinc chloride solution lost 1.4636 grams. Of course, this was a very severe test, not comparable to what takes place in the track, but even at atmospheric temperatures the corrosion of steel spikes and plates in contact with zinc-treated ties is probably greater than with creosoted ties. Whether it is of sufficient intensity to be a real detriment is not known to the author. The consensus of opinion among those who claim experience seems to be that if the zinc ties are properly seasoned before placement in the track the corrosion is of no appreciable consequence.

The presence of zinc chloride in wood is very liable to decrease the resistance of the tie to the passage of an electric current. Consequently, if the flow of current is away from the track a marked corrosion of the spikes will occur. This action may, however, take place in untreated ties, especially when wet. Zinc chloride, being deliquescent, tends to keep the ties moist, while creosote tends to waterproof them. Hence deterioration of spikes subject to the passage of electric currents is more likely to take place in ties treated with zinc chloride than in those treated with creosote.

The electrolytic action of zinc chloride and creosote in ties is a subject about which much discussion has occurred, particularly in connection with the operation of automatic block signals. Most accurate tests bearing on this subject were made at Purdue University in 1910. These tests concluded that ties treated with creosote offer greater resistance than those treated with zinc chloride and less resistance than untreated ties, as shown in Table II.

TABLE II—SHOWING EFFECT OF TREATMENTS UPON THE ELECTRICAL RESISTANCE OF TIES

Kind of Wood	How Treated	Ratio of Resistance (Treated to Natural)
Loblolly pine	Full cell process	0.34
Short-leaf pine	Full cell process	0.79
Red oak	Burnett process	0.16

The experiences of several signal engineers are that zinc-treated ties will cause trouble with the block signals if they are placed in the track unseasoned or if the distance between blocks is too long. A shortening of the circuit to about 1000 ft. or 1200 ft. has in many instances remedied these difficulties.

FINANCIAL SAVING DUE TO THE USE OF THE PRESERVATIVES

A discussion of all factors finally simmers down to a discussion of cost. Because of the scarcity of authentic service records generalities must still be used. The numerous test tracks now placed throughout the country will, it is hoped, furnish us with accurate data upon which to base decisions. Quoting from a report of the wood preservation committee of the American Railway Engineering Association:

"Creosoting at present cannot be relied upon to preserve ties more than fifteen and one-half to nineteen years, an absolute maximum, unless the ties are protected against mechanical deterioration. If badly injected they perish from decay in five to twelve years. Burnettizing, when well done, can be relied upon to preserve ties from ten to fourteen years. There are great differences in the thoroughness with which the work can be done."

From the records quoted below we will assume that a tie properly treated with zinc chloride will last, on an average, twelve years, and with creosote seventeen years, which in an untreated condition would last five years. We will assume that the cost of the tie untreated is 45 cents, the cost of creosoting 30 cents, the cost of Burnettizing 15 cents and of placement in the track 15 cents. We then have:

Cost of untreated tie in track, 60 cents.
Cost of Burnettized tie in track, 75 cents.
Cost of creosoted tie in track, 90 cents.
Life of untreated tie in track, five years.
Life of Burnettized tie in track, twelve years.
Life of creosoted tie in track, seventeen years.

From these values, figured at 5 per cent compound interest, we find that:

Annual cost of an untreated tie equals 13.86 cents.
Annual cost of a Burnettized tie equals 8.40 cents.
Annual cost of a creosoted tie equals 8.01 cents.

And if figured without interest:

Annual cost of an untreated tie equals, 12 cents.
Annual cost of a Burnettized tie equals 6.25 cents.
Annual cost of a creosoted tie equals 5.29 cents.

From this it may be deduced that both preservatives are very economical to use in comparison with untreated ties, and that of the two creosote is ultimately slightly cheaper. Under the assumptions here taken zinc-treated ties must last about twelve and one-half years in order to have the same annual charge as creosoted ties, while the creosoted ties must last fifteen and one-half years in order to have the same annual charge as the zinc-treated ties.

UNIFORMITY IN THE COMPOSITION OF THE PRESERVATIVE AND EASE OF SECURING IT

The zinc chloride produced in the United States is, for a commercial product, extremely uniform in its composition and the quality can be readily duplicated and obtained. Creosote, on the other hand, varies considerably in its composition and is not easily secured in satisfactory grades. The American Railway Engineering Association recently drew up three specifications for creosote to be used in tie preservation, and more discussion and argument have taken place over what kind of an oil should be used than have taken place over any other feature of wood preservation.

THE COMBUSTIBILITY OF THE PRESERVATIVE

Zinc chloride is non-inflammable; creosote is inflammable; hence a zinc chloride plant presents a lower fire risk than a creosote plant. Zinc chloride-treated ties can be considered more fire-resistant than untreated ties. When freshly treated creosoted ties are easily ignited, but their resistance to inflammability increases as their seasoning progresses. Inflammability tests gave a temperature of ignition for zinc-treated wood of 287 deg. C., 19 per cent of the wood, by weight, being burned. Freshly creosoted wood tested under the same conditions ignited at 176 deg. C., and 40 per cent of its weight was burned. When, however, it was air-seasoned after treatment for ninety days the temperature of ignition was 216 deg. C. and the loss in weight 27 per cent.

EASE OF HANDLING THE PRESERVATIVE AND TIES TREATED WITH IT

Zinc chloride solutions can be readily handled at much lower temperatures than coal-tar creosote and do not present the many difficulties of heating that accompany the operation of creosote plants; on the other hand, they cause a great plant depreciation, owing to their corrosive action.

Table III—Synopsis of the Comparison of Zinc Chloride with Coal-Tar Creosote for Preserving Ties

Factors Considered	Zinc Chloride	Coal-tar Creosote
Toxicity	Toxic limit about 0.4 per cent.	About same as for zinc chloride
Volatility of preservative in tie	Non-volatile	Volatile
Leachability of preservative	Leaches from wood	Does not leach from wood
Penetrance of preservative	Penetrates easier than creosote	More resistant than zinc chloride
Effect on strength of ties	Produces but little weakening	Weakening of no practical importance
Corrosion of metal	More corrosive than creosote	Corrosive action insignificant
Effect as an electrolyte	Favors current leakage	Much more resistant than zinc chloride
Uniformity of composition	Very uniform	Very variable
Combustibility of treated wood	More resistant than untreated wood	Much more combustible than zinc-treated wood
Ease of handling	Easier than creosote	More difficult than zinc chloride
Ease of testing penetration	More difficult than creosote	Simple
Financial saving due to use	Slightly less than for creosote	Slightly more than for zinc chloride
Cost of treatment	Lower initial cost than creosote (about 15 cents per tie)	Higher initial cost than zinc chloride (about 30 cents per tie)
Ultimate life	Shorter than creosote (about twelve years)	Longer than zinc chloride (about seventeen years)

Trouble has been experienced in getting track men to handle creosoted ties, supposedly on account of their disagreeable nature and their effect on the health of the track men. Such objections can, however, be avoided. There have been no complaints against zinc-treated ties in this connection.

EASE WITH WHICH THE PRESERVATIVE CAN BE TESTED AND ANALYZED IN THE TIE

The presence of creosote in the ties can be detected more readily than the presence of zinc chloride, and as a knowledge of the depth of penetration is highly important, creosoted ties are much easier to examine. A chemical analysis of the treated ties is not feasible for daily use, so that the best method of detecting the depth of penetration in zinc-treated ties is to cut a section and apply chemicals to produce color changes, or to heat the freshly cut section in an oven above the boiling point of water. However, a careful inspection of the treating plant and process is worth as much, if not more, than a critical examination of a few ties.

SUMMARY OF RESULTS

All the factors discussed above are summarized in Table III. Its study will show that there are good grounds for hesitating in the selection of a preservative to be used in treating ties, and that the conditions peculiar to each road, or even parts of the same road, should affect such a decision. No sweeping generality can have much practical significance. The more noteworthy points brought out by this study are at present:

(1) Zinc chloride and coal-tar creosote, when used under normal conditions, are both effective preservatives of cross-ties, and there is little choice between them so far as annual charges are concerned.

(2) Creosoted ties in general cost initially more than Burnettized ties, the cost of treatment being from about two to three times as great.

(3) Creosoted ties last, on an average, longer in the track than Burnettized ties, hence require less frequent renewals and changes in the roadbed.

(4) If creosote advances appreciably in price it will very probably result in stimulating the number of ties treated with zinc chloride.

PRESERVATION OF LUMBER FOR CAR CONSTRUCTION

BY J. H. WATERMAN, SUPERINTENDENT TIMBER PRESERVATION CHICAGO, BURLINGTON & QUINCY RAILROAD

The amount of lumber which it is advisable to treat with creosote for car construction will always be limited, because it is impracticable to paint timber after it has been creosoted. Most roads in this country have a standard color for their cars, and they would not want to change that color to black. But if there is no objection to that color creosoted timber is the ideal, for the cars would be permanently painted, provided the timber was framed before it was treated. So far we have treated only car sills and car decking.

FIR CAR SILLS

To date we have treated a total of twenty-three runs.

We succeeded in getting an average absorption of 11.41 lb. per cubic foot. Other statistics follow:

Board feet treated, 326,204; average steam pressure, 15 lb.; average time steam, 2 hours 23 minutes; average initial vacuum, 23 in.; average initial vacuum held, 1 hour 37 minutes; average solution pressure, 175 lb.; average solution pressure held, 17 hours 26 minutes; average final vacuum, 20 in.; average time final vacuum, 1 hour.

FIR CAR DECKING

To date we have treated a total of thirty-nine runs.

We succeeded in getting an average absorption of 14.33 lb. per cubic foot. Other statistics follow:

Board feet treated, 1,013,472; average steam, 15 lb.; average time steam, 57 minutes; average initial vacuum, 24 in.; average initial vacuum held, 1 hour 6 minutes; average solution pressure, 175 lb.; average solution pressure held, 13 hours 10 minutes; average final vacuum, 21 in.; average time final vacuum, 1 hour.

With fir car sills in the sap wood we got a thorough penetration, but in the hard wood not to exceed 1 in. all around. The car decking, when dry, was thoroughly penetrated with creosote. We feel that it is not only practicable but that it pays to treat the car sills and car decking for stock cars. It would be impracticable to treat car decking for box cars on account of the odor. They could not be used for flour and many other lines of merchandise, which would absorb at least the odor from the wood if treated with creosote, and we never can look for a very broad field to operate in so far as treating car lumber goes. However, I believe it is practicable to treat car decking for stock cars and flat cars. For stock cars the creosote acts as a disinfectant; from that standpoint it would be not only practicable, but, I believe, effective. For the roads that are using lumber for car sills, there is no question that it would lengthen the life very materially, but how much I am not able to say, for we have only practised treating car sills and car decking for about one year. In all of our new stock cars now that we build with wooden sills we treat the sills and in all of them we treat the decking.

THE REQUIREMENTS FOR SUCCESSFUL TIMBER TREATMENT

BY HERMANN VON SCHRENK, ST. LOUIS, MO.

Timber treatment has grown so rapidly in the United States that the amount of material actually treated in every year now is ten times what it was seven or eight years ago, and the number of men engaged in the industry has correspondingly increased. As the use of treated wood has increased, inevitably some conditions have arisen which I believe it is well for us to consider. In the early days of timber treatment there was a good deal of experimenting as to methods, and, for that matter, there is still some experimenting, but, as the result of some twenty years' experience, some facts are sufficiently well known at the present time to all of us, and these facts have become more or less axiomatic. Briefly stated, in order to get good results from treated timber the following points must be observed:

(1) Only perfectly sound timber should be treated.

(2) In order to obtain the best results, properly seasoned material should be used.

(3) A good preservative is essential to long life.

(4) Proper injection as to quantity and penetration is essential.

(5) Proper subsequent handling of the timber is essential.

In my investigations I have found that the premature failures of so-called treated timber were almost without exception due to the non-observance of one or more of the above principles. I am perfectly sure that in the early days a good deal of timber was treated which was sap-rotten. It was not realized ten years ago, as it is to-day, that timber may be very badly decayed in the interior and yet show absolutely no evidence on the outside. With the best intentions, therefore, many sticks of wood were doubtless treated which we would unhesitatingly throw out to-day. Many of the failures were, however, due to the fact that timber was treated because of certain contract requirements and in spite of a better knowledge of the person responsible for the actual treatment. The lessons to be drawn from failures are very obvious, and I believe we should take cognizance of them, particularly in view of more thorough knowledge of all the factors surrounding the operations which make for successful treatment.

While there is no doubt very general agreement among the men engaged in the timber-preserving industry as to the fundamental conditions enumerated above, we all know that frequently, under stress of business circumstances, they are not always adhered to. The consumer frequently makes demands which cannot be fulfilled, and if they are, they are bound to result in speedy and ultimate failure.

The inspection of material before treatment should be made with greater care. I believe that every treating company should be empowered to refuse to treat material which it knows to be defective. In other words, I do not think that anyone is warranted under any circumstances in treating material which he knows to be unfit because of various defects. A defective stick was never improved by any kind of treatment.

The same holds true for improperly seasoned material. The excuse is frequently given, in demanding treatment of absolutely green material, that emergencies have arisen which necessitate such treatment, or some similar explanation is given. Unfortunately, with the increased use of timber in its various forms, the tendency to require and do such rush work seems to me to be increasing. It is frequently inconvenient to wait six or eight months, or more, to season material properly; besides, it costs considerable for interest charges.

That which has been said for the inspection of the material before treatment holds equally for the preservative used and the manner of treatment. How much service do you suppose will be obtained by treating green red-oak ties with 2 gal. of creosote oil by the full-cell process? We all know that the penetration of timber so treated is insignificant and that internal sap rot is bound to occur in comparatively short periods of time.

TIMBER FOR CREOSOTED BLOCK PAVING

BY HARRY G. DAVIS, MANAGER PAVING DEPARTMENT CHICAGO CREOSOTING COMPANY, CHICAGO, ILL.

In selecting a wood for paving purposes three things should be taken into consideration. These are:

First—The adaptability of the wood to the purpose designed.

Second—The availability of the wood selected.

Third—The commercial conditions surrounding the wood selected.

By "adaptability" is meant both the probable service that will be given by the blocks manufactured therefrom and the natural characteristics of the wood with respect to the manufacture of the blocks.

A pavement, be it wood block, brick, stone, asphalt or tar, is laid for two purposes—namely, to facilitate traffic and to increase sanitation. The only feature worthy of consideration from the standpoint of this paper is that relating to traffic, and more particularly with reference to the effect of traffic upon the pavement. As this is true, it is necessary to select a wood which is sufficiently strong in texture to withstand the effects of the traffic and give a long life to the pavement.

Engineers, as a rule, are prone to be entirely too strict in their requirements. For instance, engineers of this country have been making long-leaf yellow pine the standard of perfection in a paving block. This wood was used in probably 75 per cent of the creosoted block pavements laid prior to 1911, when they decided that a short-leaf pine might be used if of close growth. The change was a wise one, inasmuch as short-leaf pine, while not so strong a wood as the long-leaf, is sufficiently strong for a paving block.

It is not necessary in selecting a wood for paving purposes to require one of the greatest possible strength but simply to call for a timber of sufficient strength to withstand the stress to which it will be subjected under traffic. Following this principle you will find that there are several commercial woods available for paving purposes, any of which are sufficiently strong for the purpose, and elimination must come through the more technical features of wood preservation, such as the adaptability of the wood to treatment and its power to withstand decay after treatment.

Experience has proved that in the Central West we have at least four woods which, when tested by every possible requirement, are suitable for paving purposes. These woods are Southern yellow pine, tamarack, hemlock and maple. One street paved in Chicago with black gum is not considered a sufficiently conclusive experiment to warrant the formation of a definite opinion.

For the past ten years the city of Chicago has confined its wood-block pavements almost entirely to yellow pine; in fact, all the streets laid prior to 1912 were yellow pine with two exceptions. These were about 1500 yd. of Southern black gum and about 8000 yd. of street car right-of-way paved with tamarack. In the past year we have laid a test intersection with maple and about 2 miles of tamarack blocks. The yellow pine has given excellent satisfaction on some of the heaviest traffic streets in the country. We have one street in the Loop district in Chicago paved six years ago with yellow pine, and certainly no one can say there has been the slightest failure due to any defect in the timber.

About five years ago the Chicago Railways Company purchased some tamarack blocks which were used in paving the right-of-way on Dearborn Street between Van Buren and South Water Streets. Although the construction of this pavement is open to considerable criticism, especially the treatment around the tie rods, yet the pavement is in excellent condition to-day and shows just as good results as have been obtained from yellow pine blocks.

A little more than a year ago our company furnished enough hard maple blocks to pave the intersection of Madison Street with Fifth Avenue, one of the spots with the heaviest travel in the city of Chicago. It is estimated that the daily vehicle traffic on Madison Street is 8000, while that of Fifth Avenue is over 5000. Pounded by traffic from four directions, these blocks do not show the slightest sign of wear. In fact, so satisfactory was the result that the Chicago Railways Company purchased its entire supply for 1912, specifying maple.

With reference to hemlock, attention is called to the results shown by this wood in the test pavement in Minneapolis laid under the supervision of the United States government. In a seven-year test hemlock showed only 1/16 in. more wear than the strictly long-leaf yellow pine. In compensation for this, it is understood that the relative quality of yellow pine used in this test was better than that of any other wood placed in the pavement.

Certainly these instances should prove that so far as the strength of the four woods mentioned is concerned, the engineer should have little or no hestitation in making his specification open to all. There is no doubt that hard maple is the strongest of the four, followed next by the yellow pine, and then by tamarack and hemlock. But each is sufficiently strong for paving purposes.

NORTHWESTERN CEDARMEN AT DULUTH

The seventeenth annual meeting of the Northwestern Cedarmen's Association was held in Duluth, Minn., on Jan. 7 and 8. T. B. Bradley, of Duluth, the president, occupied the chair. In his annual address he commented on the organization of the Cedarmen's Exchange for Interinsurance and also referred to an order of the Interstate Commerce Commission in the matter of the investigation of alleged irregularities and discrepancies in the weighing of freight by carriers. Mr. Bradley contended that the carriers do not give proper consideration to claims for overweight. He also referred to the practice of the railroads in making an allowance of only 500 lb. a day for the stakes and equipment of open cars. He believed the weight allowance should be 1200 lb.

Secretary H. H. McKinney, of Minneapolis, in his annual report, said it was probable that about the same amount of stock would be put in this season as a year ago. The association had twenty-two calls for inspection during 1912, thirteen of which were for poles. Mr. McKinney suggested that steps be taken at the present session of the Legislature of Minnesota to secure the enactment of a law giving the State Railroad & Warehouse Commission the same authority over the weighing of lumber and forest products as it has now over grain, hay and coal. The Northwestern Cedarmen's Association now has thirty-two members.

The Wednesday morning session was given over to a discussion of the proposed change of name of the association from the Northwestern Cedarmen's Association to the Northern White Cedar Association. On motion of Mr. Clark a special committee of three will be appointed to report on this subject at the next annual meeting. Another special committee will consider changes in the constitution in reference to time of meetings.

Officers for 1913 were elected as follows: President, W. C. Moss, Minneapolis; vice-president, J. W. Benham, Chicago; treasurer, W. B. Thomas, Manistique, Mich.; secretary, H. H. McKinney, Minneapolis; directors, E. L. Clark, Minneapolis; H. W. Reade, Escanaba, Mich.; M. K. Bissell, Escanaba, Mich.

SUB-COMMITTEES ON MODEL PUBLIC UTILITY BILL

An account of the work of the Department on Regulation of Interstate and Municipal Utilities of the National Civic Federation was published in the ELECTRIC RAILWAY JOURNAL for Dec. 14, 1912. The following is a list of the sub-committees to which have been referred different parts of the bill. A report on the work of this department will be made at the annual convention of the National Civic Federation at New York, Jan. 28 and 29.

RATES

Halford Erickson, Railroad Commission of Wisconsin (chairman); Charles R. Crane, Chicago; F. A. Delano, president Wabash Railroad, Chicago; Alexander C. Humphreys, president Stevens Institute, Hoboken, N. J.; F. K. Lane, Interstate Commerce Commission, Washington, D. C.; J. C. Lincoln, manager traffic bureau, Merchants' Association, New York; Theodore N. Vail, president American Telephone & Telegraph Company, New York.

CONTROL OF SERVICE

W. D. Kerr, National Civic Federation (chairman); H. C. Abell, American Light & Traction Company, New York; Union N. Bethell, vice-president New York Telephone & Telegraph Company; M. S. Decker, Public Service Commission, Second District, Albany; B. A. Eckhart, Chicago, Ill.; Charles L. Edgar, president Edison Electric Illuminating Company, Boston; D. O. Ives, manager transportation department, Chamber of Commerce, Boston, Mass.; W. D. Pence, Railroad Commission, Madison, Wis.; Robert R. Prentis, chairman State Corporation Commission, Richmond, Va.; R. N. Searle, vice-president Rochester Railway & Light Company, Rochester, N. Y.; Alfred H. Smith, vice-president and general manager New York Central & Hudson River Railroad, New York; Charles A. Stone, Stone & Webster, Boston; William R. Wheeler, traffic manager, Chamber of Commerce, San Francisco, Cal.; W. J. Huddle, consulting engineer, Madison, Wis.

ACCOUNTS AND REPORTS

E. M. Bassett, formerly Public Service Commissioner, First District, New York (chairman); J. E. Allison, Public Service Commission, St. Louis, Mo.; Edward G. Connette, president International Railway Company, Buffalo, N. Y.; W. M. Daniels, Board of Public Utility Commissioners, New Jersey; C. N. Duffy, vice-president Milwaukee (Wis.) Electric Railway & Light Company; B. S. Garvey, general auditor Chicago Telephone Company; Edwin Gruhl, North American Company, New York; Adna F. Weber, chief statistician Public Service Commission, First District, New York; R. H. Whitten, Public Service Commission, First District, New York.

CONTROL OF CAPITALIZATION

M. R. Maltbie, Public Service Commission, First District New York (chairman); W. J. Clark, General Electric Company, New York; George B. Cortelyou, president Consolidated Gas Company, New York; B. H. Meyer, Interstate Commerce Commission, Washington, D. C.; James Speyer, New York; Timothy S. Williams, president Brooklyn Rapid Transit Company.

FRANCHISES

Blewett Lee, Illinois Central Railroad, Chicago (chairman); Alfred L. Baker, attorney, Chicago: H. M. Byllesby, Chicago; John H. Carlisle, Watertown, N. Y.; Samuel Insull, president Commonwealth Edison Company, Chicago; John H. Roemer, Wisconsin Railroad Commission, Madison, Wis.; Mason B. Starring, president United Railways Investment Company, New York; John H. Wigmore, dean law school, Northwestern University, Chicago; Thomas N. McCarter, president Public Service Corporation, Newark, N. J.; Josiah T. Newcomb, New York; Leo S. Rowe, professor University of Pennsylvania, Philadelphia.

WAYS AND MEANS

F. Q. Brown, New York (chairman); William Barbour, president Linen Thread Company, New York; T. C. du Pont, Wilmington, Del.; John H. Gray, Minneapolis; V. Everitt Macy, New York; Emerson McMillin, New York; Josiah T. Newcomb, New York; Albert Shaw, New York; Isaac N. Seligman, New York; F. C. Walcott, New York; J. G. White, New York; Arthur Williams, New York; T. S. Williams, Brooklyn.

SAFETY OF OPERATION

Arthur Williams, New York Edison Company (chairman); W. G. Lee, Cleveland, Ohio; William B. McKinley, president Illinois Traction System, Peoria, Ill.; W. S. Stone, Brotherhood of Locomotive Engineers, Cleveland, Ohio; Daniel Willard, president Baltimore & Ohio Railroad; W. R. Willcox, Public Service Commission, First District, New York.

FORM

John H. Gray, director of investigation, New York (chairman); W. S. Allen, American Telephone & Telegraph Company, New York; E. W. Bemis, Chicago; Charles P. McCarthy, Legislative Reference Library, Madison, Wis.; Edgar J. Rich, Boston, Mass.

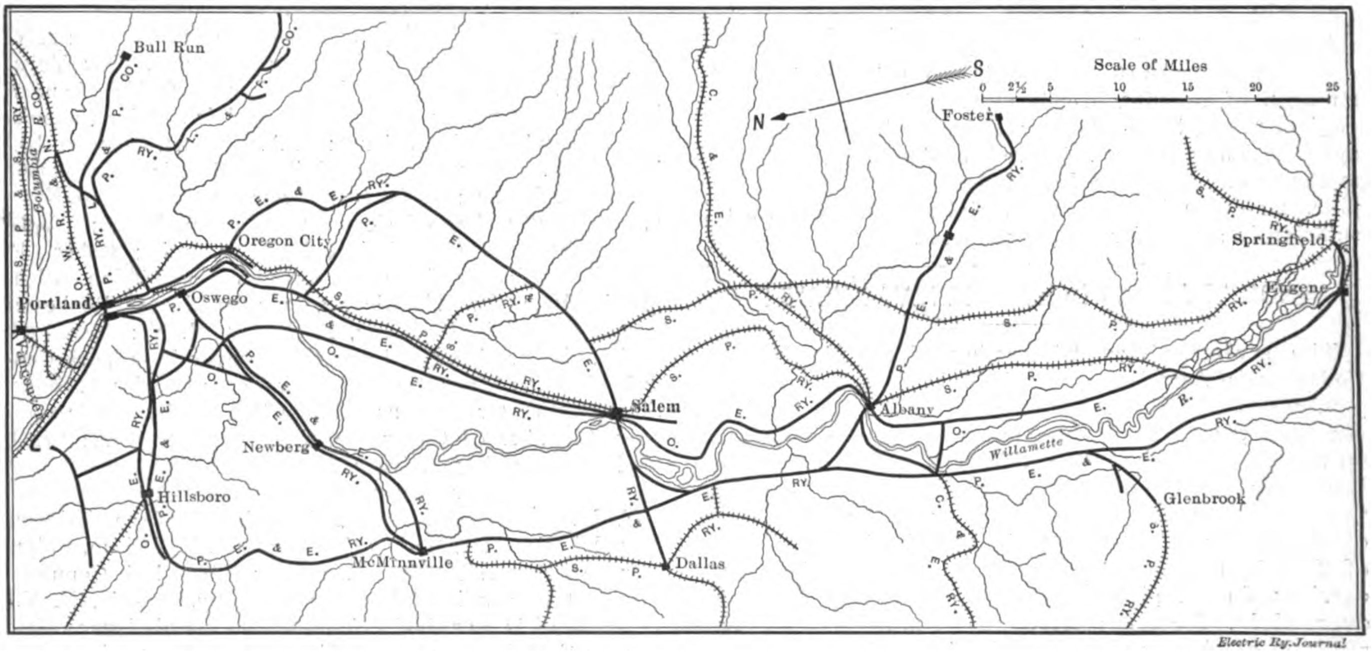
WESTERN RED CEDAR ASSOCIATION

At the annual meeting of the Idaho Cedarmen's Association, held Jan. 14 at Spokane, Wash., the name of the organization was changed to that of the Western Red Cedar Association to include the larger geographical distribution of the present membership, practically all of which was represented at the meeting. A feature of the session was the report received from J. B. Knapp, United States assistant district forester, Portland, Ore., covering comparison tests of Michigan white-cedar and Idaho red-cedar poles, 25 ft. in length, with 7-in. tops. The Idaho poles examined were declared very much superior by the forester, the Eastern poles containing varying amounts of center rot and a good many knots. For comparisons of strength, obtained with a 200,000-lb. Olsen testing machine, he submitted these figures, based on allowances for equal pole diameters: Modulus of rupture, pounds per square inch, Michigan white cedar, 3400; Idaho red cedar, 6670. Breaking load, pounds per square inch, Michigan white cedar, 8450; Idaho red cedar, 18,510.

The following officers were unanimously elected for the ensuing year: President, H. C. Culver, Sandpoint, Iowa; vice-president, M. P. Flannery, Spokane, Wash., and secretary-treasurer, R. L. Bayne, Spokane, Wash. W. M. Leavitt and E. A. Lindsley, with the president as member ex officio, were appointed as a committee to draft a constitution and by-laws for the association, the dues of which have been raised to $25 a year.

EXTENSIVE ELECTRIC RAILWAY CONSTRUCTION IN OREGON

In Oregon more miles of electric railway lines are being constructed now than in any other part of the country. This is due to the activities of two important groups of railroad interests, the Hill interests, as represented by the Great Northern Railway, and the Harriman interests, represented by the Southern Pacific Company. Both are spending large sums of money in electric railway construction in the fertile Willamette River Valley, which extends south from Portland, and that region promises soon to possess not only excellent railroad facilities but to take rank among the most important interurban electric railway systems in the United States.



Map Showing Electric Railways Being Built in the Willamette Valley, Oregon

The Hill interests were the first to enter the field so far as electric railways are concerned, and in 1910, in combination with the Northern Pacific Railway, they purchased all of the outstanding common stock of the Oregon Electric Railway, a 50-mile electric line which had been built from Portland south into the Willamette Valley. A short account of this line was published in the ELECTRIC RAILWAY JOURNAL for March 20, 1909, page 494. Since that time the line has been greatly extended, and during the past year the company has built 78 miles of track, while important extensions are proposed during the coming year. An idea of the character of construction may be obtained from the statement that during 1912 the bridges constructed for this line included one of 1200 ft. in length over the Santiam River, including seven spans of 125 ft.

each, one over the Willamette River 820 ft. long in three spans of 200 ft. and two girders of 110 ft., and one over the Calapooia River with a span of 150 ft.

Catenary construction is used with 1200 volts direct current on the trolley wire. Freight terminals have been provided at a number of cities along the route, and a freight cut-off has been built at North Portland. During the last year the company has purchased two sleeping cars from the Barney & Smith Car Company to operate between Portland and Eugene.

In its power transmission system the company is planning to use hydraulic power near the headwaters of the Mackenzie River at the outlet of Clear Lake. A concrete dam will be constructed at this point which will divert the water through a tunnel 1000 ft. in length with a finished area of 86 sq. ft. and a descent of approximately 7½ ft. per mile. At the power station this water will have a head of 907 ft. At present 30,000 hp will be developed, but the storage facilities will permit of 60,000 hp over such periods as are necessary to care for normal loads. The power will be transmitted at 60,000 volts.

The track and roadway is being built according to steam railroad standards with a maximum grade of four-tenths of 1 per cent and three degrees of maximum curvature with long tangents. One tangent is 24 miles in length.

PORTLAND, EUGENE & EASTERN RAILWAY

The Portland, Eugene & Eastern Railway is the interurban electric railway being built by the Southern Pacific interests which already have a steam railroad line through the Willamette Valley. The Portland, Eugene & Eastern Railway lies to the east and also to the west of the Oregon Electric Railway between Portland and Salem and to the west of the Oregon Electric Railway between Salem and Eugene.

The new railway commenced the construction in 1909 of 100 miles of track and has completed what is known as the West Side Loop, connecting Hillsboro, McMinville, Newberg and Oswego. In 1912 a beginning was made on the second unit of 240 miles, covering the territory south of Salem as far as Eugene, and it was decided to incorporate in the general scheme the existing city electric lines in Salem, Eugene and Corvallis. Important bridges have been built and others are projected, and it is believed that 340 miles of track will be in full electric operation about the close of 1913. The freight will be handled by electric freight locomotives. The total outlay involved in this proposed development is about $12,000,000.

The overhead catenary construction will be used, but a pantograph will be employed, as on the Southern Pacific lines at Oakland, instead of the wheel trolley.

RESULT OF MIDI LOCOMOTIVE COMPETITION

As noted in the Electric Railway Journal for Jan. 4, 1913, the French Southern Railway (Midi Railway) has been experimenting during the past year with individual single-phase locomotives as furnished by six manufacturers for its trail line between Perpignan and Villefranche. It is now announced that three of these six locomotives have been found acceptable, namely, one from the French Thomson-Houston Company, with mechanical equipment furnished by the Schweizerischen Lokomotivfabrik, Winterthur, Switzerland; one from the French Westinghouse Company and one from the Jeumont Company (Ateliers de Constructions Électriques du Nord et de l'Est). The traction equipment of the Thomson-Houston and Westinghouse locomotives comprises two 600-hp motors, and that of the Jeumont locomotive three 400-hp motors. All of these ratings are on the hour basis. Each locomotive was specified to develop a tractive effort of 27,500 lb. at starting; also to draw a train of 280 metric tons at 24.8 m.p.h. or a train of 100 metric tons at 37.2 m.p.h.

CHICAGO SURFACE RAILWAY OFFICIALS ADVOCATE PROPOSED TRACTION MERGER

Urging the local transportation committee of the City Council of Chicago to consider favorably the proposed merger of all the traction interests in that city, official representatives of the two principal surface street railway systems in Chicago appeared before the committee on Jan. 21 and made speeches that were of considerable interest. The first speaker was Leonard A. Busby, president Chicago City Railway Company, who made a frank appeal for approval of the proposed merger, in response to the committee's request for his views on the subject. He remarked first that the plan under consideration included the unification of all the surface and elevated railway lines in Chicago, universal transfers with 5-cent fare, a downtown subway for the elevated railway lines and the removal of the Union Loop after the subway was in operation, rapid transit from one division of the city to another, construction of a comprehensive subway system at some later date, and finally the amortization of the investment by the application thereto of the city of Chicago's share of the profits of operation, so that eventually the city may own the entire system.

Mr. Busby gave an interesting review of the operation of the 1907 ordinances relating to surface street railway service in Chicago. These ordinances have now been in effect nearly six years. At the time they were adopted they represented perhaps the most advanced step in the contractual relations of municipalities and street railway companies. Since then they have been the basis of settlements in several other cities. In the six-year period the companies have spent more than $85,000,000 in cash in the rehabilitation of their systems. Practically the entire equipment has been replaced, 80 per cent of the track has been rehabilitated and there are now eighteen through routes from one part of the city to another. At the time the ordinances were adopted the greatest area served by a single 5-cent fare was 48 sq. miles; now it is 134 sq. miles. At the earlier date the longest ride for a nickel, including possible transfers, was 13 miles; now it is 27 miles. In 1907 the actual cash return to the Chicago City Railway Company for each passenger ride was 3.2 cents; now it is 2.84 cents. During the six years ended Feb. 1, 1913, more than $10,000,000 will have been paid into the city treasury of Chicago by the street railway companies as the city's 55 per cent of the net divisible receipts.

The speaker expressed his belief that the surface street railway transportation given in Chicago was the best in the country. He said that the 1907 settlement ordinances were very fair to the city, but perhaps they were too burdensome on the companies; nevertheless, he did not criticise them. The results obtained have far surpassed what was reasonably anticipated at the time the ordinances were adopted. Notwithstanding this fact there have been persistent criticisms of the street railway conditions in Chicago; there has been serious complaint of downtown service during rush hours. On the South Side lines of the Chicago City Railway Company about 1000 cars are used during the rush hours, whereas 570 are sufficient during the remainder of the day. On some of the downtown loops cars are run during the rush period on sixteen-second headway. The flow of transportation is clogged and congested by the necessity of making these downtown loops with their numerous crossings. This looping arrangement downtown is due to the separate ownership of the two great surface street-railway systems in Chicago. Much the same situation exists in relation to the elevated railways, with their downtown Union Loop.

The solution proposed by Mr. Busby is unified operation, which would remove the "transportation eddy" in the downtown business district of the city. Practical street railway men agree that this unified operation would add 30 per cent to the physical operating capacity of the surface lines of Chicago. The remedy is the merger of the properties. Mr. Busby pointed out what the saving of time in transportation means to the people of the city. The results to be obtained are of the highest importance. The speaker discussed the situation in other cities. In New York, for instance, there is no universal fare between elevated, surface and subway lines, such as is proposed in Chicago. In fact, the liberal arrangement proposed for Chicago does not exist in any other city. Mr. Busby urged the committee to look on the merger from the point of view of the results to be obtained. The question of the valuation of the elevated railway properties is of minor importance.

At this point Mr. Busby took up the committee's suggestions for improved service. In relation to the universal transfer and 5-cent-fare proposition, he said that there was no question that the companies would adopt it, provided it could be worked out from the nickel. As to the elevated railway valuation, he thought a compromise might be had. He said that the difference between the city and the elevated railway companies is comparatively slight in view of the fact that in any event by far the greater part of the valuation of the combined companies will be made up of the surface companies' valuation, which is now fixed at about $135,000,000. Speaking for his own company, Mr. Busby said that he would welcome the proposal that a representative of the city be a director of the combined companies.

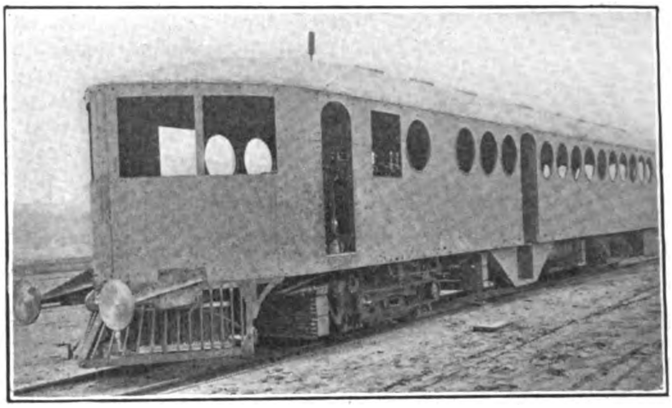
W. W. Gurley, general counsel for the Chicago Railways Company, agreed with what Mr. Busby had said. Speaking for the "association" which owns the Chicago elevated railway companies, he said that prior to the purchase it had canvassed the value of these railways very carefully. It was necessary to raise nearly $47,000,000, and to do this the promoters of the "association" had to give their obligations to return $50,000,000 in three years' time. The present owners ask to be reimbursed for the money that they actually put in and for the obligations they have actually incurred. It is for the city to decide whether it will do this. Mr. Gurley remarked, however, that there cannot be a successful merger of the traction interests in Chicago unless the elevated lines are taken in. He declared that his company was content with the valuation placed on the elevated railway companies by the present owners and would be willing to go into the merger on that basis.

There was some discussion by the aldermen, and a resolution offered by Aldermen Long was finally adopted. This resolution recites that there is a difference of nearly $30,000,000 between the companies' valuation of the real estate of the elevated railways and the city's valuation (the figures in round numbers are respectively $46,000,000 and $16,000,000). The effect of the resolution is to refer to a sub-committee this question of real-estate valuation to recommend, perhaps, some plan of possible adjustment. The sub-committee consists of Aldermen Block, Richert, Lipps, Capitain and Long.

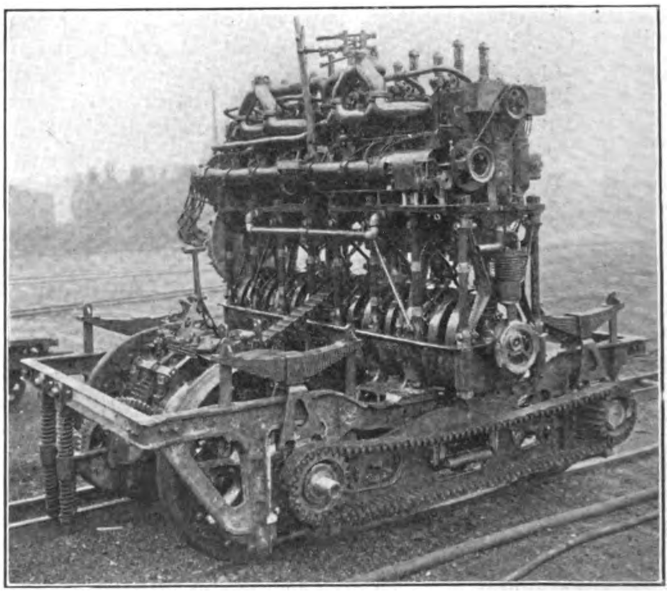
In the heart of the city of Cleveland lies a compact area in which there is a heavy demand for direct-current energy combined with a market for steam heating during the winter months. The Cleveland Electric Illuminating Company maintains a generating station in this district and uses the exhaust steam from the turbines for heating. In it is a 3750-kw geared turbo-generator, the largest direct-current unit of the kind yet constructed. The operating speed of the turbine is 1800 r.p.m., and the reduction ratio of the gear is 1 to 10. The large gear of this speed-reducing mechanism is 100 in. in diameter and has 259 teeth. The pinion has twenty-six teeth, and the ratio of 26 to 259 gives the "hunting-tooth" feature which has been recognized as desirable in the design of toothed gearing. The speed of this gear at the pitch line is approximately 54 miles an hour.

NARROW-GAGE GASOLINE CARS FOR AUSTRALIA

The McKeen Motor Car Company, Omaha, Neb., recently completed and shipped five 200-hp all-steel 55-ft. gasoline motor cars from its works to the Queensland Government Railways in Australia. These lines are 3-ft. 6-in. gage. Complete dismantling of the cars followed their construction, the cars being shipped knocked down. The manufacturers will send an expert to superintend the reerection of the cars in the railway company's shops at Ipswich. This gasoline rolling stock conforms to the McKeen standard design and construction with the exception of some special features which are necessary to meet the requirements of the Queensland Railways. These exceptions include the fact that the position of the operating levers is reversed for left-side control, and the side type of buffing gear with draw hook and screw couplings displaces the M. C. B. couplers.


Narrow-Gage Gasoline Car—General View

The depressed center entrance is constructed so as to provide accommodations for handling passengers at both elevated and roadside platforms with equal facility. The motor-truck wheelbase is limited to 6 ft. and this, in combination with the specially designed front body and truck bolsters, makes the car suitable for operation on the sharpest curves encountered over city railways.


Narrow-Gage Gasoline Car—Motor Truck and Engine

Each motor-truck side frame is one integral steel casting, bolted and wedged against the shirk or bedplate, the side frames in combination making an unusually light as well as remarkably strong and durable entire cast-steel truck frame. Artificial illumination is provided by the

Stone electric system. The seating capacity of each car is sixty-nine passengers, of whom fifty-five are accommodated in the main compartment and fourteen in the smoker.

On the power units the trucks are equipped with four cast-steel center, steel-tired wheels, 36 in. in diameter, having 6-in. by 10-in. journals and set on a wheelbase of 6 ft. The side frames and bolster are made of cast steel throughout. The gasoline engines are of 200-hp rated capacity and have six cylinders with 10-in. bore and 12-in. stroke. The engines are air-starting and reversible.

The transmission has a mechanical efficiency of 96 per cent. It has Morse silent chain drives and gives two speeds, direct and geared, through a multiple disk clutch.

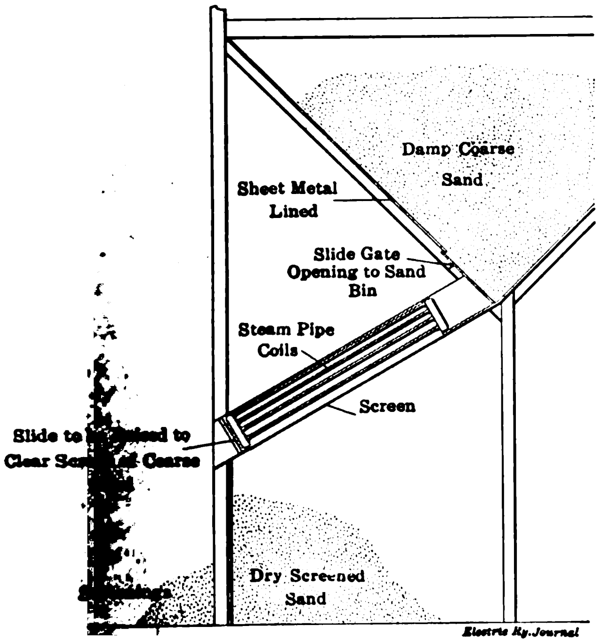
The principal dimensions of the car bodies are as follows:

Length over end-sills	59 ft.
Length over buffers	62 ft. 5¼ in.
Width over sheathing	8 ft. 9 in.
Height rail to roof	11 ft. 8½ in.
Length passenger compartment	31 ft. 7⅜ in.
Length smoking compartment	8 ft. 9 in.
Height inside floor to ceiling	7 ft. 8⅛ in.
Distance between center-plates	34 ft.
Total wheel base	40 ft.
Weight	60,000 lb.

These are the first narrow-gage gasoline motor cars ever turned out of the McKeen works.

A NOVEL SAND-DRYING PLANT

The operating department of the Lincoln (Neb.) Traction Company has built a novel sand-drying plant which is applicable to large or small railways. A wooden bin has been constructed in one of the carhouses to hold one car of sand. The sand is thrown into this bin by hand from cars alongside. The sides are sloped at an angle of 45 deg. to hoppers at one side of the bottom. These hoppers, when opened, allow the sand to flow onto the dryer beds, which slope at 30 deg. from the horizontal. Each dryer bed is a 6-ft. square screen with 12-in. side boards. Nine four-pipe coils with branch tees are set on the dryer bed. These coils are arranged in parallel rows so that the sand may flow or be raked between them as it comes from the storage bin overhead. When the steam is turned on, the drying sand falls to dry-sand bins underneath the screen, and the coarse material rolls to the foot of the sloped dryer bed, where it is deposited in another bin after all the fine sand has passed through the screen.

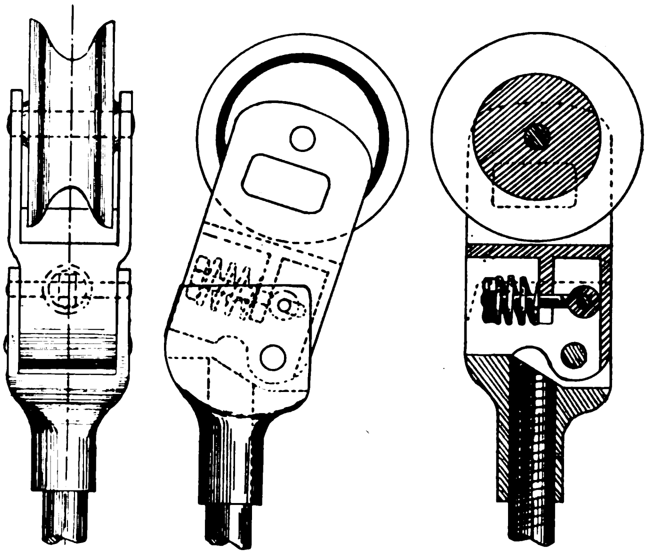


Section of Sand-Drying Plant, Lincoln, Neb.

Another novel feature in connection with the car sand-drying plant is the method of distributing it for use on the cars. A supply of car sand is available at several points on the property, and in order to reduce the cost of handling to a minimum it is shoveled into old cement sacks at the dryer and delivered to the supply points. After the sacks have been emptied directly into the sand boxes on the cars they are returned to the dryer for refilling.

HARP WITH SPRING AND KNUCKLE JOINT FOR RETAINING TROLLEY WHEEL

The accompanying illustrations disclose the construction of a new type of harp, aptly termed the "Neveroff" and made by the Special Electric Company, Chester, Pa., in which a spiral spring is used to force the trolley wheel against the wire before the pole has had time to recover from the downward movement caused by striking some obstruction. A detailed description follows:



Views of Harp with Spring and Knuckle Joint

From the bifurcated end of the harp there is pivoted a forked member which supports the trolley wheel. As shown, a pivot pin passes through the ears, the latter being cut away at the bottom to allow them to adjust themselves to the end portions of the support. The ears are provided with elongated slots, as shown in the side elevation, to receive the transverse pin. The spiral spring is interposed between a plate and the end of the bolt which passes through an aperture in the plate. The right-hand view shows the harp in its normal position with respect to the trolley wire. Should the wheel meet with an obstruction it will be kept in place by the release action of the spiral spring in the harp and by the tension spring at the base of the pole. As this occurs, the harp assumes the position shown in the middle view, thus keeping the wheel in direct contact and alignment with the wire. It does not permit the trolley wheel to slide or to "bite" the wire, and it has other meritorious features. This harp may be used with any standard trolley pole. The spiral spring in the harp should be adjusted so that the springs at the base of the pole will force the harp downward until it is seated on its stop, when the trolley wheel is in contact with the trolley wire. The harp will then be parallel with the pole and the spring in the harp will be compressed.

A test of the "Neveroff" harp was recently made on the lines of the Southern Pennsylvania Traction Company, Chester. The car on which it was installed traveled 8000 miles, and the trolley wheel, according to the report of the master mechanic of the road, who carefully watched the performance of the harp, never left the wire. The annoyance of short curves and complicated overhead construction are believed to be effectually overcome by the use of this device.

Messages of the Governors

Extracts from the Messages of the Governors Are Presented, Supplementing Those Published Previously

In the ELECTRIC RAILWAY JOURNAL of Jan. 11, 1913, extracts were published from the messages of the Governors of New York, Massachusetts, Pennsylvania, Rhode Island, Oklahoma, Maine and South Dakota, covering the subjects of public service corporations, minimum wages and workmen's compensation measures. Similar extracts from messages since presented by the Governors of New Jersey, Minnesota, California, Michigan, Wisconsin, Ohio, Indiana, Missouri, Colorado, Iowa, Montana and Kansas are appended:

GOVERNOR WILSON OF NEW JERSEY

"The corporation laws of the State notoriously stand in need of alteration. They are manifestly inconsistent with the policy of the federal government and with the interests of the people in the all-important matter of monopoly. It is our duty and our present opportunity to amend the statutes of the State in this matter not only, but also in such a way as to provide some responsible official supervision of the whole process of incorporation and provide, in addition, salutary checks upon unwarranted and fictitious increases of capital and the issuance of securities not based upon actual bona fide valuation.

"The people of the State are at present, moreover, at the mercy of investment companies of every kind. Investment companies should be put under inspection and regulation by the State, and no one should be allowed to sell securities in New Jersey without public license issued from the department exercising the rights of inspection and regulation.

"The Board of Public Utility Commissioners should be empowered to order the abolition of grade crossings in such ways and at such a rate as will adjust its orders to each particular case and set of circumstances. The act conferring the power can and should make of that power a legal duty imposed upon the commission, the discretion of the commissioners to exist only in respect of their right to guide, direct and adjust the processes of elimination in a thoroughly practical fashion."

GOVERNOR EBERHART OF MINNESOTA

"Minnesota has long realized the importance of State control of public utilities. In my opinion, public utilities must be either owned or controlled by the people. Where the control can be vested in a fair, impartial and competent authority, removed as far as possible from political influence, it is far superior to ownership. It is essential that the regulating authority should be independent of local conditions, more permanent as to tenure than the constantly changing city administration, and composed of experts with sufficient authority and funds to enforce rules and regulations fearlessly and impartially. I sincerely trust that this Legislature will enact into law the measure that will bring the greatest benefits to the people at large throughout the State.

"In the development of new territory it is important that favorable opportunities be given for the profitable investment of capital, and most of our States have been quite liberal in the granting of such returns. The indiscriminate issuing and sale of stocks and bonds is, however, of no advantage to a financially sound enterprise, but has rather the opposite effect in creating suspicion and distrust. A law should be enacted which will effectively prevent the issuing and sale of stocks and bonds which have little or no value.

"Representing on this occasion organized as well as unorganized employees and employers, I am asking at your hands a fair and adequate workmen's compensation act. I fully realize the difficulty of enacting a satisfactory compensation law, but we have the experience of a number of foreign countries as well as several States to guide us, and with the agreement between employees and employers as to the main provisions of the bill itself, reported to the special committee of this Legislature, the desired legislation should be passed at this session."

GOVERNOR JOHNSON OF CALIFORNIA

"In January, 1911, the Railroad Commission consisted of three elective members. In that year the well-known Stetson-Eshleman railroad bill was passed by the Legislature, giving to the Railroad Commission powers as extensive as the constitution would permit. At the election of October, 1911, the people passed two constitutional amendments relating to the Railroad Commission, by which the commission was enlarged to five and made appointive instead of elective, and the most plenary powers were conferred upon it. At the extra session of the Legislature of 1911 the public utilities bill was passed. During the thirty-two years of the existence of the Railroad Commission prior to 1911, approximately 100 complaints were presented to that commission, and in less than two years approximately 2000 complaints have been presented to the new commission. In the very brief period that has elapsed the people probably already fully understand not only the value of the commission to them, but its absolute necessity.

"I strongly urge upon you, if the industrial accident law is to continue to be a part of the policy of the State of California, that you take the necessary means for providing for a State insurance fund."

GOVERNOR FERRIS OF MICHIGAN

"I recommend the enlargement of the powers of the Railroad Commission to cover all public-utility corporations of the State. Furthermore, I recommend that the commission be authorized to make physical valuation of all such properties as it may deem advisable, that the rates fixed may return reasonable dividends on actual cash investment. It is hardly fair to expect the people of Michigan or any other State to have any adequate knowledge concerning the real value of the stock of foreign corporations. I suggest the enactment of a law similar to the Kansas law, whereby our people will be protected from State frauds. In other words, prohibit the sale of stocks and bonds of any company until said company has been first investigated and approved by the railroad commission."

GOVERNOR McGOVERN OF WISCONSIN

"A number of States have made provision for compensating employees for specific injuries to workmen by requiring payment for definite time on the basis of a percentage of the wage received when the injury occurred. Our law fixes the amount to be paid on the basis of actual loss of wages only. This is not always just, and I recommend an amendment which will provide for the adoption in such cases of the rule now followed in other States. At a certain date fixed by law all employers in Wisconsin should be deemed to be within the scope and operation of the workmen's compensation act unless prior to this time they shall have notified the commission in writing to the effect that they do not wish to be so.

"So far as hydraulic energy is required for public purposes, the State should reserve the right to compel the maximum development of the water powers for which franchises are granted. In all authorizations to build dams it should also require, in cases where the energy may be used either within the State or outside its borders, that its own citizens shall have the preference."

GOVERNOR COX OF OHIO

"Conditions not only justify but demand a drastic anti-lobby law. Any person interesting himself in legislation will not, if his motive and cause be just, object to registering his name, residence and the matters he is espousing with the Secretary of State or some other authority designated by your body. There ought to be no temporizing with this situation. Lobbying without registration should be an offense punishable by imprisonment.

"The State regulation of public utilities has been of such benefit to every interest concerned that every possible legislative facility should be extended to this administrative branch of the government. The existing law gives to the commission the right to make a physical valuation. This should be made mandatory. The utility and tax commissions have made considerable headway in working out the detail of valuation. But their labors in this particular have been confined almost, if not entirely, to cases which came to their notice by requests for increased capitalization or complaints with respect to taxation values. There can be no permanent or logical base for the successful operation of these departments without a physical valuation of utilities.

"One development of the railroad and utilities law, which has been very unfair to the State, should be corrected. Under present practice the commission establishes or revises a rate. The utilities company, if it desires, makes objection and receives a hearing. The commission then either amends or retains the rate previously fixed, whereupon the corporation in many instances goes into court, asks for and receives an injunction. The delays of the law are well known and the issue remains unsettled for a year or more. The law should be so changed that the court cannot issue an injunction in these rate matters without an investigation. This is the practice elsewhere and should be adopted in Ohio."

GOVERNOR RALSTON OF INDIANA

"Numerous and serious questions frequently arise between public utilities companies and their patrons or customers, involving the public in many instances to a greater or less extent. Out of this condition has grown a demand in different sections of the State for a public-utilities commission, and I recommend the creation of the same. The many properties and the vast amount of capital that would come under the jurisdiction of a utilities commission indicate the ability and care required in drafting a utilities law fair to both the public and those who have their money invested in such properties. It is important that the law should contain a provision against watered stock and overbonding and against abuses in granting franchises, and it should require a system of uniform accounting. I hope the Legislature will make a zealous effort to enact a satisfactory law on this subject. There should be a law against the issuance and sale of watered securities, unless on the face thereof the amount of percentage of water therein is accurately stated.

"We should have in this State a workingman's compensation law. Whether such a law can be made compulsory under the Indiana constitution is a question. If a law on this subject is enacted containing a compulsory provision and it otherwise meets my approval, I shall let the Supreme Court say whether it is constitutional."

GOVERNOR MAJOR OF MISSOURI

"This Legislature should create a tax commission to study the questions of taxation and report its labors to the next Legislature, to the end that we may revise and improve our revenue system.

"A public service commission is one of the necessities of the hour. The creation of such a commission is a progressive step which, in view of past experiences, every State must take. I would recommend that the salaries of the commissioners be fixed at a reasonable amount, commensurate with the services required of them and their employees and sufficient to justify able and competent men serving.

"The practical success of a workingmen's compensation act depends upon its simplicity, definiteness, reasonableness and compatibility with our state and federal constitutions. Such a law must be fair and just to the employer and the employee. Committees appointed by the last Legislature have investigated the subject and no doubt are now ready to report a proper law upon this subject."

GOVERNOR AMMONS OF COLORADO

"I hope the General Assembly will enact a measure along the line of the Kansas 'blue-sky' law, effective enough to eliminate from this State bad promotion schemes of all kinds. The most effective way to secure sufficient money at low rates of interest to take care of our industrial growth is to make our securities first class in every respect.

"Two plans are suggested for the control of public utilities. The Railroad Commission proposes amendments to the law under which it is operating to make the act more effective. It is urged that some important advance has been made on account of recent court decisions, and that the surest way to save this advantage is to retain the present law and make it stronger by amendment. The commission, however, suggests no plan for including other public utilities. On the other hand, bills have been prepared which, I understand, include the very provisions of the railway law already adjudicated and which also comprehend the entire field of public utilities. It seems to me useless to have two commissions. I am advised that all the advantage gained through the action of the courts under the old law can be protected in the new.

"The employees' compensation commission appointed by the Eighteenth General Assembly, I am told, has not completed its investigations, and it should be continued, either to report at the next session of the General Assembly or to initiate a law covering the subject."

GOVERNOR CLARKE OF IOWA

"I sincerely hope that a workman's compensation act will be passed at this session. The commission authorized by the last General Assembly, after a thorough investigation and study of the subject, has reported a bill for consideration at this session.

"Kansas was wise ahead of her sister states in providing in substance that when stocks and bonds are offered for sale the banking department must be satisfied that they are a reasonably good investment and a permit secured before they can be offered to the public. I commend this wise law as a basis for similar legislation in Iowa."

GOVERNOR STEWART OF MONTANA

"The business of the public-service corporations which operate in Montana should be regulated. The present Board of Railroad Commissioners can do this work and thereby obviate the necessity for and the expense of a new commission. A law should be passed defining the liability of employers and regulating the compensation of employees for accidents received in the course of employment. A law should be passed providing for the supervision of all investment companies and promotion enterprises in the State. A 'blue-sky' law of fair intent will not interfere with legitimate business."

GOVERNOR HODGES OF KANSAS

"I would urge that all laws passed by you be drafted in clear, simple language, so definite that they can be readily understood. It is a travesty on justice that laws are drafted in such an ambiguous manner that they require interpretation by expert lawyers to determine their meaning.

"I am sincerely gratified to report to you that our utilities law is a great success and that it needs only slight amendment, if any. In the hands of broad-gaged men it will continue to be an instrument of the highest value for the development and upbuilding of the State."

News of Electric Railways

Increase in Operating and Maintenance Funds Asked in Cleveland

On Jan. 18, 1913, the directors of the Cleveland (Ohio) Railway authorized the sale of $3,600,000 of additional capital stock. This stock is to be sold at par to stockholders of record of Feb. 5 pro rata, and the proceeds are to be used to take up the $3,000,000 of bonds due on March 1 and to pay for extensions, betterments and improvements proposed by the City Council.

The directors authorized J. J. Stanley, president of the company, to ask the City Council for an increase in the operating and maintenance funds, in order to avoid the deficits that are piling up. The operating report for December shows an ordinance surplus of $37,511, with deficits of $40,788 in the maintenance fund and $27,166 in the operating fund, with the result that there is an actual deficit of $30,433 for the month. This was due, as explained, to scrapping twenty-five old cars, the reproduction cost of which was charged against maintenance. It seems that there yet remains $87,500 to be charged off as the reproduction cost of the Canal Street power house which was abandoned. This will bring the total deficit in the maintenance fund up to $392,315. The deficit in the operating fund totals $203,542. Against this there is a surplus of $484,282 in the interest fund. The fare cannot be raised until this fund falls below $300,000.

Mayor Baker has announced that operation of the West Sixth Street and the West Ninth Street lines must be resumed in order to accommodate the thousands of women and girls employed in the garment factories and wholesale houses in that section. Both employers and employees have been insisting upon this ever since operation on the "court house" loop was begun. Councilman Bernstein has introduced a resolution in Council calling for the extension of the Woodland and Scovill lines to the Union Station. Mayor Baker is reported to have said that he had not decided which lines should be routed in that way. Mr. Witt declares that he will not allow the Euclid Avenue and Paine Avenue service to the station to be restored.

Mr. Witt announced on Jan. 17 that cars would be taken from the Euclid, Scovill and Lorain lines and placed on the Superior and St. Clair Avenue lines. About thirty-nine round trips would thus be taken from these lines and the Euclid Avenue service would be reduced between 500 and 600 car miles.

The West Side Improvement Association is opposing the step taken by the city to allow interurban freight cars to be hauled over the city lines at certain hours of the night. The association declares that a referendum vote must be taken on the ordinance. The Chamber of Commerce has endeavored to work out a satisfactory adjustment of the matter with the West Side people, as this plan will be of great benefit to the wholesale houses and manufacturers.

Mr. Witt's office has furnished the public schools with 75,000 blotters, bearing the following rules of safety in the streets, to be distributed among the school children:

"Look out for the cars.
"Look out for autos.
"Look out for horses.
"Don't play on the streets where there are car tracks.
"Don't cross car tracks without looking both ways.
"Don't cross the street if you see a car.
"Don't get on or off a car while it is moving.
"Don't lean out of car windows.
"Don't face to rear in stepping off cars.
"Don't touch or allow any one to touch any wire.
"Don't let your schoolmates get into any danger."

Tom Sidlow, secretary to the commissioner, has been addressing the children of the public schools on the subject of danger. Large placards bearing the warning "Always look out for cars before crossing street" have been put up in the various school buildings. The "Help Across" Club, composed of older boys who look out for the youngsters and help them across the streets where there are tracks, has been approved by the commission and its members will likely be furnished with blotters, also.

Report of Massachusetts Railroad Commission

The forty-fourth annual report of the Massachusetts Railroad Commission has been submitted to the 1913 Legislature. It contains the usual separated statistical data of steam railroads and electric railways, and a general discussion of transportation conditions in the State, with special reference to the New York, New Haven & Hartford and Grand Trunk situation. Returns for the year ending June 30, 1912, were received from sixty-five street railways. By reason of a consolidation there were sixty-four existing companies at the end of the year. The net increase in street railway mileage was 30.73 miles of single track. The Massachusetts companies now own 2947.3 miles of single track. There was an increase of 44.24 miles of track operated during the year. The surplus was $11,405,060, or 12.8 per cent of the capital. The aggregate capital stock of all of the companies was $89,118,975, an increase of $2,479,800 over 1911.

The companies declared $4,916,370 in dividends. Thirty-seven of the sixty-five companies paid dividends ranging from 1 per cent to 11 per cent, and twenty-eight companies declared or paid no dividends. The dividend rate averaged 5.52 per cent on the capital stock. The funded debt on June 30 was $77,706,700, an increase of $6,198,000 in the year, and the total unfunded debt was $26,834,394, an increase of $4,614,175. The total capital investment was $185,720,897, an increase of $13,584,732 over 1911. The average cost of the street railways of the State was $68,503 per mile of main track, and the capital investment per mile of track constructed was $67,679.

The total income of the companies for the year was $38,414,857, and the total expenditure, including dividends declared, was $38,355,427, making a net surplus of $59,430. The total operating revenue increased from $35,036,997 to $36,080,237 in the year. Operating expenses increased from $22,895,804 to $24,363,903. The revenue from the transportation of mails and merchandise increased from $337,463 to $385,383. The net operating revenue was $11,716,334, a decrease of $424,859. The total number of passengers carried was 701,798,274, a gain of 248,698, and the car mileage increased from 123,659,082 to 125,078,724. The gross earnings per mile of track increased from $12,877 to $13,148 and the operating expenses from $8,415 to $8,878. The gross earnings per car mile were $0.288 against $0.283 in 1911 and operating expenses $0.195 compared with $0.185 in 1911. The average gross earnings per passenger were 5.14 cents, operating expenses being 3.47 cents and net earnings 1.67 cents, the net of the previous year being 1.78 cents. On June 30, 1912, the companies had 23,290 employees and 8004 cars compared with 21,972 employees and 7821 cars a year ago.

There were 7843 accidents, compared with 6963 in 1911. Twenty-seven passengers were killed, compared with 15 in 1911, and 5701 injured, the preceding year showing 5101 injured. Twenty-one employees were killed and 428 injured, the 1911 figures being 24 and 340 respectively.

The board has continued during the year its study of fenders and wheelguards. For the purpose of making a special study of accidents caused by persons coming in contact with either the fender or wheelguard the board provided street railway companies with blank forms for reporting such accidents. In 1912 on all the street railway lines 426 persons came in contact with fenders or wheelguards, of whom forty-six were fatally injured, while forty-four received serious and 336 minor injuries. Lifting jacks have been installed upon cars of the different companies and conductors and motormen instructed in their use. In twenty-one of the fender and wheelguard accident cases the use of jacks was required. During the year it was suggested to the board that the issuance of free passes to persons not within the prohibition of the statutes constitutes a discrimination in passenger rates, of which the board might take cognizance under its general powers. The board is of the opinion that any action would constitute a declaration of policy and as such would be within the province of the Legislature rather than of the board.

Hearings on Subway Contracts in New York

During the week ended Jan. 18, 1913, the Public Service Commission for the First District of New York held public hearings, as required by law, on the terms and conditions of the proposed contracts with the Interborough Rapid Transit Company and the New York Municipal Railway Corporation (Brooklyn Rapid Transit) covering the construction and operation of the new subway lines and elevated railroad extensions in the dual system. These contracts were as follows:

1. With the Interborough Rapid Transit Company for the operation of extensions of the existing subway in Manhattan, the Bronx and Brooklyn, the cost of construction to be borne jointly by the city of New York and the company, each contributing $58,000,000. The cost of equipment, estimated at $22,000,000, to be borne by the company.
2. With the Interborough Rapid Transit Company for the construction, at its own expense, of extensions of the existing elevated railroads in Manhattan and the Bronx, to cost about $16,000,000; also the operation thereof by the company.
3. With the Manhattan Railway for the third-tracking of the elevated railroads in Manhattan and the Bronx leased to and operated by the Interborough Rapid Transit Company, to cost about $11,000,000; also for the operation of the same by the Interborough company.
4. With the New York Municipal Railway Corporation for the construction by the city and the company jointly of the new Broadway subway in Manhattan, two new tunnels to Brooklyn and extensions of the Centre Street loop subway and the Fourth Avenue subway, the company to contribute $14,500,000 and the city about $100,000,000 toward the cost of construction, all to be equipped and operated by the company in conjunction with its existing elevated railroad system in Brooklyn. It is estimated that the new equipment will cost $26,000,000.
5. With the New York Municipal Railway Corporation for the construction, at its own expense, of certain extensions to its elevated railroads to Jamaica and other points and the operation thereof in connection with the rest of the new system. The cost of such extensions is estimated at $8,000,000.
6. With the New York Municipal Railway Corporation for the construction, at its own expense, of additional tracks on existing elevated railroads and for the operation thereof in connection with existing lines. The cost of such additional tracks is estimated at $6,500,000; also for the reconstruction of existing elevated lines at its own expense at an estimated cost of $10,000,000.

At the hearing on Jan. 18, 1913, in regard to the proposed construction by the Brooklyn Rapid Transit Company of the projected Franklin Avenue, Jamaica Avenue and Liberty Avenue elevated lines considerable opposition developed on the part of the residents of the districts which would be affected by the construction of these lines. At the hearing on Jan. 20, 1913, President Mitchel of the Board of Aldermen, objected to the terms of the proposed contracts, mentioning such details as the preferential payments, the rates at which the companies are raising the money and the recapture clauses.

Reorganization of a Chicago Information Bureau

The bureau organized by a number of public utility companies and accident insurance companies to supply information concerning jurors, witnesses and claimants in suits, which has been in existence in Chicago for about five years, has been reorganized and Sidney Ossoski, the general claim agent of the Chicago (Ill.) Railways, has been made chairman of the advisory board, with complete control of the operation of the bureau. Besides Mr. Ossoski, the advisory board is composed of L. L. Austin, general claim agent of the Chicago Elevated Railways; H. M. Weber, claim agent of the Chicago Telephone Company; William Beye, general claim agent of the Illinois Steel Company, and H. D. Wagner, claim investigator for the Employers' Liability Assurance Corporation. The reorganized bureau has taken up quarters at Suite 1552, Otis Building, Chicago, and intends to expand, and will advertise in Chicago and other cities with a view to increasing the number of subscribers.

In laying his plans before the advisory board, Mr. Ossoski mentioned the following:

First—It is the intention to furnish more and better service and a more prompt and efficient system of reports to all inquiries of subscribers.

Second—The new office will be properly equipped with modern filing cabinets and other equipment necessary to increase and felicitate the efficiency of the bureau.

Third—It is the intention to prepare and maintain a street index in connection with the regular index now in use. This street index will tell in what part of the city the majority of the claims and suits arise. It will show out of what houses or certain streets the chronic claims and suits arise. It will give a check on repeaters in cases where the claimant or plaintiff changes his name or her name. This street index will be invaluable in examining jurors, plaintiffs, claimants and witnesses, and, by providing proper telephone service, information on jurors or witnesses will be furnished on short notice. With the great number of cases coming in from the larger corporations, the street index will be of utmost value, and the bureau will accordingly be of just as much benefit to a client whose business is small as it will be to the big corporations.

Fourth—An investigation department in connection with the bureau will be installed. Investigations will be made for other cities and outside individuals on request, and these will be paid for at standard rates.

Fifth—It is proposed to make the bureau more effective by drawing into it outside subscribers. It is possible that a lower rate will be charged to out-of-town subscribers, as they will in many cases want investigations made and want the bureau to do the work.

In calling attention to the co-operation of subscribers necessary in making the bureau a success, the members are urged to make reports of all claims and suits and send in special reports of all chronic claimants and plaintiffs. It is also desired that special reports of all suits or claims that develop in investigation of cases of which the bureau has no record be made and forwarded to the bureau office.

Another Traction Plebiscite in Brooklyn

The Brooklyn (N. Y.) Rapid Transit Company on Jan. 18, 1913, gave out an analysis of the vote taken on Jan. 17 on the question of the company's proposal to create a Sound to Ocean rapid transit line as laid out in the proposed form of certificate now before the Public Service Commission of the First District of New York. This analysis covers the vote as reported at the office of the company up to 9 p. m. on Jan. 17 from the various depots. It is a preliminary count, subject to verification by a later canvass which the company is requesting the Public Service Commission either to conduct or to supervise, as the commission may see fit. The result, as shown by these figures, is that the proposition was indorsed by a majority of more than twenty to one on the entire system, and was ratified on every operating line, surface and elevated, in the system. In a statement which it issued the company said:

"An examination of the figures for the crosstown depot shows that in the Greenpoint section, where prolonged agitation has been conducted against this line, the vote was quite as heavy as on any other part of the system. The lines operated from the Ridgewood depot include among others the Greene and Gates Avenues line, which runs through the area where the agitation against the proposed route has been acute, yet the vote on the Greene and Gates Avenues line was nearly 10 to 1, being 3730 in favor and 395 opposed. The company submits this as showing in some measure what the real sentiment of the traveling public of Brooklyn is on its proposal to create a Sound to Ocean line by the only practical means of getting such line, namely, by building an elevated structure from the Brighton Beach line at Fulton Street through the Williamsburg section, Greenpoint and Long Island City, to connect with the Astoria and Corona lines at the Queensboro Plaza."

Advertisements setting forth the proposal of the company were published in Brooklyn newspapers Jan. 14, 15, 16 and 17, 1913, and reprints of advertisements were distributed in surface and elevated cars on Jan. 15, 16 and 17, to the number of 125,000 each day. Ballots were distributed by conductors on surface lines and by conductors and guards on elevated lines. Ballots were collected by conductors and inspectors on surface lines, and conductors, collectors, guards and ticket agents on elevated lines. All ballots marked but not signed were excluded. This count did not attempt to eliminate duplications or verify addresses. The ballots signed are being preserved at depots and terminals to await further canvass for final count.

Los Angeles Railway Corporation Development Plans

W. E. Dunn, vice-president of the Los Angeles Railway Corporation, Los Angeles, Cal., has addressed a letter in part as follows to the Public Utility Commission of Los Angeles in reply to the letter from the commission published in the Electric Railway Journal of Jan. 4, 1913, recommending the addition of cars for use in the city:

"This company is making a careful investigation of the side-entrance car with a view to determining its utility in actual operation, and is almost daily making changes in the present car suggested by experience and intended to bring it to the highest possible state of efficiency. As soon as the car is finally complete we shall adopt it as a standard, and will order new cars of that type. The number of new cars to be ordered during the year 1913 will be in excess of the suggestion made by you, namely, seventy-five.

"The subject of the use of trailers during rush hours is receiving careful attention by us, and we are getting data from other cities. It is positively to the advantage of the company to use trailers, if they can be properly handled and moved through the streets with the rapidity with which we are able to move single cars. If, on the other hand, it should be found that trailers delay to any appreciable extent the moving of cars, it would increase the congestion rather than help it out.

"We believe that the moving of heavy interurban traffic to San Pedro Street will materially relieve congestion on downtown streets, and particularly on Main Street, First Street and Seventh Street. Accomplishing this, we will be enabled to distribute traffic to the great benefit of Spring Street and Broadway as well. If it is determined that trailers can be used to the advantage of the public, we will, in addition to the cars above named, order a reasonable number of trailers for use in the rush hours.

"The examination now being conducted will, I believe, convince you that the equipment we now have, as well as the equipment to be ordered, is more in quantity than the earnings of the company will justify, other improvements considered; but we shall, as we have in the past, try to keep at the head of the procession."

The letter of Paul Shoup, president of the Pacific Electric Railway, in this connection was published in the Electric Railway Journal of Jan. 11, 1913, page 79.

Interurban Terminal Question in Cincinnati

A controversy has arisen between the administration at Cincinnati and the Association for the Improvement of the Canal, of which George R. Balch is president, over Plan No. 4 of Bion J. Arnold's report, which relates specifically to the proposed interurban terminal. It seems that Mr. Arnold's plan provides for the entrance of several of the interurban lines over a route built on canal land which has been leased from the State by the city. He proposes to depress the tracks, so that they would pass under all streets. The Association for the Improvement of the Canal, through whose activities the canal property was turned over to the city, objects to having the tracks built in an open ditch and asserts that the bill enacted by the Legislature providing for the lease to the city specifies that the land shall be used for boulevard purposes, but that there will be no objection to a subway under it. President Balch says that the association and the city are pledged to use the canal land as specified and that a concerted opposition will be made if there is any attempt to have the conditions modified or to put any other construction on the contract.

Mayor Hunt issued a public statement on Jan. 17 in which he said that he and Mr. Balch agreed upon practically all points. He said that the tracks will be depressed north of Liberty Avenue, where no injury to property will result by having cars operated in an open cut. Because of the wording of the law on which the lease is based, he said he thought it best to have an amendment passed, but that he is not sure that this will be necessary.

Mayor Hunt holds that if the cost of building the terminals can be brought below $6,478,940 by competitive bidding, it might be best to award a franchise to a private corporation, but if not then the city should build and own them. He has been advised that the revenue from the property would be sufficient to retire the necessary bond issue within a few years and that the undertaking will be of more benefit than the Cincinnati Southern Railroad, which the city owns, because it will aid in solving the housing problem.

Annual Report of New York Railways Association

The sixteenth annual report of the New York Railways Association, composed of employees of the New York (N. Y.) Railways, for the year ended Sept. 19, 1912, has been issued in pamphlet form. During the year the membership was increased from 4284 to 4636. The total receipts increased, while the total expenses decreased, as compared with the returns for the previous year. The total book value of the investments of the association as shown in the report is $54,461, as compared with $48,221 on Sept. 19, 1911, and the cash on hand in the treasury on Sept. 19, 1912, was $8,550, as compared with $6,441 on Sept. 19, 1911. The cash and investments of the association as of Sept. 19, 1912, amounted to $63,012, as compared with $54,662 on Sept. 19, 1911, an increase of more than 15 per cent. These figures do not include the amount received by the association from the operation of the lunch rooms and placed to the credit of the lunch room fund. On Sept. 19, 1911, this fund amounted to $1,915. At the close of the last fiscal year of the association the fund amounted to $5,238. The statement of receipts and disbursements for the year as contained in the report follows:

Cash on hand Sept. 19, 1911		$6,441
Receipts:		
Dues	$28,171	
Initiation fees	3,110	
Entertainments	6,658	
Pool room	2,560	
Interest on investments and deposits	1,816	
Miscellaneous	442	42,757
Investments		8,044
Total receipts		$50,801
Total		57,242
Disbursements:		
Sick benefits	$17,606	
Death claims	9,314	
Medical fees	4,978	
Entertainments	1,021	
Pool room	1,249	
Printing and stationery	1,088	
Library	17	
Miscellaneous	69	$35,342
Investments		13,350
Total disbursements		$48,692
Cash on hand Sept. 19, 1912		8,550
Total		$57,242
Investments and cash:		
Bonds, book value		$54,461
Cash on hand		8,551
Total investments and cash		$63,012

The following interesting statements in regard to the loan fund of the association and to the pensions for employees are made by Frank Hedley, chairman of the board of trustees of the association:

"The profits from the operation of the lunch rooms have enabled your trustees to set aside such an amount as is necessary to enable the association to make loans to its members without interest. The plan provides for the payment of the loans in small instalments. It is the object of the association to assist in this way those of its members who may find themselves temporarily in need of money to meet obligations which could not readily have been foreseen and which may arise as a result of illness or other causes beyond their control. Association members are thus spared the necessity of borrowing money at exorbitant rates of interest from 'loan sharks.' During the past year the association has loaned about $4,500. Applications for loans should be made to the secretary.

"I desire to call your attention to the fact that the board of directors of the New York Railways has authorized a continuance of the pension system which has heretofore been carried on by the Metropolitan Street Railway, under which the members of this association are entitled to pensions upon retirement from active service. In other words, the New York Railways proposes to supplement the work of the association and make provision toward the support of the association members when the latter have arrived at the age of retirement and have completed a term of service which entitles them to withdraw from active participation in the operation of the company."

National Association of Corporation Schools

The National Association of Corporation Schools, which has been in process of formation for the past year, was finally organized in New York City on Jan. 25, 1913. The object of the society is to render available to its members authoritative information on instruction methods in corporation schools, so that new schools may be successful from the start by avoiding the pitfalls into which others have fallen, and to assist existing schools in increasing their efficiency. Active membership has been limited to corporations, and in order that the object set forth may not be subverted the control is invested entirely in the active members, thus admitting only so much of theory and of extraneous activities as the corporations themselves feel will be beneficial and will return dividends on their investment in time and membership fees.

Accredited delegates representing about fifty large corporations having schools attended the meeting, which was closed by a dinner at Delmonico's on the evening of Jan. 25. Among the organizations represented were the Pennsylvania Railroad, American Locomotive Company, Public Service Railway of New Jersey, American Electric Railway Association, New York Edison Company, the Doherty companies, Yale & Towne Manufacturing Company, National Cash Register Company, Westinghouse Air Brake Company, Consolidated Gas Company, New York; Dodge Manufacturing Company, Mishawaka, Ind.; General Electric Company, Schenectady, and Commonwealth Edison Company, Chicago. The American Electric Railway Association was represented by Prof. H. H. Norris, of Cornell University, chairman of its education committee.

New Illinois Road Placed in Operation.—The Kankakee & Urbana Traction Company, Kankakee, Ill., placed its line between Urbana and Rantoul in operation on Jan. 16, 1913. The company has arranged to rent power from the Illinois Traction System.

Exhibit of Illinois Traction System at Peoria Show.—The Illinois Traction System, Peoria, Ill., was an exhibitor at the Peoria Electrical Show held from Jan. 18 to 25, 1913. In addition to a booth where various forms of literature and posters were on display, several signals similar to the type used on this road were installed in the exhibition hall. These were electrically connected and arranged so that the blades would periodically pass from the danger to the clear position, or the reverse.

Additional Guard Rails on Chicago Elevated Structure.—As a result of derailments on curves on the elevated loop structure in Chicago which occurred on Jan. 8 and 16, the management of the Chicago Elevated Railways contemplates installing additional guard rails and protective girders at the danger points. It will be necessary to obtain a permit from the city before these additional protective features can be installed on the structure, but the plans are well under way and will be submitted to the city for approval in the near future.

Decision in United States Commerce Court Impeachment Case.—On Jan. 13, 1913, Robert W. Archbald, judge of the United States Commerce Court, was dismissed from his position by the action of the Senate in impeachment proceedings. Judge Archbald was convicted upon five counts in thirteen articles of impeachment, each of the articles describing a separate offense. All of the charges except one of those upon which he was convicted related to conduct since his appointment to the position of judge of the Commerce Court, a verdict of acquittal being given upon the charges relating to conduct before he became a member of that court, a majority of the Senate holding that actions prior to his appointment should not be made a subject of condemnation.

Additional Municipal Lines Suggested in San Francisco.—A resolution has been adopted by the Board of Supervisors of San Francisco, Cal., granting fifty-two days' extension of time from Jan. 7 to the W. L. Holman Company, within which to complete its contract for furnishing the remaining cars for the Geary Street Municipal Railway. Mayor Rolph has suggested to the public utilities committee the desirability of giving close study to the project of constructing a belt road to run along the Embarcadero and connect with the Geary Street line at the foot of Market Street. Chairman Vogelsang, on behalf of the utilities committee, said that the matter would receive prompt and proper attention, as well as the propositions to construct municipally owned railroads on Van Ness Avenue and on Stockton Street.

Consolidation of West Penn Plants.—The West Penn Traction & Water Power Company, Pittsburgh, Pa., has consolidated several of the electric light plants which were purchased some time ago so as to form a part of the West Penn system. This merger means the elimination of seven central station plants, power for which is now being supplied primarily from the steam power station of the West Penn Company at Connellsville, Pa., which has a capacity of 42,000 hp. Power will eventually be supplied by the hydroelectric development of the West Penn Traction & Water Power Company on the Big Sandy and the Cheat Rivers in West Virginia. Construction work is now under way on these plants, the first of which, with an originally installed capacity of 50,000 hp, will be in operation about Jan. 1, 1914.

Special Message to Council of Rochester.—Mayor Edgerton of Rochester, N. Y., sent a special message, in part as follows, to the City Council recently in regard to the service of the New York State Railways, Rochester Lines: "As a result of the recent appeal to the Public Service Commission the congestion on Main Street has been relieved, but, according to complaints received from citizens, the overcrowding of street cars is due to inadequate equipment. The Public Service Commission, Second District, has temporarily discontinued its investigations, but the public, in the meantime, continues to suffer. I would suggest that the Common Council direct its law and railroad committee to investigate these conditions, to the end that the company may be compelled to provide adequate service, and that the committees report their findings back to your honorable body."

Conference of Governors of New England States on Railroad Affairs.—At the conclusion of a conference on Jan. 17, 1913, between Governor Baldwin of Connecticut and Governor Foss of Massachusetts, held at the office of Governor Baldwin, in Hartford, Governor Foss is reported to have made the following statement in regard to a plan to call all the governors of the New England States together to consider such railroad matters as it is felt concern all of New England: "As a result of my conference with Governor Baldwin there is nothing that can be called a definite decision on matters pertaining to the general railroad situation in New England. We discussed the controversy from every angle. This afternoon's meeting was the first of a series which I am endeavoring to inaugurate between the governors of all the New England States. I offered no tentative solution to-day and neither did Governor Baldwin. The New Haven-Grand Trunk deal was talked about and the whole New England situation was touched upon with regard to demands to be made by coming generations. I expect to see Governor Pothier of Rhode Island soon. Then the other governors of New England will be invited to conferences."

San Francisco Railway Development Discussed.—At the regular weekly meeting of the San Francisco Development League, held on Jan. 14, 1913, an address was delivered by

J. R. Bibbins, resident engineer for Bion J. Arnold, Chicago, on the growth and development of San Francisco and its transportation facilities. The burden of the talk was the absolute necessity for quick action by San Francisco in making due preparation for the growth that is to come by building extensions to its transit lines and by working out a system of finance by means of which the present unsatisfactory relation between the city and its transit systems may be improved. The absolute inadequacy of the city's purchasing power for the acquisition or construction of utilities was emphasized, and results from other cities were drawn upon to illustrate the immediate response of underlying property values to improved transit facilities. Mr. Bibbins also showed that municipal boundaries as they exist have practically no bearing upon the broad movements of population; rather it is its rapid transit facilities and the geography of the district which alone control these movements. This results in the creation of a metropolitan district, and points to the great advantage of organizing a metropolitan district control for conserving the proper development of utilities and industries.

Service on the Excelsior Springs Line of the Kansas City, Clay County & St. Joseph Railway.—J. R. Harrigan, general manager of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., announced that regular service over the Excelsior Springs division of the company would be begun on Jan. 21, 1913. Cars will leave Kansas City and Excelsior Springs at 6 a. m. and make regular trips throughout the day at intervals of an hour and a half. This service, however, is temporary and within a short time trips will be made in each direction every hour. The last car will leave Kansas City at 11 p. m. and will be known as a theater special. The running time to Excelsior Springs will be one hour and ten minutes. The station in Excelsior Springs is near the Wabash depot and the business section. The first stop out of Kansas City will be at Avondale, and for the present at least the company will make no effort to handle traffic to North Kansas City, leaving that for the line across the bridge recently placed in service by the development company. Cars will leave Kansas City from the company's waiting rooms, Thirteenth and Walnut Streets, running north on Walnut Street to Third Street, east to Cherry Street, thence across the bridge. Entering Kansas City the cars will turn south from Third Street on Grand Avenue to Thirteenth Street, thence west to Walnut Street. As the cars will run over the Metropolitan Street Railway in Kansas City, a 5-cent fare will be charged within the city. The fare will be 65 cents for one way or $1.15 for the round trip to Excelsior Springs. Tickets will be sold at the Kansas City office, Thirteenth and Walnut Streets; Liberty and Excelsior Springs. At other points cash fares will be accepted.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

INDIANA

A summary of the principal bills which have been introduced in the Legislature of Indiana follows: A bill to prohibit the use of intoxicating liquor on the cars of interurban and steam railroads except in dining buffet cars. House bill providing for the revision of the highway laws and authorizing boards of county commissioners to grant interurban railways rights-of-way on public highways. Senate bill to require publicity of acts by county commissioners, town councils and boards of public works having power to grant franchises in public highways, the cost of the publicity to be borne by the applicant for the grant. House bill to require railroads to construct and maintain convenient crossings over their rights-of-way and to provide and keep up on all private lands such bars and gates as the owners may elect. Senate bill to authorize the Railroad Commission of Indiana to order the separation of grade crossings, the cost to be prorated between the railroads and the county in which the separation is made. House bill to abolish the collection on steam and interurban lines of cash fares in excess of the regular ticket fares. House bill to limit passenger fares on steam railroads and interurban electric railways to 2 cents a mile for adults and 1 cent a mile for children between the ages of five and twelve years, and prescribing charges for fractions of a mile and fixing the minimum fare which shall be charged.

A meeting of representatives of the electric railways, electric light companies, water works, telephone companies and other public service interests was held in the Traction Terminal Building, Indianapolis, on Jan. 17 to consider the bill introduced by Senator Shively to supplant the Railroad Commission of Indiana with a public utilities commission of five members.

MINNESOTA

A number of bills have been introduced in the Legislature in accordance with the recommendations of the Governor to that body. An employers' liability bill, providing that contributary negligence on the part of a fellow employee is not a defence, and fixing the amounts in which an employer is liable, has been introduced into the House. A bill has also been introduced into the same body to compel electric railway companies in cities of more than 50,000 to station flagmen at all grade crossings with steam railroads. Three "blue sky" bills have been introduced into the House. A "blue sky" bill has also been introduced into the Senate. A bill introduced into the Senate would create a board of public utility commissioners.

NEW YORK

A bill to provide for workmen's compensation within the limitations prescribed by the Court of Appeals in its decision holding unconstitutional the law urged by the Wainwright commission has been introduced in the Legislature. The bill provides that every employer and employee shall be considered as within the provisions of the act unless the State insurance department receives notice of an intention to reject its provisions. Employers who decide to come within the act are required either to insure their liability for compensation with stock or mutual insurance companies or to give satisfactory proof to the insurance department that they are able to meet their obligations.

OHIO

A complete revision of the public utilities law of Ohio is anticipated by those who are acquainted with the ideas of Governor Cox. He would remove the restrictions of the old law respecting qualifications of the members of the commission and would departmentize the commission. It is believed the Governor will ask that the law be changed so that appeals from the decisions of the commission can be taken direct to the Supreme Court, such appeals to have precedence over all other cases. Judge J. Adams, dean of the law department of the Ohio State University; William H. Page, author of "Corporations" and "Wills" and professor in the State University law school, and Charles C. Marshall, special counsel in Attorney-General Hogan's office, have been retained by the Governor to draft a bill to cover the situation. They will have the advice of Commissioner Oliver H. Hughes. Representative Kilpatrick, of Trumbull County, has introduced a bill providing that toilet rooms shall be installed on all interurban cars operated for a distance of more than 10 miles out of a terminal city.

PROGRAM OF ASSOCIATION MEETING

Illinois Electric Railway Association

On account of the unavoidable absence of a number of the members of the Illinois Electric Railway Association, it was decided to postpone the annual meeting from Jan. 17 until Jan. 31. The meeting will be held at the Hotel La Salle, Chicago, and the opening session will begin at 10 a. m. In view of the amount of work to be done at this meeting, the program committee thought it would be for the best interest of the association to omit the presentation of papers and confine the meeting entirely to the business program, which is as follows:

Review of year's work, by President E. C. Faber.
Report of executive committee, by H. E. Chubbuck.
Report of membership committee, by F. E. Johnson.
Final report of the traffic committee of an interchangeable coupon ticket, by G. W. Quackenbush.
Report of the signal committee, by J. Leisenring.
Unfinished business.
Appointment of nominating committees.
Election of officers.
Appointment of committees for ensuing year.

Financial and Corporate

Stock and Money Markets

Jan. 22, 1913.

The net gain in the general level of prices of the securities traded in on the New York Stock Exchange was higher to-day than on the previous day. It is expected that the action of the market during the next few days will indicate whether the improvement is permanent. Money was easy to-day despite further gold exports. Rates in the money market to-day were: Call, 2@3 per cent; sixty days, 3¼@3½ per cent; ninety days, 3¾@4 per cent; five and six months, 4@4½ per cent.

In the Philadelphia market there was a sharp demand at the opening for Philadelphia Electric, but trading became extremely dull following the noon hour.

Trading on the Chicago market to-day was narrow and dull. The feature was the sale of 420 Chicago Railways series 2's. The bond sales were confined largely to the issues of the local railways.

The Boston market to-day was dull but firm. The demand, although not large, was effectual in advancing prices. The local investment bond market is inclined to drag.

The Baltimore market to-day was narrow, but the volume of transactions was fair. The bond sales to-day totaled more than $80,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 15	Jan. 22.
American Brake Shoe & Foundry (common)	92	92
American Brake Shoe & Foundry (preferred)	131½	131
American Cities Company (common)	47½	47½
American Cities Company (preferred)	78½	77
American Light & Traction Company (common)	410	405
American Light & Traction Company (preferred)	106½	108
American Railways Company	40½	40¼
Aurora, Elgin & Chicago Railroad (common)	43¾	44¼
Aurora, Elgin & Chicago Railroad (preferred)	87	86¾
Boston Elevated Railway	112¼	113¼
Boston Suburban Electric Companies (common)	5	7½
Boston Suburban Electric Companies (preferred)	67	65
Boston & Worcester Electric Companies (common)	7	7
Boston & Worcester Electric Companies (preferred)	40	40
Brooklyn Rapid Transit Company	89½	89⅝
Capital Traction Company, Washington	121½	122
Chicago City Railway	150	150
Chicago Elevated Railways (common)	30	30
Chicago Elevated Railways (preferred)	89	90
Chicago Railways, ptcptg., ctf. 1	91½	94
Chicago Railways, ptcptg., ctf. 2	24½	24½
Chicago Railways, ptcptg., ctf. 3	8	8
Chicago Railways, ptcptg., ctf. 4	3½	2½
Cincinnati Street Railway	*122½	118
Cleveland Southwestern & Columbus Ry. (common)	*5⅛	*5⅛
Cleveland Southwestern & Columbus Ry. (preferred)	*33	*33
Cleveland Railway	*103½	104
Columbus Railway & Light Company	60	55
Columbus Railway (common)	80	81¼
Columbus Railway (preferred)	81	83¾
Denver & Northwestern Railway	118	118
Detroit United Railway	76	75
General Electric Company	182	182¼
Georgia Railway & Electric Company (common)	122½	123½
Georgia Railway & Electric Company (preferred)	82½	83
Interborough Metropolitan Company (common)	17⅞	17⅜
Interborough Metropolitan Company (preferred)	60¼	61
International Traction Company (common)	*38	*38
International Traction Company (preferred)	*99	*99
Kansas City Railway & Light Company (common)	18¼	18
Kansas City Railway & Light Company (preferred)	40	40
Lake Shore Electric Railway (common)	9	*9
Lake Shore Electric Railway (1st preferred)	91	*91
Lake Shore Electric Railway (2d preferred)	25½	*25½
Manhattan Railway	130	131¼
Massachusetts Electric Companies (common)	16½	17
Massachusetts Electric Companies (preferred)	75	75
Milwaukee Electric Railway & Light Co. (preferred)	100	*100
Norfolk Railway & Light Company	25	*25
North American Company	80½	80
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	100	100
Philadelphia Company, Pittsburgh (common)	49¾	50
Philadelphia Company, Pittsburgh (preferred)	44¼	44
Philadelphia Rapid Transit Company	27½	27
Portland Railway, Light & Power Company	68½	68½
Public Service Corporation	117	116
Third Avenue Railway, New York	37½	38¼
Toledo Railway & Light Company	2¼	1½
Twin City Rapid Transit Co., Minneapolis (common)	105¾	106¾
Union Traction Company of Indiana (common)	4½	*4½
Union Traction Company of Indiana (1st preferred)	81	*81
Union Traction Company of Indiana (2d preferred)	34	*34
United Rys. & Electric Company (Baltimore)	24	23½
United Rys. Inv. Company (common)	32	33
United Rys. Inv. Company (preferred)	60¼	60
Virginia Railway & Power Company (common)	51	51
Virginia Railway & Power Company (preferred)	90	89
Washington Ry. & Electric Company (common)	85½	85½
Washington Ry. & Electric Company (preferred)	87½	90¼
West End Street Railway, Boston (common)	80½	80½
West End Street Railway, Boston (preferred)	97	97½
Westinghouse Elec. & Mfg. Company	73¾	74¼
Westinghouse Elec. & Mfg. Company (1st preferred)	115	117½

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*Last sale.

ANNUAL REPORTS

York Railways

The following statement of earnings of the York (Pa.) Railways, Edison Electric Light Company, York Steam Heating Company and the York Suburban Land Company for the year ended Nov. 30, 1912, was presented at the annual meeting of the stockholders of the companies held on Jan. 13, 1913:

	1912	1911
Gross earnings	$710,471	$681,185
Operating expenses	$366,519	$360,594
Allowances for depreciation	15,589	14,637
	$382,109	$375,232
Net earnings	$328,361	$305,953
Miscellaneous income	4,229	4,448
Total income	$332,591	$310,401
Fixed charges and taxes	252,327	244,074
Net income	$80,263	$66,327
Dividends	64,000	16,000
Surplus	$16.263	$50,327

SURPLUS ACCOUNT

Balance Dec. 1, 1911	$44,625
Net profit year ended Nov. 30, 1912	80,263
	$124,888
Less dividends, January and July, 1912	64,000
Surplus, Nov. 30, 1912	$60,888

Gordon Campbell, president of the company, said in part:

"Although general conditions have affected the gross earnings, there is nevertheless a substantial increase, and with a relatively small increase in operating expense, a gain is effected in net income amounting to $13,936. This improvement is largely due to the advantage gained from the installation in the previous year of steam reserve power. This plant has proved highly satisfactory and very efficient in operation. Providing as it does ample protection against interruptions, it has resulted in greatly improved relations with both the public and the York Haven Water & Power Company. Some increase in the expenditure for maintenance has been made, the aim being to maintain the property in excellent condition.

"During the year new double track was laid and paved on East Market Street from Sherman Street to Lehman Street and on West Market Street between Hartley Street and West Street. This track was constructed of 90-lb. girder rail and in the most substantial manner.

"Since 1907 the West College Avenue line has been closed on account of the condition of the County Bridge, which was condemned as unsafe and closed to traffic during the long controversy which ensued involving your company's rights upon the bridge. In 1911 the county repaired and reconstructed the bridge, but continued to contest the company's right to cross. This controversy has been brought to a happy conclusion by a decision of the court sustaining the company's position, and the track on the bridge has been relaid, service being opened to the public on Dec. 1. The line is showing satisfactory returns from its operation.

"Among other improvements are the construction of a new line car, the addition of a wheel lathe in the repair shop and the substitution of electric heaters for car stoves, thus increasing the effective capacity of the city cars.

"In the power house a 100-kw motor generator set was installed for use as a battery booster, and improvements were made in the switchboard to permit of practically instantaneous operation of the storage battery as a reserve for lighting, to be used in emergency as a supplement to the steam power. A number of minor extensions of the lighting company's lines have been made.

"A franchise was obtained by the York Steam Heating Company for extending its mains on South George Street from Mason Alley to College Avenue, and extensions of the steam mains were laid on South George Street from Mason Alley to Princess Street, and on North George Street from Clark Alley to Philadelphia Street.

"The expenditures charged to cost of property during the year amount to $62,360.

"In view of the unsatisfactory bond market at this time, the issue of $350,000 of one-two year 6 per cent collateral trust notes which matured on Jan. 1, 1913, was renewed for one year.

"The work of the year is shown in the increased earnings. In the meanwhile the property has been well maintained and shows further improvement in general condition."

Third Avenue Railway

The Third Avenue Railway, New York, N. Y., has issued its first annual report for the calendar year 1912. It contains a consolidated income account for the eleven months ended Nov. 30, 1912, showing a surplus over charges, including depreciation of $355,000, of $1,209,429. F. W. Whitridge, president of the company, states, however, that, estimating December earnings at $110,000, the net earnings for the year ended Dec. 31, 1912, were about $1,319,000, after paying interest upon all the subsidiary securities and upon the 4 per cent refunding bonds and setting aside the $400,000 depreciation fund. Following is the consolidated statement of income for the eleven months ended Nov. 30, 1912:

Operating revenue:	
Transportation	$8,424,189
Advertising	80,067
Rents	139,894
Sale of power	108,085
Total operating revenue	$8,752,235
Operating expenses:	
Maintenance of way and structures	$788,039
Maintenance of equipment	565,658
Power supply	681,329
Operation of cars	2,251,793
Injuries to persons and property	448,610
General and miscellaneous expenses	624,494
Total operating expenses	$5,359,923
Net operating revenue	$3,392,312
Taxes	618,339
Operating income	$2,773,973
Interest revenue	35,799
Gross income	$2,809,772
Total deductions	1,600,343
Net income	$1,209,429

Mr. Whitridge says in part:

"Estimating the earnings for December at $110,000, the net earnings for the year are approximately $1,319,000, after paying interest upon all the subsidiary securities and upon the 4 per cent refunding bonds and setting aside the depreciation fund. Ordinarily this would have been more than sufficient to pay the interest upon the 5 per cent adjustment bonds, but this has not been a normal year. Large expenditures were necessary for the completion of the reorganization. The cash on hand amounts to $2,556,756, of which $1,131,104 is allocated to tracks under the reorganization plan; $35,239, together with 453 4 per cent refunding bonds of the Third Avenue Railway, is in the depreciation fund; $1,024,270 is in the interest and tax account hereafter mentioned, and $358,719 is in the current account. The unpaid bills for paving reduce the amount of free cash on hand, but there remains sufficient to pay an instalment of interest on the adjustment bonds on April 1, the next interest date, amounting to 1¼ per cent, which I recommend be paid on that day.

"Pending the decision of the litigation in respect to the franchise taxes for the last three years, I have paid to the Comptroller of the city of New York such amounts as we considered should be paid under any circumstances, and have also paid in to the account entitled 'interest and taxes account' the remainder of the amount claimed by the State authorities. This amounts to upward of $275,000 and is deposited with the Central Trust Company at interest.

"Large expenditures are still necessary upon the property, and for the purpose of informing ourselves and the security holders as fully as possible about them, I have had a careful budget prepared of all the expenditures which can be foreseen during the next one or two years. A considerable part of the expenditure upon the track and paving would be charged, under any circumstances, to operating expenses, and a large part of the balance, together with nearly the whole of the expenditures called for by the other departments, is properly chargeable to capital. Such expenditures could probably be met by the issue of additional 4 per cent refunding bonds. The company has, however, sufficient funds on hand to meet all these expenditures for the current year as well as to pay $350,000 on account of the purchase of the New York City Interborough Railway and upward of $100,000 which will be necessary to expend upon the Mid-Crosstown Railway, Inc., in case the owners of that property should conclude to accept our offer to purchase it. It may probably be desirable to apply to the Public Service Commission for consent to issue 4 per cent refunding bonds for part of these capital expenditures. It will not be necessary to market such bonds, and it should be our policy, so far as possible, not to increase our fixed charges.

"Finally, I think it may be said, notwithstanding the large expenditures shown in this budget, and which will probably hereafter be shown in similar budgets, that the outlook for the owners of Third Avenue securities is encouraging.

"All of the companies show a steady increase in gross receipts, except the Dry Dock, East Broadway & Battery Railroad, which is affected by the partial suspension of the Desbrosses Street ferry, and the Westchester Street Railroad, which is affected by the beginning of operations on the New York, Westchester & Boston Railway. In this latter case I think the decrease is only temporary, as more people will be brought into the territory. The increased gross receipts for the year including these roads are, in round numbers, $520,000, and while a part of this is due to our having assumed the possession of the subsidiary companies and of the New York City Interborough Railway, the increase upon the Union Railway and the three Manhattan companies alone is $368,000, an amount far in excess of the estimates originally made.

"During the year a contract for the purchase of the New York City Interborough Railway was approved by the Third Avenue Railway, and a note for $1,350,000 was given to the Central Trust Company for the money necessary to purchase the securities offered for sale and partly to complete the road it was entitled to build under its franchises. Since that time the Third Avenue Railway has purchased additional securities of this road at a cost of $220,375, for cash. The purchase of these securities, which include all the bonds and about four-fifths of the stock, has been approved by the Public Service Commission.

"As receiver of the Third Avenue Railway, I have for the last two or three years been operating the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad (since reorganized as the Mid-Crosstown Railway, Inc.), and I proposed to purchase that property at a cost of $500,000. That proposition was not approved by the Public Service Commission, and I am bound to say that the receipts of the line since I took it have been disappointing and that the Public Service Commission was justified in refusing to allow the purchase to be completed. Since the decision by the commission another offer has been made to purchase the property, free of debt, for $250,000."

The budget for expenditures referred to by Mr. Whitridge calls for an outlay of $232,388 by the Third Avenue Railway, $148,200 by the Union Railway, $55,074 by the Westchester Electric Railroad, $18,850 by the New York City Interborough Railway, making a total of $454,513. For maintenance and construction of all lines the sum is $1,142,140, making a grand total of $1,596,653.

Value of Chicago Elevated Railways Discussed in Merger Proceedings

It appears that the local transportation committee of the Chicago City Council has arrived at an arrangement agreeable both to the city and the Chicago Elevated Railways in regard to the value for the elevated railways in the general merger of all transportation lines in Chicago. W. G. Beale, counsel for the Chicago Elevated Railways, submitted figures representing the cost to the association of the three elevated railway properties as of July 1, 1911, Jan. 1, 1912, and Jan. 1, 1913. These figures are shown in the accompanying table.

The committee questioned the cost of obtaining $28,500,000 upon association notes and the cost of obtaining $16,-

UNIV. OF CALIFORNIA

000,000 through preferred shares. In both instances the committee considered the brokerage charge excessive and contended that the charge in connection with the $16,000,000 of preferred shares should be eliminated from the cost of the property to the city. Mr. Beale advised the committee that the seemingly excessive brokerage charge was due largely to the previous failures of attempts to organize the elevated roads into a single company. Finally, H. A. Blair consummated a merger of the operating departments of the three companies in July, 1911. The new organization had not been incorporated, but merely represented an association of various financial interests and stockholders. In order to bring about the merger and underwrite the floating debt, it was necessary to pay a large brokerage fee. Mr. Beale stated that at the time the operating agreement between the companies was arranged the Stone & Webster Engineering Corporation reported a fair value of the property as $90,000,000. The members of the committee continued to press the representatives of the elevated railways association to eliminate the two brokerage items from the valuation, but the representatives of the companies refused to comply with this condition.

Mr. Beale said that the association intended to assume control, but that the adjustment for unified operation would require a number of years. Although the Oak Park line is in the hands of receivers, the association at public sale assumed a portion of the floating debt. The court had authorized receivers' certificates, but the association had been unable to obtain money on the certificates at this time to improve the property.

In concluding the explanation of the company's position, Mr. Beale advised the committee that if the general merger of all transportation lines was not brought about quickly, a complete merger between the elevated lines would be undertaken by the association in the near future. This would require further reorganization and many physical changes in the existing property, and entail an expense in excess of $1,000,000. As to the items representing organization and miscellaneous costs, Mr. Beale said legal expenses had been included as well as loss of interest on funds on hand. This latter item probably made up the larger proportion of the total amount shown.

At the conclusion of the discussion of the various items shown in the table of costs of acquiring the property, the committee appeared to be of the general opinion that progress had been made. In view of this it instructed the original valuation committee, which represented the city, and was composed of members of the Harbor and Subway Commission, to complete its valuation of the elevated lines. It will be recalled that the original valuation made by this commission did not contain intangible values or values representing the loss of interest during construction, expense of organization, cost of obtaining frontage and numerous miscellaneous items which would add materially to the total. Following the issuance of these instructions, J. J. Reynolds, of the original valuation commission, raised the question as to whether the committee was satisfied with the value of real estate in which there was so great a difference between the figures of the company and those of the city. This should be decided in order to give them some basis upon which to compile the complete valuation. The chairman of the committee said that he did not believe that it was generally agreed that the real estate value was correct, but that the values made originally would serve as some basis for arriving at complete figures.

The corporation counsel was also instructed to draft a skeleton ordinance embodying eleven suggestions printed in the Dec. 21, 1912, issue of the ELECTRIC RAILWAY JOURNAL, page 1242. The purpose of this skeleton ordinance was to start the general discussion of the various clauses to be included in the general merger ordinance. At a meeting of the local transportation committee held Jan. 13 these suggestions were taken up clause by clause and discussed with a view to advising the corporation counsel of all the points each clause should include. One of the questions raised in this discussion was that of additions to capital account. It was the opinion of the chairman of the committee that the 10 per cent profit on construction work done by the company should be eliminated from capital account. He also questioned the amounts that should be charged under the renewals-in-part clause in the old ordinance. Many items now being added to capital account under the 1907 ordinance were properly chargeable to operation. At the conclusion of this session it was suggested that the representatives of the two surface railways be requested to offer their opinions as to the fairness of the valuation set on the elevated railways by the holding association. Upon resolution the suggestion was adopted.

COST OF ACQUISITIONS

(Disregarding betterments made by companies after July 1, 1911.)

	As of July 1, 1911	As of Jan. 1, 1912	As of Jan. 1, 1913
Required for purchase of stocks of Metropolitan, South Side and Northwestern companies	$21,201,745	$21,201,745	$21,201,745
Cost of obtaining $28,500,000 upon association notes ($30,000,000)..	1,500,000	1,500,000	1,500,000
Cost of obtaining $16,000,000 through association preferred shares	4,000,000	4,000,000	4,000,000
Provided for Northwestern company (paid Sept. 1, 1911)...........	20,000,000	20,000,000	20,000,000
Paid toward acquisition of Oak Park road		1,665,577	1,680,970
Organization and miscellaneous...	198,122	345,472	507,241
	$46,899,868	$48,712,795	$48,889,958
Add funded debt of all four companies existing July 1, 1911, excluding Northwestern bonds due Sept. 1, 1911. (See accompanying schedule)	32,285,750	32,285,750	32,285,750
	$79,185,618	$80,998,545	$81,175,708
MEMORANDUM. — Balance of the original amount of $44,500,000 realized by the association from its notes and preferred shares..	3,100,132	1,287,205	1,110,042
	$82,285,750	$82,285,750	$82,285,750

SCHEDULE OF FUNDED DEBT

Northwestern Company first mortgage 4's, due Sept. 1, 1911..	$18,000,000
Northwestern Company equipment notes 6's..................	184,000
Union Elevated Company 5 per cent bonds, due 1945.........	4,472,000
South Side Company 4½ per cent bonds, due 1924............	8,000,000
Metropolitan Company first mortgage 4 per cent bonds, due 1938	10,000,000
Metropolitan Company extension 4's, due 1938..............	4,433,000
Metropolitan Company gold notes, 5 per cent...............	150,000
Union Consolidated Company 5 per cent bonds, due 1936.....	407,000
Oak Park Company first mortgage 5 per cent bonds, due 1928	4,432,000
Oak Park Company 5 per cent equipment notes...............	40,000
Oak Park Company 6 per cent equipment notes...............	157,000
Oak Park Company real estate mortgages....................	10,750
Funded debt July 1, 1911..................................	$50,285,750
Deduct Northwestern bonds due Sept. 1, 1911...............	18,000,000
Funded debt as of July 1, 1911, excluding Northwestern bonds.	**$32,285,750**

Chicago (Ill.) Railways.—A dividend of $6 has been declared on the participation certificates, Series I, of the Chicago Railways. This, with the 6 per cent paid on Oct. 31, 1912, makes a total of 12 per cent paid during the fiscal year to the end of Jan. 31. The previous distributions were $8 on Sept. 1, 1909, and an initial payment of $4 on Nov. 15, 1908. The present distribution leaves the distributions, which are 8 per cent cumulative, 16 per cent in arrears.

Cities Service Company, New York, N. Y.—A monthly dividend of five-twelfths of 1 per cent has been declared on the common stock of the Cities Service Company, payable on Feb. 1, 1913, to holders of record of Jan. 15, 1913, placing the stock on a 5 per cent yearly basis. The regular monthly payment of one-half of 1 per cent on the preferred stock will be made at the same time.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—The Cleveland, Painesville & Eastern Railroad has been authorized by the Public Service Commission of Ohio to issue its forty-year 5 per cent refunding and extension bonds of a par value of $62,000 at not less than 80, the proceeds to be used to reimburse the income account for expenditures made therefrom in payment for improvements.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—The Commonwealth Power, Railway & Light Company has declared an initial dividend of 1 per cent on the $12,000,000 of common stock of the company, payable on May 1, 1913, to holders of record of April 10, 1913.

Dayton, Covington & Piqua Traction Company, West Milton, Ohio.—The Public Service Commission of Ohio has authorized the Dayton, Piqua & Covington Traction Company to issue $40,000 of its first mortgage 5 per cent gold bonds at 90, the proceeds to be used to pay and discharge prior liens aggregating $7,100 and to discharge certain items of floating debt.

El Paso (Tex.) Electric Company.—The directors of the El Paso Electric Company have voted to offer $250,000 of the unissued common stock for subscription pro rata at par to both common and preferred stockholders of record at the close of business on Feb. 1, 1913.

Louisville (Ky.) Railway.—The annual report of the Louisville Railway for 1912 was made public following the recent meeting of the directors of the company. The increase in gross revenue of the company was almost $100,000 during 1912. Operating expenses increased only $47,212, leaving the increase in operating revenue $52,682. An increase of $81,710 in charges and taxes, as compared with 1911, left the net revenue from operation of the company's city lines $29,028 less than in 1911, but this was largely compensated for in an increase of $24,835 in "other income," derived from the operation of the interurban lines of the Louisville & Interurban Railroad. Practically all of the $670,650 paid in dividends during the year by the company went to the Louisville Traction Company, the holding corporation. The report for 1912 follows: Gross revenue, $3,130,492; operating expense, $1,700,037; operating revenue, $1,340,455; charges and tax, $786,127; net revenue, $554,328; other income, $234,885; net income, $789,213; dividends. $670,650; surplus, $118,563.

Mount Vernon (Ohio) Electric Railway.—The Public Service Commission of Ohio has authorized the Mount Vernon Electric Company to sell its street railway in Mount Vernon to the Mount Vernon Electric Railway, which is to pay $50,000 for the property, payable $40,000 in 6 per cent bonds and $10,000 in the paid-up capital stock of the Mount Vernon Electric Railway.

New York, New Haven & Hartford Railroad, New Haven, Conn.—Morton F. Plant, New London, Conn., and Lawrence Minot, Boston, Mass., have been elected directors of the New York, New Haven & Hartford Railroad to succeed Augustus May, Bridgeport, Conn., and George MacCulloch Miller, New York, N. Y.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—John A. Monroe, C. W. Hamilton and Frank B. Johnson, all of Omaha, have been elected directors of the Omaha & Council Bluffs Street Railway to succeed E. A. Cudahy, Chicago, and Randall K. Morgan, New York, resigned, and W. V. Morse, deceased.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—Application has been made to the Public Service Commission of the Second District of New York for its consent to the consolidation of the Rochester, Syracuse & Eastern Railroad, the Syracuse, Lake Shore & Northern Railroad, and the Auburn & Northern Electric Railroad as the Empire United Railways, Inc., with a capital of $11,600,000. The companies are controlled and operated by the so-called Beebe Syndicate. The directors of the new corporation are Hendrick S. Holden, James M. Gilbert, William K. Pierce, Edward Joy, Willis A. Holden, Charles M. Warner, Charles A. Lux, B. L. Smith, William Nottingham, Albert E. Nettleton and Clifford D. Beebe, Syracuse; Fidelio K. Hiscock, North Yakima, Wash.; Edwin D. Metcalf, Auburn; Ferdinand W. Roebling, Jr., Trenton, N. J., and Cadwell B. Benson, of Minetto, N. Y.

Third Avenue Railway, New York, N. Y.—The Third Avenue Railway has applied to the Public Service Commission of the First District of New York for permission to purchase all of the $200,000 of stock and the $2,200,000 of bonds of the Belt Line Railway Corporation for $2,450,000. It intends to finance the purchase temporarily by borrowing on short-term notes, with the stocks and bonds of the Belt Line Railway Corporation as security. The Belt Line Railway Corporation is the successor to the Central Park, North & East River Railroad. In its petition to the commission the Third Avenue Railway sets forth that the lines of the Belt Line Railway Corporation can be operated more profitably and economically in conjunction with the lines of the Third Avenue Railway than they could independently and that the purchase of the property by the Third Avenue Railway would prevent any disturbance of the transfer compromise arranged between the surface railways in the borough of Manhattan and the Public Service Commission recently.

Toledo Railways & Light Company, Toledo, Ohio.—At the annual meeting of the stockholders of the Toledo Railways & Light Company Albion E. Lang, former president, resigned as a director. Mr. Lang is now a resident of Vermont. Conrad Weil, of Hodge & Weil, Toledo, was elected to succeed Mr. Lang. All other directors were re-elected. The board met and adjourned to Jan. 30 without electing officers or transacting other business. The report of the president will be read at the adjourned meeting. The delay was occasioned by the fact that the reorganization plan has not yet been completed.

Wilkes-Barre (Pa.) Railway.—The Wilkes-Barre Railway has filed with the Secretary of State at Harrisburg notice of the increase in the stock of the company from $300,000 to $900,000.

Yarmouth Light & Power Company, Ltd., Yarmouth, N. S.—The Yarmouth Light & Power Company, Ltd., was incorporated recently to take over the property of the Yarmouth Electric Company and the Yarmouth Street Railway, Ltd. The directors of the company are: Willard M. Kelley, president; Edgar K. Spinney, vice-president; John T. Murphy, W. H. Covert, Blake G. Burrill and C. C. Hichards. John T. Murphy, Halifax, is managing director.

Dividends Declared

Brazilian Traction, Light & Power Company, Montreal, Que., quarterly, 1½ per cent.

Chicago (Ill.) Railways, 6 per cent, participation certificates, series I.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, one-half of 1 per cent, preferred; quarterly, 1¾ per cent, common.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., 2½ per cent, preferred.

Railways Company General, Philadelphia, Pa., quarterly, 1 per cent.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, quarterly, 1¼ per cent, preferred.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Nov.,	'12	$47,844	*$31,211	$16,633	$14,400	$2,233
1 "	"	'11	44,655	*29,683	14,972	14,429	543
5 "	"	'12	300.894	*168,343	132,551	72.000	60.551
5 "	"	'11	294,515	*163,334	131,181	72,258	58,923

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Nov.,	'12	$239,141	*$145,324	$93,817	$43,388	$50,429
1 "	"	'11	214,563	*125,204	89,359	43,730	45,629
11 "	"	'12	2,736,156	*1,551,988	1,184,168	481,563	702,605
11 "	"	'11	2,454,651	*1,359,562	1,095,089	487,120	607,969

PHILADELPHIA RAPID TRANSIT COMPANY.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Dec.,	'12	$2,065,830	$1,221,530	$844,300	$763,640	$81,660
1 "	"	'11	1,964,272	1,168,293	795,978	741,502	54,476
6 "	"	'12	11,926,124	7,086,774	4,839,350	4,560,921	278,429
6 "	"	'11	11,344,408	6,858,487	4,485,920	4,430,323	55,597

PORTLAND (MAINE) RAILROAD.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Nov.,	'12	$76,071	*$57,798	$18,273	$10,254	$8,019
1 "	"	'11	72,068	*53,951	18,117	9,636	8,481
5 "	"	'12	473,222	*292,043	181,179	51,682	129,497
5 "	"	'11	470,615	*301,219	169,396	47,774	121,622

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Nov.,	'12	$570,863	*$288,933	$281,930	$151,765	$130,165
1 "	"	'11	541,934	*250,134	291,800	130,807	160,993
11 "	"	'12	6,055,452	*3,050,229	3,005,223	1,609,588	1,395,635
11 "	"	'11	5,780,306	*2,813,164	2,967,142	1,377,530	1,589,612

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Nov.,	'12	$100,787	*$54,495	$46,292	$19,710	$26,582
1 "	"	'11	94,577	*60,322	34,255	19,381	14,874
11 "	"	'12	1,068,965	*611,650	457,315	216,350	240,965
11 "	"	'11	997,884	*625,361	372,523	211,900	160,623

UNION RAILWAY, GAS & ELECTRIC COMPANY, ROCKFORD, ILL.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Nov.,	'12	$386,772	*$221,275	$165,497	$91,555	$73,932
1 "	"	'11	290,240	*162,432	127,808	63,751	64,057
11 "	"	'12	3,553,966	*2,084,578	1,469,388	870,799	598,589
11 "	"	'11	2,864,796	*1,646,145	1,218,651	680,000	538,651

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*Includes taxes.

Traffic and Transportation

Relation of Interurban Freight Service to the High Cost of Living

Edward C. Spring, manager of the Philadelphia division of the Lehigh Valley Transit Company, Allentown, Pa., read a paper, "The Relation of Interurban Trolley Freight Service to the High Cost of Living," before the City Club of Philadelphia on Jan. 18, 1913. Mr. Spring reviewed at considerable length the history of the development of electric railway freight service in the Middle West and pointed out how methods which had been found of value there could be modified and applied successfully by the lines in the East. The following brief abstract has been made of the paper which he presented on the subject:

"The subject of the high cost of living is demanding the attention and study of every wage earner and provider. The most potent factor which presents itself is the closer relationship between producer and consumer and the agency which will bring these two into closer relationship. No other improvement of modern times has done more to develop communities, build up municipalities and revolutionize social life among the masses of this country than the electric railway system. Hitherto the handling of freight by electric railway has received much less attention in the East than has been given to the same subject in the Middle West, and quite naturally the managers of the lines in the East look to the interurban lines in the Middle West for help in solving freight and express service problems.

"The state agricultural institutes have told the farmer how to prepare the ground and till the soil and plant to produce the best results, but the farmer has been told very little about how to find a market for his product after it has been developed. My work with the company that I now represent is to familiarize the farmers with the relation which the electric railways bear to them.

"The community in and about Philadelphia is splendidly served as far as the farmer is concerned by the up-to-date service of the companies which have recently established a fast express service at freight rates between Allentown and Philadelphia. The company with which I am connected has established a brokerage department in connection with its express and freight service whereby the farmer can secure a market for his commodity without going to the city. The company does not charge for this service, and it is one which so far as I know has never before been attempted by an electric railway in the East.

"Philadelphia, situated as it is in the heart of a wonderful development and occupying as it does the position of the third largest city in the United States, cannot help realize and take advantage of the possibilities of the productive agricultural sections within close touch of the city. I believe that city markets should be established at various sections of the city with tracks running directly to them and a freight terminal as near the center of the metropolitan district as conditions will permit, so that farm products could be delivered direct to these markets. Owing to the wide gage of the city tracks, however, the city of Philadelphia cannot allow direct communication with the outlying electric railways. These matters should have the attention of the engineers in laying out the future transportation plans of the city.

"The company which I represent is probably doing more to-day than any other electric railway to develop express traffic from the farms, and traversing as it does the highly productive counties of Montgomery, Bucks and Lehigh for a distance of 58 miles to the north of Philadelphia, it is in a position to serve the city to great advantage. So rapidly has the recently established business of transporting farm products developed that the company has ordered several new cars to handle the traffic. The development of the field of transporting farm products by the electric railways, so far as the sections in and around Philadelphia are concerned, has only just begun. The volume of business which will be developed by the electric railways and the advantages which will accrue to the city of Philadelphia cannot be estimated. The recent advent of one of the largest old-line express companies on the Lehigh Valley Transit Company's line is an added feature to the progressive and up-to-date methods that are being instituted for the benefit of the Philadelphia markets.

"The key to the success of any interurban electric railway service is its terminal facilities in the large cities. A system of electric railway freight terminals must be established to bring the producer and the consumer into close touch and eliminate the middleman. A fair adjustment of rates on the part of the city line with the interurban roads must be made so that the through rates for transportation between the farming districts and the city will be attractive to the farmer. At present the city lines receive the same percentage of the through rate for a haul of 5 or 6 miles that the interurban lines receive for 30 or 40 miles. It seems to me that these two factors, namely, terminal facilities and rates charged by the city lines, are the most important and are of vital interest to Philadelphia in the development of electric railway freight service."

Increase in Wages on Third Avenue System

F. W. Whitridge, president of the companies included in the Third Avenue Railway System, New York, N. Y., addressed a communication as follows to the trainmen on Jan. 17, 1913, in regard to a proposed revision in the wages of the men:

"The first year of the corporate existence of the new Third Avenue Railway closed on Dec. 31, 1912. It has been a prosperous year for the company; the receipts on all the lines of the system except two have increased, and I realize that a part of that increase is due to the care and general conduct of those who run the cars. I think it just that this recognition by the companies should take the form of an increase in wages, so that the men may realize that when the company prospers they shall participate in its prosperity. I propose that the wages hereafter to be paid shall be:

"Third Avenue Railway, Forty-second Street, Manhattanville & St. Nicholas Avenue Railway and the Dry Dock, East Broadway & Battery Railroad:

	Conductors, per Hour, Cents.	Motormen, per Hour, Cents.
First year	24	25
Second year	25	26
Third and fourth year	26	27
Fifth year	27	28½

"On storage battery lines the rate will be:

	Cents per Hour.
Conductors	22
Motormen	25

"Union Railway, including the New York City Interborough Railway and the Southern Boulevard Railroad:

	Cents per Hour.
Conductors and motormen, first year	24
Conductors and motormen, second year	27

"Westchester Electric Railroad, including the New York, Westchester & Connecticut Traction Company:

	Cents per Hour.
Conductors and motormen, first year	24
Conductors and motormen, second year	27

"Yonkers Railroad:

	Cents per Hour.
Conductors and motormen, first year	24
Conductors and motormen, second year	27

"This will take effect upon all the lines of the company on March 1, except in the case of the Yonkers Railroad, where the men have not been at work for a couple of weeks and the company has suffered some loss because of their little vacation, for which it must in part be recouped, and the increase will therefore take effect in the case of the Yonkers men on June 1.

"The Third Avenue Benefit Association, as you know, has accumulated $54,000, which is invested in New York city 4¼ per cent bonds, and every man is guaranteed by that fund an insurance of $250. I have been for some time in negotiation with some of the large insurance companies, and I think that it will be possible to procure an insurance for each of the men of, say, $1,000 at very moderate rates, which will cut out all agents' commissions and put the insurance within the reach of all. I therefore inclose a post card upon which those of you who are members of the association may signify your preference."

The post card in regard to the matter of insurance says: "If a considerable number of the men desire to have additional insurance, I will report to them specifically what can be done. In the meantime no man is committed to anything."

Temporary Increase in Fare Between Trenton and Princeton Approved

On the application of the receivers of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., the Board of Public Utility Commissioners of New Jersey has issued an order authorizing an increase in the fare of the company between Trenton and Princeton, N. J., from 10 cents to 15 cents, effective from Feb. 5, 1913, for a period of one year. The rate of fare which is to be supplanted temporarily has been in force since 1902, in accordance with provisions of the ordinances granted to the company by the borough and the township of Princeton. The provision of these ordinances in regard to the matter of fares was recently repealed. The order of the board to the company follows:

"The Board of Public Utility Commissioners hereby orders and directs that the companies to this application shall for a period of twelve months beginning Feb. 5, 1913, establish and make charges as follows:

"1. The rate of fare for a continuous trip between Trenton and Princeton, in either direction, shall be 15 cents.

"2. There shall be three fare zones between these two places, instead of two zones, as hitherto. The rate of fare for traversing any one of these three zones, or any part thereof, shall be 5 cents. The first zone shall extend from Warren Street, Trenton, to Eggert's Crossing, a distance of 4.1 miles. The second zone shall extend from Eggert's Crossing to Rosedale Road, a distance of 4.51 miles. The third zone shall extend from Rosedale Road to the Witherspoon terminus at Princeton, a distance of 3.95 miles.

"3. An overlap shall be established between Eldridge Park and Lawrenceville, in either direction, and within this overlap only one fare of 5 cents per passenger shall be collected of passengers traveling between the two stations in question.

"4. The companies to this application shall sell bunches of tickets or block tickets, not less than twelve tickets in a bunch or block, at the aggregate price of $1, each of said tickets to be good for passage between Lawrenceville and either Trenton or Princeton in either direction."

Campaign Against Smokers in Philadelphia

The Philadelphia (Pa.) Rapid Transit Company has in the interest of the public health begun a campaign against smokers. The company has caused the following notice in the form of a placard 13 in. high by 21 in. wide to be placed in its cars:

"Passengers are earnestly requested to co-operate by abating the smoking and spitting nuisance in the cars of this company.

"Conductors will be required on and after Feb. 1, 1913, to remove passengers who persist in smoking, spitting or carrying partly consumed cigars or cigarettes, either lighted or unlighted, into the cars at any time."

Cards 2½ in. high by 4¼ in. wide which read as follows have been prepared by the company to be handed by the conductors to passengers who violate this rule after Feb. 1, 1913:

"IN THE INTEREST OF PUBLIC HEALTH

"Smoking, spitting or the carrying of partly consumed cigars or cigarettes, either lighted or unlighted, is not permitted on any part of closed cars at any time.

"Passengers are earnestly requested to co-operate by observing this necessary rule; conductors are required to remove from the car such passengers as persist in violating this rule of the company.

"The police department has instructed its officers to assist in removing from the car such passengers as persist in violating this reasonable rule of the company."

Near-Side Car in Vancouver.—The British Columbia Electric Railway, Vancouver, B. C., has placed a near-side car in operation in Vancouver. The company has also equipped the rear platforms of a number of its cars with wire gates of the folding type, designed especially to prevent accidents.

Petition for Increase in Service and Reduction in Fare in Manchester, N. H.—A petition has been filed with the Public Service Commission of New Hampshire for more frequent service over the Manchester Street Railway between Manchester and Goffstown and for a reduction in fare on all the lines of the company in Manchester from 5 cents to 4 cents.

Service Order in Atlanta.—The State Railroad Commission has issued an order directing the Georgia Railway & Power Company, Atlanta, Ga., to operate a ten-minute schedule during rush hours on the company's Ponce de Leon line, and a fifteen-minute schedule during the remainder of the day. The commission has also ordered that the last outbound car on the Ponce de Leon line of the company shall leave the center of the city no later than midnight.

Accidents in Greater New York in December.—Accidents on the railroads and street railroads of Greater New York reported to the Public Service Commission for the First District for December, 1912, aggregated 5732. This was an increase of 394 over December, 1911. The number of serious accidents, however, was about the same, being 165 against 167 for December, 1911. The number of persons killed in December, 1912, was nineteen, against twenty-four in the same month of 1911.

Fare Order by New York Commission.—The Public Service Commission of the Second District of New York has made an order providing that the rates of fare to be charged by the New York, Westchester & Boston Railway from its terminus in the city of New York to its station in White Plains shall be 30 cents, and that the maximum rate for sixty-trip commutation monthly ticket shall be $7. The present rate provides for a fare of 35 cents single trip and monthly commutation ticket $8. This fixes the fare at the same rate as between Port Chester and New York and the rate now ordered was agreed to by the company as a proper one.

Question of Fare Over Illinois Central Railroad at Chicago.—As a result of an opinion rendered by Corporation Counsel Sexton to the Chicago City Council, the local transportation committee of that body has called a special meeting to take up the question of rates of fare on the Illinois Central Railroad. The company recently raised its rate of fare on one-way and round-trip tickets to 2 cents per mile. There was no increase in the commutation rates, but citizens who use the Illinois Central Railroad to reach the downtown district and real estate dealers in the territory affected have protested against the change. The opinion rendered by corporation counsel was to the effect that the City Council has the power to regulate railroad fares between points inside the city limits.

Skip-Stop Idea Received with Favor in Portland.—C. J. Franklin, general superintendent of the railway department of the Portland Railway, Light & Power Company, Portland, Ore., is reported to have said that the plan of stopping cars on the Mount Tabor and Sunnyside lines on alternate blocks has proved so successful that the company will in all probability adopt the plan on the Rose City Park line in the near future. Mr. Franklin is quoted as follows: "There seems less confusion than we feared, and I have heard a great deal of favorable comment. One thing that seems to please passengers is the reduced jolting of the cars now that they have opportunity to get under headway before the brakes are applied again for another stop. It not only makes smoother riding, but also saves time. Of that there is no question."

Electric Express Company to Be Dissolved.—J. T. Harmer, president of the New England Investment & Security Company, Springfield, Mass., president of the Springfield Street Railway, vice-president of the Worcester Consolidated Street Railway and president of the Electric Express Company, issued the following bulletin recently: "Commencing on Jan. 1, 1913, the express business will be carried on directly by the electric railway companies instead of through the Electric Express Company. Application will be made later to the State to dissolve the Electric Express Company." C. V. Wood, vice-president and general manager of the Electric Express Company, will continue to superintend the express and freight business on all three railways. There will be no changes in the agents or other employees of the companies.

Rate Hearing Before the I. C. C.—Special Examiner J. Edgar Smith of the Interstate Commerce Commission on Jan. 10 presided over a hearing on the complaint of S. J. T. Price and others against the Washington & Old Dominion Railroad, Washington, D. C., which a few months ago took over a branch of the Southern Railway and relieved it of the necessity of running suburban passenger trains into the Washington terminal. When the lines of the Southern Railway were taken over the electric railway rates from the nearby points in Virginia were increased, and the commutation tickets were sold in such a manner as to lead to the charge by the suburbanites that the aim of the company is really to defeat the jurisdiction of the commission and keep under that of the Virginia Corporation Commission, which has allowed the increased local rates to go into effect. F. E. Wright, president of the company, introduced exhibits tending to indicate that the rates are just and reasonable considering the services performed and the increased necessities of the property.

Briefs Filed in Louisville-Indianapolis Case.—The brief of the Louisville Board of Trade, Louisville, Ky., and other shippers of that city to the Interstate Commerce Commission praying that through routings be established along the electric railways between Louisville, Indianapolis and other northern Indiana points, was recently filed with the commission by Louis B. Wehle, attorney for the shippers. The commission instituted an investigation into interurban freight conditions in the territory affected a short time ago. In answer briefs have been filed by the defendants with the commission. The answer of the Indianapolis, Columbus & Southern Traction Company with respect to the inexpediency of enforcing through freight routings sets forth three principal facts as follows: First—The defendant line is not built to handle freight except packages at express rates. Second—It would be impossible for the line to take care of its passenger business should it operate through freight connections. Third—The freight business now handled is and must of necessity be done at a loss. The Louisville & Northern Railway & Lighting Company states that through freight business to Indianapolis would have to be done at a loss upon the additional investment required for such service. The Louisville & Southern Indiana Traction Company avers that the bridge over which it operates in entering Louisville is too congested under present conditions to admit of freight traffic.

Fares Between Seattle and Tacoma Up for Settlement Again.—John A. Shackleford, Tacoma, Wash., and J. B. Howe, Seattle, Wash., counsel for the Stone & Webster interests in the Pacific Northwest, have notified the Public Service Commission of Washington that it is proposed to appeal for redress from the rates which the Puget Sound Electric Railway was compelled to establish between Seattle and Tacoma after the Supreme Court of Washington had upheld the decision of the commission fixing the rates. The commission and the court estimated that the company would receive a 7 per cent annual return on the value of its property from the rates ordered by the commission to be established by the company. In a statement which it issued at the time the Supreme Court rendered its decision upholding the rates as fixed by the commission, the company said: "The Puget Sound Electric Railway will give the rates ordered a fair trial, and if the trial proves that the estimates of the commission and the court were wrong and the company is injured thereby, it will look with confidence to the commission of its own motion to change its order, as it has the power to do, and thereby right the wrong which it has unintentionally inflicted. If, however, in such case the commission offers no relief, then the company will seek the protection of the courts to prevent the confiscation of its property and believes that in so doing it will be sustained not only in the courts but also in the opinion of all fair-minded persons."

Personal Mention

Mr. W. H. MacAllister, comptroller of the Cincinnati (Ohio) Traction Company, has been elected vice-president of the Cincinnati Car Company.

Mr. W. G. Ross, formerly managing director of the Montreal (Que.) Street Railway, has been appointed chairman of the Montreal Harbor Commission.

Mr. George A. Hearn, electrical engineer of the San Francisco, Napa & Calistoga Railway, Napa, Cal., has been promoted to the position of superintendent of power and equipment of the company.

Mr. F. A. Healy, secretary and treasurer of the Ohio Electric Company, Cincinnati, Ohio, was recently elected first vice-president of the Cincinnati Transportation Club to succeed the late Eugene W. Dahl.

Mr. Norman Read has been appointed electrical engineer and superintendent of motive power of the Denver (Col.) City Tramway in charge of all power plants and substations of the company and other matters pertaining to electrical operations.

Mr. Roger W. Toll has been appointed chief engineer of the Denver (Col.) City Tramway in charge of all matters pertaining to civil engineering, track and roadway construction and maintenance, bridges, viaducts, subways, buildings and quarry.

Mr. George H. Lyne has been appointed superintendent of transportation of the Jackson Light & Traction Company, Jackson, Miss., to succeed Mr. A. T. Miller, resigned. Mr. Lyne was formerly superintendent of the Henderson (Ky.) Traction Company.

Mr. James Graham, formerly with the Canadian General Electric Company, Halifax, N. S., is resident general manager of the Yarmouth Light & Power Company, Ltd., Yarmouth, N. S. which has taken over the property of the Yarmouth Electric Company and the Yarmouth Street Railway, Ltd.

Mr. N. I. Garrison, for eight years auditor of the Fort Smith Light & Traction Company, Fort Smith, Ark., has accepted the position of auditor of the Western States Gas & Electric Company, with headquarters at Stockton, Cal. Mr. Garrison was tendered a banquet on Jan. 14, 1913, by the employees of the company.

Mr. John Evans has tendered his resignation as chief engineer of the Denver (Col.) City Tramway. Mr. Evans finds that it is necessary for him to give practically all of his attention to other interests, but will in the future give the Denver City Tramway the benefit of his services as consulting engineer when the occasion demands.

Mr. W. N. Smith, who last year was consulting engineer of the Washington & Old Dominion Railroad, Washington, D. C., and electrified that line and previously was electrical engineer of Westinghouse, Church, Kerr & Company, has just become connected with the construction department of the Edison Electric Illuminating Company, Boston, Mass.

Mr. Charles F. Conn, who for the last nine years has been vice-president, secretary and general manager of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., has been elected president and general manager of the American Cement Company, which will be reorganized under the name of the Portland Cement Company, with headquarters in Philadelphia, Pa.

Mr. C. H. Robertson, who has been appointed general manager of the Central California Traction Company, Stockton, Cal., was formerly general superintendent and purchasing agent of the East Shore & Suburban Railway, Richmond, Cal., for seven years. Previous to that he was connected with the mechanical department of the United Railroads, San Francisco, Cal., for twelve years.

Mr. J. F. Calderwood, vice-president and general manager of the Brooklyn (N. Y.) Rapid Transit Company, and Mr. W. S. Menden, engineer of rapid transit developments of that company, were retained to report to the readjustment managers concerning the railroad property of the Hudson & Manhattan Railroad, the plan for the readjustment of the debt of which was referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 18, 1913.

Mr. A. L. Lott has resigned as superintendent of electric line of the Omaha & Council Bluffs Street Railway, Omaha, Neb., effective on Feb. 1, 1913, to become connected with the Kawneer Manufacturing Company, Niles, Mich., which manufactures drawn-metal window fronts and metal molding. Mr. Lott has been connected with the Omaha & Council Bluffs Street Railway for more than five years. He has been superintendent of electric line of the company for the last three years.

Mr. Sidney Ossoski, general claim agent of the Chicago (Ill.) Railways, has been made chairman of the advisory board of the bureau organized about five years ago in Chicago by a number of public utility companies and accident insurance companies to supply information concerning jurors, witnesses and claimants in suits. He will have complete control of the operation of the bureau, which intends to expand and advertise in Chicago and other cities with a view to increasing the number of subscribers.

Mr. W. Kesley Schoepf, president of the Cincinnati Traction Company, has been elected president of the Cincinnati Car Company to succeed Mr. Harry C. Ebert. Mr. Ebert will continue with the company as sales manager. It is explained that Mr. Ebert, although having the title of president, gave his entire attention to the sales department, and his duties required him to be absent from Cincinnati for extended periods. The recent expansion of the Cincinnati Car Company's business and the acquisition of the Armor steel foundry made a resident president necessary and for this reason Mr. Schoepf was elected to the position. On Jan. 14, 1913, Mr. Ebert was married to Miss Estelle A. Alter. Mr. and Mrs. Ebert are now on a trip in the East.

Mr. J. P. E. Clark, general manager of the Binghamton (N. Y.) Street Railway, who has been connected with the company for twenty years, has been relieved of the management of the affairs of the company for a period of one year with full pay, during which time the property will be under the direction of Mr. G. Tracy Rogers, president of the company. Mr. Clark has been ill for some time and during the last few months has been confined to his room. Mr. Clark's physicians say that he is on the road to recovery provided he can be free from business for a time, and the directors of the company have granted him the extended leave of absence so that he can undergo treatment abroad. Mr. Clark has been re-elected a director of the company.

Mr. P. D. Kline, who resigned recently as general superintendent of construction of the Falkenau Electrical Construction Company, Chicago, Ill., has accepted the position of general superintendent of the Ogden Rapid Transit Company, effective on Feb. 1, 1913, with offices in Ogden, Utah. Mr. Kline has had charge of the field engineering and construction in connection with installations of power stations, electric railways and general contracting carried out by the Falkenau Electrical Construction Company and the H. A. Strauss Company since January, 1905. Previous to that time he was connected with the contracting department of the Allis-Chalmers Company for two years and as superintendent of transportation of the Sheboygan Light, Power & Railway Company, Sheboygan, Wis., for four years.

Mr. Oscar T. Crosby, whose resignation as president of the Wilmington & Philadelphia Traction Company, Wilmington, Del., was mentioned in the last issue of this paper, is expecting to make an exploration trip into the unknown regions of Borneo and New Guinea, after certain personal business affairs in this country are settled. The regions which he expects to visit are among the few on the globe which have not yet been charted, and in this expedition Mr. Crosby hopes to repeat some of the original exploration work which he conducted in 1900 in Abyssinia and the Soudan and in 1903 in Turkestan and Tibet. It is to be hoped that he will also summarize his experience on this new trip in a book of travels as he did in the very interesting volume which gives an account of his experiences during the Tibet expedition.

Mr. E. L. Lewis, whose appointment as superintendent of the Los Angeles (Cal.) Railway Corporation to succeed Mr. John J. Akin, resigned, was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 14, 1912, was born in Osceola, Mo., in 1859. He entered the service of the Geary Street Railway, San Francisco, Cal., in 1887, as an engineer of the company's steam extension, which was operated from Central Avenue over Point Lobos Avenue and First Avenue to Golden Gate Park. He next became a conductor on the Geary Street Company's cable line and continued in this capacity until August, 1888. Mr. Lewis next entered the service of the Los Angeles (Cal.) Cable Railway as a conductor. In a few months he was appointed to the position of receiving clerk in charge of the money turned in by conductors at the end of each trip. He continued as receiving clerk until August, 1890, when he was made chief clerk to Mr. John J. Akin, the superintendent. In May, 1902, Mr. Lewis was advanced to the position of assistant superintendent. He continued as assistant superintendent until Jan. 1, 1913, when he was appointed superintendent of the company to succeed Mr. Akin.

William H. Winslow

Mr. William H. Winslow, the new president of the Wisconsin Electrical Association, is a representative type of the progressive electric-service operator in a city of less than 50,000 population. He is vice-president and general manager of the Superior Water, Light & Power Company, Superior, Wis. Born in Chicago in 1867, he went to Superior in 1889, becoming cashier of his present company, which was formed at that time. Thereafter he was promoted to be, successively, secretary, manager, general manager and vice-president. Mr. Winslow was president of the Wisconsin Gas Association in 1911 and is a member of the important rate research committee of the National Electric Light Association. He is also a member of the Illuminating Engineering Society and the American Water-Works Association.

OBITUARY

Charles Edward Troxell, claim agent in litigation cases of the Chicago (Ill.) City Railway, died on Jan. 16, 1913, at the age of thirty-one years. He had been in ill health for some time, but the direct cause of his death is said to have been over-exercise. Mr. Troxell entered the service of the Chicago City Railway in 1902 as a claim adjuster. Just previous to his taking up this work and following his leaving college he studied law in the offices of Mr. Clarence Darrow. Through promotions he was made claim agent in charge of cases in litigation.

W. H. Lanius, president of the Hanover & McSherrystown Street Railway, Hanover, Pa., died at his home in York, Pa., Jan. 21, 1913. He was seventy years old. Mr. Lanius was very well known in business and railway circles in Pennsylvania. He was at one time president and a director of the York Street Railway, which is now part of the system of the York Railways. He was one of the projectors of the extension of the Western Maryland Railroad to York and was instrumental in the development of the northwestern portion of that city.

James W. Johnson, district manager in Chicago for the General Electric Company, died of pneumonia, after a short illness, on Jan. 14, 1913, at his home in that city. Mr. Johnson was born in Waverly, N. Y., on Dec. 3, 1862. He began his business career with the Bell Telephone Company in 1878, and remained with that company and its successor, the Chicago Telephone Company, until 1885. For two years thereafter he was managing partner of the firm of Johnson, Holland & Company. In 1887 Mr. Johnson became manager of the Northwestern Electric Accumulator Company, and a year later he entered the Chicago office of the Thomson-Houston Electric Company as a salesman. With the exception of a period of about three years when he was connected with the United States Fire & Police Telegraph Company, Mr. Johnson served the Chicago office of the Thomson-Houston Electric Company and its successor, the General Electric Company, Schenectady, until his death.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Mobile & Baldwin County Railroad, Mobile, Ala.**—Application for a charter has been made by this company in Alabama to build an interurban railway between Mobile, Bay Minette and Pensacola. Capital stock, $50,000. Incorporators: W. P. Miller, M. H. Miller, John P. Lowell and J. R. Cross.

***Palatka-Hastings Interurban Railway, Palatka, Fla.**—Application for a charter has been made by this company in Florida to build a 10-mile railway between Palatka and Hastings. The motive power will be gasoline. Capital stock, $250,000. Officers: C. A. Dupont, president; Howell A. Davis, vice-president; F. J. H. Von Angelken, secretary; T. R. Byrd, treasurer.

***Alton & Eastern Railway, Alton, Ill.**—Incorporated in Illinois to build an electric railway in Madison County. Capital stock, $2,500. Incorporators: L. C. Haynes, A. J. Purinton, T. W. Gregory, O. C. Macy and R. C. Hardy.

***Gettysburg & Hanover Traction Company, Gettysburg, Pa.**—Incorporated in Pennsylvania with a capitalization of $5,000.

Charleston-Isle of Palms Traction Company, Charleston, S. C.—Chartered in South Carolina to take over the Seashore division of the Charleston Consolidated Railway & Lighting Company between Mount Pleasant and the Isle of Palms, including all wharf property and ferryboats, together with the power house on Sullivan's Island, and to build a 35-mile line to connect McClellanville, Awensdaw and Mount Pleasant. Capital stock, $1,000,000. Headquarters, New Charleston Building, Charleston. Officers: James Sottile, president, and W. W. Fuller, general superintendent and chief engineer, both of Charleston. [E. R. J., Jan. 4, '13.]

***San Antonio & Austin Interurban Railway, San Antonio, Tex.**—Incorporated in Texas to build an 80-mile interurban railway between Austin and San Antonio, via New Braunfels and San Marcos. Capital stock, $25,000. Directors: Vories P. Brown, W. B. Tuttle, Jesse D. Oppenheimer, Sam C. Bell, San Antonio; H. G. Henne, New Braunfels; C. L. Hopkins, San Marcos, and A. J. Eilers, Austin.

FRANCHISES

Birmingham, Ala.—The Kelly Company has received a thirty-year franchise from the Council over certain streets in Birmingham. [E. R. J., Jan. 4, '13.]

Phoenix, Ariz.—The Salt River Valley Electric Railway has asked the Board of Supervisors for a franchise for right-of-way over county roads between Phoenix and Mesa, via Tempe.

Huntington Park, Cal.—Victor G. Kleinberger has received a franchise from the Board of Trustees for a single-track or double-track electric railway in Huntington Park. [E. R. J., Nov. 30, '12.]

***Los Angeles, Cal.**—The City Council has ordered prepared for sale three electric railway franchises in Los Angeles.

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the City Council in Los Angeles for a line on San Pedro Street from Aliso Street to Ninth Street with an alternative of building on Los Angeles Street between the two points in case the city needs San Pedro Street for its municipal railway. Work on this line will be begun at once. The company will ask the Supervisors for a permit to construct a trestle across the entrance of Alamitos Bay for an extension of its line between Long Beach and Bay City.

Oakland, Cal.—The San Francisco-Oakland Terminal Railways has received an extension of its franchise for three years in which to begin the construction of its line in Oakland.

San Francisco, Cal.—The United Railroads has received a franchise from the Board of Supervisors to extend its line from Polk Street and Bay Street, in San Francisco, along Bay Street to the Fort Mason reservation, connecting with tracks to be laid there.

Milford, Conn.—The Connecticut Company has asked the Council for a franchise to double-track some of its line in Milford.

Palatka, Fla.—The Palatka-Hastings Interurban Railway, the incorporation of which is noted eleswhere in this department, has asked the county commissioners for franchises through Putnam and St. Johns Counties in Florida.

Greenville, Ill.—The Springfield & Central Illinois Traction Company, Springfield, has received a franchise from the Board of Supervisors to use the highways of the county for its interurban line.

Stonington, Ill.—The Decatur, Sullivan & Mattoon Transit Company, which is leased to the Springfield & Central Illinois Traction Company, has asked the Board of Trustees for a franchise in Stonington. John G. Thode, Mattoon, secretary. [E. R. J., Dec. 28, '12.]

Clinton, Ia.—It is stated that the Clinton Street Railway and the Clinton Gas Company will ask for a twenty-five-year combination franchise from the City Council. The extension of the franchise will carry with it, it is said, permission to build a line to the southwestern part of Clinton and one on Hickory Street.

Newark, N. J.—The Public Service Railway, Newark, has received a fifty-year franchise, on consent of the Essex County Board of Freeholders, for a double-track line on the bridge from the foot of Central Avenue, East Newark, over the Passaic River to Carlisle Place, Newark.

Medford, Ore.—W. H. Barnum, representing the Rogue River Valley Railway, has asked the City Council for a franchise to build an electric railway in Medford either as a separate system or as a part of a system operated in Medford.

Pittsburgh, Pa.—The Pittsburgh Railways has received a twenty-five-year franchise from the City Council along Corliss Street in Pittsburgh.

St. Elmo, Tenn.—The Chattanooga Railway & Light Company has received a franchise from the Council in St. Elmo.

Argenta, Tex.—J. W. Carpenter, Corsicana, president of the Corsicana Transit Company, has received a fifty-year franchise from the Council over certain streets in Argenta. He also received permission to build a power station and construct terminals in Argenta. This is part of a plan to build a line between Argenta and Corsicana.

Ogden, Utah.—The Ogden Rapid Transit Company has filed an official acceptance of the franchise granted by the County Commissioners for a right-of-way for the Huntsville extension through Ogden Canyon.

Kelso, Wash.—The Washington-Oregon Corporation, Vancouver, has received a franchise from the Cowlitz County Commissioners over the county roads from Kelso to Castle Rock on the west side of the Cowlitz River.

***Port Townsend, Wash.**—W. B. Webb and associates have asked the Council for a fifty-year franchise to build an electric railway in Port Townsend.

Seattle, Wash.—E. M. Mills, representing bondholders and creditors of the Seattle, Renton & Southern Street Railway, has applied to the Council for three franchises for extensions to its present railway in Rainier Valley. Application was made to the city utilities and franchise committee, and the city utilities committee unanimously voted to indefinitely postpone the measure.

Seattle, Wash.—The City Council of Seattle proposes to issue additional bonds to the amount of $600,000 for extensions of the municipal line in Seattle. H. R. Dimock, Seattle, city engineer. [E. R. J., Nov. 2, '12.]

Newell, W. Va.—The Newell Street Railway has asked the Council for a twenty-five-year franchise to double-track and extend some of its lines in Newell.

TRACK AND ROADWAY

Tidewater Power Company, Birmingham, Ala.—This company, in which J. W. Dewberry and others are interested, proposes to construct an independent railroad from Birmingham to the Warrior River, about 25 miles, to connect there with a steamboat line.

Visalia Electric Railroad, Exeter, Cal.—An extension of this company's line east of Orosi to Fresno will soon be built.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has awarded a contract to the Maywell Railroad Supply Company, San Francisco, for the construction of its line. Work will be begun about Feb. 15.

Pacific Electric Railway, Los Angeles, Cal.—The Board of Public Works has awarded a contract for the construction of the line on St. Pedro Street between Aliso Street and Ninth Street, Los Angeles, to this company. Work will be begun at once.

San Diego (Cal.) Electric Railway.—This company has been asked to consider plans for a double-track line through the city park to the northeastern section of San Diego.

***San Francisco, Cal.**—Preliminary surveys have been made and construction will soon be begun on an electric railway in San Francisco from the present terminus of the Sunnyside Avenue line in a westerly course connecting with Sloat Boulevard and Corbett Avenue and having a western extension through St. Francis Wood that will terminate at the western portal of the proposed Twin Peaks tunnel. It is not yet decided whether this line will be undertaken by private capital or whether it will be built by the United Railroads of San Francisco.

Geary Street Municipal Railway, San Francisco, Cal.—The Board of Public Works has taken initial steps toward having contracts awarded for the extension of this line from both of the present terminals in San Francisco. It is expected that the contracts will be let by Feb. 15, and that the railway will be in operation from the ferry to the beach by April 1.

Ocean Shore Railroad, San Francisco, Cal.—Preliminary steps are being taken by this company to build a line between Tunitas and Smith Cove, a distance of 28 miles.

Southern Pacific Company, San Francisco, Cal.—Surveys have been completed by this company from Searles to Searles Lake, a distance of 25 miles.

United Railroads, San Francisco, Cal.—This company has asked the War Department for permission to extend its line into the Presidio.

Tidewater & Southern Railroad, Stockton, Cal.—Surveys will be begun at once by this company for the extension from Modesto to Fresno. Construction will be begun as soon as the surveys are completed. It is reported that the new line will eventually be extended to Southern California.

Florida Interurban Railway & Tunnel Company, Jacksonville, Fla.—Preliminary arrangements have been completed by this company and construction will soon be begun on its line between St. Augustine and Jacksonville. Right-of-way has been secured and franchises have been obtained from South Jacksonville and Pablo Beach. M. W. Bates, Jacksonville, president. [E. R. J., Nov. 23, '12.]

Georgia Railway & Electric Company, Atlanta, Ga.—Right-of-way is being obtained by this company for a proposed extension from Snapping Shoals to Jackson.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—Plans are being made by this company to electrify its 18-mile gasoline motor line between Fairburn and Atlanta. Power will be obtained from the Georgia Railway & Power Company.

Northwestern Elevated Railroad, Chicago, Ill.—The suit in which the village of Wilmette enjoined the operation of this company in the village will be heard before Judge Gibbons of the Circuit Court in about two weeks. The village has questioned the right of the elevated railway company to operate its cars over the tracks of the Chicago, Milwaukee & St. Paul Railroad which have been leased for this purpose. Following the successful termination of this suit, the railway company will request a permit to build a terminal station, as was mentioned in the ELECTRIC RAILWAY JOURNAL April 13, 1912.

***Warren, Ill.**—It is reported that southern Illinois capitalists are contemplating an electric railway paralleling the Illinois Central Railway from Warren to Freeport. C. F. Taylor, Warren, is interested.

Evansville & Southern Indiana Traction Company, Indianapolis, Ind.—The Indiana Railroad Commission has granted this company and steam railroads serving Princeton an extension of time in constructing a $25,000 interlocking switch crossing in Princeton.

Waterloo, Cedar Falls & Northern Railways, Waterloo, Ia.—This company has opened its extension between Waterloo and La Porte City to regular service and is now grading and building the bridges between La Porte City and Urbana, Ia. It is the intention to push the construction as fast as possible into Cedar Rapids, which when complete will add 60 miles to this company's lines.

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—At a recent meeting of the stockholders of this company a bond issue of $1,500,000 was authorized to build the first division of the line from Paducah to Murray. The entire route extends from Paducah to Henderson and from Paducah to Hickman. At Henderson the line will cross the Ohio River and enter Evansville, Ind.

Gardner, Westminster & Fitchburg Street Railway, Gardner, Mass.—Plans are being considered by this company for an extension from West Boylston to the company's line in Westminster.

Nevada, Lebanon & Eastern Railroad, Nevada, Mo.—This company plans to build an electric railway between Nevada, Lebanon, Stockton, Bolivar and Buffalo. Officers: W. A. Thompson, 309 Garfield Avenue, Kansas City, president; S. A. Wight, Nevada, vice-president, and W. I. Differderfer, Lebanon, secretary and treasurer. [E. R. J., Oct. 12, '12.]

United Traction Company, Albany, N. Y.—Announcement has been made by this company that it will extend its Arbor Hill line along Livingston Avenue to North Lake Avenue, Third Street and Watervliet Avenue in Albany, thus opening a way to West Albany.

Binghamton (N. Y.) Railway—Plans are under way by this company to extend a branch line from Main Street in Lestershire to the new Endicott, Johnson & Company shoe factory and to the entrance to Johnson Park.

***Rome, Boonville & Old Forge Electric Railway, Rome, N. Y.**—The survey of this line from Rome to Old Forge is now completed to Dunn Brook, the town line of Boonville. At a meeting recently held at Westernville it was decided to change the line passing through Westernville to the east side of the Black River Canal, taking the old survey made by the New York Central over twenty-five years ago. The change begins at the east side of the Delta dam and follows the Berme bank for 5 miles to the canal bridge north of Westernville.

Charlotte, N. C.—The material for a new line in Charlotte that is to be extended from the Heath corner in Piedmont to the Mecklenburg Country Club has arrived. Surveys have been made and construction will be begun at once. The contract with Tucker & Laxton has been signed by the Chatham company after the necessary arrangements had been perfected with the Charlotte Electric Railway for the operation of this line.

Newbern-Ghent Street Railway, Newbern, N. C.—Plans are being made by this company to extend its lines in Newbern.

Mount McKay & Kakabeka Falls Railway, Fort William, Ont.—It is reported that this company plans to spend $140,000 on extensions in Fort William in the near future.

Portland, Eugene & Eastern Electric Railway, Portland, Ore.—This company will extend its line to Molalla.

Pittsburgh (Pa.) Railways.—In order to make time and facilitate interurban traffic, portions of the Charleroi and Washington interurban divisions of this company are being double-tracked. It is proposed to install a second track from Castle Shannon to the Mount Washington tunnel. The Charleroi division is double-tracked from Castle Shannon to Finleyville, and part of the plan now is to double-track the entire distance, after considerable grading has been done. At some points numerous trestles will have to be widened. The Beechview line is said to be included in the double-tracking program, and the improvement is expected to be started early in the spring. Preparations are being made by this company to let contracts for the construction of an extension of its Charleroi line from the present terminus at Roscoe to California.

Westmoreland County Railroad, Pittsburgh, Pa.—The extension of this company's line from Derry to Ridgeview Park and possibly to Blairsville will be built during this year.

Warren (Pa.) Street Railway.—Announcement is made by this company that it will extend its lines 9 miles to Youngstown in the spring.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—This company has been asked to consider plans for an extension from the main line near Greer to Woodruff, via Reidville, and from Woodruff to Cross Anchor and thence to Union.

Brownsville Street & Interurban Railway, Brownsville, Tex.—It is reported that this company has placed in operation 3 miles of its line in Brownsville. S. L. Dwerman, Brownsville, president. [E. R. J., March 23, '12.]

El Paso (Tex.) Electric Railway.—Extensive improvements will soon be made by this company, among which will be the extension of several of its lines.

Galveston (Tex.) Electric Company,—Plans are being made by this company to extend its lines into the southeastern section of Galveston.

Whatcom County Railway & Light Company, Bellingham, Wash.—An extension of the North Street line in Bellingham from the present terminus to Bennet and Marietta is being asked of this company.

Ohio Valley Electric Railway, Huntington, W. Va.—This company is reported surveying for a contemplated extension from Ashland to Russell, Ky., about 4 miles.

Morgantown & Wheeling Railway, Wheeling, W. Va.—This company proposes to build a line from Cassville to Wheeling, which will complete its route from Morgantown to Wheeling, 73 miles. L. S. Brock, president. [E. R. J., Sept. 28, '12.]

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by this company to build a new carhouse in Vancouver. The cost is estimated to be $175,000.

Northern Electric Railway, Chico, Cal.—Plans are under way by this company for the construction of a new depot in Durham.

Florida Interurban Railway & Tunnel Company, Jacksonville, Fla.—This company has purchased property in North City upon which it will build its terminal station. M. W. Bates, Jacksonville, president. [E. R. J., Nov. 23, '12.]

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—This company has opened its new office at 810 Broad Street in Augusta.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—Plans are being considered by this company to build new passenger stations in Iowa City, North Liberty and Mount Vernon. The structures will all be of brick construction and one story high. W. G. Dows, general manager.

Union Traction Company, Independence, Kan.—This company has awarded a contract to C. M. Wilson for the construction of a new freight depot on East Eighth Street in Coffeyville. The structure will be 45 ft. x 200 ft. and of brick construction.

Berkshire Street Railway, Pittsfield, Mass.—This company is building a new carhouse on the McGraw property south of Great Barrington.

Mesaba Electric Railway, Duluth, Minn.—Work has been begun by this company on its new depot adjoining the substation in Mesaba.

Public Service Railway, Newark, N. J.—In connection with the recent purchases of property in Park Place and vicinity, Newark, upon which a terminal is to be erected, tentative plans have been outlined by the Public Service Railway for a system of short subways leading into the terminal, and also an elevated spur over a private right-of-way. The proposed terminal will be situated between Proctor's Theater and the American Insurance Company Building. It will have provisions for taking care of passengers alighting from subway, surface or elevated cars.

Corvallis & Eastern Railway, Portland, Ore.—Among improvements by this company during the year will be a new 35-ft. x 200-ft. carhouse, a 24-ft. x 100-ft. store room and a 20-ft. x 30-ft. addition to its machine shop in Albany.

Montreal (Que.) Tramways.—Alterations to cost $7,440 will be made by this company at its carhouse in Montreal.

El Paso (Tex.) Electric Company.—This company has awarded the contract for the construction of an addition to its carhouse in El Paso to the Stone & Webster Engineering Corporation, Boston. It will be 140 ft. x 75 ft.

Galveston-Houston Electric Railway, Houston, Tex.—Plans are being made by this company to purchase property at the southeast corner of Mechanic Street and Twenty-fifth Street, in Galveston, upon which it will build a terminal depot. Plans call for a structure two stories high and of brick and concrete construction.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company is considering plans to build a new substation east of the Sixth and Main Street passenger station in Los Angeles.

Tri-City Railway & Light Company, Davenport, Ia.—This company has purchased from the Westinghouse Electric & Manufacturing Company a 12,500-kw Westinghouse-Parsons horizontal turbo-generator. The generator is wound for two-phase, 4800-volt, 60-cycle current. The unit was purchased complete with Westinghouse-Le Blanc surface condenser and necessary auxiliary equipment, which includes a 400-gal. per minute turbine-driven boiler-feed pump. It will be added to the present capacity of this company's station, which now is 20,000 kw, to take over a portion of the load, leaving a number of smaller units as reserve capacity. No provision was made in the existing station to install a unit of this size, so that it will be necessary to build an addition to the plant.

Lake Shore Electric Railway, Cleveland, Ohio.—It is reported that practically the entire output of the new hydro-electric plant on the Sandusky River, just south of Fremont, will be sold to this company. The surplus will be sold to manufacturing plants and others who use electric power.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—Plans are being made by this company to build a new substation at St. Catharines with a capacity of 1000 hp and a new substation at Niagara-on-the-Lake with a capacity of 500 hp.

Corvallis & Eastern Railway, Portland, Ore.—During the year this company plans to install in its power house a new boiler, additional motors, etc. D. M. McLaughlin will have charge of the work.

Portland, Eugene & Eastern Railway, Portland, Ore.—Plans are reported to be in progress by this company for the construction of a new passenger station in Albany.

Portland Railway, Light & Power Company, Portland, Ore.—The building purchased by this company with the Mount Hood Railway will not be moved from its present location in East Vancouver, as was at first stated, but instead a new structure will be constructed at the foot of Washington Street in the near future. The building will be 180 ft. x 200 ft. It is to contain a power plant, freight depot and waiting room, besides a landing for a ferry.

Nashville Railway & Light Company, Nashville, Tenn.—A new substation is being erected by this company to handle power being brought to it from the Caney Fork station of the Tennessee Railway, Light & Power Company.

El Paso (Tex.) Electric Railway.—A 1200-volt motor-generator set will be installed at the El Paso power plant of this company in the near future.

Manufactures and Supplies

ROLLING STOCK

Los Angeles (Cal.) Railway Corporation expects to purchase seventy-five cars during 1913.

Binghamton (N. Y.) Street Railway has decided to expend $40,000 in the purchase of new rolling stock.

Michigan United Traction Company, Jackson, Mich., has ordered from the St. Louis Car Company six 61-ft. steel interurban passenger motor coaches, four 56-ft. steel passenger trailer coaches and four 50-ft. steel baggage cars.

Salt Lake & Ogden Railway, Salt Lake City, Utah, has ordered from the Niles Car Company eight 56-ft. high-speed interurban motor cars. The cars will have Baldwin trucks, General Electric motors, and Westinghouse straight and automatic air brake equipment. The Salt Lake & Ogden Railway has ordered from the General Electric Company a 40-ton locomotive which will be equipped with Baldwin trucks and Westinghouse E. T. straight and automatic air brake equipment.

TRADE NOTES

Cleveland Trolley Wheel Company, Cleveland, Ohio, has increased its capital stock from $50,000 to $75,000.

North American Railway Specialty Company, Chicago, Ill., has changed its name to Littlefield, Fry & McGough, Inc.

Ross W. Harris, Madison, Wis., electrical engineer and traction expert, has removed his office to 435 Washington Block, Madison, Wis.

American Engineering Company, Philadelphia, Pa., builder of the Taylor stoker, has opened an office at 412 Traction Building, Cincinnati, Ohio.

Pressed Steel Car Company, Pittsburgh, Pa., has elected J. B. Rider a director to fill a vacancy. Mr. Rider has been general manager of the company for some time.

Chicago Interlocking Railway Rail & Joint Truss Company, Chicago, Ill., has been incorporated with a capital stock of $150,000 to do a general manufacturing and equipment business. The incorporators are: William C. McDowell, A. Umenhofer and Otto Trenlish.

H. R. Wilson Machinery Company, St. Louis, Mo., has been organized by Harold R. Wilson, who was formerly connected with Arthur S. Partridge, St. Louis, to conduct a general second-hand electric and steam machinery business, with headquarters in the New Bank of Commerce Building.

William Bayley Company, New York, N. Y., announces that F. B. Hawkins, who was formerly connected with the Vulcan Rail & Construction Company, agent for the Bailey-Springfield steel sash, has been appointed manager of Eastern sales for the William Bayley Company. The sash will now be sold directly by the manufacturers.

H. M. Byllesby & Company, Chicago, Ill., announce that the fourth annual convention of H. M. Byllesby & Company and affiliated companies, set for Jan. 23 and 24, 1913, has been postponed until June on account of certain important activities which prevent the attendance of some of the officials of the company and the managers of some of the local properties.

Standard Heat & Ventilation Company, New York, N. Y., announces that it now owns the right of the Ward Equipment Company and the Safety Car Heating & Lighting Company relating to car heating and ventilating, and will manufacture and sell the devices in these special lines heretofore furnished by these companies. The Safety Car Heating & Lighting Company will also act as its agent.

Cincinnati Car Company, Cincinnati, Ohio, announces several changes in its personnel. W. Kesley Schoepf, president of the Cincinnati Traction Company, has been elected president of the Cincinnati Car Company to succeed Harry C. Ebert, who will give his entire attention to the sales department as sales manager. W. H. McAllister, comptroller of the Cincinnati Traction Company, has been elected vice-president of the Cincinnati Car Company.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed C. E. Allen assistant manager of the detail and supply department. Mr. Allen has been connected with the Westinghouse Electric & Manufacturing Company since 1909, when he entered the employ of the company as head of the transformer division of the detail and supply department. Previous to that time he was connected with the General Electric Company in its engineering and commercial departments.

F. O. Grayson, president and general manager of the Grayson Railway Supply Company, St. Louis, Mo., has arranged to represent the Houston Car Wheel & Machine Company, Houston, Tex., and take charge of its sales, effective Feb. 1, in connection with his present business. The Houston Car Wheel & Machine Company is a new concern. The plant of the company will be in charge of George Doering, formerly foreman of the St. Louis Car Wheel Company. Mr. Grayson, who was formerly general sales agent of the St. Louis Car Wheel Company, will no longer represent that company.

Sanford Riley Stoker Company, Ltd., Worcester, Mass., has been organized recently to manufacture and sell a new type of stoker known as the Riley self-dumping underfeed stoker. The company is said to have strong business connections. The officers are as follows: President, R. Sanford Riley, formerly president of the American Ship Windlass Company, builder of the Taylor stoker; treasurer, Aldus C. Higgins, secretary and counsel of the Norton Company; secretary, George N. Jopson, works manager of the Norton Company. Among the other stockholders may be mentioned C. L. Allen, treasurer and general manager of the Norton Company, and Fred H. Daniels, of the American Steel & Wire Company.

Western Electric Company, New York, N. Y., reports that the Oregon Electric Railway has adopted the telephone for dispatching its trains. The apparatus will be supplied by the Western Electric Company. There will be two circuits, one from Portland to Forest Grove, approximately 40 miles, and the other from Portland to Eugene, approximately 125 miles. Two train dispatchers are to be located at Portland. The apparatus to be used includes two complete dispatchers' equipments comprising key cabinets and forty-five calling keys in all, besides the telephone sets and thirty-five way-station equipments, consisting of No. 102-B selector sets, containing the well-known standard No. 50 type selector, and the new "folding gate" type telephone bracket, known as the No. 147, equipped with Western Electric desk stands. Foot switches, vacuum and cut-out arresters and switch panels are also being furnished. Trains will be equipped with No. 1330-E portable telephone sets for use in communicating with headquarters from points between way stations. Each portable set will be furnished with line poles and plugs. The latter are to be used in connection with fifty No. 186 type jacks which will be installed at sidings along the right-of-way.

American Brake Shoe & Foundry Company, Mahwah, N. J., in its report for the fiscal year ended Sept. 30, 1912, as presented by Otis H. Cutler, the president, refers in part as follows to the progress of the business of the company: "Operations at the new Chicago plant were begun early in 1912, and while a number of minor difficulties have been encountered with the new labor-saving and mechanical devices, each month has shown a lower cost per ton of good castings, and within a short time it is expected that the figures of economy predicted will be satisfactorily demonstrated. In addition to a satisfactorily maintained and growing brakeshoe output, the company has made material progress during the year in developing an increased tonnage of miscellaneous gray iron castings, in the production of which the foundry experience and organization acquired in the manufacture of our special product have proved of much value. Active efforts will be continued to increase this tonnage and the business along these lines. The business of the Edgar Allen American Manganese Steel Company has developed in a very satisfactory manner during the year. The benefit of substantial plant improvements heretofore made at the Chicago Heights and New Castle works is becoming apparent, and they are now producing a finer quality of material with a higher percentage of good castings than ever before. The monthly output is about 1000 tons, and a still further increase may be expected if conditions at large continue good."

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, FEBRUARY 1, 1913 No. 5

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office..............................1570 Old Colony Building
Philadelphia Office........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

THE MIDYEAR MEETING

The first midyear meeting of the American Electric Railway Association was held only three years ago and at that time the idea was considered very much of an experiment. It was thought questionable whether railway men would take the trouble to leave their properties at the busiest time of the year and spend a day or more at the conference so soon after the autumn meeting. The success of the first convention, however, established the desirability of the plan, and the attendance has constantly increased from year to year. The records for this week's meeting showed a registration up to Friday afternoon of 260 members, and this number was augmented by those who were detained until the final event of the conference, the banquet in the evening. Great regret was expressed at the enforced absence of President Harries, but the proceedings were admirably conducted by Vice-president Black and the deliberations were profitable from every viewpoint. The subjects were such as naturally to attract interest because they are the livest of the day and ones which everyone interested in public utilities is considering, and this fact, together with the many committee meetings, attracted a very representative gathering.

EDUCATION FOR APPRENTICES

The publication of primers on individual topics, as disclosed in the new plans of the educational committees of the American, Engineering and Accountants' Associations, appears to be entirely practicable and should meet with a quick and hearty response. The committees have not abandoned their plans for a correspondence course, but feel that it is necessary to lead up to this by preliminary propaganda. The main feature of work of this kind is to keep the instruction well within the grasp of those who are to be reached. There is always danger of making the instruction too technical and hence discouraging. The committees wisely plan to avoid this and apparently intend to make every effort to put their instructions into plain every-day terms.

TRAINING AND HOLDING PLATFORM MEN

The committee on the training of transportation employees certainly has a large task in hand, for one of the most distressing and costly features of electric railway operation is the rapid change in the personnel of the platform men, and this despite the fact that their actual annual earnings often exceed those of "skilled laborers." It is true that the average electric railway employment bureau is a catch-all of jobless men who have been trained in other fields; but this does not explain why they should be so eager to leave the service for positions with a lower net income. This fact was of less account in the early period of the industry, but it is a serious one under the more complex conditions of the present day, when a very appreciable amount, say $50 to $100 per individual, is expended to instruct new men in the technique of car operation and accident prevention. Surely there must be some underlying cause for a condition in which an annual desertion of 50 per cent is looked upon as a matter of course. This problem is not to be solved by the laborious gathering of statistics but rather by a study of the fundamental conditions which differentiate car platform employment from other kinds. For instance, there may be something about the present methods of instruction and discipline repellant to men who have been wont to do their daily work with little or no minute supervision. If this is true, more attention should be given toward explaining the operating rules in such a way that the men will not become imbued with the feeling that the rules are arbitrary but will realize that there is a reason for each. This is one important aspect of the problem before the committee, and it is encouraging to note that in trying to solve it the committee will depart from the beaten track by endeavoring to discover the fundamental factors which are common to the situation everywhere.

MODEL UTILITY LEGISLATION

The report of the department of the National Civic Federation which is preparing a so-called model form of law for the regulation of public utility corporations, presented by Mr. McMillin at the annual meeting this week and published elsewhere in this issue, contains one statement in particular which accords with the views of many thinking people. This is, that the only alternative of reasonable public regulation is public ownership and operation. The quiet, steady growth of this belief in the public mind in the last few years is one of the factors that have made the movement toward regulation irresistible. It is to be noted, however, that the language of the National Civic Federation report is "reasonable public regulation." This implies that it is conceivable that there may be unreasonable regulation. There is indeed danger that the public authorities will forget in some cases that what they are regulating is not the operation of public properties but the operation of private properties. The right to regulate the property of other people, without the responsibility or accountability to them for deeds of omission or commission, is one that is conferred so freely by the new type of law that the commissioners must be men of high character to realize that they hold the power and that they escape the direct responsibility of safeguarding the properties. If, with public ownership and operation, the commissioners had their duties enlarged to include that control, they would be required to assume the responsibility as well as to hold the power. Regulation will be at its best if it protects the public and likewise the corporations, and while this end will be attained through the choice of commissioners and their decisions rather than by the words in which the new laws are framed, the National Civic Federation should emphasize as clearly as it can, when it promulgates its "model" law, that its action is designed to promote reasonable regulation and not confiscatory regulation.

CORPORATIONS AND THE PUBLIC

Mr. Strauss analyzed in a masterly way at the midyear meeting the causes for the condition of unrest which exists in regard to corporations and so-called corporation privileges. As explained by him, the word "privilege" sounds well in a harangue against corporations by the stump speaker and also to the legislator when he wishes to offer an excuse for the imposition of a new tax on corporations. But practically, as shown by Mr. Strauss, the privilege enjoyed by corporations of being corporations is essential to modern life and activity. Industry would come to a standstill if men could not co-operate by this means and thus provide more capital than individuals are able to furnish, and any attempt by a large corporation to do business without a limited liability for its stockholders is impracticable. As for the privilege of a street railway company to use the streets it would not be a street railway if it did not do so. It is refreshing also to read so clear an exposition as that presented by Mr. Strauss of the absurdity of expecting that capital will be encouraged to engage in the development of public utilities if all future investment is to be limited to from 6 per cent to 7 per cent on a physical valuation arbitrarily made and nearly always much less than the amount of money required to develop the property into a going concern. Profit, as the paper points out, begins only when current interest rates leave off.

The device of shares without par value suggests one possible means by which the present confusion which exists in the public mind as regards valuation and the proper remuneration due on the investment might be lessened, but unless there is a radical change in general sentiment about these matters the plan will accomplish little.

Mr. Strauss' paper is a fine educational document on the principles of corporation finance. It is a good antidote for many of the nostrums which are being peddled as panaceas for this serious situation. After all, the only hope for reform is that there shall be a clearer understanding on the part of the public of the reasons for the organization of companies and the motives which impel investors to develop new enterprises, and Mr. Strauss' paper emphasized the importance of popular education on these topics.

THE PROBLEMS OF THE MIDYEAR MEETING

The midyear meeting has settled into its rightful place in the scheme of organization of the American Electric Railway Association as the forum for discussion of the gravest problems confronting the industry. These problems crystallize into the questions of public relation which are treated in the report of the committee dealing with fares and in the comprehensive study of railway finance comprised in the report of the Railroad Securities Commission appointed by President Taft. No matter through what medium the problems are presented to the association for discussion, they affect all the companies because they involve rates of fare and values of property. The discussion on these topics which took place at the meetings yesterday is published in another part of this issue and it should be read with care by those members of the association who were not able to be present to hear it. The discussion on the report of the committee on fares brought out the fact which is clear to those who are of the industry, but is not appreciated by those who are of the traveling public, that the electric railway business is one of the most difficult in the world to manage with success to the companies and with satisfaction to the public.

Mr. Duffy, in his contribution, directed attention to the part played by the low load factor in the present unwholesome condition of the companies. This condition is, unfortunately, an inherent disadvantage of the urban street railway which has not been overcome by any course that the average manager has found himself able to adopt. The many hours of light load and the very few hours of heavy load which the riding habits of the American public impose upon the companies are practical considerations which are not easy to alter. The fact that they have not been altered in the past, however, is no reason why they cannot be altered in the future by a determined campaign and effort. Certainly, when there are so many avenues of discouragement open, the companies are not justified in failing to take active and energetic steps to accomplish some good results by attacking the low load factor which Mr. Duffy pointed out.

Mr. Clark has studied the British municipal tramway conditions for many years, and his interesting contribution on this aspect of the fare situation is supported by a statement of facts which are not only new to the American public but are, in reality, not appreciated by the great body of railway managers in this country. Low rates of fare are not advantageous to the public in the long run if they do not meet all the expenses and reasonable charges assumed in the provision of the service, and this is so without regard to whether the properties are owned municipally or privately. The reference by Mr. Clark to the action of the English authorities in deferring electrical tramway development until the American companies had gone through a long process of experimentation and progress would have been a matter affording pride to the American sense of superiority a few years ago, when advancement and initiative in the properties, even at high cost, were applauded in this country; now it emphasizes a conservatism in the British attitude which many managers in this country will wish their predecessors here a decade or two ago had adopted in their policies. The progress and improvement which came with American invention was beneficial to the riding public, but it has left capital accounts burdened with an element of cost which, if reasonable and proper accounting practices have been followed, is a justifiable part of the cost of the present properties. There are such radical differences in the rate-making methods of the American and the English companies that it is impossible to measure their revenues by the same standard. The American urban rate is a flat one, with an unmeasured ride per passenger, while the English method proportions the fare according to the distance traveled. When the English lines, under these circumstances, which seem so favorable to American managers, admit unprofitable and unsatisfactory experiences, it is an evidence that the advantages which they enjoy are offset by disadvantages that are serious. The lesson for American managers in this is that even if they experiment with a zone system of fares the outcome will be disastrous unless they make the rates high enough or flexible enough to provide for future contingencies.

Since the lessening of the margin between gross and net is due to the enlargement of operating expenses the paper of Mr. Burleigh on this feature of the problem explains a condition which is written down in the experience of every company. Few companies, however, have compiled the actual percentages of increase so as to display the facts as emphatically as they have been set forth by Mr. Burleigh. Unless increases in total cost can be offset by a greater use of facilities that will keep the unit cost stationary or reduce it they will make it impossible for the companies to show the improvements in results which ought to be realized.

The remarks of the various speakers show that the seriousness of the prevailing situation is realized fully by leaders of the industry and that they do not want to shirk a duty which becomes more pressing as each day passes without a fair settlement of the problems. The real work of the midyear meeting is not behind, but before, the industry.

INCREASING SERVICE CAR EFFICIENCY

The prompt delivery of equipment parts and materials to shops and carhouses is an important requirement in the efficient administration of a street railway system covering a large territory, and in this connection an occasional analysis of the service and routing of stock cars will pay well for the time and trouble taken. In the past the shipment of materials from a central storehouse to outlying carhouses has too often been on a spasmodic basis. Greater care in planning such trips with reference to the geographical locations of the carhouses will often indicate savings in time, car mileage, power and platform labor, as in a recent case where a new service car timetable including about forty houses was cut from a week to four and one-half days without interfering with the work of visiting each carhouse from four to five times a month.

When a revised schedule is established care should be taken to post a copy at every storage and operating carhouse well in advance of the time when the stock car will visit it, and information sent to carhouses should include data as to the time that orders should reach the stores department in order to be filled on the following trip, the time the car is scheduled to reach every carhouse on the system and the time it is due back at its starting point. To secure the results successfully under this more efficient management, carhouse foremen must co-operate to the utmost to be ready to receive the car when it reaches their headquarters, and the motorman in charge of the stock car on any division must be qualified and determined to maintain its schedule. If the latter finds, because of light load, that he will be able to reach any carhouse ahead of his schedule, or that on account of a heavy load he will be delayed, the carhouse next in order should be notified by telephone, so that the available time can be utilized to best advantage. Irregularities in the amount of material to be handled will at times upset the most carefully planned schedule, but a more effective use of the telephone, combined with careful studies of what the stock car can be expected to do under normal conditions, will do much to offset the uncertainties which in so many instances are militating against the most efficient handling of this branch of the auxiliary service.

REGULATIVE POLICIES IN WISCONSIN

Discussion of the epoch-marking decision of the Railroad Commission of Wisconsin in the Milwaukee fare case was logically the most important feature of the meeting of the Wisconsin Electrical Association which was reported in our issue of Jan. 18, 1913. Without dwelling on the fact that the decision is now in the courts for judicial determination of the rights of the company under its franchise contract with the city of Milwaukee, Mr. Mack brought out the serious conditions which confront companies in the State of Wisconsin generally if the contentions of the commission as to its authority to disregard franchise contract obligations are upheld. These conditions hamper development unless such development follows the lines of financial accounting approved by the State, and this fact was made plain by Mr. Mack. The fear of public utility operators regarding the effect of regulation is twofold. The first question which they ask is whether regulation will be so directed as to destroy or imperil the investment represented by outstanding securities; the second question is whether it will limit the freedom which is conducive to extensions and betterments of existing properties, consolidations of plants and increasing profit arising from improved efficiency and economy in operation.

We think that in the main the operators of established properties would not object to a policy of regulation provided it protected the existing investment and afforded a reasonable return for enterprise and economy in future operation and development. If these fundamental conditions are assured, interference with the service should not reach a serious point. The trouble is that, as the Milwaukee case indicates, these conditions are not only not assured, if the courts agree with the commission, but the investment is theoretically scaled, the contract with the city is disregarded and the business of transportation in Wisconsin, so far as financial return is concerned, becomes a hazardous and uncertain enterprise. In other words, the past, the present and the future are regulated, and all are regulated by the same measure. These are radical policies and it is to be hoped that regulative laws and commissions generally will deal more equitably with the public utilities. If they do not do so because the fairness of this course appeals to them as a justification of a conservative attitude, they will drive all new capital from the business unless the courts will protect the properties.

PRESENT STATUS OF TIMBER PRESERVATION

At the annual convention of the American Wood Preservers' Association, held last week in Chicago, several subjects of general interest to all users of treated timber were discussed. Probably most interest was aroused in the bill now before the ways and means committee of the House of Representatives, known as the "Underwood bill," which assesses a 10 per cent import duty on creosote oil. As only 30 per cent of the total quantity of creosote oil consumed in the United States is produced here, the resulting increase in the price will have an important bearing on the timber-treating industry. Although a sufficient amount of coke-oven and gas-works tar is produced in this country to yield, if distilled, creosote oil in quantities more than enough to take care of our requirements up to the present time, it has not been profitable to manufacture more than one-third of the quantity needed. The reason for this is that the demand for the creosote oil is far in excess of the demand for the other by-products of coal tar, and the installation of a plant for the production of the former is too expensive to produce creosote alone at its present market price.

If the duty is applied it will protect the creosote-oil producer here but will increase the price of the oil to the consumer and restrict the growth of treating plants in this country. In other words, the government will help to defeat its own policy of lumber conservation. The natural increase in the quantity of oil required for timber preservation in the United States has been so rapid that producers have not been able to keep pace with it, and as a result, recently, the price of the oil has gone up. This increase, when added to the proposed import duty, will put the price of oil at a point where some other cheaper preservative must be discovered or there must be a reduction in the quantity of oil used per cubic foot of timber, as the annual track charge at the old price of oil was such as barely to make its use economical with some hard woods.

The discussion also brought out that results far beyond those anticipated were being obtained by steam roads from ties treated with zinc chloride, but this method of preservation does not offer great economies so far as electric roads are concerned, on account of damage from corrosion. A reduction in the quantity of preservative used per cubic foot will probably be the best solution for the present. It was shown that the maximum life has been obtained by both the full-cell and empty-cell processes. It is not a question of whether a tie or timber will last a given length of time, but whether it will last sufficiently long to equal its mechanical life. There is no need of preserving timber against decay beyond this point. For timber-treating experts to strive for a uniform penetration throughout a stick may be an ideal, but it will not result in practical economy for a railway.

It was generally stated that evaporation of creosote oil took place in proportion to the surface exposed and to a depth of about ½ in., and that the amount of evaporation has been reduced by the addition of refined tar to the creosote oil which, in the process of treating, coats the exterior surface. As this tar evaporates far more slowly than creosote oil, it produces the desired result. If perfectly sound, seasoned timber is treated and the depth of penetration is such that evaporation does not take place sufficiently fast to remove the beneficial effect of the creosote oil before the timber has failed mechanically, the maximum economical result will be obtained.

It is possible that other preservatives will be discovered which will produce as satisfactory results as creosote oil or zinc chloride. It was suggested in the discussion that a preservative need not necessarily have toxic properties but need only be an antiseptic. In other words, the preservative will be just as successful if, upon impregnating the wood, it creates a medium in which the fungi producing timber decay cannot exist as it would if it were a germicide. Crude oil which will produce the foregoing result is being tested by one steam road with satisfactory service up to this time.

HUMAN FALLIBILITY IN RAILWAY OPERATION

All human enterprises have to take into account the weakness and fallibility of the individual, and this is especially true in train operation. An instance in point is the collision on the New York elevated railway system last week, in which one person was killed and several were injured. The day was clear and the working apparatus on the elevated train, so far as the records at present show, was in perfect condition. The operating conditions were no more severe or conducive to an accident than those which have probably occurred a great many times in the past without casualty. The motorman, so far as the evidence shows, was in full possession of his senses. But as the second train approached the one ahead of it, the motorman, according to one of the passengers who was near enough to observe him, was looking out of the side window, so that something diverted his mind, and he heedlessly collided with the train in front.

The situation is not a new one. Steam railroad engineers run by signals set at danger and disregard rules which they have been trained for years to observe. The motormen of surface cars, in periods of abstraction, will run into other vehicles which are using the street or strike pedestrians when the clear space ahead ought to be sufficient to permit the cars to be stopped without difficulty. The term "man failure" is often applied to conditions of this kind, and a year or more ago a number of psychologists met to consider whether any means could be adopted for determining in advance among the many applicants for employment those who would be likely to be liable to failure of this kind.

We have not heard anything recently of the study of this subject from a theoretical standpoint. The corrective generally being applied is that of care in the selection of the men and the maintenance in the corps of employees of a spirit of responsibility for the lives which are dependent upon the carmen's attention to business. By the exercise of this system of personal vigilance it has been possible for some companies to keep the accidents due to "man failure" down to a minimum, and among them there is no more conspicuous example than the elevated railway system in New York upon which the recent accident occurred. In fact, the accident in question was so unusual as to mark it as a rare exception and one which shows what is possible to attain by extreme care in this regard.

A comparison of the number of accidents to passengers on the elevated roads in New York and on the steam railroads is noteworthy. The accident mentioned was the first during the thirty years in which the elevated roads have been in operation in which a man has been killed in a collision and the second in which any one has been killed after having safely boarded a train. Yet the company carries during the year about half as many passengers as are carried upon all of the steam railroads in the country combined. The figure as given by the Interstate Commerce Commission for passengers carried on the steam roads for the year ended June 30, 1910, was 971,683,199 and on the elevated railways of New York during the same period the figure was 456,320,081; yet the number of passengers killed on the steam railroads last year was 318. The average distance of passenger haul on the steam railroads was, of course, very much larger, but the congestion on the cars and at the stations was very much greater on the elevated railways. The figures quoted are, we believe, significant and constitute a remarkable record not only as to the excellence of the transportation conditions existing on the elevated system but also indicating the perfection of the maintenance of the mechanical equipment upon which those in charge of the trains must depend in their control of train movement.

A NEW INDUSTRIAL EDUCATION ORGANIZATION

The National Association of Corporation Schools, which was formed in New York Jan. 24, is the result of an attempt to get together for exchange of experience the representatives of corporations which are conducting educational work for the benefit of their employees. More than 200 manufacturing and public service companies are doing this and the interest in the results of these educational experiments is growing.

The organization is to be made up largely of company members, which will bear the expense incident to the gathering and disseminating of information relative to industrial education. There will be a central office in New York City where statistics will be compiled for the benefit of the members under the direction of the executive secretary. It is expected that the data thus made available will be of assistance to companies starting in with educational work and that many companies which have not yet appreciated the advantages of such work will be stimulated to begin it. Information like that which the association will compile has not been available in the past, and it has been only by means of extensive trips of inspection that any idea of what is being done could be obtained. In fact, it was the difficulty experienced by the founders of the association in obtaining such information, together with their surprise at the amount of work now being done, that led them to suggest the organization.

The companies and firms which are back of the new enterprise are of such standing that there should be no doubt of its success. Among these are the Pennsylvania Railroad, the Public Service Corporation of New Jersey, the General Electric Company, the American Locomotive Company, the Westinghouse Air Brake Company, the New York Edison Company, the companies represented in the Doherty Operating Company and many others well known to our readers. All of these have been doing active and successful educational work for some time. The Pennsylvania Railroad has had in operation for a number of years a fully equipped school system by means of which hundreds of boys from the shops and offices have been trained in company time by paid instructors. The educational work of the New York Edison Company has been remarkably satisfactory, more than a thousand students being enrolled in the courses which are conducted by leading teachers and successful business men. A considerable proportion of the increase in the business of this company in recent months has been attributed to the education in practical business methods which the employees have eagerly absorbed. Both the General Electric Company and the Westinghouse Companies have offered special inducements to young men, with the foundation of a good education, to enter their student courses and thereby have built up technical corps which have contributed greatly to their success. The Public Service Corporation has a course which was established comparatively recently, but, according to its officers, is proving very satisfactory.

The manufacturers have been ahead of the public service corporations in adopting these methods, but this will not be true in the future. The electric railway industry is taking part in the movement for better training of employees. Electric railways can profit by the more intelligent and loyal service rendered by men who are mentally alert and observing. These men have had good school advantages and will take an interest in important principles which tend to make them happier and more ambitious. They want more than the technique of their every-day work and will, as a rule, show hearty appreciation of non-patronizing efforts made in their behalf. Of course, it must be made apparent to them that there is personal gain to result from efficient use of the educational privileges, but it may be assumed that any company that will go into this work will be ready to reward satisfactory achievement. A well-known electric railway manager recently said to a class of boys who were undertaking to improve themselves by means of a correspondence course, "As soon as one of you boys is ready to take my place I shall step out." Employers are looking for good "timber" for important positions and are glad to welcome any agency which tends to bring out latent ability. The new association, organized to spread the gospel of industrial education, is a step in the right direction.

Proceedings at the Midyear Meeting

At the First Session There Was a Discussion of the Report of the Committee on Determining a Proper Basis for Rates and Fares—The Subject for the Second Session Was the Recent Report of the Federal Railroads Securities Commission

The fourth annual midyear conference of the American Electric Railway Association was held at the Engineering Societies Building, New York City, on Friday, Jan. 31, 1913. In the absence of the president, General George H. Harries, of Louisville, Ky., the meeting was called to order by the first vice-president, Charles N. Black, of San Francisco, at 11 o'clock.

Mr. Black announced that the session of the morning would be devoted to a discussion of the report of the committee for determining the proper basis of rates and fares. (This report was published in the Electric Railway Journal for Oct. 10, 1912, and the extensive appendices contributed by Messrs. Duffy, Bradlee and Ford were published in abstract in the Electric Railway Journal for Nov. 30, 1912.) Mr. Black then asked Mr. Ford, chairman of the committee, to present the recommendations of the committee as to the best means for continuing its work.

Mr. Ford presented the following report:

REPORT OF COMMITTEE

"Your committee on determining the proper basis for rates and fares, after two years' study which it has embodied in two reports already submitted to you, desires to present the following plan for a continuance of this work on a permanent basis. If this is acceptable to you, the committee requests that it be relieved from further consideration of this subject and discharged. We recommend:

"(1) That the association, through its executive committee, appoint a salaried official or establish a department of its present organization—

"(a) to collect statistics and records relating to railway rates, fares and cost of services;

"(b) to co-operate with company members in the solution of these problems, and

"(c) to inform the public.

"(2) That the association appoint a new committee to determine the cost of carrying passengers, which will co-operate with the above department.

"(3) That through this committee and department the association formulate a standard method for making traffic counts and for determining the average length of passenger haul, and that it recommend to its company members that such counts be made at least annually, the results to be available for the use of the association."

This report was presented by Mr. Ford in behalf of the committee, which consisted, in addition to Mr. Ford, of C. S. Sergeant, C. N. Duffy, W. J. Clark, James F. Shaw, E. C. Foster, H. G. Bradlee and R. I. Todd.

Mr. Black then announced that he had received a telegram from General Harries, president of the association, expressing his regret that he was detained from attendance at the meeting by important business engagements. The telegram, which was dated Louisville, Ky., Jan. 30, and addressed to the secretary of the association, follows:

"Until this afternoon I held on to the belief that I might possibly reach New York in time for the dinner to-morrow evening, but that hope is now gone. It is impossible because of the telegraph regulations for me to give proper expression to my feelings. The things I have to say will be held in storage until suitable opportunity presents itself. Will you ask whoever presides over to-morrow's sessions and over the dinner to-morrow night to present my regrets and to say that nothing short of a complicated and highly important business situation could possibly keep me away from our mid-winter conference and the succeeding dinner? Let me know who will preside at to-morrow's sessions so that I may send a telegram to him direct.

[Signed] "George H. Harries."

Mr. Black then asked Mr. Duffy, another member of the committee, to discuss the report. Mr. Duffy presented a communication which is printed on another page of this issue.

H. G. Bradlee, Boston, expressed his pleasure that the executive committee had accepted and approved the recommendations of the committee on rates and fares. He believed the problem was one which was worthy of continued study and that it was fundamental to the entire electric railway industry. He believed that it should be worked out if the electric railways were to continue to carry passengers for a continually increasing distance at an increased cost of operation and investment, and that the proper method was one which would give at least a reasonable amount of flexibility to the question of fares, depending upon the distance which the passengers were carried and the cost of operation in different cities. While the problem had not been solved, he believed that there were enough data now available to enable the association to bring the matter before the public. This could not be done successfully if the matter was presented in a technical way, but it should be put in a popular form so that it could be readily understood. The public should learn to understand that a 5-cent fare, regardless of distance and regardless of increasing operating costs, was in no sense a reasonable proposition.

Mr. Black then called upon W. J. Clark, New York, who discussed the subject of British tramway conditions especially as regards the rates of fare. Mr. Clark's discussion is published in abstract elsewhere in this issue of the Electric Railway Journal.

The chairman expressed the thanks of the association for the clear presentation of British conditions by Mr. Clark, and E. C. Foster, Manchester, N. H., suggested that the paper be printed in pamphlet form and be distributed among the member companies.

William R. Alberger, Oakland, Cal., said that he believed that the longest hauls for a nickel were in Oakland. On some lines the haul is 25 miles for 5 cents. On one line it is 18 miles for 5 cents. Of these distances, 3 miles is by ferryboat. Nevertheless the public believes that the rates should be reduced. The company had recently had a case before the Public Service Commission of California where there was a haul of 16½ miles for 20 cents over an interurban line. Eight-tenths of a mile of this was through the city of Oakland. The rest of the distance was divided into three 5-cent zones, yet the public wants the fare reduced to 15 cents. Upon an average, 690 passengers per day are carried from the town 16 miles distant over this line. The case is still before the commission. Through the help of the association, his company had prepared a strong argument against any reduction. The trainmen receive high wages, but there is a large proportion of men who have been in service for a long time. Of the 900 motormen and conductors, 27 per cent have been in the service ten years or longer.

Charles D. Joslyn, attorney Detroit United Railway, advocated that the facts and features presented by the committee should be brought before the public in a popular way so that they should be understood and so that the public would realize the cost of producing transportation.

A. K. Baylor, New York, described some of the conditions which led up to municipal ownership and operation of street railways in Great Britain. A knowledge of these, be said, was necessary to understand the reasons for the adoption of certain practices in that country. The first horse car line was introduced in England by George F. Train in the early seventies, and a bill passed Parliament soon after authorizing the construction of such lines. That act had a purchase clause which provided that the municipalities might take over the properties after twenty-one years at the value then placed upon them. The result was that many of the horse car lines became subject to purchase by the municipalities between 1891 and 1895. One of the first upon which this option occurred was in the city of Birmingham, which has recently established an electric lighting department under the control of the municipality. Joseph Chamberlain was then Mayor of the City. The lighting plant was a very small undertaking, in a very densely populated and very wealthy district, and it showed a great success. Just at that time the idea of municipal control was taken up throughout the country and was greatly agitated. Coincident with this was the expiration of the franchises in other English cities and also the tremendous development of electric traction in the United States. This brought about an agitation for the acquisition of the tramways by the municipalities. One factor only was needed to complete the chain of circumstances in favor of municipal control, and that was found in the decision given on the first purchase which took place, a section of the North Metropolitan Tramways of London, which was taken over by the London authorities. Under the arbitration which was held to determine that first purchase under the act Sir Frederick Bramwell was referee. It was stipulated in the purchase clause of the tramway act, as stated, that the tramways should be taken over at the end of twenty-one years at the value then placed upon them. This value was determined by Sir Frederick Bramwell to be the scrap value of the old physical assets, old rails and ties, good, bad and indifferent horses, carhouses and whatnot. The referee did not take into consideration any other thing whatever. As Mr. Clark had pointed out, in this way the franchise, the good will of the property as a going concern and all other intangible property of the railways came into the hands of the municipal corporations without expense. That was a thing which should be borne in mind in connection with any arguments for municipal operation in this country based on the results secured in England. Another point which should be borne in mind is the existence in England of the penny rate of fare and the zone system. The reason for their existence, the speaker believed, was because the penny happened to be the smaller coin in common use in England. The next larger piece was the threepence, which is smalled in diameter than the dime and thinner and so not a very practicable coin. Below the penny is the halfpenny and below that the farthing. Hence the penny as the most common coin of low denomination was adopted as a basis of fare on buses and on tramways for short distances, and when longer rides were available the zone system with several penny fares was adopted. Later, halfpenny stages had been introduced in some places.

One effect of municipal control in England had been to confine the construction of tramways largely within the limits of the city owning the system, and suburban lines had not been developed to the extent which they had in this country.

C. S. Sergeant, Boston, referred to the developments of the electric railway in Boston since the consolidation of the original five or six horse railway lines in 1888. At that time the capital invested was about 2.72 times the gross earnings, and the average distance from the center of the city to the end of the different routes was 4.79 miles. The average number of passengers per half trip was 22.5. Soon after, the company began to install electrical equipment and in 1892, when about half of the system was electrified, the number of passengers per half trip was twenty-eight. Four years later, when the road was almost entirely electrified, there were twenty-nine and a half passengers per half trip. In 1912, owing to the demand of the service in the meantime, the number had decreased to twenty-five and a half. It seemed to the speaker that these figures were probably typical of many cities, and that in the future there would be even more demand for transfers and more demand for extensions into unprofitable territory. He was heartily in sympathy with the conclusions of the committee and the plan of the executive committee in collecting data on this question and getting it before the public.

J. J. Burleigh, Newark, N. J., then presented a written discussion on the subject. Mr. Burleigh's paper is published elsewhere in this issue.

C. G. Young, New York, gave some experiences of the Shanghai tramway. The company there adopted the zone system, with nine zones and small fares. But the result was not so satisfactory as in Manila, where the uniform 5-cent fare had been adopted. He believed that it was desirable for all companies to have valuations of their properties, but a much better basis for taxation was a percentage of the gross receipts.

R. B. Stearns, vice-president and general manager of the Milwaukee Electric Railway & Light Company, said that the work of the committee continued to be of importance, and each session added more pertinent data. Mr. Stearns read a paper, an abstract of which is published elsewhere in this issue.

Upon the completion of Mr. Stearns' remarks Chairman Black said that the luncheon hour had arrived, but before adjournment some action must be taken on the report of the committee. He had no doubt that the recommendations of the committee would meet with the approval of all. The only question that occurred to the executive committee at its meeting yesterday was in reference to the ways and means of financing the recommendations of the committee, and he would suggest a modification of the report in so far as it applied to this particular point; in other words, that a committee be appointed not only to perform these duties, as outlined in the recommendation of the committee, but to look into the ways and means of establishing such an independent bureau under a salaried official for the association and to report at the annual convention in October.

On motion of C. L. Henry, the report of the committee was accepted and placed on file, and the president of the association was authorized to appoint a new committee, this committee being discharged.

The meeting then adjourned for luncheon.

AFTERNOON SESSION

Vice-president Black called the meeting to order at 3 o'clock. He announced that the subject for discussion was the report of the Railroad Securities Commission. Unfortunately Walter L. Fisher, Secretary of the Interior, and B. H. Meyer, member of the Interstate Commerce Commission, had found it impossible to attend, but the discussion would be opened by Bentley W. Warren, general counsel Bay State Street Railway.

ADDRESS OF MR. WARREN

After Vice-president C. Loomis Allen had taken the chair, Mr. Warren began the discussion of the subjects mentioned. He said that the report was a most admirable one. It touched the electric railway industry only indirectly, because the problem considered was whether the securities of interstate carriers should be regulated by the federal government. Most of the electric railways, of course, were not interstate carriers. At the same time the tendency of interstate commerce decisions had been such that at almost any time electric railways might find themselves actually drawn within the jurisdiction of the Interstate Commerce Commission. The commission thought it was of doubtful expediency to have the issue of securities regulated at the present time. Mr. Warren did not think, however, that it was that conclusion which made the report valuable so much as the reasoning which led to it. Thus, in the matter of capital stock, the commission pointed out that there was a great deal of confusion regarding its nature. It was a subject which had been discussed, particularly in the State of New York, where a law which permitted the issue of stock without any fixed value whatever had now been enacted. The report of the commission made very clear the distinction between capital stock and bonds. In doing that it touched upon the question of physical valuation and the value or lack of value of such valuation. As a Massachusetts man he found very interesting the commission's remarks regarding stock watering. The Massachusetts anti-stock watering statutes were quite drastic. They were quite annoying even to an honest man, and to the dishonest man they were even more annoying. One of these laws required the issue of capital stock at the market value of the stock, not to be less than par, however, instead of at the par value of $100 per share. In commenting upon this feature the commission said:

"The experience of Massachusetts has shown that the attempt to prohibit the issue of stock below its market value has hampered the investment of capital and has distinctly interfered with the development of facilities. If this has been the experience of Massachusetts where capital was abundant, we can hardly expect better results in states where capital is more scarce."

In confirmation, Mr. Warren said that it had been increasingly difficult to obtain capital for transportation companies in Massachusetts since the enactment of the law in 1894. Further, he believed that the same law had been responsible for driving certain industries out of Massachusetts. Thus the American Telephone & Telegraph Company or its predecessor, the Bell Company, was a Massachusetts corporation. It had its origin in that State and received all of its earlier development and much of its financing there. In the course of its development it required very large additions to capital, but at that time there was no general law which enabled a corporation which had more than $1,000,000 to issue stock without special legislation. The company went to the Legislature to obtain authority to increase its capital stock at par. The bill was vetoed by the then governor and a substitute was passed permitting the capital to be increased but requiring the stock to be issued at its market value. The company struggled along on that provision for two or three years, issued some stock for very high prices and the stockholders grumbled. The difficulty of issuing stock in that way increased, and eventually the American Telephone & Telegraph Company was organized in the State of New York. Then it offered its stock at the rate of two shares for one of the Bell Telephone Company, the price fixed on the latter stock under that law having been about $200.

Another Massachusetts enterprise was the Boston & Albany Railroad, which, after a severe legislative fight, obtained authority to increase its capital stock at par; that is to say, before the general law was passed, by $10,000,000. It issued $5,000,000 at par, and the stockholders were glad to furnish the necessary capital. Then the present law was passed and was made applicable to the Boston & Albany Railroad. The corporation never issued a share of stock after that, and the first thing the Massachusetts public learned was that the directors of the company had arranged to have the New York Central & Hudson River Railroad lease the property. Since then the Boston & Albany Railroad has been a mere appendage of the New York Central.

The Boston & Maine Railroad was another illustration of the same tendency. A few years ago that company wished to increase its capital stock and was required to put the stock out at $190 a share. He remembered this quite distinctly because as a trustee he took some of it, relying on the judgment of the railroad commissioners that it was surely worth the $190 fixed by them. The next time that the railroad wanted to issue the stock the price had dropped to $165. He took some more of the stock so as to average down the holdings. The next time the price was about $120 and he took some more to average down again. The last time, which was quite recently, he heard that an order would be issued with the price at par $100 and the market price $96. If Massachusetts had recognized the principle that the stockholders be allowed to take their stock at par value the chances were that the Boston & Maine Railroad would have been able to finance itself and to have remained an independent corporation if that was desirable. The reason that the New York, New Haven & Hartford Railroad can continue to expand and develop the Boston & Maine Railroad is that it holds a charter in Connecticut.

Mr. Warren then gave a few results of his experience with the Railroad Commission of Massachusetts in connection with the supervision of securities. In saying that one of the defects inherent to regulation was delay, Mr. Warren did not want it understood that he was opposed to state supervision. On the whole such supervision had been an advantage, and whether it was an advantage or not public sentiment was such that it had to be accepted as a necessary incident in public service business. He thought it possible, however, to so restrain the state statutes that delays would be avoided by making the law very specific as to just what sort of securities could be issued and under what conditions and terms.

Referring to the question of physical valuation, Mr. Warren recalled a case where the commission decided that there was an impairment in the physical assets of a corporation amounting to about 15 per cent of its capitalization. In reaching that decision, which was about ten years ago, the commission refused to consider the item of interest during construction, the organization expenses of about fifteen different corporations which had gone to make up this corportation, and even refused to listen to arguments on the experimentation costs which the company had suffered because it was one of the pioneers in electric traction. A very reasonable allowance for each one of the factors named would have wiped out $1,250,000 of depreciation.

The purpose for which securities can be issued ought to be specifically stated in any law of this kind. In any business the need of working capital would seem to be axiomatic. Yet for years in Massachusetts the practice in the case of new companies was to let them capitalize the actual physical value of their complete property and to launch them forth as common carriers without enough cash in the treasury to make change the first time that a 5-cent fare was collected. The need of working capital was called to the attention of the commission but in view of its own precedents the commission did not believe that it ought to make a change without some indication of approval by the Legislature. Consequently it was necessary to get the law amended by inserting the words "working capital" into the law before authorization could be obtained. Another feature that gave trouble was the necessity of having the law amended to cover discount on bonds. If his company had $100,000 to be capitalized the board would give it $100,000 of bonds with which to meet the requirements, but if the bonds brought only $95,000 there was a deficit of $5,000 which could not be paid out of the proceeds.

On the whole Mr. Warren thought that most of the commissions meant to be fair and that the public meant to be fair, but that it was very hard to reach them with the facts. The commissions, for instance, ordinarily have to learn the business when these matters are first brought to them, and by the time they have learned it they are apt to go off the commission either through political changes or for other reasons. Hence, if the laws themselves are not pretty definite, the corporations will not get from the commission the things to which they are entitled.

Upon the conclusion of Mr. Warren's remarks, Frederick Strauss read a paper entitled "Some Mistaken Popular Notions Concerning Public Service Corporations." This paper is published elsewhere in this issue.

REMARKS OF OSCAR T. CROSBY

Oscar T. Crosby said he wanted Mr. Strauss to know that while he was listening to the latter part of his remarks it made him feel as though a dream of his had come true, namely, that some of the young railway men should turn to the academic side of the business. Railway work carried with it large and most important public relations and political relations. Railway men were of necessity politicians making a living out of public questions. It was for them to turn to the academic side if somebody else who had a great deal of time and a great deal of proper interest and less information than they was engaged on that academic side, determined to have his views prevail.

As to the practical means of doing this, there was first the necessity of self-education. What could the association do? The association could approach the general public through different avenues. One was by appearing through its proper representatives in every legislative body in this country. A second way was to plead general principles before the commissions of this country.

Mr. Crosby said that the courts were not fair in being guided by precedents. They were bound morally, but not by precedents. Where was there a precedent for a kilowatt-hour until the men sitting in the meeting established a kilowatt-hour? Where was there a precedent for carrying a ton of freight over such a vast distance as between San Francisco and New York? There were not any precedents. He was not going to present his views as to what the new rule should be, but he wanted to emphasize the fact that when the early decisions were made twenty-five years ago there was no 6 per cent confiscation rule. Mr. Crosby warned his hearers not to let the legislative bodies and commissions feel that there is any precedent governing the case. The next body to go to was the general public, through the press. The newspaper representatives didn't know what harm they were doing. Railway men should go to them and explain the seriousness of their position and let them know that possibly criminal endeavors to derail trains were due to agitation. The master mechanics and the men owning and conducting these enterprises had to turn to these problems, unless they wanted uninformed citizens of this country to direct the public in the wrong way on important subjects. The next thing to do was to urge railway employees who for the most part were a decent lot of fellows. The association should be made useful in these ways. The physical problems were fairly well worked out. The companies were just entering a field for which no lot of experts was being prepared.

FINAL DISCUSSION

S. G. McMeen said one of the questions which had to be faced was the plurality of the bodies which were considering regulation and the uninformed condition of the individuals who made up these bodies. One difficulty that impressed him in this respect was the short tenure of office of the commission members, a condition which hindered the thorough education of regulating bodies.

Arthur W. Brady said the report of the railroad securities commission was a great public document which did not relate simply to the actual issuance of securities but covered a general discussion of the principles which must apply inevitably to all regulation of businesses of this character. It was interesting to ask what would be done with valuations after they had been obtained. Within the last sixty days, the Adamson valuation bill had been passed by the House of Representatives and had gone to the Senate, where it was now before the committee on interstate commerce affairs. This bill provided that the property of all common carriers subject to the jurisdiction of the Interstate Commerce Commission should be valued. The report of this commission, notwithstanding the ability with which the principles therein set forth are stated and the high character of the men back of it, had been absolutely disregarded by Congress as far as the Adamson bill was concerned. Yet the report simply recommended that a valuation of these properties should be made in those cases where the Interstate Commerce Commission may deem it a desirable thing. The Adamson bill would require the spending of an enormous amount of money to value property without regard to whether the valuation was required or not. He did not agree with Mr. Crosby that the field was altogether new and that all precedents must be disregarded. The principles laid down in the report of the Railroad Securities Commission might just as well have been laid down twenty-five years ago. Elemental as these truths were, it was vital to the prosperity of the railway business that railway companies should undertake to impress them upon the public—not only upon the general public but upon the commissions, legislatures, common councils and other bodies of similar nature. If they failed to do what they could to inculcate proper principles, they themselves would be the sufferers.

Professor A. S. Richey then presented a written discussion on the subject. This appears in abstract on another page of this issue.

Charles L. Henry also praised the report of the commission, particularly its exposure of the cries of "No watered stock" and "No sale of bonds for less than face." After all, the fundamental question was: "What is the owner of the property entitled to earn on it?" whether the ownership is vested in one person or in hundreds of persons. No man would contend that the return which he received on his money should be limited to the mere interest to pay for the investment. There was no profit until one went beyond the interest charge. The principles in the report under discussion applied just as well within the limits of a state as to interstate carriers. He likened the development of an electric railway to that of a highway which was hewn out of the wilderness, then paved with logs, and then with stone hauled long distances. Who would claim that the correct appraisal of that highway was the present value of the materials of which it was composed?

The meeting then adjourned.

THE PRESENT TENDENCY OF STREET RAILWAY OPERATING EXPENSES

BY J. J. BURLEIGH, SECOND VICE-PRESIDENT PUBLIC SERVICE CORPORATION OF NEW JERSEY

A paper on "The Present Tendency of Street Railway Operating Expenses" might, with a due regard for accuracy, be so condensed as to set forth the answer to the proposition in the single word "upward." Although such a contribution would possess the doubtful merit of brevity, it would be doing no more than stating a fact that is obvious to most, if not all, of us. It would be citing an effect without giving the causes therefor, proclaiming a result but throwing no light upon the conditions which produced it. My purpose will be to set out briefly some of the figures and factors which will explain and make clear why the operating expenses have been mounting higher and higher during the past years, and my observations will be based upon the actual experiences of the company with which I have the honor to be connected.

One of the chief reasons why operating expenses have been increasing has been the tendency toward longer hauls for a single 5-cent fare, due to additional transfer privileges and the extension of fare zones because of the expansion of municipal limits coupled with franchise obligations to carry passengers from any part to any other part of a given city or town reached by a company's lines without extra charge. The growing demands of the public for more service and better service, necessitating more costly equipment and heavier power outlays, has also been a factor. Wages of trainmen and other employees have been increased from time to time, which has added materially to the burdens of operating from a financial point of view and the single item of taxes, including franchise, real and personal, as represented in cash outlay has been nearly doubled on a car-mile or car-hour basis within ten years, making this charge alone an exceedingly heavy toll exacted from the company's gross revenue.

In an endeavor to get at the underlying facts let us subdivide the costs of operating and consider the factors which have been responsible for the increases. We will begin with the maintenance of way and structures. Our experience has been that this item accounted for 1.154 cents per car mile in the year 1904, went to 1.189 cents in 1908, to 1.453 cents in 1909, to 1.888 cents in 1910, to 2.926 cents in 1911 and to 2.999 cents in 1912.

The increases are largely due to a higher wage scale for track and line laborers and an advance in the price of materials used for replacements and repairs. Ten years ago laborers could be hired for 15 cents an hour against a rate of 17½ or 19 cents an hour to-day. This shows an increase of 16⅔ per cent, and men who are charged with the supervision of this labor declare unequivocally that there has been a diminution of efficiency equal to 25 if not 30 per cent. In other words, the class of men available for this character of work to-day makes it necessary to hire at least four men for every three employed at similar tasks ten years ago. Nor is the end yet, for there is already ground for the belief that a still higher rate of wages will have to be paid with the coming of spring.

Rails, frogs, switches and mates and all other special work chargeable to operation as replacements have gone up in price, as have fishplates, tie rods, bolts and practically everything else which enters into repairs, from 15 to 25 per cent over the prices of ten years ago, and modern carhouses and concrete roadbeds bring with them certain necessary outlays which must be charged to operating.

Demands in the way of street pavements have grown more exacting and incidentally more costly. Where the relatively inexpensive macadam pavement sufficed formerly it has been superseded, by virtue of franchise obligations, by wood-block or specification granite block which cannot be laid short of approximately four times the cost of macadam. Reduced to a car-mile basis, our experience has shown that street-paving requirements cost 0.172 cent in 1904 and 0.309 cent in 1912, covering a system which includes populous cities, suburban towns and rural communities.

At the same time the cost of bridges has increased, due also to the necessity of providing for the heavier rolling stock, while the rather insignificant item of ties has contributed its share to the general burden of expense. In the past ties were used that cost about 60 cents each, but modern practice dictates the use of creosoted ties at a cost of about $1 each. As they are placed closer together under the heavier girder rails, more of them are required per mile of track. While figures show that the initial cost is many times greater, on a car-mile basis, than formerly, the changed conditions return a measure of compensation in the form of materially longer life of specially treated ties.

Under the head of transportation reference may be again made to the larger and heavier type of cars now used. More energy is consumed in propelling the heavier vehicle, and the car of to-day must be equipped with air brakes as well as hand brakes, unit switch control so that cars may be operated in units or multiples and devices for preventing or minimizing accidents, such as fenders, platform doors or gates and folding steps, all of which have a tendency to increase the cost of maintenance.

It is in the item of wages for motormen and conductors and the cost of supervision that larger inroads into a company's revenues may be discerned. In the case of the company with which I am most familiar the cost of wages for trainmen has increased nearly 25 per cent on a car-hour basis, from 40 cents per hour in 1904 to 49 cents in 1912, and during the same period the cost of supervision has increased as much, if not more, the actual percentages not being readily obtainable because of a rather radical change in the classification of the account. Under the head of transportation, mention may also be made of the sprinkling of tracks. Where formerly it was deemed sufficient to sprinkle with water many municipalities now insist upon the dust being laid with oil, an operation which has added to operating charges to a measurable degree.

In the item of taxes the street railway company bears its full share of the cost of every public improvement and the governmental outlays of every community in which its property is located besides meeting municipal or state demands in the form of special exactions, or assessments on gross receipts, or in the form of franchise taxes. Higher standards of living and the desire on the part of taxpayers for greater municipal conveniences, better sanitary conditions, more police and fire protection and improved educational facilities all make for increased tax rates and larger tax bills, which must be met from the accumulation of nickels representing rides, so far as the street railway company is concerned. When to all these is added an increasing franchise tax on gross receipts, as has been the situation with which we have been confronted, it is easily understandable that the burden of taxation has been growing no lighter as the years have gone by.

To state the facts concretely let me say that in 1904 the taxes paid by the company the writer represents amounted to 5.12 per cent of the total operating revenue; the cost per car mile was 1.301 cents and the cost per car hour was 11 cents. Growing in volume each year, the corresponding figures for 1912 were 7.12 per cent, 2.226 cents and 19 cents respectively. Here figures are more eloquent and more illuminating than words.

One other source of expense properly chargeable to operating is worthy of consideration. It is one that had its inception in the comparatively recent past and yet has assumed sizable proportions. It concerns the employees and working conditions and may be designated by the word welfare. Distinct from the requirements of a legislative enactment known as an employers' liability and workmen's compensation law, in force in our State, the welfare work of the company with which the writer is connected comprehends sick benefits, life insurance and pensions paid voluntarily by the company without contributions on the part of the employees. Started in 1911, the cost of these beneficial features amounted in the aggregate to $30,320, or the equivalent of 0.063 cent per car mile, while for the year just ended the outlay had grown to $37,757, or 0.08 cent per car mile. This was in addition to other minor outlays for the promotion of social functions, dinners, entertainments, smokers, outings and inter-division baseball league of twenty teams, pool tournaments and other games and contests for the benefit of the trainmen and members of their families. The workmen's compensation act above alluded to called for an expenditure, in addition to all of the foregoing, of something like $27,000 during the first twelve months it was in force.

With these observations, treating as they do of only some of the elements of operating costs and substantiated, I dare say, by the practical experience of every man actively engaged in the industry, it is not difficult to see "The Present Tendency of Street Railway Operating Expenses."

Our problem is to bring the facts home to the public, to the municipal authorities and to the state legislatures so that they, too, will see and be convinced that there is a limit beyond which the street railway cannot go and still fulfil, in an efficient manner, the purpose for which it was created; that the burdens cannot be made too heavy without curtailing its sphere of usefulness or retarding its efforts as an upbuilder and developer of the communities it serves.

DISCUSSION OF REPORT OF RAILROAD SECURITIES COMMISSION

BY PROF. A. S. RICHEY, WORCESTER POLYTECHNIC INSTITUTE

In this able report the Railroad Securities Commission recommends that the Interstate Commerce Commission shall have power to make a "physical valuation" of transportation utilities as the governing factor in determining the reasonable rate for the service rendered by such utilities. It is unfortunate that in this report the commission did not define what it meant by physical valuation.

Webster defines physical as pertaining to nature, external, and valuation as estimated worth, an appraisement. Applying this definition to "physical valuation," we have "an external appraisement."

If this definition is what this commission had in mind when it wrote this phrase into the report, it is a far reach from the real, true value on which the investment is entitled to a fair return. Physical value thus defined is merely the material and labor cost applied to an inventory of the property being valued, in which only such items and materials are listed as can be seen or known to exist in such property. There is no provision here that includes the intangible values that necessarily form a large part of any active property, such as the cost of pioneering, cost of underwriting, cost of organization and administration, interest, legal expenses, taxes, engineering, contractor's profits, etc., during the construction period, development expenses, changes in the art and other intangible values, all of which are as much a fact of the cost of the finished property as the material and labor cost.

Recent valuations for rate-making purposes have, in a number of instances, been more or less of a political nature and as such made almost wholly with the sole purpose of beating down value to the lowest possible point and that point barely covering the mere physical material and labor cost.

In view of this is it any wonder that this transportation industry, with its millions of dollars of investment, is, as the commission suggests, to a great extent opposed to physical valuation?

With governmental assurance that these valuations, which in many cases will be necessary in the determination of reasonable rates, will be broadly and fairly made without fear or favor and that every item of value of whatever nature, tangible or intangible, will receive its proper amount of value, there is no doubt that this industry will lend willing and earnest aid in helping to clear this now vexed and complex problem of a reasonable rate. In the valuation of a property to determine the investment on which a reasonable return should be made, depreciated or so-called present value has no part or place. The investment is by all moral and legal right entitled to a reasonable return on every dollar that it can be determined has been invested in the property, unless, only, it is shown that the property has been allowed to deteriorate in order to pay excessive dividends.

Even for this condition, the remedy is not in measuring the extent of the depreciation to deduct it from the full investment and say that on such a remainder a reasonable return or rate can be made. The return should still be on the full investment, but before any such return is paid out in dividends it shall be used first to bring the property back to a state of normal efficiency.

To find thus the reproduction value of a property as representing the investment and then depreciate it to find a so-called present value is wholly erroneous, and is nothing more or less than penalizing its existence as a live, beneficial going concern.

A property that is not in existence but is going to be put in existence will without a question be allowed to earn a reasonable return on every dollar invested.

How absurd is the condition relative to return that exists in some of our appraised properties in that on one part of the property the rate of return is based on a wholly unjust depreciated value, while on the other part, where the investment has been made after such appraisal, the return is on the full value! This means that a part of the property is allowed to earn a return on, say, only 70 per cent of the investment, while this other part is earning on 100 per cent.

In conclusion, it may be stated, and without fear of honest contradiction, that a rate to be reasonable must be adequate enough not only to pay operating and other expenses of every nature necessary in conducting the business and interest on the full investment commensurate with the hazard involved, political, financial or otherwise, but it must also provide for the return of the full investment intact dollar for dollar at the end of such investment period, and in addition to this must enjoy a fair share of the prosperity of the community that such investment has built up and made possible.

DISCUSSION ON RATES AND FARES

BY R. B. STEARNS, VICE-PRESIDENT AND GENERAL MANAGER MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

The work of the committee on determining the proper basis for rates and fares continues to be of importance, and each session adds more pertinent data. Gradually we are arriving at conclusions and fixed or fundamental principles with which every system must eventually be inoculated before it can survive the attacks of politicians and the uninformed public.

Increasing demands for extensions of lines into outlying districts for the one fare, increasing demands for more frequent service, regardless of the adequacy of the present service when measured in load factor or percentage of passengers to seats, and increasing demands for reduction of rate of fare to outlying or second-fare districts, continue to be the burden of the street railway management.

The education of the patrons of the public utilities in the affairs of the companies and an illumination of the details of the cost of service seem necessary and urgent to the end that much of the accompanying resistance from the public may be removed by the elimination of the opposition of the thinking business men to sane, sound, fundamental principles involved in the application of the proper rates and fares.

Study of the terminal and movement method of determining the maximum passenger haul discloses most forcefully the necessity for the adoption of the zone system for zones beyond the congested or central district. A joint action or application of this plan by the street railway interests on the basis of 2 cents per mile zones outside the present central one-fare district will save the street railway business from its worst enemies and preserve the integrity of its securities along sound and equitable lines.

Obviously a central district must be recognized in which the one city fare applies to all alike. The outer limits of such district should be extended from time to time as the density of population within increases and as the load factor likewise increases—the limit of haul (all lines within the central district treated as a whole) being fixed at such distances as will permit of a reasonable return to the investors.

Ways and means or proper methods for collections of fares in such a zone system are a perplexing problem. The proposal that the federal government shall coin a 3-cent piece applicable to street railway business should be discouraged and prevented as of no value to the industry and only tending to increase the difficulties in effecting uniformly fair rates and practices. A coin of 2 cents will measure the cost of service within a 1-mile zone and can be made to cover the cost, provided the frequency of service or the movement charges are kept in consistent relation to the contribution or demand for service.

As the variation in load factor greatly affects the terminal charges in the cost of service, the determination of the frequency of service during off-peak hours becomes an important factor. Frequency of service during hours of maximum travel, when measured on basis of seats per car and passengers standing by choice, is usually most satisfactory, but is regarded by the critical public as "poor" service or inadequate when cars are interrupted and bunched owing to causes over which the company has no control. Frequency of service during off-peak hours or non-rush periods, measured in the same way, would be regarded probably as wholly inadequate, as the general public has for years become accustomed to an interval between cars which usually approximates three seats per passenger.

SOME MISTAKEN POPULAR NOTIONS CONCERNING PUBLIC SERVICE CORPORATIONS

BY FREDERICK STRAUSS, J. & W. SELIGMAN & COMPANY, NEW YORK

I should like to-day to say a few things that may seem to you elementary, so elementary, in fact, that you may accuse me, as Dr. Holmes did the Katydid, of saying "an undisputed thing in such a solemn way"; but, in spite of their being so elementary, they are frequently lost sight of in discussing corporations, and particularly public-service corporations. We have heard, of late, much heated talk concerning the "special privileges," so called, granted to such corporations. Those indulging in such talk have apparently forgotten the old maxim that "intemperance in talk makes a dreadful havoc in the heart," and one might add also, "a dreadful havoc in the head." The belief seems quite general that such talk concerning public service corporations is an indication of progressiveness on the part of the speaker, when in truth, to paraphrase slightly the words of Arnold, he has only been stanchly and mechanically following stock notions and habits, instead of turning upon them, as he should, a stream of fresh thought derived from knowledge of the best that has been thought and said on the subject.

SPECIAL PRIVILEGE

What is meant by the term "special privilege," as applied to public service corporations? First, there is usually named the power granted to them of exercising the right of eminent domain, but a little thought will make it clear that without this right a railroad could not be built at all. The State possesses the power of eminent domain; the people of a State want a railroad built (or transmission lines, pipe lines or what not) and, accordingly, they grant, through the State, to the parties willing to build the line, the right of eminent domain; that is to say, they grant them the right to build the road over the necessary lands regardless of the owner's wish, but requiring the payment of full compensation to the owner. To grant them the right to build without procuring for them the right to run over the necessary lands is only another way of not granting them the right at all. Other so-called "special privileges" to corporations are perpetuity of corporate life, limited liability of stockholders and the right to act by majority vote. Perpetuity of corporate life is no more a privilege than is the right of eminent domain; it is absolutely needed for the public good. If railroads should be run by individuals and copartnerships and were to cease running upon the death of individuals or the dissolution of copartnerships, a state of confusion would exist which would instantly cause to appear absurd the idea that perpetuity of corporate life was a "special privilege." Again, limited liability of stockholders is only another *sine qua non* of a railroad's existence. Railroads are rarely built by rich capitalists, although there are occasional exceptions, such, for instance, as the Florida East Coast Railway and the Virginian Railway. Usually the money required is obtained from large and small investors, through the bankers of the country, purveyors of capital rather than themselves contributors. This money could never have been obtained if stockholders were to become liable for the debts of the corporation, sums in most instances many times greater than probably even the richest of them could ever hope to possess. So, again, we see that this so-called "special privilege" is in reality nothing more than a complying with necessary requirements. The railroads of this country, if they are to be built by private capital, could as soon be built without steel and wood as without the limited liability feature of corporate bodies.

To provide that a corporation is to be governed by its officers selected by a board of directors chosen by a majority of the stockholders is only to say that it is to be governed in accordance with reason. If minority stockholders could successfully obstruct the policies of the management pursued in good faith by overriding the rule of the preponderant majority, or if policies could be carried out only by unanimous consent, an unthinkable state of affairs would arise; the corporation could not adequately serve the public. It follows, therefore, that government by majority is something which the public interest requires, and permission to corporations to be so governed is not a "special privilege" at all.

There remains, however, the occasional but not universal element of monopoly. Where it exists, such monopoly is usually one of fact, rather than one due to special monopolistic grant; in other words, the law itself permits competition, but as the public interest is best served by a single, regulated public-service corporation rather than by competitive ones, (experience having shown that such competition is wasteful and generally results in ultimate combination) public sentiment is usually against granting unnecessary franchises. In the case of street railroads, the element of monopoly is one that is being recognized more and more as being for the general good, as through routes and transfers can best be obtained by monopoly. So we see once more that a grant of the use of streets for the purpose of an electric road to a single company is not in order to favor that company but because of public necessity. The inconvenience attendant upon tearing up of streets for gas pipes, electric conduits, etc., likewise results, in sensibly governed cities, in the authorities declining to grant franchses to others than the company in possession. Such grant is rarely or never in the nature of an exclusive grant. The municipality simply declines to grant further franchises to so-called competing, but frequently only raiding concerns.

RIGHT TO OCCUPY THE STREETS.

But it is frequently said that the right to occupy the public streets at all is a "special privilege." But how can you have a street railway without its occupying the streets? Is it expected that modern science will produce a streetless street railway? How can you have gas in your houses for cooking and lighting purposes, or current for electric light or power, without the pipes and wires being placed in the streets to conduct the gas and the current from the places where it is produced to the places where it is to be used? Here, again, what is called "special privilege" is nothing more than one of the absolutely necessary conditions to the existence of the public utility that the public insists on having. Another current stock notion, so abraded by continuous circulation as to have reached "the limit of tolerance," is the one that franchises should not be perpetual but should be only for a limited period, and that a short one. In a number of states franchises are limited to twenty-five years or less. You, of course, know how unwise this is. You know that with an expiring franchise there is no incentive to keep up the property, because if the franchise is not renewed, your property in any event will be worth little, if any, more than its estimated depreciated replacement value, and if it is to be renewed on the basis of a mere interest return on its so-called "physical value less depreciation," that valuation will be very little affected by the property's being in a better or in a worse physical condition. A theoretical valuation takes place in due course to determine what it would cost to reproduce the property if new, and then a deduction for theoretical depreciation based on the time that the material has been in service. That so-called valuation is a guess, necessarily inaccurate, as such of us as have relied on thoroughly competent engineers' estimates in providing money for the construction of public utilities know by sad experience. What incentive, in either event, is there for experimentation, for the application of costly new methods, for the discarding of obsolete or semi-obsolete machinery, when the public is not willing to defray the "cost of progress"?

Of course, you who have spent most of your lives in studying these problems know quite well that the most satisfactory franchise in the public interest, as well as in the interest of the stockholders, is a perpetual one, with rates either regulated intelligently by a non-political public service commission, or, what is much better, regulated by arbitration at regular intervals of time specified in the franchise, such regulation to be based on the value of the service rendered, and not on the basis of "physical value," so-called. Bankers are disinclined to provide capital for public utilities the franchises of which have only ten or fifteen years to run; and, of course, without capital the public utility cannot progress, and the failure to progress retards the growth of the community.

There is nothing novel in what I have just said. I am almost ashamed to have said it—it appears so self-evident. And yet "candidates for political influence and leadership," as well as those holding office and leadership, are, again to quote Arnold, "caressing the self-love of those whose suffrages they desire, knowing quite well . . . that they are using a sort of conventional language, or what we call claptrap, which is essential to the working of representative institutions."

CAUSE OF ATTACK AND REMEDY

Those attacking public-service corporations have at all times a ready audience. Why is this so? We know that it is, in part, due to that instinct in us which prefers the sensational to the accurate; the same instinct that makes us experience a profound satisfaction in seeing our own candidate thoroughly beaten in an election if he is to be beaten at all. Such of us as were on the losing side in the late election still feel a kind of comfortable sensation in the thought of the monumental pluralities that overwhelmed our party. Then there is that other human quality that, if only we hear a thing said over and over again, we begin almost to believe and actually do end by believing it. But there is still another reason, and for that reason railroad men and those interested with them in the management of public service corporations are to blame. They understand the subject, or ought to, at least; but, in the face of misstatement and misinformation, they usually adopt either a policy of silence, or else one of apology when no apology is called for. They, too, try to flatter and cajole the public. They are ready to insert expensive advertisements in the newspapers for the purpose of winning over the press, instead of considering to what extent, if at all, public clamor may be justified and, to the extent that it is not justified, educating the public. They bend to the storm rather than face it. Instead of combating some deadly error, such as the theory of so-called "physical valuation," they will content themselves with attempting to prove "physical value," instead of frankly trying to show to public bodies, commissions, legislatures, etc., the absurdity of such a notion of value.

In other words, they, too, cling to stock notions and habits, instead of turning a stream of fresh thought upon them. They, too, attempt to caress the self-love of the people by using the conventional language of claptrap, forgetting that "the number of those who need to be awakened is far greater than that of those who need comfort."

Because the constitution of the United States says that the commandments, thou shall not kill, thou shall not steal, or, what is the same thing, that a man shall not be deprived of his life or property without due process of law, are as applicable to the majority as to an individual, public service corporations content themselves with opposing confiscatory rates in the courts by attempting to prove "physical value" and then contending for a reasonable return thereon, without at the same time intelligently spreading among the people the idea that mere abstention from confiscation will not suffice to produce capital for extensions, for improvements, for progress in the arts by the discarding of obsolete appliances and methods and for the necessary experimentation by new methods. This fatal heresy of so-called "physical value" has been allowed to go so far that one hears at times the phrase "the constitutional rate"—meaning thereby 5 per cent or 6 per cent or 7 per cent return (according to the legal rate of interest in a particular section of the country) on the estimated cost of reproduction as at the time of the inquiry, less an arbitrary and theoretical deduction for depreciation; as though the constitution said anything at all on the subject, other than that no one shall be deprived of his property without due process of law—not another word on the subject. Another one of our uncombated stock notions is the one that 5 per cent or 6 per cent or 7 per cent return on the "value of the property" is a reasonable profit, when, in reality, profit only begins where current interest rates leave off.

SHARES WITHOUT PAR VALUE

The introduction of shares of no par value has been much discussed and earnestly advocated as a substitute for shares that purport to be full paid, when, as a matter of fact, they do not represent actual money paid in. Shares of no par value in such a case no doubt serve a useful purpose. The Railroad Securities Commission reported unanimously in favor of this device, and it would be well if some or all of the forty-seven states, other than New York, were to adopt it. New York is the only state, so far as I know, that has adopted it, but with such limitations and qualifications that its applicability is limited. But in advocating this device we are again in danger of falling into our mechanical way of worshipping machinery, instead of the god of the machine. If the public policy is to be that 6 per cent, or any other interest return, on the money invested or on the estimated cost of reproduction as at the time of the inquiry, less depreciation, or on any of the varieties of "physical value" so-called, is all that a public utility company is to be allowed to earn, then any machinery that is devised to get out profits that will never exist is stationary machinery and it is of no avail, nor would it be of avail to have any other kind of device or machinery, for the trouble lies not in the device or the machinery, but at the root of the matter, since it arises from an unwillingness to permit an adequate profit. We shrink from meeting the real difficulties by the substitution of devices for the purpose of soothing the critics, thus postponing the real solution of the problem.

WATERED STOCK

And while on this subject of shares of no par value and the object sought to be attained by their use, we come across another one of our mechanical repetitions, namely, "stock watering." We say that Europe has got along without it; but has it? In the first place, promoters there receive large compensation either directly in full paid shares, or else in cash, which, in turn, is frequently invested in shares, which, of course, is the same thing as though the shares had been given directly in compensation. Then, again, when shares have once been issued and paid for in full, there does occur, in England, what is called stock splitting and stock duplication, which latter is nothing else than what the balance sheet in England terms "nominal additions to capital," or what we term "water." The stocks of most of the English railroads have undergone this process.

What none of the critics of "watered stock" seem to take into account is that on the continent of Europe the great banks, with their enormous capital and surplus and their fixed deposits, carry new projects until the earnings thereof have reached the desired point, and then the actually full paid shares are sold to investors at a high premium. Thus the promoters and the sustainers of these enterprises during their infancy reap a large profit, and the capital of the banks is free once more for new ventures, but here the banks cannot do this, and the means of private bankers, however great, would be entirely insufficient for the purpose. Of course, no prudent bank or banker here would use deposits for this purpose, banking conditions being entirely different from those abroad, and the imprudent ones that have attempted to do this have usually come to grief. The economic necessity that capital should be set free at the earliest possible moment to do new work is the cause of the issue, in this country, of so-called "watered stock" and of the advocacy of shares "without the dollar mark." This mobility of capital is a national asset. Without it the development of the country would have been retarded.

Capital seeks that form of expression in the way of stock and bond issues that has the greatest market value. In endeavoring to procure capital this principle, which is ever at work, should not be underrated. The investor that is content with a low rate of interest but wants absolute security will take a bond bearing 4 per cent or 5 per cent interest, provided that there is back of his investment a large equity. The investor that desires a somewhat larger return but still is not willing to run a very great risk will buy a preferred stock entitled to 5 per cent, 6 per cent or 7 per cent preferential dividends, provided that there be some equity back of his investment, as evidenced by earnings in excess of the preferred dividend requirements. Finally, there is that class of speculative investor who is willing to take large chances for large profits. The saving that is due to the application of this principle of classification benefits the holder of the equity and belongs to him as a matter of right. The idea that the public is entitled to the saving effected by the mortgaging of stockholders' property or by the granting of preferential dividends to partners in an enterprise is vicious in principle and harmful in effect.

The fact that banks here should not, and that private bankers cannot, carry enterprises during their initial stages of development makes requisite some method of mobilizing capital, and the method of so doing by so-called "stock watering," or by the device of "shares without par value," has, therefore, a legitimate foundation. The fact that the capitalization of surplus earnings into common stock has become so prevalent in this country, while it is not in general use in other countries, is in itself an indication, not of a desire to deceive or to defraud, but of the economic necessity of such a course, growing out of our peculiar banking system and our peculiar trade customs.

When all has been said that can be said against "stock watering," and there are objections to it as well as benefits derived from it, we still have to face the fact that the mere payment in full in cash for stock is no criterion of its value. "It has at best," to quote the words of the Railroad Securities Commission, "only a historical importance, as showing what property was or purported to be worth at the time of the incorporation. It does not show what it is worth . . . ten years later or even one year later."

Another idol of the uninformed reformers is that railways and other public service corporations should sell securities directly to the investor instead of indirectly through bankers. The *Railway Age Gazette,* in speaking of this some time ago, said that a man is not expected to be a chemist just because he has to buy drugs from an apothecary, and that no one complains because a manufacturing chemist does not sell his goods directly to the public, but allows several middlemen's profits to intervene. The general public is not supposed to have all the qualifications of an apothecary, but the intricate science of investment, says the *Gazette,* is assumed to be the common knowledge of the great American people.

EDUCATION THE REMEDY

Strange it is that our country is the only one where the experienced judgment of a manager of a public service corporation is, in the public estimation, not considered worthy of respectful and eager attention on subjects relating to his profession! Are not the managers as intelligent, as efficient, as public-spirited, as honest, as the politician, the shipper, or the passenger? Why do the people imagine such a vain thing? Is it not largely because the sensational writers and demagogues rage so furiously that the voice of reason cannot be heard? Is it not because in our country we are unwilling to submit ourselves to intellectual authority—to assume that others know more about their own occupation or profession than we can possibly do? Ask these loose critics to specify a remedy for that about which they are complaining, or even accurately to specify their complaints, and you will find that they have been dealing in generalities merely; that they have been "stanchly and mechanically" following "their stock notions and habits" instead of "right reason." On the other hand, it cannot be denied that the practical men of affairs in our country give but little thought to the theory of their work. The hewers of wood and the carriers of water have been so busy hewing and carrying that they have neglected to study the theory of their craft, leaving the theorists of no practical knowledge or experience to dogmatize on the subjects concerning which they so freely express their opinions unchallenged.

And the same cause that operates to make the great mass of the people that have no intimate knowledge of the operating and financial problems of public service corporations cling to their "stock notions and habits" operates also on us on whom devolves the management of such companies, namely, the failure to turn on these problems a "fresh stream of thought." And by our failure adequately to think out our own problems and to give expression to our thought, and by contenting ourselves, instead, to work them out by practical experience merely, unaided by theory, we fail to make an impression upon the popular fallacies that are believed in so "stanchly and mechanically," for we ourselves, after all, usually only reiterate the conclusions of our own practical experience, instead of attempting at the same time to dissipate the ignorance of the uninformed by intelligent appeal to their reason, just as the theorists reiterate their ideas uncorrected by the results of practical experience.

I can do no better, in concluding, than to quote a few more words from Arnold, who, in speaking of the motto of the Cobden Club of England, namely, "Peace, Retrenchment and Reform," expressed the hope that this motto might mean "Peace to our nonsense, retrenchment of our profligate expenditure of claptrap, and reform of ourselves."

DISCUSSION ON RATES AND FARES

BY WILLIAM J. CLARK, MANAGER TRACTION DEPARTMENT GENERAL ELECTRIC COMPANY

To determine the exact production costs of any commodity is difficult. The kindred problem of fixing selling prices which will afford a real profit thereon is equally hard to solve. When the former has been accomplished economic laws require that the latter be rigidly adhered to, or financial disaster awaits the seller.

Our sub-committee is entitled to thanks and congratulations for its able work and what it has pointed out to us on the first two features. Its conclusions can be summed up in the statement of your committee to the effect that "the street railway business, as conducted in this country, is selling goods below cost." Consequently, the problem which confronts us is the finding of ways and means which will permit conformity with the economic principle above stated.

ZONE SYSTEM OF FARES

A previous report of your committee suggests the adoption of the zone system of fares in this country, in place of our present flat-rate fare, on the theory that it would afford a solution for at least a portion of that great problem which confronts us.

I fully concur in the wisdom of this recommendation, but fear that we must go somewhat further before that problem is solved in its entirety, and in some manner provide for the readjustment of fare rates when necessary to conform to changes in the cost of transportation.

My principal reason for coming to this conclusion is through a recent study of British municipal tramway conditions, which reveals the fact that such tramways are also "selling goods below cost," and in all probability their condition in this respect must become worse.

What follows will not only make this fact apparent, but will also show that this unfortunate condition is realized by the management of British municipal tramways.

From the first radical differences have existed between British and American theory and practice on the creation, finance and operation of street railways, particularly since British municipalities have figured so conspicuously in their ownership and operation.

British municipal tramways have been especially favored in every manner which would tend toward low capitalization and small operating charges, as will now be briefly sketched.

BRITISH ADVANTAGE OF AMERICAN DISADVANTAGE

It was officially stated in Glasgow, at the commencement of the British municipal tramway movement in 1896, that its development had been delayed to take full advantage of American experience in electric railway development.

In this connection the following language was used: "The pioneers of the electric overhead system have come through a trying and expensive experience."

Ability to take full advantage of this costly experience, which has legitimately swelled the capital accounts of American street railways, has greatly reduced the capital investment required for British municipal tramways, and has likewise favorably affected their total cost of furnishing transportation, through low fixed charges.

The following fact has had similar favorable effects: Although American street railway companies have frequently paid for development made and properties created by their predecessors far more than these were actually worth, British municipal tramways have paid but little for what similarly preceded the creation of their present properties. Generally what their predecessors had created was legally confiscated or only scrap value paid therefor.

To demonstrate this fact: The parliamentary report of 1912 on tramway and light railways in the United Kingdom shows that the total amount expended by all municipal tramways for "construction or purchase of old lines and works now superseded" has been less than the equivalent of $31,000,000. A portion of this total is represented by certain expenditures made by the municipalities themselves for work since abandoned. Consequently, British municipalities have paid less than $30,000,000 for the properties of all the tramway companies which preceded their present tramway systems.

British municipal undertakings have also received many financial benefits and advantages paid for by local taxation which do not show in their capital accounts.

Undisputed sworn testimony was given before the Royal Commission on London Traffic a few years since to the effect that tens of millions of dollars had been expended by British municipalities for street widenings and similar improvements, made necessary by municipal tramway construction, that had never been charged to the cost of the tramways.

In advocacy of British municipal ownership of tramways and other public utilities, it has been correctly stated that the municipalities have been able to borrow capital at far lower rates than are possible for American public utility companies, but it is not stated in this connection that the ordinary rate of interest at London is far less than in this country.

It is, of course, true that the low rate of interest now paid upon the present capital investment of municipalities in tramway and other public utility undertakings means low fixed charges and thus lessens their full cost of service.

INTEREST RATES HIGHER

But conditions have changed in this regard, and British municipalities cannot longer borrow money at the low rates of the past.

This is best evidenced by the quotations on certain British municipal securities from the official London stock list of Dec. 30, 1912, shown in Table I. The quotations are for one issue in each case.

TABLE I.—QUOTATIONS OF BRITISH MUNICIPAL SECURITIES

	Bid.	Asked.
London County Council	67	68
Corporation of London	73	75
Barnsley Corporation	80	82
Barry Urban District Council	79	81
Bath Corporation	82	84
Batley Corporation	81	83
Birkenhead Corporation	74	76
Birmingham Corporation	67	69
Bradford Corporation	82	84
Brighton Corporation	67	69
Bristol Corporation	80	82
Cambridge Corporation	81	83
Cardiff Corporation	81	83
Coventry Corporation	73	75
Croydon Corporation	82	84
Derby Corporation	79	81
Eastbourne Corporation	80	82
Exeter Corporation	70	72
Glasgow Corporation	70	72
Edinburgh Corporation	76	78
Hull Corporation	80	82
Lancaster Corporation	79	81
Leeds Corporation	79	81
Liverpool Corporation	67	69
Manchester Corporation	84	85
New Castle upon Tyne Corporation	74	76
Portsmouth Corporation	72	74
Reading Corporation	79	81
Sheffield Corporation	68	70
Southampton Corporation	74	76
West Ham Corporation	77	79
Bristol Corporation	70	72
Leicester Corporation	67	69
Thames Conservancy Board	73	75
Metropolitan Water Board of London	75	77
Port of London	73	75

LOWER WAGES IN UNITED KINGDOM

The lower rates of British wages should naturally reduce the cost of transportation below figures which are possible in the United States without regard to the fact that our American street railways have not been so favorably treated on their capital investment as have British municipal tramways.

True, there has been some slight increase in the rate of British wages within recent years, but that this has not been proportionate to similar increases in America is illustrated by the following quotation from the report of the Glasgow Corporation Tramways in 1911:

"The tramways committee has agreed to recommend that the wages of motormen and conductors, cleaners, sandmen and greasers be increased as from June 1. The scale of wages recommended is as shown in Table II.

"It has also agreed to recommend that the minimum wage of able-bodied laborers in the car works, Pinkston power station, and permanent way be at the rate of 5½d. (11 cents) instead of 5d. (10 cents) per hour."

Taxes paid by British municipal tramways are far less proportionately than the similar item in this country, while their accident costs per car mile are about one-third of ent conditions of these tramways.

MOTIVE OF BRITISH MUNICIPAL TRAMWAY MOVEMENT

Now as to the real motive which has animated the British municipal tramway movement, which is not generally understood, and also to afford a glimpse of the present conditions of these tramways.

Counselor James H. Rodgers, chairman of the New Castle Corporation Tramway Committee, in a paper read before the British Municipal Tramway Association in September, 1911, states: "We [the municipalities] have had established in almost every district throughout the country parks and recreation grounds art galleries, museums, free libraries, free schools, better lighting and watching, isolation hospitals, better sanitation and many other equally important and necessary improvements.

TABLE II.—WAGES RECOMMENDED ON GLASGOW CORPORATION TRAMWAYS

Motormen and Conductors	Shillings per Week	Equivalent to
First year:		
First six months	24	$6.00
Second six months	25	6.25
Second year:		
Third six months	26	6.50
Fourth six months	27	6.75
Third year:		
Fifth six months	29	7.00
Sixth six months	30	7.50
Fourth year	31	7.75
Fifth year	32	8.25
Thereafter	33	8.75
Cleaners, Sandmen and Greasers.		
First year:		
First six months	23	$5.75
Second six months	24	6.00
Second year:		
Third six months	25	6.25
Fourth six months	26	6.50
Third year	27	6.75
Thereafter	28	7.00

"The money required for all this generally comes out of the rates [local taxes], which have unfortunately gone up year by year in almost every district throughout the country.

"It is unnecessary to point out how that continuous increase hampers the proper development of a district. Municipal corporations cannot be blamed if, seeing as they did, expenditure going upward in providing those necessary improvements, they turned their attention to see if it were not possible to find some new sources of revenue. This many did, with the result that they secured the monopolies in their respective district, such as gas, water, electric lighting and, last but by no means least, the trams. Whether they have generally turned out satisfactorily from a money-earning standpoint is very questionable.

"The first consideration of a tramway committee ought to be to make its undertaking financially sound by the building up of a sufficient reserve and renewal fund. Its second consideration should be to see that the traveling public is supplied with proper accommodation and facilities. Its third should be to see that good conditions of labor are given to all the workers, and the fourth consideration should be to see that when the first three are complied with the ratepayers [taxpayers] who back its bill and over whose streets it runs its cars should have some returns in the shape of contribution toward the rates [local taxes]."

That securing of profit from operation was the primary object in creating municipal tramway systems is thus frankly admitted.

OUTLYING DISTRICTS NOT PROVIDED WITH FACILITIES

This is further shown by stating that the tracks have been constructed principally through densely populated districts which afford a heavy traffic and but little attempt has been made to provide local transportation for outlying districts and suburbs, or in what American street railway men would consider poor territory. In short, they have not lessened their total of net profits by the construction of those long unprofitable lines through sparsely settled localities which so unfavorably affect the net earnings of nearly every American street railway system.

This particular difference between British and American conditions is understood better by stating that in 1912 the total length of tramway lines in the entire kingdom was but 2637 miles, representing 4297 miles of track, or not far from the extent of similar trackage in New York State or Pennsylvania.

COMPENSATION PROPORTIONED TO SERVICE

British municipal tramways have also had the great advantage, from an earning standpoint, of a zone system of fares, so they have been free from that growing burden of furnishing longer rides for a fixed rate of fare, and have thus been compensated proportionately to the service which they render; but, as is apparent, they have not afforded those great advantages to the public at large which have been afforded by American street railways, through the redistribution and expansion of population, with its making of living conditions more sanitary and agreeable and the creation of enormous taxable values, from which municipalities and states have so greatly benefited.

In short, British tramways, although not successful in so doing, have aimed alone at securing net profits, while American street railways have also striven to develop the communities in which they are located.

BOTH SELLING BELOW COST

Despite the wide differences in conditions which have been recited, principally through different phases of similar general causes, as already stated, British municipal tramways and American street railways are now in practically the same condition as regards "selling goods below cost."

These important causes are: over-estimating probable net earnings under future conditions, failure to provide properly for obsolescence, considering the life of material as far beyond its actual length, and increases in the cost of labor and material.

British tramway experience has consequently shown that even with their financial advantages of zone system of fares, the fixing of a definite price upon transportation without regard to its cost at different periods must at all times threaten capital investment in local transportation properties and consequently operate against the public readily securing ample transportation facilities.

EXPERIENCE OF CROYDON

Illustrative of the inadequate local transportation facilities usually afforded by British municipal tramways, what has been attempted in connection therewith and the actual results secured from their operation, an excellent example exists at Croydon. This city has a population of 168,000 and has an exceedingly well-managed municipal tramway system, consisting of 11.66 miles of line, or 19.1 miles of track, upon which are operated an average of fifty-six motor cars, which in the last fiscal year performed a total service of 2,462,468 car miles and 311,469 car hours.

It is interesting to note in connection with this that the average of platform wages was the equivalent of 4.21 cents per car mile and 34.08 cents per car hour.

The capital investment per mile of track, not including power station and transmission lines, is $61,858, which represents a capital investment of $3 for each $1 of gross income.

A total of 20,849,230 passengers were carried, which averages 8494 per car mile, or 1,090,179 per mile of track. The average receipts per car mile were equivalent to 18.1 cents and the operating expenses were 12.056 cents.

This operating expense per car mile is about 2 cents less than the average on all British municipal tramways and, upon the same basis of computing power costs, would be a trifle less than the expense per car mile at Glasgow, where it is generally considered that the most favorable results have been secured from municipal ownership and operation of tramways in the United Kingdom.

This feature should be remembered when subsequent reference is made to rates of fare.

The geographical location of Croydon as regards London is similar to that of Yonkers to Manhattan. Its tramway system connects with that of the London County Council, and a joint traffic agreement exists between the two systems under which the through fare is at the rate of ½d., or 1 cent, per mile.

As will be subsequently stated, the Croydon municipal tramway authorities show that the maximum distance over which a passenger can be transported for the equivalent of a 1-cent fare is fifty-one one-hundredths of a mile.

To compare with this figure, it should be said that in Glasgow the maximum distance over which a passenger is carried for the equivalent of a 1-cent fare is fifty-seven one-hundredths of a mile and the average charge there, per passenger mile, is equal to nine-tenths of a cent.

On eighty-seven British municipal tramways the average fare rate per passenger mile is the equivalent of 1.36 cents.

That such rates of fare are unprofitable seems to be fully demonstrated by the extract from the last annual report of the Croydon Tramways Committee in 1912 shown in Table III.

TABLE III—DISTANCE AT WHICH PASSENGERS PAYING A PENNY FARE CEASE TO BE REMUNERATIVE

Based on accounts for year March 31, 1912

Average length of penny stage, miles....2.206

	Pence.	Equivalent in Cents.
Average fare charged per mile....	0.490	0.98
Average cost per passenger mile....	0.897	1.794
Less average charge per mile....	0.490	0.98
Loss per mile on passengers traveling full distance	0.407	0.814

Equal to a loss of 45.37 per cent of the cost of carrying a passenger one mile, leaving a margin of 54.63 per cent as the remunerative portion, and being equivalent on the average length of penny (2 cents) stage to 1.205 miles.

Commenting on this result, the report continues: "Thus every passenger carried a greater distance than as shown causes a loss which has to be offset by the shorter distance passengers."

OTHER OFFICIAL OPINIONS

For other official opinions on this subject the following further quotations are made from the paper of James H. Rodgers already referred to.

"In Glasgow, or two or three other cities, with their densely crowded streets, a halfpenny fare may be both useful and successful, but that, I think, cannot be said of thinly populated areas. It is this kind of policy, I feel sure, that is the cause of so many of our tramway undertakings being the financial failures they are.

"In no fewer than twelve towns where losses are made each year the committees have granted halfpenny fares; while in six others, where the profits are not sufficient to make proper provision for track renewals, the committees have made the same concession. In only ten places that may be looked upon as financially successful are halfpenny fares allowed. Four of these are in Scotland, which, of course, includes Glasgow, and four are in England, namely, Leeds, Sheffield, London County Council and West Ham, each serving very large populations. The remaining two are Stockport and Warrington, both of which, I feel sure, would have done better if they had never granted the concession at all.

"This goes to prove very clearly, I think, that halfpenny fares ought not to be given, especially by small tramway systems; even the larger ones should be exceedingly careful before granting such facilities."

Regarding the general financial condition of British municipal tramways and its relation to the rates of fare charged, Mr. Rodgers states as follows:

"We ought not to be satisfied with the knowledge that some thirty of the eighty-eight tramways may be financially sound, while the other fifty-eight are either struggling to make ends meet, or are kept going by the assistance of the rates [local taxes].

"I have frequently been amused at these conferences and elsewhere by hearing speakers give figures in bulk to prove that the municipal tramways of this country are a financial success. To lump figures together in this way and use them to prove success or otherwise is simple folly unless all the municipal tramways are run by a large trust or company, and the successful ones make good the losses of the less fortunate. Then, and only then, would such figures be of use in that way."

Mr. Rodgers then gives a list of thirty-four municipal tramways, principally located in large communities, whose last previous annual reports show actual losses from their operation. This he follows with another list of sixteen additional municipal tramways which he states are also not in sound financial condition, and he further refers to eight more whose financial condition is uncertain.

Other members of the British Municipal Tramway Association have expressed themselves at its recent conferences in much the same manner as did Mr. Rodgers.

From what has been stated it must be apparent that, despite the manner in which our British tramway brethren have been favored as regards their capital investment and on the essentials to securing low operating costs, their rates of fare are but little below the average of fares in this country, and their rates are without question unprofitable. So there, as here, necessity exists for finding some means for ready readjustment of transportation charges to conform to changes in operating cost, whenever there is need of such action.

EFFECT OF LOAD FACTOR ON COST OF ELECTRIC RAILWAY PASSENGER SERVICE

BY C. N. DUFFY, VICE-PRESIDENT THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

Load factor for the purposes of this discussion is defined as the ratio of the number of passengers to the maximum seating capacity of the cars. It is thus analogous to that definition of load factor sometimes used in central station practice, which expresses the ratio of the average load on the station to its rated capacity.

Conceding that the cost of producing electrical energy or the output of a manufacturing plant is reduced by an increase in load factor, the application of cost analysis to electric railway passenger service produces some interesting results.

TABLE I—RELATION AND RELATIVE MAGNITUDE OF VARIOUS CLASSES OF COST.

	Per Cent of Total.	
(A) Expenses which exist even though there is no traffic (terminal cost):		
(1) Expenses varying with the miles of track operated.....	2.3	
(2) Demand expenses at power plant....	3.0	
(3) Depreciation due to causes other than traffic....	3.5	
		8.8
(B) Expenses proportional to traffic (terminal or movement cost dependent upon load factor):		
(1) Expenses varying with the car miles run....	7.9	
(2) Expenses varying with the car hours run....	24.3	
(3) Output expenses at power plant....	5.9	
(4) Depreciation due to traffic....	9.5	
(5) Return upon investment	24.7	
		72.3
(C) Expenses proportional to number of passengers (movement cost):		
(1) Expenses varying with the number of passengers carried		6.7
		87.8
Adminstrative expense burden		12.2
Total cost of service, exclusive of any prorating of administrative expense burden		100.0
Total cost of service after adding pro rata share of administrative expense burden:		
(A) Expenses which exist even though there is no traffic (terminal cost)		10.0
(B) Expenses proportional to traffic (terminal of movement cost dependent upon load factor)....		82.4
(C) Expenses proportional to number of passengers (movement cost)		7.6
Total cost of service, including prorating of administrative expense burden		100.0

The method herein shown is that developed by the statistical department of the Railroad Commission of Wisconsin in the Milwaukee fare cases. It involves the determination of the independent variable factors and the separation of total cost into its various components. It is an amplification of the methods suggested in the report of the committee on determining the proper basis for rates and fares and as such should be of interest to the association at this time.

The total cost of service has been separated under two general groups, viz., terminal and movement cost. "Terminal" costs correspond with what are understood to be "demand" or "fixed" costs, as defined and applied in determining the cost of electric service or in formulating a schedule of electric service rates; similarly "movement" costs correspond to "output" or "variable" costs.

In making this separation it is found that there are three underlying classes of costs, viz.:

(a) Expenses which exist even though there is no traffic.

(b) Expenses proportional to traffic.

(c) Expenses proportional to number of passengers carried.

The relation and relative magnitude of the various classes of costs are shown in the diagram or "cost tree" reproduced iin Table I on page 195.

Details of certain elements of expenses in the various groups shown in Table I are given in Table II, published herewith.

TABLE II—DETAILS OF CERTAIN ELEMENTS OF EXPENSES.

(A) Expenses which exist even though there is no traffic (terminal cost):
- (1) Part of way and structure accounts.
- (2) Part of power accounts.
- (3) Depreciation due only to deterioration caused by the ravages of time and the effects of the elements, obsolescence and supersession.

(B) Expenses proportional to traffic (terminal or movement cost dependent upon load factor):
- (1) Part of way and structure accounts.
- (2) All equipment accounts.
- (3) Part of power accounts.
- (4) Part of operation of cars accounts.
- (5) Depreciation due only to wear and tear.
- (6) Return on investment.

(C) Expenses proportional to number of passengers (movement cost):
- (1) All traffic accounts.
- (2) Part of operation of cars accounts.
- (3) Part of undistributed accounts (injuries and damages).

Administrative expense burden:
- (1) All general and miscellaneous accounts.
- (2) All of undistributed accounts except injuries and damages.
- (3) Contingencies (extraordinary).
- (4) Taxes.

Summarizing these results in formula shape and designating the load factor or number of passengers carried to maximum seating capacity of the cars as x, we have:

$$\text{terminal cost} = a + (100 - x)\, b$$
$$\text{movement cost} = c + (x)\, b$$

or, substituting the percentage relations found in the Wisconsin Railroad Commission's analysis, we have:

terminal cost $= 10 + (100 - x)$ 82.4 per cent of the total cost of service;

movement cost $= 7.6 + (x)$ 82.4 per cent of the total cost of service.

Assuming, under this cost analysis, that the average rate of fare per passenger was 5 cents, that the maximum average length of passenger haul was 4 miles, that the average loading of cars was 40 per cent of the maximum seating capacity of the cars, the division of the total cost of service shown in Table III would result.

From the analysis herein shown, the following conclusions may be drawn:

(a) That the movement cost approximates 0.5 cent per passenger mile.

(b) That the terminal cost per passenger decreases as the load factor increases.

(c) That for a flat rate of fare of 5 cents per passenger the maximum possible length of haul increases from 1.36 miles at 10 per cent load factor to 4 miles at 40 per cent load factor, and to 8.88 miles at 100 per cent load factor.

(d) That for a given length of haul it is apparent that the cost of "off-peak" service is materially less than the cost of service determined by the capacity of the system.

(e) That the cost of service under a given rate of fare and length of haul could be reduced, were it practicable to increase the load factor by spreading the traffic over a greater number of hours of the day.

(f) That low rates of fare during rush hours cannot be justified.

(g) That the system of cost analysis is applicable to city, suburban or interurban electric railway systems.

(h) That even where operating expenses, including depreciation, contingencies (extraordinary), taxes and investment charges, are identical, as between two electric railway systems, the reasonable length of haul is dependent upon load factor conditions, which must be reckoned with in determining rates and fares.

TABLE III—DIVISION OF TOTAL COST OF SERVICE

Per Cent Load Factor Assumed	Per Cent of Total Cost of Service, Including Operating Expenses, Depreciation, Contingencies (Extraordinary), Taxes and Return on Investment		At 5-Cent Fare		
	Terminal	Movement	Terminal Cost per Passenger, Cents	Movement Cost per Passenger, Cents	Maximum Possible Length of Ride, Miles
10	84.16	15.84	4.208	0.792	1.36
20	75.92	24.08	3.796	1.204	2.38
30	67.68	32.32	3.384	1.616	3.18
40	59.44	40.56	2.972	2.028	4.00
50	51.20	48.80	2.560	2.440	4.82
60	42.96	57.04	2.148	2.852	5.62
70	34.72	65.28	1.736	3.264	6.44
80	26.48	73.52	1.324	3.676	7.25
90	18.24	81.76	.912	4.088	8.07
100	10.00	90.00	.500	4.500	8.88

ELECTRIC RAILWAYS OF JAPAN

The twelfth yearbook of the Japanese Ministry of Finance contains the following figures showing the growth of electric railways in that country for 1911 as compared with 1910: The number of companies increased from thirty-four to forty, the paid-in capital from $47,190,000 to $80,439,500, the length of lines in operation from 363.6 to 431.5 miles, the length of lines under construction from 180.44 miles to 221.05 miles, the number of passengers from 325,066,000 to 395,666,000 and the net earnings from $4,059,500 to $4,493,500. The total number of motor cars operated to the end of the year 1911 was 2459. It is not anticipated that the increase in the mileage of electric railways during the coming years will equal the ratio shown by the past year, as much of the work done in 1911 was stimulated by a pending increase in the tariff on electric-railway supplies. The government has taken up the subject of electrification of steam railroads, and it is proposed to experiment between Tokyo and Yokohama.

STATIC DUE TO FEATHER DUSTER CAUSE OF FILAMENT BREAKAGE

In a certain Eastern school building complaint was made about the short life of the incandescent lamps furnished, many globes being found with their filaments broken and twisted to the sides of the glass. The lamps themselves, when tested in regular life racks, showed good average performances, so that a service test was finally determined upon for the purpose of studying the lamps under actual working conditions.

In twenty-six days, according to the New York Electrical Testing Laboratories, fifty-six lamps, or 29 per cent of the total, burned out. Thirteen new lamps were then put in one of the fixtures, and after being dusted in the regular manner with a feather duster, current was turned on and four of the lamps immediately burned out. Wiping with a slightly dampened cloth was substituted for the cleaning with the feather duster, and the abnormal breakage at once ceased, indicating that the trouble was caused by the action of static charges of electricity produced by the feathers rubbing on the glass of the lamp.

Committee Meetings of the Midyear Meeting

Reports Are Published of the Meetings of the Committees of the American Electric Railway Association and Its Affiliated Associations Which Met in New York Jan. 29-31

The practice of holding meetings of different committees of the American Electric Railway Association and its affiliated associations at the time of the midyear meeting is increasing, and this year over forty committees held sessions in New York during the latter part of this week. These sessions began with meetings on Wednesday morning of the committee on the joint use of poles of the American Association and the classification committee of the Accountants' Association. The sessions were continued through the rest of the week, and the meeting of one committee, the equipment committee of the Engineers' Association, was scheduled for Saturday morning, Feb. 1.

An account is published below of meetings of all of the committees which met on Wednesday, Thursday or Friday.

COMMITTEE ON TRAIN OPERATION FOR CITY SERVICE

The meeting of the division covering city service of the committee on train operation was held on Thursday at 10 a. m. The members of the committee representing the Engineering Association who were present were H. H. Adams, New York, chairman, and H. A. Benedict, Newark, N. J. From the Transportation & Traffic Association, W. H. Sawyer, New York, N. Y., chairman; P. N. Jones, Pittsburgh, Pa., and George Keegan, New York, N. Y., were present. J. W. Brown, Newark, N. J., and A. T. Brown, Brooklyn, N. Y., also attended the meeting at the request of the committee. The matters taken under consideration at this meeting consisted largely in outlining the work of the committee for the ensuing year, and the effect of train operation upon schedules was discussed at length for the purpose of determining its importance as a matter to be considered in the report. In this discussion Mr. Jones stated that schedules with trailer service differed very little from those which would be maintained on the same runs with single cars, provided experienced crews were employed, and that the difference in speed between trailer operation and that of single cars was practically covered by the difference in rapidity of acceleration.

The arrangement suggested by last year's committee, which involved the operation in a single train of one two-motor equipment and one four-motor equipment, was also discussed, recent experience having demonstrated that such a six-motor arrangement would be desirable under many circumstances. It was the expectation of the committee that data could be obtained to show that but few more stops were made by trains than were made by cars operated singly, and in this connection the general utility of the skip-stop idea as inaugurated in Cleveland was included as a matter for investigation.

Messrs. Adams and Sawyer brought up the questions of the influence of the ability of platform men upon schedule speed as well as the influence of the length of stops in train operation and also called attention to possibility of increased headway producing a decrease in the number of passengers who would otherwise make use of surface cars for short rides.

During the consideration of the matter of maintenance of multiple-unit equipment A. T. Brown stated that a car with multiple-unit control had been operated for several years on the Brooklyn Rapid Transit system and that it had been found to require materially less repairs to the control equipment than were required with the standard types of apparatus. It was, however, the consensus of opinion of the committee that the figures given in the report of last year on the maintenance and power required for multiple-unit equipment should be left standing without revision.

Among the recent developments in design which were brought up in the meeting, the Boston articulated car received consideration as a substitute for train operation, and the committee decided to include a discussion of that type in its report for this year. It was, however, decided to devote most of the committee's efforts to a consideration of the subject from the transportation standpoint, and it was expected that a very considerable amount of operating data could be obtained by conferring with the management of the electric railways in Newark, Pittsburgh, Cleveland and Boston, and if experiments could be inaugurated, from the New York Railways and the Brooklyn Rapid Transit Company, as well, both of the latter systems having recently ordered a considerable number of new cars capable of being used in train service. The meeting then adjourned subject to the call of the chairmen, it being the plan of the committee to hold another meeting as soon as operating data could be obtained and compiled by the co-chairmen.

COMMITTEE ON BUILDINGS AND STRUCTURES

The meeting of this committee of the Engineering Association was held on Thursday morning. The committee members in attendance were: R. H. Pinkley, chairman, Milwaukee, Wis.; C. L. Crabbs, Brooklyn, N. Y.; W. B. Ingham, Newark, N. J., and H. G. Salisbury, Toronto, Ont., in place of W J. Harvie, New York, N. Y., resigned. This committee had three subjects on its program as follows:

(a) General specifications and form of contract for railway structures (continued); (b) review of methods of carhouse construction (continued), and (c) fire protection rules. This last matter is a subject now about to be considered by the National Fire Protection Association.

As to subject "a" it was decided to limit this to a presentation of general contract and specification clauses, including the bond, but leaving out any clauses covering specific parts of building construction. The committee will try to get this matter into shape for submission to the committee on standards, or for adoption as recommended practice, as the convention may determine. Subject "b" will be chiefly in the nature of a review of the most typical examples of carhouse practice. Subject "c" will include a discussion of the organization and drilling of fire-fighting gangs and the prevention of conditions which cause fires. An endeavor will be made to have this subject ready for presentation to this year's committee on standards.

George Weston was appointed vice-chairman, after which the following sub-committees were named: Subject "a"—George Weston, Chicago, Ill.; W. B. Ingham, Newark, N. J., and H. A. Fiske, New York, N. Y.; subject "b"—D. G. Knight, Newark, N. J.; H. G. Salisbury, Toronto, Ont., and L. C. Datz, New Orleans, La.; subject "c"—C. L. Crabbs, Brooklyn, N. Y., and W. T. Dougan, New York.

COMMITTEE ON PASSENGER TRAFFIC

The committee on passenger traffic of the Transportation & Traffic Association met on Thursday at 10 a. m., present at the meeting being F. G. Buffe, chairman, Peoria, Ill.; J. E. Gibson, Kansas City, Mo.; J. L. Adams, Upper Darby, Pa.; S. W. Greenland, Fort Wayne, Ind., and W. S. Whitney, Springfield, Ohio. At the meeting the subjects assigned by the executive committee of the Transportation & Traffic Association were divided among the members of the committee so that they could prepare lists of questions to be presented to the member companies. To Mr. Buffe was assigned the development of a plan for placing in the association headquarters copies of the advertising literature of the member companies. In addition, he will handle the following subjects: methods of advising the public of timetable changes; proper advertising when new features are introduced; and parks and winter traffic. Mr. Gibson was requested to devote further study to the subject of factory closing hours with a view to possible extension of peak hours, and also to the question of permitting passengers to ride in front vestibules of closed cars. The subject of special car tariffs and basis for rates, namely, fares, car miles and car hours, was assigned jointly to Messrs. Gibson and Whitney.

The general subject of industrial development both with regard to location of industries and of colonization was assigned to Messrs. Adams and Greenland, the former member being assigned to consider the subject of the use of motor buses. Three subjects, namely, the consideration of the value of reduced fares for round trips, the standardization of forms and sizes for tickets, and the consideration of a basis for making cash, single-trip and round-trip rates on interurban lines, were assigned together to Mr. Greenland. In view of the fact that two of the subjects assigned to the committee were of general importance, namely, the matter of free transportation for employees and others and an investigation of the best method for collecting and registering cash fares on interurban lines, they were not assigned to any individual member of the committee. These two subjects are to be taken under consideration by the committee as a whole.

COMMITTEE ON ELECTROLYSIS

The committee on electrolysis of the American Association met with the committee on the same subject of the Engineering Association Thursday morning. Those present representing the American Association were Calvert Townley (chairman), New York, N. Y., and E. J. Blair, representing B. I. Budd, Chicago, and of the Engineering Association, A. S. Richey, Worcester, Mass.; Martin Schreiber, Newark, N. J., and E. B. Katte, New York, N. Y. The committee decided to ask authority to invite the representatives of the steam railroad interests to discuss electrolysis with it and also permission from the executive committee to accept an offer, which will probably be tendered to the committee, to meet with a similar committee to be appointed by the American Institute of Electrical Engineers.

COMMITTEE ON RELATIONS WITH SECTIONAL ASSOCIATIONS

A meeting of this committee was held Thursday morning. Those present were C. L. Henry (chairman), Indianapolis, Ind.; L. C. Bradley, Houston, Tex.; H. C. Page, Worcester, Mass.; Thomas Lees, president New England Street Railway Club; H. A. Faulkner, secretary New England Street Railway Club; R. P. Stevens, Allentown, Pa.; E. C. Faber, Chicago, Ill., and W. J. Harvie, New York.

Mr. Stevens spoke about the initial meeting of the committee at Denver in 1909 and urged the value of closer relations between the American Association and the various sectional associations. In the discussion which followed of the ways in which the sectional and national associations could co-operate, Mr. Stevens suggested the desirability of publicity on important railway questions of the day through lecturers who would present at Y. M. C. A. and other meetings the real situation in regard to railway corporations. He believed that arrangements for such speakers might be made through the American Association so that they could be engaged as might seem necessary by the sectional associations or individual companies.

Mr. Henry spoke about the efforts now being made on the Pacific Coast to organize an electric railway association which should be affiliated with the American Association. He referred to the circular letter suggesting such an organization recently issued by F. W. Hild, Portland, Ore., and said that the committee of the American Association had promised to be represented at the organization meeting of this association to be held some time in March and to suggest means by which the affiliation between the two associations could be made to be of mutual benefit.

A discussion of various plans for relations between the sectional associations and the national association followed and it was decided to take the question up further with the sectional associations to learn which plan would be most satisfactory to them.

EXECUTIVE COMMITTEE OF THE CLAIMS ASSOCIATION

The executive committee of the Claims Association met in New York at 2 p. m. on Wednesday, Jan. 20. Owing to the non-arrival of President Avant the meeting adjourned until Thursday morning at 10 a. m. Those present at the meeting were C. A. Avant, Birmingham, Ala.; W. F. Weh, Cleveland, Ohio; George Carson, Seattle, Wash.; B. B. Davis, Columbus, Ohio; E. P. Walsh, St. Louis, Mo.; R. E. McDougall, Rochester, N. Y.; P. C. Nickel, New York; J. S. Kubu, Utica, N. Y., proxy for W. Tichenor, and H. K. Bennett, Fitchburg, Mass., proxy for C. G. Rice.

The question of a permanent representative of the Claims Association at the headquarters of the American Electric Railway Association was referred to the president for a discussion of the feasibility of the plan with the executive committee of the parent organization.

The question of a permanent Index Bureau at headquarters was also referred to the president for similar action so that the American Electric Railway Association, through its secretary, could get the opinions of the general managers of the member companies as to the feasibility of such a scheme.

Mr. Bennett moved that a committee for uniform forms and records be appointed to report to the next convention, and President Avant appointed H. K. Bennett, P. C. Nickel and J. J. Reynolds to this committee.

The report of the subjects committee was received and the following subjects were adopted for consideration in a series of papers which were to be in the hands of the president not later than May 30: the prevention of accidents, the value of safety committees and motor vehicles. The committee assigned H. V. Drown and J. H. Handlon to write papers on the first subject and P. C. Nickel and O'Dell to discuss it. Mr. Carson was assigned to prepare a paper on the second subject, and Messrs. McDougall and Bennett were assigned to its discussion. M. B. Bracken, St. Louis, was assigned to prepare a paper on the third subject, and the discussion on this is to be prepared by James R. Pratt, of Baltimore, and H. R. Hoshorn, of Philadelphia.

Mr. McDougall was requested to compile the ordinances now in force in large cities regarding vehicles on the street and to report to the next convention. H. K. Bennett, who was president during the year 1911-1912, was then presented with a gold badge similar to those given to other past-presidents, and on motion the meeting was adjourned.

CONSOLIDATED COMMITTEE ON RULES

The meeting of this committee of the Transportation & Traffic Association was held on Thursday and Friday. The following members were present: F. A. Boutelle, chairman, Tacoma, Wash.; L. H. Palmer, New York; Edward Dana, Boston, Mass., and B. J. Jones, Cincinnati, Ohio. The subjects assigned to this committee follow:

(a) Harmonizing the codes of city and interurban rules.

(b) Investigation of the extent to which these codes have been adopted.

(c) Study of rules of prepayment car operation, considering in this connection the necessary rules for near-side and center-entrance cars; also multiple-unit and trailer operation and the use of fare boxes.

(d) Development of a set of rules covering block signal operation. This subject to be also considered with the members of the joint committee on block signals for electric railways.

(e) Conference with American Railway Association. With regard to this the executive committee has appointed the following committee to represent this association at the conference to be held with a committee of the American Railway Association: George H. Harries, president

American Electric Railway Association; Dana Stevens, president Transportation & Traffic Association; J. N. Shannahan, past-president Transportation & Traffic Association; F. A. Boutelle, chairman committee on rules; W. R. W. Griffin, vice-chairman committee on rules; J. K. Choate, vice-president and general manager Morris County Traction Company, Morristown, N. J.

After a general discussion of the assigned topics action was taken as follows: subjects "a" and "b" to be handled by the committee as a whole; subject "c," L. H. Palmer, New York; Edward Dana, Boston, Mass., and George Kuemmerlein, Jr., Milwaukee, Wis., and subject "d," F. A. Boutelle, Tacoma, Wash.; L. H. Palmer, New York; B. J. Jones, Cincinnati, Ohio; W. R. W. Griffin, East Liverpool, Ohio, and W. H. Collins, Gloversville, N. Y.

COMMITTEE ON INTERURBAN TRAIN OPERATION

There were present at this meeting E. C. Faber (chairman), Wheaton, Ill.; C. N. Wilcoxen, Michigan City, Ind., and J. B. Stewart, Jr., Allentown, Pa. The work of this division of the committee on train operation, owing to the fact that it is a completely new committee working in a new field, consisted in a general discussion of the report of the committee for 1912. At the conclusion of this discussion it was decided to prepare an information blank which would be sent out to all railways which were operating trains. The information to be requested will include comparative costs and will be arranged to show the advantages of train operation where physical conditions make it possible. The committee prepared a skeleton form to make a basis for the work of the coming year and to form an outline for the committee report. The matters which will be considered by the committee will be as follows:

General conditions.

Schedule adherence and flexibility for meeting extreme traffic conditions. Accidents. Construction costs.

Schedule and platform expense.

Comparison of operating costs as affected by number of units per train, as one car, two cars, three or more cars. Effect on substations and power supply.

Maintenance of equipment. Brakes, couplers and pilots.

Communicating signals between cars. Recommendations.

It was decided that the chairman would make such assignments of these various subjects to the members of the committee as might seem desirable, and that reports from each member would be made at the next meeting of the committee.

COMMITTEE ON FARES AND TRANSFERS

This committee of the Transportation & Traffic Association met on Thursday morning. The following members were present to discuss the following subjects as assigned by the executive committee of the association: F. T. Wood (chairman), New York; J. V. Sullivan, Chicago, Ill.; F. L. Hubbard, Toronto, Ont.; G. K. Jeffries, Indianapolis, Ind., and W. B. Thomas, East Liverpool, Ohio: (a) Investigation of the matter of fare boxes; (b) metal vs. paper tickets, considering in this connection the matter of liability of counterfeiting; (c) methods of accounting for the transportation of free passengers; (d) desirability of advertising on transfers; (e) economy in company printing; (f) use of transfer-issuing devices on prepayment cars; (g) methods by which lap-over zone fares may be simplified; (h) prevailing methods of registration and accounting of fares on both city and interurban lines, with the various blanks and forms used, and (i) desirable methods of checking transfers.

The subjects will be studied by the committee as a whole with the exception of caluses "g" and "h," which were assigned to a sub-committee consisting of J. V. Sullivan (chairman), Chicago, Ill.; G. K. Jeffries, Indianapolis, Ind., and W. B. Thomas, East Liverpool, Ohio. The committee will ask brief questions to get a general idea of the prevailing situation. It recognizes the fact that local conditions must govern in each case and therefore it will not attempt to draw any conclusions. The committee is planning to present the standard practices of various companies throughout the country with an explanation in each case to account for the methods employed.

COMMITTEE ON UNITED STATES MAIL

The members in attendance at the meeting of this committee were T. H. Tutwiler (chairman), Memphis, Tenn.; H. A. Nicholl, Anderson, Ind.; A. R. Piper, Brooklyn; J. K. Choate, Morristown, N. J. After discussion it was decided to report to the executive committee that while no tangible result had followed from the efforts of the present committee, owing to the lack of necessary data which had not been forwarded by the members of the association with the completeness desired, it was believed by the committee that substantial progress would be made in its work at a very early date, as a special hearing was to be held on the question by the committee in Washington early in February.

COMMITTEE ON EDUCATION

At the meeting of the committee on education a number of practical plans were discussed and provision was made for actually beginning the work of this committee. In the first place, its functions were defined as follows: (a) to keep the membership posted on educational matters; (b) to formulate suggestions as to the application of the fundamental principles to railway work; (c) to inaugurate instruction courses, and (d) to co-ordinate the work of the committees of the affiliated associations.

The committee plans to utilize *Aera* as a means of communication between the members and itself. A series of educational primers, dealing with the fundamental principles involved in the work of shop apprentices, will be printed in that paper and afterwards issued in leaflet form. The first of these will point out the common faults of apprentices and will show how these can be overcome by simple means. The importance of the appreciation of the value of materials and labor will be emphasized so that employees will be encouraged to economize in the use of both.

The second publication will deal with actual costs of materials and labor of interest to shop men and will go into considerable detail. This publication will be prepared by some member of the Accountants' Association, and its purpose will be to impress upon the shop men in simple terms the actual cost of detail parts of the equipment on which they are working. The third primer will consist of problems of simple but very practical nature intended to give practice in the computation of bills of material and costs of the common things about a shop or power house. This is the limit of what the committee has blocked out for the present, and upon the response met with depend the lines to be followed later.

As stated, it is also proposed to reprint these primers in pamphlet form for distribution to men and boys who are not members of the association but are in the employ of member companies. Foremen will be requested to apply for such numbers of these reprints as can be conveniently used, and for numbers after the first a nominal charge will probably be made. Foremen and superintendents will be requested to urge the study of the primers and to assemble the apprentices and other employees from time to time to discuss the points brought out. It is not the plan of the committee that this work should place any financial burden on the companies, but that the necessary expenses shall be borne by the recipients of the pamphlets.

COMMITTEE ON CONSTRUCTION OF SCHEDULES AND TIMETABLES

The meeting of the committee on construction of schedules and timetables was held on Jan. 30. At the meeting were present J. E. Duffy (chairman), Utica, N. Y.; E. J. Dickson, Springfield, Mass.; T. F. Grover, Terre Haute, Ind.; C. E. Morgan, Jackson, Mich. The committee at this meeting formulated a data sheet to be sent out to the member companies, in order to get a general expression of opinion on questions brought before the committee, and also prepared an outline of the work for the coming year. This will consist in carrying out further the work of last year as covered in the committee's report on checking short trips, mileage, etc., and will include consideration of the methods used in keeping the time of trainmen, arranging for a standardization of detention report forms, and preparing recommendations as to what should be shown upon timetables.

The work for the year will include securing information in relation to the use of the near-side stop with special regard to its influence upon the maintenance of schedules and the reduction of accidents, and an investigation of the general practice which is followed in using distinctive colors for different routes either by the painting of cars, by the use of colored lenses or lights, or by the use of special forms of destination signs or route numbers, will be carried out.

A request will be made on the data sheet sent to the member companies for suggestions as to desirable topics for investigation by the committee.

COMMITTEE ON TRAINING OF TRANSPORTATION EMPLOYEES

The meeting of this committee of the Transportation & Traffic Association was held on Thursday and Friday. The committee members present were: C. B. Wells, chairman, Denver, Col.; C. E. Learned, vice-chairman, Boston, Mass.; Bruce Cameron, St. Louis, Mo.; J. T. Crabbs, Brooklyn, N. Y., and E. E. Strong, Syracuse, N. Y. The committee discussed the following subjects which had been duly assigned to it: (a) Further study of the question of discipline—disciplinary methods; (b) methods of dealing with employees; (c) development of the cost of training men and the results of changes in the personnel, with particular relation to accidents; (d) safety movements and the prevention of accidents; (e) methods of co-operation with the claim department; (f) periodical examination of trainmen, and (g) bonding of trainmen, both conductors and motormen.

As the result of this discussion it was the judgment of the committee that, instead of continuing the statistical and analytical reports of previous years, a broad study should be made of the underlying causes productive of deficiencies in operation as related to the personnel. The report, therefore, will be a study of cause and effect, an endeavor being made to enunciate principles which will prevent rather than cure temporarily the operating troubles due to human inefficiency.

COMMITTEE ON COMPANY MEMBERSHIP

This committee met Thursday morning. Those present were Richard McCulloch (chairman), St. Louis; F. W. Brooks, Detroit, Mich.; J. K. Choate, Morristown, N. J., and L. D. Mathes, Montgomery, Ala. The committee decided to follow the general practice established by previous committees and make an especial appeal to the small companies to join the association. It was believed that the small companies derive relatively much more benefit from the association than the large companies because as a rule they have not the same number of experts in different branches of work in their employ, and by membership with the association they secure the results of studies made by these various experts. The campaign for membership will begin promptly.

MEETING OF COMMITTEE ON JOINT USE OF POLES

The meeting of this committee was held Wednesday afternoon. Those present representing the electric railway interests were W. J. Harvie (chairman), New York; A. S. Richey, Worcester, Mass.; W. S. Twining, New York, and C. L. Henry, Indianapolis, Ind. The lighting and telephone interests were represented by Farley Osgood, Newark, N. J.; F. B. H. Paine, Buffalo, N. Y.; W. T. Oviatt, Providence, R. I.; F. L. Rhodes, New York, and H. S. Warren, New York.

COMMITTEE ON STANDARD CLASSIFICATION OF ACCOUNTS

This committee began its sessions on Jan. 29. The following were present: H. L. Wilson, Boston, Mass., chairman; W. F. Ham, Washington, D. C.; W. B. Brockway, New York, N. Y.; W. H. Forse, Jr., Anderson, Ind., and the following representatives of the Interstate Commerce Commission; C. A. Lutz, chief of the division of accounts; J. F. Brizzie, examiner, and A. H. Morrow, chief of the electric railway section of the division of statistics. The committee considered a tentative general balance sheet, classification of additions and betterments and statement of income and profit and loss account, prepared by the Interstate Commerce Commission. The commission desires to establish these accounts for electric railways under its jurisdiction beginning on July 1. Before the accounts are finally adopted, however, the tentative classifications will be sent to electric railways of the country.

COMMITTEE ON EDUCATION OF THE ACCOUNTANTS' ASSOCIATION

At its meeting this committee decided to work in active conjunction with the committee on education of the American Association and plans made with this object in view will be carried out. The meeting was attended by F. J. Pryor, Jr., Philadelphia, Pa., the chairman; F. B. Lasher, New York, N .Y.; J. H. Neal, Boston, Mass., and W. H. Forse, Jr., Anderson, Ind.

JOINT COMMITTEE ON ENGINEERING ACCOUNTING

The committee outlined detailed plans for taking up the work assigned to it by the executive committee. Those present representing the Accountants' Association were: F. B. Lasher, New York, N. Y., co-chairman; M. W. Glover Mobile, Ala., and J. M. Joel, Utica, N. Y. Representing the Engineering Association there were J. H. Hanna, Washington, D. C., co-chairman; H. H. Adams, New York, N. Y.; E. O. Ackerman, Columbus, Ohio, and John Sibbald, Gloversville, N. Y.

COMMITTEE ON INTERLINE ACCOUNTING

In outlining its work for the year, this committee considered the report of the committee on this subject which was made at the 1911 convention. Since the 1911 report was presented some changes have been made in the blank forms used in interline accounting, and the report to be prepared for the 1913 convention will include such changes in order to make the recommended forms standard. The meeting of the committee was attended by L. T. Hixson, Indianapolis, Ind., the chairman, and E. L. Schmock, Willoughby, Ohio.

COMMITTEE FOR THE STUDY OF THE BEST METHODS OF COLLECTING AND ACCOUNTING FOR VARIABLE RATES OF FARE

At the meeting of this committee there were present M. R. Boylan, of Newark, N. J., the chairman, and C. H. Allen, Boston, Mass. A number of replies have been received to a circular letter sent to foreign companies with a request for information, and the data which have been secured are being tabulated. The committee is working on its report.

JOINT COMMITTEE ON LIFE OF RAILWAY PHYSICAL PROPERTY

On behalf of the Accountants' Association the following were present: Robert N. Wallis, Fitchburg, Mass., co-chairman; A. R. Patterson, Boston, Mass., and H. E. Weeks, Davenport, Ia. The Engineering Association was represented by Martin Schreiber, Newark, N. J.; R. B. Rifenberick, Detroit, Mich., and Edwin Gruhl, Milwaukee, Wis. The committee considered a modification of the classification of physical property which was contained in the 1912 report. Copies of this will be sent to member companies. Mr. Rifenberick and Mr. Patterson were appointed a sub-committee to prepare a letter of explanation, which is to be sent to member companies with the modification of the classification of physical property.

COMMITTEE ON PUBLIC RELATIONS

This committee met Thursday afternoon with the following attendance: Thomas N. McCarter, chairman, Newark, N. J.; Oscar T. Crosby, Wilmington, Del.; James H. McGraw, New York; William H. Heulings, Philadelphia. Various matters concerning the relation between the public and the companies were considered. A joint meeting was proposed between this committee and the corresponding committee of the National Electric Light Association.

COMMITTEE ON WELFARE OF EMPLOYEES

This committee met Thursday morning. Those present were J. J. Burleigh, chairman, Newark, N. J.; D. F. Sherman, Providence, R. I., and C. S. Crick, New York. The committee decided that each member should prepare for the annual meeting a tentative report which would present his ideas as to the features which should be represented in welfare work. These reports will be mailed to the other members of the committee, and from them it is expected to embody a final report on welfare work which will be of interest to the association and embody the ideas of the different members.

COMMITTEE ON FEDERAL RELATIONS

This committee met Thursday afternoon. Those present were Arthur W. Brady, chairman, Anderson, Ind.; Frank R. Ford, New York, N. Y.; F. W. Brooks, Detroit, Mich.; L. S. Cass, Waterloo, Ia.; Richard McCulloch, St. Louis, Mo.; L. S. Storrs, New Haven, Conn., and J. N. Shannahan, Hampton, Pa. Albert E. Lange, Toledo, was also present during the session. The committee discussed different bills affecting common carriers now before Congress and other proposed legislation, including the Adamson bill calling for the physical value of railroads, the bill covering hours of service now in the House, proposed legislation in regard to steel cars, etc.

COMMITTEE ON COMPANY SECTIONS

This committee met Thursday afternoon and C. N. Duffy, chairman, Milwaukee, Wis.; P. N. Jones, Pittsburgh, Pa., and Martin Schreiber, Newark, N. J., were present. The committee discussed the work accomplished by the company sections already formed and decided to push the movement.

JOINT COMMITTEE ON EXPRESS AND FREIGHT ACCOUNTING

J. K. Choate, Morristown, N. J., co-chairman, representing the Transportation & Traffic Association, and Walter Shroyer, Anderson, Ind., representing the Accountants' Association, considered the work outlined for the committee during the coming year.

JOINT COMMITTEE ON STATISTICAL UNIT FOR CAR OPERATION

The committee, following its 1912 report, is making a careful investigation of the advantages and disadvantages of each of the units in common use. This investigation is being conducted as a basis for the 1913 report, although the committee is not yet prepared to say that there are any better units for electric railway practice than the car mile and car hour. The Accountants' Association was represented at the meeting by C. H. Lahr, Akron, Ohio, co-chairman, and C. S. Mitchell, Pittsburgh, Pa. The Transportation & Traffic Association was represented by C. B. Buchanan, Richmond, Va., co-chairman; Nathan H. Daniels, Jr., Boston, Mass.; J. A. Emery, New York, N. Y., and W. J. Harvie, New York, N. Y.

COMMITTEE TO DEVELOP UNIFORM DEFINITIONS

This committee, continuing its work of the preceding year, discussed various terms in use in the transportation department and proper definitions thereof. A list of terms to be defined by the committee for its report at the 1913 convention was compiled and a number of tentative definitions were considered. As so many of the terms in use in the transportation departments of the various companies are confined to one or a few localities, the committee decided to select for definition a number of terms which are in common use. Those who attended the meeting were W. C. Callaghan, Rochester, N. Y.; T. C. Cherry, Annapolis, Md.; L. C. Bradley, Galveston, Tex., and Frederic Nicholas, Chicago, Ill.

COMMITTEE ON INSURANCE

The committee on insurance met Thursday morning and afternoon. Those present were H. J. Davies, (chairman), Cleveland, Ohio; S. L. Tone, Pittsburgh, Pa., and A. H. Ford, Birmingham, Ala. H. N. Staats, the association insurance expert, also met with the committee. Mr. Davies spoke about a joint meeting which representatives of the committee had held with representatives of the Central Traction & Lighting Bureau of the old-line insurance companies at which the classification of power houses, the placing of underwriters' labels on cars and other property, some of the rules of the bureau and of the National Fire Protection Association and other subjects were discussed. It was decided to hold another joint meeting in Cleveland in April, to be attended by all of the members of the insurance committee, by the members of the Central Bureau and by other representatives of the insurance companies from the East as well as from the West. Cleveland was selected for the place of the meeting because of its central location. Mr. Staats presented a written report of his work as insurance expert with a list of traction companies which had retained him and a statement of the income and expenses.

The question of recommending that the wiring of all cars be inspected by the underwriters' bureau and that they bear the bureau's labels was then discussed. The committee also considered suggestions as to cutting current out of caryards and carhouses at night, removing controller handles, tying down car trolleys, etc. The assignments for the coming year were as follows:

E. J. Cook will consider the bonding of tracks in carhouses and the hazards of fire in carhouses from electrical causes and will confer with representatives of the Engineering Association, insurance engineers and others interested. Mr. Ford will work with the insurance expert on insurance forms. Mr. Tone will study, in connection with the insurance expert, the reports in the possession of the association and such other information as may be available on the statistics of fires in electric railway properties and their causes. Mr. Healy, will prepare a report with the insurance expert on the subject of the valuation of the railway properties and the best methods of adjusting fire losses. The secretary of the association will be requested to send out the usual data sheets of the committee and urge all companies to furnish all information required.

MEETING OF EXECUTIVE COMMITTEE

The meeting of the executive committee of the American Electric Railway Association was held Thursday afternoon. The president, Gen. George H. Harries, was unable to be present owing to business engagements. The first vice-president, Charles N. Black, presided at the meeting. There were also present C. Loomis Allen, second vice-president; Charles L. Henry, third vice-president; John A. Beeler, fourth vice-president; J. H. Neal, representing the Accountants' Association; Martin Schreiber, representing the Engineering Association; C. A. Avant, representing the Claims Association, and Dana Stevens, representing the Transportation & Traffic Association; also H. C. Donecker, secretary and treasurer, and the following past-presidents: Charles S. Sergeant, Herbert H. Vreeland, W. Caryl Ely, Arthur W. Brady and Thomas N. McCarter.

The first business was the report of progress submitted by the secretary. This showed the active net company membership Jan. 30, 1913, as 398 members and the individual members as 2733. The estimated receipts of the year were $56,850, and the estimated expenditure $53,425.

The report further showed that the annual proceedings of 1912, including reports of the affiliated associations printed in five volumes, totaled 2873 pages, involving the printing and binding of 16,000 volumes. The report recommended that a separate year book be printed, containing the lists of members of the associations, the constitution and by-laws, etc., such matter to be omitted from the reports of the proceedings, and in this way it was estimated that an expenditure of $1,000 annually would be saved. This change was authorized by the executive committee.

Attention was also called to the fact that sets of the annual reports were sent to the member companies, according to the membership fees paid by the companies, and in some cases as many as fifteen sets were being sent to such companies. It was agreed by the committee that hereafter no member company was to receive more than five sets of the annual reports except on special request, the companies to receive from one set to five sets according to the grade of membership held.

The next business considered was the place and time for holding the 1913 convention. W. T. Dabney, representing the Chamber of Commerce of the city of Richmond, Va., extended an invitation from that body, the Virginia Railway & Power Company and the Governor of Virginia to hold the 1913 meeting of the convention of the association in that city. There was some discussion as to whether the meeting of the association should be held a little earlier, or a little later, than the time usually selected. Chairman Black appointed a committee consisting of Messrs. Allen, Henry and Donecker to meet with a committee of the Manufacturers' Association to take up the question of the time and place of the 1913 convention, with power to decide on the place and date.

Mr. Avant presented the request on behalf of the Claims Association that a man in charge of the affairs of that association, particularly with reference to the information bureau, should be installed at the headquarters of the association and a bureau instituted to take the place of the Hooper-Homes Information Bureau. It was decided to defer action on this matter until the next meeting of the committee and in the meantime to continue the service of the Hooper-Homes Information Bureau.

The location of the midyear meeting was considered, and it was decided to continue the present place for this meeting, New York City.

There was considerable discussion on the question of holding the 1915 convention of the association at San Francisco. It was the opinion of the members of the committee that, since it was desirable that the meeting should at some time be held in San Francisco, no better time could be selected for holding the meeting in that city than during the Panama-Pacific International Exposition, to be held in 1915. No action was taken.

Frank R. Ford, chairman of the committee on determining proper basis for rates and fares, then presented the report of that committee. The report of the committee was received and the committee was discharged. It was decided to appoint a new committee whose duty it will be to suggest ways and means for carrying out the recommendations of the previous committee.

The design of the gold medal to be given for the best paper read before a company section and also the design of the charter for company sections were then approved.

Charles L. Henry then presented the report of the committee to consider relations with sectional associations. This report is mentioned below. On motion, the committee was continued with the request that it study the situation further and formulate some definite recommendations to be submitted to the next meeting of the committee.

C. Loomis Allen, chairman of the *Aera* advisory committee, reported that the Manufacturers' Association had been invited to participate in defraying the expenses of a publicity campaign through *Aera*. By invitation he had appeared at a meeting of that association, at which that matter was discussed, and the members stated that they would endeavor to raise the money. Upon motion, $5,000 was appropriated to cover the editorial work in connection with *Aera* for the coming year, it being understood that such portion only of that amount would be expended as was necessary.

In connection with the formation of the proposed Pacific Coast Sectional Association the committee expressed itself as highly pleased that the companies on the Pacific Coast should be so much interested in the work and welfare of the association as to organize this branch.

Henry J. Davies presented the report of the committee on insurance, accompanied by a report of Henry N. Staats, the insurance expert. The report showed that fifty-one companies were availing themselves of the services of the insurance expert.

H. H. Norris, chairman of the committee on education, presented the report of that committee, containing the recommendations mentioned later. The executive committee appropriated $250 to enable the work of the committee on education to be carried on until the October convention.

T. H. Tutweler, chairman of the committee on compensation for carrying United States mail, then presented the report of that committee. The report was accepted.

The following appropriations were then made for the affiliated associations: Accountants', $1,250; Engineering, $4,000; Claims, $1,250; Transportation & Traffic, $2,250.

The report of the special committee to consider the matter of electrolysis, Calvert Townley chairman, was presented by the secretary. The report contained the recommendations mentioned below. The report was accepted and approved.

Eleven member companies and approximately 1000 new individual members were then elected.

Calvert Townley, acting as chairman of the committee on subjects, suggested that the following be considered at the 1913 annual convention: (1) valuations, (2) the relation between carriers and the development of the territory they serve, (3) the relief of congestion in cities by subways and viaducts, (4) publicity. The report of the committee was accepted and approved. The meeting then adjourned.

COMMITTEE ON POWER GENERATION

The meeting of the committee on power generation was held on Friday at 10 a. m. B. F. Wood, chairman, Altoona, Pa.; L. P. Crecelius, Cleveland, Ohio; W. H. Sawyer, New York; William Roberts, Akron, Ohio; J. W. Welsh, Pittsburgh, Pa., and G. C. Hall, New York, were present.

Of the subjects assigned to the committee by the executive committee of the Engineering Association, that of peak loads was given to Messrs. Wood and Crecelius for consideration. This subject, it was decided, will also include the consideration of purchased power. The subject of boiler settings and furnace design was assigned to Messrs. Crecelius and Knox with instructions to prepare papers of special reference to the influence of baffling and to the different general types of stokers.

The subject of suggested arrangements of automatic relays and apparatus for protection in power plants from shutdowns was assigned to Messrs. Sawyer, Welsh and Hall. Part of this subject has already been covered by Mr. Welsh, who read a paper giving special attention to the use of reactance in generator or circuits in order to protect against damage from heavy short-circuit currents which might occur on the line.

To Mr. Roberts was assigned the consideration of the application of the distant-control principle to all important valves in the power plant with reference to concentration of control in some points in the plant remote from the possibilities of damage.

After the discussion of the various phases of the different subjects assigned to the members of the committee it was decided to hold another meeting in Chicago on April 28 at the Auditorium Annex, at 9.30 a. m., each member of the committee being prepared at that time to submit his portion of the general report.

COMMITTEE ON STANDARDS

The committee on standards met on Friday morning at 9 o'clock. There were present P. D. Windsor, Boston, chairman; F. B. H. Paine, Buffalo, N. Y.; G. W. Palmer, Boston, Mass.; C. H. Clark, Cleveland, Ohio; J. H. Hanna, Washington, D. C.; H. H. Adams, New York; F. R. Phillips, Pittsburgh, Pa.; R. H. Pinkley, Milwaukee, Wis., and J. M. Larned, Pittsburgh, Pa. Martin Schreiber, president of the Engineering Association, and H. C. Donecker, secretary, were also in attendance.

The meeting opened with a report by Secretary Donecker regarding his investigation into the methods of procedure in the adoption of standards by other technical associations, and in addition Mr. Donecker spoke regarding the proposed method of compiling the standards of the association and presenting them before the individual members in a loose-leaf binder. After a general discussion Mr. Adams moved for the appointment of a sub-committee of three for the purpose of compiling the various standards and recommended practices of the association, this committee to arrange for the preparation of a suitable form of binder, including the arrangement of an index for it. This committee is to work with the secretary in preparing a report for submission by letter ballot to the member companies. The motion was carried.

The copper wire table which was approved at the last convention and submitted for final adoption by the standards committee was approved as a standard for the association. It was, however, decided to request the committee on power distribution to extend the table to include the various sizes of cables up to 2,000,000 circ. mils, this extension to be placed in the hands of the secretary for printing at the earliest possible date. The specifications for overhead crossings of electric light and power transmission lines were then taken under consideration. These specifications had been approved at the last convention, but final adoption was dependent upon concurrent action by other technical societies affected. In this connection Mr. Palmer spoke of the possibility of harmonizing the portions of the specifications which conflict with those of other societies, and it was finally decided to adopt the specifications as recommended practice in the form approved by the convention.

The specifications for galvanizing iron and steel which, as a part of the specifications for standard line material, were approved at the last convention were adopted as standard after an extended discussion upon the propriety of approving the individual specifications for galvanizing as a standard when they had been practically included in the specifications for high-tension overhead crossings which stood as recommended practice only. It was the consensus of opinion of the committee, however, in the interpretation of the terms "standard" and "recommended practice," that the term "standard" should be freely used for matters of technical importance and should be subject to change with the developments which might arise at a later date.

With regard to the report of the committee on signals, it was decided to approve as standard the three items approved at the last convention, namely, the use of three fundamental indications for signaling, stop, proceed and caution; the recommendation that where semaphore signals are installed the upper left-hand quadrant is to be used, and the recommendation that, in three-position signaling, the aspects given in recommendation No. 3 on page 8 of the report of the signal committee be approved.

After the discussion of the revised specifications for heat-treated carbon steel axles, shafts and similar parts, it was decided that no action should be taken at this time by the standards committee. The specifications for cold-rolled steel axles which were approved by the convention as recommended practice were adopted by the committee as recommended practice in accordance with the form printed in the proceedings, with the inclusion only of the item referring to the limit for sulphur content, this to be not over 0.05 per cent.

The specifications for annealed carbon steel axles, shafts and similar parts were also approved as recommended practice. This approval includes the specification of a limit for the sulphur content of 0.05 per cent and the omission of the requirement that the steel must be cooled in a furnace in the process of annealing, for which requirement is substituted the words "in an approved manner."

In addition to the sub-committee, to be appointed by the chairman to handle the matter of a digest of existing standards and recommended practices already mentioned, it was decided to request the chairman to appoint one or two committees at his discretion to arrange for a new set of rules for the adoption of standards and for arranging for standard forms and style of specifications. Both of these committees, if appointed, will report later to the standards committee.

COMMITTEE ON HEAVY ELECTRIC TRACTION

This committee of the Engineering Association met on Friday afternoon. The committee members present were E. B. Katte, New York; J. H. Davis, Baltimore, Md.; W. S. Murray, New Haven, Conn.; Hugh Hazleton, New York, and J. M. Rosenbury, Peoria, Ill. This committee had originally been assigned the subjects of electrolysis, overhead clearances and the location of automatic train stops. The subject of electrolysis has been dropped from this program, however, owing to the fact that the executive committee of the association has referred it to a special committee. The subject of overhead clearances was referred to a sub-committee, consisting of Messrs. Katte, Hazleton and Murray, who will confer with similar sub-committees from the American Railway Association and the American Railway Engineering Association. The second sub-committee, consisting of Messrs. Hill, Davis and Bosenbury, was appointed to confer with representatives of the two organizations named upon the location of automatic train stops.

EXECUTIVE COMMITTEE OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

A meeting of the executive committee of the Transportation & Traffic Association held on Jan. 31 was attended by Dana Stevens, Cincinnati, Ohio; Henry C. Page, Worcester, Mass.; Robert I. Todd, Indianapolis, Ind.; H. A. Nicholl, Anderson, Ind.; L. C. Bradley, Galveston, Tex., and Matthew C. Brush, Boston, Mass. The committee received reports from various committees of the Transportation & Traffic Association in regard to the work which these committees are to do in preparation for the reports to be presented at the 1913 convention.

COMMITTEE ON WAY MATTERS

This committee of the Engineering Association met on Thursday and Friday. The committee members present were: J. M. Larned, chairman, Pittsburgh, Pa.; C. H. Clark, Cleveland, Ohio; J. D. Evans, New York; E. H. Berry, Cincinnati, Ohio; R. F. Kelker, Chicago, Ill.; E. P. Roundey, Syracuse, N. Y.; C. W. Gennett, Jr., Chicago, Ill., and H. F. Merker, East St. Louis, Ill. There were also present on invitation of the committee Charles Alden, Pennsylvania Steel Company, Steelton, Pa; E. B. Entwistle, Lorain Steel Company, Johnstown, Pa.; V. Angerer, William Wharton, Jr., & Company, Philadelphia, Pa. The subjects assigned to the way committee were as follows:

(a) Designs of 7-in. and 9-in. girder grooved and girder guard rails (continued); (b) designs of joint plates for 7-in. and 9-in. rails (continued); (c) proper construction of tracks in paved streets; (d) alloyed steel rails (continued); (e) specifications for spliced bars for girder and high T-rails (continued); (f) investigation of the extent of use of T-rails in streets (continued); (g) pavement for use in connection with girder and T-rails, and (h) rail fastenings for heavy service.

The following sub-committees were appointed: No. 1, proper construction of tracks in paved streets, Messrs. Berry, Merker and Kelker; No. 2, use of T-rails in streets, Messrs. Clark, Kelker and Roundey; No. 3, pavement for use in connection with girder and T-rails, Messrs. Kelker, Roundey and Clark; No. 4, rail fastenings for heavy service, Messrs. Evans and Roundey; No. 5, alloyed steel rails, joint specifications and other subjects to be handled jointly with the American Society for Testing Materials, Messrs. Merker, Gennett and Roundey, and No. 6, rail and joint designs, to consist of the committee of the whole, the chairman to have sections in accordance with rules and dimensions decided upon at the meeting Jan. 30, 1913, drawn up and submit the same to each member of the committee for final approval.

BLOCK SIGNAL COMMITTEE

The members present were J. M. Waldron, New York; C. D. Emmons, Fort Wayne, Ind.; Gaylord Thompson, Springfield, Ohio; J. J. Doyle, Baltimore, Md.; B. E. Merwin, Wheaton, Ill., and J. Leisenring, Springfield, Ill. Mr. Waldron was made chairman and Mr. Emmons vice-chairman. All members of the committee were present excepting Messrs. Conn and Morrison. It was decided to hold the next meeting on March 18 at Chicago, because this would permit attendance at the annual exhibit of the National Railway Appliance Association and at the meetings of the American Railway Engineering Association.

In addition to the subjects adopted at the meeting of the 1912 committee held at Buffalo, July 27, 1912, it was decided to take up the subject of clearances and rules, so that the complete program reads as follows: (1) progress report on signaling up to date; (2) bring bibliography on electric railway signaling and allied subjects up to date; (3) collect data regarding rulings of the Interstate Commerce Commission and the various state railway commissions; (4) discuss general subject of standards (for signal indications and aspects); (5) confer with the signal companies and report their findings and recommendations with respect to the proper method of solving the signaling problems presented in the instructions of the executive committees; (6) clearances; (7) rules; (8) to report progress in the development of automatic train stops.

The following sub-committees were then appointed in accordance with the program: Subject 1, Messrs. Waldron and Conn; subject 2, Messrs. Doyle and Morrison; subject 3, Mr. Doyle; subject 4, Messrs. Waldron and Morrison; subject 5, Messrs. Leisenring, Merwin, Emmons and Thompson; subject 6, Messrs. Morrison, Leisenring and Thompson; subject 7, Messrs. Doyle and Waldron; subject 8, Messrs. Waldron and Morrison. The committee has decided to pay particular attention to subject 5 so that a detailed report can be submitted at an early date. Subject 4 was also amended so that, as it now reads, the instructions end at the word "standards," thus giving a broader meaning to that term. The original clause is indicated by the bracketed portion of the foregoing program.

In connection with subject 8, the sub-committee was requested to collect literature on the subject of automatic train stops and present it for the consideration of the committee, so that a decision might be made as to how it could be handled in the 1913 report. Some discussion was held on automatic signals controlled by trolley contactors, and the chairman pointed out that sooner or later the committee should standardize the indications of car-counting trolley contactor signals.

The chairman said that bills had been introduced in Congress to compel all roads within a limited time to equip with automatic train stops. A hearing on the proposed bills will be held Feb. 8. The chairman was instructed by the committee to ask the parent association what its wishes were in connection with the consideration of these bills.

Mr. Leisenring suggested a continuation of the study of the aspects for three-position signaling, pointing out that the 1912 report showed the same aspect for "stop and proceed" as it would for "proceed under control (prepared to stop short of any obstructions)." These aspects were identical for light signaling. It was suggested that the yellow light on the proceed with caution aspect should be staggered, but no census of opinion was taken because it was a subject which warranted study. Hence is was scheduled for the next meeting of the committee.

EXECUTIVE COMMITTEE OF THE ACCOUNTANTS' ASSOCIATION

The executive committee of the Accountants' Association met on Jan. 30 and made plans for the program for the 1913 convention. The meeting was attended by the following: J. H. Neal, Boston, Mass.; M. W. Glover, Mobile, Ala.; F. B. Lasher, New York, N. Y.; M. R. Boylan, Newark, N. J.; G. W. Kalweit, Milwaukee, Wis.; George G. Whitney, Washington, D. C., and Thomas P. Kilfoyle, Cleveland, Ohio.

A definite decision was made in regard to several subjects which will be taken up in papers to be presented at the 1913 convention. Mr. Kalweit will prepare a paper dealing with the subject of transfers. Mr. Lasher will read a paper discussing the relations between the accounting and other departments of the railway. A. R. Patterson, of Stone & Webster, Boston, Mass., will read a paper discussing the question of whether the accounting department is productive or non-productive.

In accordance with the action of the association at the last convention a new committee to take up the subject of overhead charges was appointed. It consists of P. S. Young, Newark, N. J.; A. L. Linn, Jr., New York, N. Y., and B. E. Bramble, Champaign, Ill.

The resignations of C. E. Thompson, Chicago, Ill., and H. M. Grafton, Baltimore, Md., as members of the joint committee on engineering accounting were filled by the selection of M. W. Glover, Mobile Ala., and J. A. McGowan, Indianapolis, Ind.

J. C. Collins, Rochester, N. Y, resigned as co-chairman of the joint committee on express and freight accounting. Walter Shroyer, of Anderson, Ind., was appointed co-chairman of this committee, and H. F. Read, Boston, Mass., was made a member of the committee.

COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC

The committee on express and freight traffic of the Transportation & Traffic Association met on Thursday afternoon, F. D. Norviel, chairman, Anderson, Ind., and A. R. Piper, Brooklyn, N. Y., being present. The work of the committee consisted in preparing a form for a list of questions to be submitted to the member companies, requesting information in which the following points were included:

The possibility of pick-up and delivery service in connection with express and freight traffic on interurban lines and the possibility of using auto-trucks in connection with this service.

The value of general interchange of business between electric and steam lines.

The possibilities for a uniform scale of rates based on mileage for interurban lines.

The matter of "per diem" charges for equipment when it is used by foreign lines, similar to the arrangement adopted by the American Railway Association.

The value of establishing a standard classification for freight.

The matter of adopting the standard American Railway Association rules for the settlement of freight claims covering loss and damage.

The possibility for increased revenue by establishing another class of freight which would be handled on passenger trains at a slightly higher rate than freight of the ordinary classifications.

The question of the possibilities in adopting standard rates for milk and cream, and for freight left uncalled for beyond the usual allowance of free time.

The adoption of national car demurrage rules.

The relative value of unit waybills and blanket waybills.

The possibilities in the adoption of a uniform exception sheet for interline business.

The possibilities for increased revenue by establishing a joint weight and inspection bureau for interurban lines.

THE MANUFACTURERS' COMMITTEE DISCUSSES PUBLICITY

The executive committee of the American Electric Railway Manufacturers' Association met at the Engineering Societies Building, New York, on Thursday. The usual routine business was attended to and details with regard to the annual dinner, at which the Manufacturers' Association was to be the host, were perfected.

Much of the attention of the meeting was devoted to a proposal advanced by C. Loomis Allen, who met with the committee. Mr. Allen appeared as chairman of the *Aera* advisory committee of the parent association and spoke on behalf of the work which that committee has before it. He presented a plan for a joint publicity and educational campaign through *Aera* in which the Manufacturers' Association was invited to join. He pointed out the need of such a campaign for the purpose of educating the public into a more comprehensive knowledge and a more fair-minded point of view toward electric railway interests and problems. Emphasis was placed upon the opportunity for accomplishing much good in this direction by fortifying officers and employees of the companies themselves with accurate information and rational ideas so that they may be prepared to meet antagonistic sentiment among their neighbors as issues arise from time to time.

After the fullest discussion of Mr. Allen's proposal a resolution was presented by E. M. Williams and seconded by W. L. Conwell which was to the effect that the Manufacturers' executive committee recognizes the close relations and mutual opportunities and obligations which must exist between the manufacturers and the transportation companies, and that it expresses sympathy with and approval of the suggestion that the manufacturers represented by the association should have an opportunity to contribute money enough to create a fund of $12,000 which Mr. Allen stated would be necessary to meet the expenses of the work for 1913. The officers of the Manufacturers' Association were instructed by the resolution to present the matter fully to the members of that association with a note of explanation.

Another resolution was offered by B. A. Hegeman, Jr., seconded by D. W. Smith, which was unanimously carried, declaring it to be the sense of the Manufacturers' executive committee that *Aera* should be published without any commercial advertising.

THE INFLUENCE OF PERSONNEL ON ORGANIZATIONS

At the annual meeting of the Efficiency Society in New York, Jan. 27 and 28, Harrington Emerson presented a paper entitled "The Creation of Organization with Special Reference to Personnel." In it Mr. Emerson called attention to the wide differences both in general ability and in disposition or applicability in certain lines of work which existed between individuals. These differences were emphasized by numerous examples which were taken from many sources.

Investigation, he said, showed that in most industrial plants at least three-quarters of the men were badly placed, which, however, did not in the least mean that the men were undesirable. An intelligent readjustment and reassignment of positions without discharge could improve the efficiency of a plant from 30 per cent to 40 per cent.

Efficiency tests and analyses, tests of operation, not of organization, always showed among the day wage earners in the same plant individual variations between 30 per cent and 120 per cent, the extremes of actual test on a whole month's work being 7 per cent and 210 per cent. Operation could gradually, in the course of months and years, eliminate men of low efficiency, and by experiment and test and successive discharges replace them with men of higher efficiency, but it was possible by predetermination of aptitudes to curtail the time very greatly and in the end secure a better personnel.

In determining costs it was usual to add to the wages of the direct workers an hourly rate to take care of all overhead and other indirect charges logically classified under the four heads of power, maintenance, supervision and rent. There had to be included also an hourly rate for the equipment used. He said that 30 cents an hour for wages and 40 cents for all indirect expenses, a total of 70 cents, might be taken as an average machine shop cost.

A man at 100 per cent efficiency doing 3000 hours of normal work would take 3000 hours, costing $2,100, but a man of 30 per cent efficiency would take 10,000 hours, costing $7,000, the loss due to inefficiency being $4,900 on the one man. At 80 per cent efficiency the loss would be $525 per man.

NATIONAL ASSOCIATION OF CORPORATION SCHOOLS

In accordance with the program announced in these columns last week the organization meeting of the National Association of Corporation Schools was held in New York on Jan. 24 at the School of Commerce of New York University. There were present representatives of about forty corporations, practically all having corporation schools.

The morning session was devoted to an opening address by Dr. Lee Galloway and to a report on the scope of the work proposed for the first year. This report, presented by E. J. Mehren, managing editor of the *Engineering Record*, outlined the relations of the new association to other societies and movements and presented an analysis of corporation school problems, proposed as the basis for the principal initial work of the organization. This principal work would include the collection of statistics and their division so as to form the material upon which four sub-committees might work. The first sub-committee would consider the general problems connected with corporation school management, while the other three would consider the curricula of salesmanship schools, commercial schools and mechanical and technical schools respectively. No action was taken on the report, other than to refer it to the executive committee.

At the afternoon session the following papers were read: "Results Obtained by the National Cash Register Company from Its Eighteen Years of Educational Work," by William C. Garner; "What the New York Edison Company Is Doing Along Educational Lines and Results Obtained," by F. C. Henderschott. The closing session was a dinner at Delmonico's, at which addresses were delivered by Arthur Williams, C. P. Steinmetz, Chancellor Brown of New York University and E. St. Elmo Lewis.

The following officers were elected: President, Arthur Williams, New York Edison Company; first vice-president, E. St. Elmo Lewis, Burroughs Adding Machine Company; second vice-president, C. P. Steinmetz, General Electric Company; members of the executive committee, A. F. Bardwell, Yale & Towne Manufacturing Company; G. M. Basford, American Locomotive Company; C. R. Dooley, Westinghouse Electric & Manufacturing Company; J. W. L. Hale, Pennsylvania Railroad; F. C. Henderschott, New York Edison Company; W. D. Kelly, Consolidated Gas Company, New York City; Melville Mix, Dodge Manufacturing Company, Mishawaka, Ind.; J. E. Rogers, National Cash Register Company; D. C. Wolff, Curtis Publishing Company.

The Midyear Banquet

The Concluding Event of the Midyear Convention, the Banquet, Was Held at the Hotel Astor on the Evening of Jan. 31—Abstracts of the Speeches Are Published

The Friday night banquet, with its total of about 900 diners, fairly taxed the capacity of the great banquet room of the Hotel Astor. The entertainment committee had provided for an elaborate musical treat, comprising the great organ of the dining hall, a string band and a trio of men singers. The efforts of the latter were nobly reinforced by the diners themselves, who had been furnished with a booklet containing the text of many popular songs, in addition to a sheet upon which songs about the association officers were projected. The menu card was most appropriately decorated with a group showing the evolution of the street car from the horse-drawn vehicle to the stepless type double-decker.

Abstracts follow of the addresses made by the several speakers of the evening, who were introduced by Wm. H. Heulings, Jr., president of the American Electric Railway Manufacturers' Association. Mr. Heulings first noted briefly the marvelous growth of the midyear meeting, as shown by the fact that the number of diners at the banquet had increased from 353 to 900 in four years. The Manufacturers' Association would always stand shoulder to shoulder with the American Electric Railway Association and assist it to the limits of its power in any movement that it would undertake.

O. T. CROSBY'S REMARKS

Owing to the unavoidable absence of Charles A. Bookwalter, Mayor of Indianapolis, O. T. Crosby kindly consented to speak on "How Public Utilities Should Be Treated by Municipalities." His theme was the great power that a public body can have over a public utility, and his text lay in the paraphrase of a Chinese proverb that "With grants of power go parasols and white elephants mad with pride." When agents of a public regulating body were brought face to face with the question of exercising their vast power, they must be reminded of the necessity of using moderation and justice. They should have an appreciation of the rights as well as the duties of those over whom they have such vast power. In short, the duty of a public official was to define the rights of all concerned. The corporations should constantly place before every governing body the fact that they are the agents of the public in performing a public duty.

It should be made clear whether a public service corporation has a right to make an indefinite amount of money or only a right to make some specific return. If it be a right only to make some specific return, then let the public authorities say what that specific return should be; where and how it had been expressed and, further, what the conditions surrounding that return should be. Practically every question which arises between the public utility and its master, the public, will eventually be found to turn on that question.

It was possible that in the inebriation of power, public officials might follow the example of Alexander the Great by killing the friend that had carried them over the river. If this inebriation of power was not curbed by conscience, as expressed by a close investigation of the rights of the corporations, it would, like "white elephants mad with pride," lead to the trampling down of the social organization around us. The rights of a corporation could not be invaded without danger to the common welfare any more than the rights of an individual.

On this question the corporations were not acting merely from the standpoint of their own selfish interests, but from the broader standpoint that insistence upon contract rights was important to society in general. It should, therefore, be urged that the corporations were not getting all that justice and equity demand. Democracy had not finally settled the problem of government without having the dreadful guard of conscience. The corporations should demand perspicacity and definiteness as to their limitations and rights so that the unhealthful power now in the hands of public bodies would be reduced to its proper proportion. When that end was accomplished the "white elephants mad with pride" would calm down because they would no longer have the trampling power left to them.

SPEECH OF W. CARYL ELY

W. Caryl Ely spoke on "The New Partnership." In beginning he remarked that he was not much of a hand for new partnerships; he liked the old partnerships well enough. "New partnership" meant an attempt to describe the new relations that were supposed to be instituted between the public service corporations and the public they serve. Partnerships between these two interests were not new, however. Mr. Ely recalled a discussion at a dinner at the time when the public service commissions law was pending in the Legislature of New York and reference was made to the Massachusetts commissions, so that while the idea may be new in a way, it was in fact an old one.

It had always been Mr. Ely's proposition that public service commissions or some governmental body of authority should exist in order that the public might be represented in the equation. Now that the whole country was coming to that position, he felt as if he had been a pioneer in the idea. There could be no partnership unless two parties were represented in it. Everybody knew what the exercise of power wrongfully by a public service corporation would do. But it was generally admitted that there was less exercise of power in that way than ever before, and this must be taken as one of the effects of the partnership or of the "show-down" which was evidenced by the reports of financial operations filed by the companies with the public authorities.

Mr. Ely, in continuing, said that the part that the association and its affiliated organizations played made for the right of the new partnership. He expressed his great gratification at the progress made by the association and the industry. One of the greatest works upon which the association was just entering was publicity. The public should know that for years the companies had been giving the public a "look-in" at the results of operations. Anybody in New York State and anybody in many other states had been able for years to go to the public records and inspect reports of the companies. How many had done this? How many of those who stirred up matters affecting public service corporations had taken the time and trouble to look up the reports of the companies?

Mr. Ely then referred to those who attacked public service corporations, saying that their statements were characterized largely by gross ignorance of the things upon which they talked and wrote. Publicity was necessary until the people knew the situation, and when they knew the situation in regard to public service corporations the American people were not to be feared.

REMARKS OF ARTHUR W. BRADY

Arther W. Brady, president Union Traction Company of Indiana, speaking as the representative of General George H. Harries, president of the association, thanked the Manufacturers' Association for its splendid hospitality. He read a telegram in which General Harries expressed his deep regret at his inability to be present and his confidence in the success which would attend the meetings and the banquet.

Mr. Brady said that unusual success had marked the conference. The questions discussed at the two general sessions on Friday were not questions of importance to the street railway industry alone; they were of equal importance to every form of public-utility industry.

Mr. Brady then discussed the Adamson bill, now before the Senate after having passed the House of Representatives, which would make it mandatory upon the Interstate Commerce Commission to value every mile of steam railroad within its jurisdiction. The need for publicity was illustrated by the fact that this measure had been passed by the House of Representatives despite the opposition to universal valuation. It was not only necessary for the railways to see that every Congressman was familiar with this report, but that all of his constituents were also educated. Here was an immediate opportunity to exert the policy of publicity advocated by Mr. Ely.

Mr. Brady was followed by Colonel Henry B. Bope, vice-president Carnegie Steel Company, who spoke on "Requirements Upon Modern Manufacturing."

REMARKS OF H. C. BOPE

The story is familiar of the party visiting a forge plant where in showing not only the power but the ease of manipulation of a large hammer the workman asked for a watch, which was placed upon the block. The hammer was brought down with apparently tremendous force, but so splendid was the control that it merely reached the delicate object with a touch as dainty as that of a lady's finger, and of course no harm was done. The story may be true or not, but it seems to illustrate the first requirement upon the modern manufacturer. Upon the block lies what may be either "big" business or "little." for they are intertwined. The hammer is law. The manipulator—well, you may call him—for he is masculine—executive, legislative or judicial. Is the hammer to be used as a means of enforcing due regard for the law in the operation of business, or is it to be brought down ruthlessly to the destruction of all that lies underneath?

This is the question we are all asking ourselves. But the situation means that the requirement is not only study of the law but its application to the broad principles of business, so that it shall not be contravened. But here the difficulty arises as to the understanding of the law. "When doctors disagree who shall decide?" Certainly no one will say that there is perfect accord as to the meaning and intent of all laws. If framed prior to the arising of conditions which have so changed the methods of modern business, conditions beyond the control of any power to prevent because they arose from natural causes in part created by the people themselves, they sometimes do not fit in. But it is a requirement upon the manufacturer to conform in his production and its disposition to the statute law, and willing as he is to be law-abiding and law-supporting he finds it difficult at times through the fact of inability to obtain a proper interpretation of the law.

Every practical business man knows there has been a revolution in the nature of business and method of transaction within the past fifteen years. The growth of population, increase in wants, the problems arising from the massing of the people in large cities, the necessity of producing in a larger way foodstuffs for greater manufacturing centers, have changed wonderfully manufacturing of every kind. Revolutions do not move backward, even if the minds of statesmen retain somewhat of the attributes of the Bourbons in never forgetting anything and never learning anything. Consequently, in the sale and distribution of materials, the necessity of conforming to statutes and the new conditions of business demands constant watchfulness and a wide knowledge of national and state laws which, at times, militates against obtaining the best results for both buyer and seller.

It is my belief that the old situation of drastic competition can never return and in the interests of economic welfare ought not to return. And there seems to me an inconsistency on the part of some of our legislators and statemen in advocating peace measures as between nations and peoples while favoring a state of war between rival manufacturers to the destruction of profits, the lowering of wages and the operation of plants in such a manner as to use up materials without compensating advantages, and the lessening thereby of our natural resources without adequate returns. Better far to conserve these resources by their proper utilization, under conditions of co-operation under government regulation, to obtain the best results alike to all interested.

Another requirement is that of adapting manufacture to demand, and this is by no means easy. In times of depression plants are either altogether or in part out of operation. The closest study does not permit accurate knowledge of just what the demand will be, and either business is lost through inability to manufacture or stocks are accumulated with no certainty as to when disposition can be made. In times of great prosperity, as at present, with population enlarging, demands increasing, the buyers by reason of their number expand more rapidly than the central manufacturer, and he finds himself entirely unable to meet the requirements of his trade. If he increases too largely he has just so much more plant idle in depression periods, just so much more fixed capital not bringing in returns. Expand to some extent he must, but the evolution of business will compel that same central manufacturer to put less of his resources in fixed capital and more in liquid through carrying larger stocks or supplies of raw material readily convertible in any increasing demand. Then the legislator will come along with a bigger tax on inventories and perhaps the last state will be worse than the first, but on that we must take a chance. The next great change in the relation of buyer and seller will be through such contractual obligations as will more nearly balance the operation of the law of supply and demand.

A further requirement on the manufacturer is that of the consideration of quality of the article supplied. This has been a constantly increasing factor for years. And this better quality by no means in every case carries with it a compensatingly higher price. The tendency in all lines of manufacture is toward better quality and lower price. This in part is caused by increased output, the result being obtained by lower unit profit on a larger production, and this larger production will be continuous on the average, due to growth of population and increasing demand.

Another requirement, not a new one, but becoming steadily more important, is the development and maintenance of a first-class organization both in operation and sales. Success carries with it in its train study and imitation on the part of others and the adoption of methods, shown by results to be successful. It means drafts on able men, necessitating constant vigilance that the organization does not become weakened. Competitors do not seek at the bottom but at the top, where the crop is best if less abundant. Organization, method, system means so much these days that the manufacturer dares not suffer loss of prestige, which means loss of business, by the impoverishment of his working forces, either through lack of watchfulness to maintain it, or weakness through absolute loss of men who are valuable elsewhere as well as to himself.

And as a natural sequence of this comes the requirement arising from the demand of the age for a larger humanitarianism in the conduct of business. As a result of this demand employers are insuring the lives of their employees for the benefit not of themselves but their people; they are establishing pension funds for maintenance in old age; they are assuming responsibility for both death and sick benefits and the care of those injured in their service; they are employing all kinds of safety devices for the preservation of life and limb of their employees; they are installing all sorts of profit-sharing measures; in a smaller but not less important way they are giving supervision to the welfare of their employees in matters of living, personal and home cleanliness, the installation of libraries and other similar institutions for mental growth as well as the cultivation of social happiness, and the promotion of habits leading to better homes and better lives. I can readily understand how such measures can be carried out by large and prosperous institutions, but the burden in proportion must bear heavily on the smaller manufacturer whose income can not readily support such a drain, yet to his credit be it said he is meeting this demand of the age as readily and as cheerfully as his larger and more financially able brother.

These things are not paid for by the workman, but are a direct charge on manufacturing costs, yet these employers are the men, we are told, who are harsh, exacting, grinding the face of labor, depriving the workman of his just share of profit. An eminent senator recently told a body of employers that they were regarded generally as malefactors and criminals, because, forsooth, they had been successful in the use of talents God-given, and many of these same talents were and are employed in the betterment of the conditions of their fellow men.

I am asked to say a word as to the outlook, with some special reference to the great interest represented here to-night and in whose honor we are gathered together. Every right-thinking American believes this great country of ours has, under God, a great destiny to fulfil. We are working out this destiny as best we know how. Our great growth of widely dissimilar elements, which we are fusing into a common citizenship, is aided beyond all expression by the development of the city and interurban railways, whereby with the cheapest transportation on earth and average unequaled facilities the worker is no longer compelled to live near his place of employment but may enjoy suburban or even country life with no detriment to his labor. Vast tracts of land before beyond the reach of the wage earner have been opened up to settlement through your instrumentality. You have been, you are and you will be advance agents of prosperity in aiding the growth of population and removing also the vast aggregations in our cities which make problems of sanitation and protection almost unsolvable.

The next speaker was Frederick W. Whitridge, president Third Avenue Railway Company, New York.

REMARKS OF F. W. WHITRIDGE

Mr. Whitridge said that three things were uppermost in his mind, namely, labor organizations, municipal ownership and regulation. As to labor organizations, he supposed the time had been when they were essential and desirable from all points of view. Even to-day many of the unions were desirable and useful to the country. But the kind of union that he had had to deal with recently was composed of uneducated, unskilled labor. The men were perfectly sincere and honest, but they had been hypnotized by leaders who were paid out of their own pockets. He had found many of the leaders grossly ignorant, financially corrupt and cowardly. As he had said to their faces, they did not have the brains of a canary. The remedy for this evil was publicity, and what might be called the new spirit in connection with relations with employees. The ideal for which the railways should work was that no labor union whatsoever could do as much for their employees as the railways were ready and anxious to do for them themselves. That was the new spirit. In measurable time that new spirit would penetrate the temporarily paralyzed brains of the unfortunate, misled employees. The management must not be mealy-mouthed. Mr. Worldly Wise may say "Is it prudent, is it wise, is it expedient?" but he preferred to follow Martin Luther, who had said, "It is the truth; I cannot do otherwise."

As to municipal ownership in this country, that was only a spectre. No sane man who was familiar with the conditions in this country would advocate it for the United States. In Germany it was a triumphant success, but in the matter of law and its administration every other country in the world could kneel at the feet of Germany. German cities did not elect mayors or engineers. They sought men who had made good records elsewhere and then made ten-year contracts with them. England had a great system of voluntary service of public officials. It had no such thing as a man making money or a living out of public office. When we could have such systems of government, municipal ownership would be conceivable. To have it now in New York City with transportation contracts going into hundreds of millions of dollars would be a repetition of the feasts of Nero.

Referring to regulation, Mr. Whitridge said there was now a general insanity on the subject of having the State regulate everything. Even great corporations, fearful of their own powers, wanted to have the State fix the selling price of their products. If the State fixed the selling price, it would also fix the labor price—and labor had votes. After all, what was the State? Its powers were administered by commissions and those commissions were composed of human beings with human failings. Mr. Whitridge concluded his remarks with a quotation from one of the late Premier Gladstone's letters in which he wrote that he had always been convinced that men could not be regenerated from their woes by the State.

REMARKS OF S. G. M'MEEN

S. G. McMeen, president of the Columbus Railway & Light Company, was the last speaker. It was a great thing, he said, to get together once a year and find out something about the other fellow's troubles. So far as the rate of return was concerned, Mr. McMeen said that it had ceased to trouble railway men in his part of the country, where tickets were sold for 25 cents a yard. But he was going home, strengthened in the sound convictions that were the outgrowth of these gatherings where a large number of people got together to think about the same thing at the same time.

With the diners singing a song in honor of "Billy Boy" Heulings, the banquet came to an end.

STEEL TIE AND CONCRETE TRACK CONSTRUCTION AT SPRINGFIELD, MO.*

The tracks of the Springfield Traction Company have been generally rebuilt on the streets which were paved by the city of Springfield, Mo., during the year 1911, and the methods used in carrying out this work were described by A. C. Polk in a paper read before the American Society of Civil Engineers, as abstracted in the Electric Railway Journal for Oct. 19, 1912, page 883. The general features of the construction outlined by Mr. Polk were a 7-in., 70-lb. T-rail section, resting on steel ties laid in longitudinal reinforced concrete beams with a 5-in. concrete mat for the paving foundation. The rail tread was set ¼ in. above the street paving and the paving between rails was started from a point ½ in. below the tread, with a concrete filler or special nose brick to form the flange groove, and from there extended between rails with a high crown.

In a written discussion on the paper E. E. R. Tratman called attention to the fact that the flangeway groove used at Springfield was a wide rectangular one with a flat bottom, a vertical face and a sharp corner. He raised the question as to whether the vertical face of the groove would stand up under traffic or whether the wheels of vehicles would crush or crack it to an approximately beveled outline. The more usual method of forming a groove, he said, was to use nose brick laid as headers, with the top surface next the rail and beveled so as to fit beneath the rail head. Another plan was to use ordinary bricks laid as headers and tilted so that one end fitted under the rail head while the top surface lay approximately in the contour of the crowning of the pavement between the rails. A third plan was to use a rectangular stretcher course of brick under the rail head but projecting beyond it with a higher beveled edge stretcher course level with the paving. In all of these methods the flangeway was of beveled or triangular section rather than rectangular. Mr. Tratman also called attention to the fact that the crown between the rails as shown in the drawings which were submitted appeared to be unduly high, thus making an irregular contour in the cross-section of the street. The fact that the beveling was ½ in. below the rail head on the inside and ¼ in. below it on the outside caused the rail to form a distinct ridge in the pavement and did not appear to be desirable. The wide spacing of the ties, 5 ft., was liable to cause disintegration or crushing of the concrete immediately beneath the rail, owing to the vibration and slight deflections, in spite of the fact that theoretically the rail had a continuous solid bearing.

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*Abstract of discussion of a paper presented Oct. 16, 1912, before the American Society of Civil Engineers, entitled "A Brief Description of a Modern Street Railway Construction," by A. C. Polk, printed in full on pages 1599 to 1605 of the society's proceedings for November, 1912.

Walter C. Howe, in another written discussion of the paper, cited his experience in Oakland, Cal., where the original asphalt street surface adjoining the electric railway tracks was found to fail next to the tracks and to disintegrate gradually outward from the rail. In consequence a type of construction somewhat similar to that described by Mr. Polk was considered, but in view of the expense a compromise was made in which rock ballast 6 in. deep was substituted for the concrete under the ties. However, Mr. Howe admitted the superiority of the concrete base where cost was no object. The compromise type which was adopted at a considerably decreased cost included 141-lb. 9-in. girder rails with steel tie plates, the concrete extending to the bottom of the wooden ties. Underneath the ties 6 in. of crushed stone ballast was laid, and notwithstanding the apparently cheap construction the results had been uniformly satisfactory.

Another written discussion was submitted by Lewis A. Mitchell, superintendent track and roadway Indiana Union Traction Company, who stated that in his experience the concrete beam construction of which that described by Mr. Polk was a type had not been entirely satisfactory. The failures, however, were not necessarily due to the type of construction but rather to excessive loads and loose joints which permitted a slight movement of the rails when a wheel passed over them, the movement starting a hammer blow which eventually broke the beam under the joint. By placing a steel tie directly under the joint and thus supporting it, he said that Mr. Polk had taken a step in advance, as this support would prevent working at the ends of the rails. The writer believed that the life of the joint would be greatly increased if the support under it was increased to the full length of the joint bar or even beyond it. The matter of making a good joint for paved streets was, he said, a matter of the utmost importance. When bolts were used the holes in the web of the rail and in the joint bars should be of the same size as the bolt, and machined bolts should be used, making a driving fit. The ends of the rails should be ground so that they would fit tightly, especially at the ball. The drilling should be such that when the bolts were in place the ends of the rail would fit tightly together. Since specifications for rails allowed for a possible small variation in height at any joint it was necessary that the joints of new track should invariably be ground to an even surface just as soon as possible after the work was completed, and when joints were made up as described it was difficult to find where the joints were after they had been ground.

Mr. Mitchell also stated that the track under his charge was made up in some cases with concrete under the whole track and in others the track was laid on broken stone ballast with concrete from the bottom up to 2 in. above the top of the ties. Both of these types had been in service one and a half years without requiring any maintenance, the joints being made up as previously described. It was found, however, in some cases that some cupping of the rails had taken place. Mr. Mitchell concluded by saying that joints made up with rivets instead of machined bolts would assure an equally tight fit between the rail and the splice bar.

COMMUNICATIONS

T-RAIL PAVEMENT CONSTRUCTION

Toledo, Ohio, Jan. 20, 1913.

To the Editors:

I notice the article on page 61 of your issue for Jan. 11 in regard to a new style of paving designed by the Illinois Traction System, but I question the feasibility of this method of paving with brick. With the gravel ballast there is bound to be more or less movement of the rails and ties, which in time will open the joint between the bricks near each rail. This will permit the water to enter the ballast and the subgrade will become badly frozen. When the spring thaw comes or a winter thaw, such as we recently had, it will be found that the first one or two courses of brick next to the rail will heave very badly and be driven out by action of teams when turning out of the tracks.

This has been our experience during the past two weeks, for we have very bad conditions with tracks laid in this manner. To overcome it we are relaying the bricks at right angles to the rail, but we intend to abandon this method of paving entirely and expect to lay brick paving with the filler block in the web of the rail and the rest of the brick at right angles to the rail. We believe that there will be no opposition to this, because with girder rails the general custom is to lay the brick level with the tram of the rail.

This article is not written in a spirit of criticism but simply to show what results are probable.

A. Swartz,
Engineer Maintenance of Way.

PUBLIC UTILITY BIDS IN TEXAS AND MAINE

A bill creating a State public utilities commission has been introduced into the Texas Legislature by Mr. Dwight L. Lewelling. The measure, which has been patterned largely after the public utilities laws of the State of Wisconsin, provides that the public utilities in Texas shall be placed under the control of a separate commission composed of three persons, to be elected by the Senate and House of Repersentatives in joint session. The commission is to have adequate powers, and the proposed law provides for appeals from its orders to the courts but forbids the setting aside of any order or suspension thereof by injunction pending the decision of the court. One of the most important features of the proposed law is the placing of every franchise within the State under the public service commission and so altering or amending any franchise as to make it in effect an indeterminate one.

State Senator I. G. Hersey, of Houlton, Aroostook County, Maine, has presented a bill before the Maine Legislature to establish a utility commission formulated on the plan of the Rhode Island act. The commission proposed would comprise three members, appointed by the Governor, who could also remove his appointees at pleasure. All franchises granted to public utilities by towns or cities would be placed under the commission's control, and corporations would be permitted to appeal to the commission from orders of municipalities.

Meeting of the National Civic Federation

Reports Are Presented by the Departments on Regulation of Interstate and Municipal Utilities, on Workmen's Compensation and on Industrial Mediation

The annual meeting of the National Civic Federation was held at the Hotel Astor, New York, on Jan. 28 and 29. Among the subjects considered which are of particular interest to public utility corporations were the regulation of public utilities, workmen's compensation laws, amendments to the Erdman railway conciliation act and a proposed model state mediation act.

The report of the department on regulation of interstate and municipal utilities was presented by Emerson McMillin, the chairman, and an abstract thereof is published in this issue.

August Belmont, chairman of the department on workmen's compensation, was unable on account of sickness to present his report in person. An abstract of the report is published in this issue.

At the session at which amendments to the Erdman act were considered a number of men actively interested in the subject took part in the discussion. Marcus M. Marks, chairman of the industrial mediation department of the federation, opened the discussion. An abstract of his paper is published in this issue. Other speakers were Samuel Gompers, president of the American Federation of Labor; William C. Rogers, chief mediator New York State Board of Arbitration; Oscar S. Straus and W. G. Lee, president of the Brotherhood of Railroad Trainmen.

REPORT OF THE DEPARTMENT ON REGULATION OF INTERSTATE AND MUNICIPAL UTILITIES

PRESENTED BY EMERSON M'MILLIN, CHAIRMAN

The department on regulation of interstate and municipal utilities of the National Civic Federation was organized in the summer of 1911. Regarded from the standpoint of the National Civic Federation, it is an outgrowth of the municipal ownership investigation of 1906 and 1907, which is one of the most notable achievements of the federation. In that investigation a large commission was created for the purpose of studying in this country and abroad the results of municipal ownership and of determining the advisability of extending the activities of municipal governments in this country to the ownership and operation of gas, electric, water, street railway, telephone and other so-called public service utilities.

In an able and exhaustive report, approved by the federation, the commission advised that municipal ownership and operation were not desirable if effective public regulation of such enterprises were obtainable. Generally speaking, the object of creating the department of regulation of interstate and municipal utilities was to determine what kind of regulation was desirable in the interests of the public and of the utilities themselves and what kind of regulation would make inexpedient and inadvisable a resort to public ownership and operation.

The principle of public regulation of quasi-public undertakings is firmly established in this country. Massachusetts led the way about a half century ago, with a state commission for the regulation of railroads. The Massachusetts Board of Gas and Electric Light Commissioners antedates the Interstate Commerce Commission and is now almost thirty years old. Congress established a commission to regulate interstate railroads in 1887. Forty-two of the forty-eight states of the Union to-day have commissions of one kind or another exercising central supervision over railroads or local public utilities or both. Many cities, grown impatient with the delay of the state in establishing regulating bodies, have attempted, usually under limited and incomplete authority, to establish municipal commissions to regulate the relations between public service companies and their patrons.

The old idea that the purveyor of transportation, gas, water, electricity and other public services under modern conditions was engaged in a private business, subject to the same rules of bargain and sale as the dry-goods merchant, the butcher or the manufacturer, no longer prevails. Much may be said, perhaps, in behalf of unrestrained activity in such fields as these in the early days of the development of a country such as ours, but, whatever may have been that condition in the past, to conduct these enterprises to-day on the basis on which private business is conducted is in conflict with public sentiment.

Whatever may be the views of any individual regarding the desirability of having the state regulate the conduct of public utility enterprises, all must agree that the signs of the times point clearly in one of two directions—either to public ownership and operation or to public regulation of private ownership and operation. Competition, relied upon in the earlier days to protect supposed public interests, has failed completely. Competition in a public service business is war, and General Sherman's description of war applies as well to the public service industry as to the battlefield. The furnishing of a transportation, gas, water, electric, telephone or other public service is, and should be, naturally a monopoly. Unregulated monopoly in any field of endeavor is abhorrent to Anglo-Saxon people. While regulation of public utilities must be based on full recognition of the monopolistic character of the business, it is also true that recognition of monopoly invites public regulation or public ownership and operation. The department believes not only that public regulation is preferable to public ownership and operation, but that public ownership and operation may be deferred only by reasonable public regulation.

The temper of the times will demand measures to protect public interests against the cupidity of the public utility companies. An equal necessity exists for measures to protect the utility companies against spasmodic, hasty and inconsiderate demands of clamorous parties. Managers of public utility enterprises are foremost among those who believe that anything less than complete regulation is as dangerous to the public utilities as it is to the public at large. Public utility managers have been blamed, sometimes justly perhaps, for extortionate and discriminatory rates and inadequate and unreasonable service, but too little has been said about the influence of politics and of politicians in the relations between public utilities and their patrons. The state owes it to its quasi-public agencies performing the transportation, gas, water, electric, telephone and other public services no less than to the public itself to free public utilities from the baneful influence of local politics. The state must see to it that the common law rule of resonableness and non-discrimination is applied fully and in all respects fairly to these industries.

SAMPLE BILL TO EXPRESS A WORKING PLAN

The department on regulation of interstate and municipal utilities was established to evolve, if possible, a working plan, adaptable in the main to every part of the country, whereby public utilities may be regulated by the state wisely and in the interests alike of the public and of themselves. The efforts of the department have been directed to the drafting of a sample bill. The bill, which is now nearing completion, will be available as a sample for use in all states in the country which have not as yet legislated on the subject and in other states which are proposing to revise existing legislation. Among the states in which public utility regulation is an important legislative issue are Massachusetts, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Minnesota, Missouri, Texas, Idaho and Colorado. Legislation in the District of Columbia has been agitated for some time. The work of this department is particularly opportune, and it is expected that legislative bodies will find the work of assistance to them in creating laws for the protection of the public.

The subjects which are being dealt with in the bill, and the treatment given them, are too numerous and too intricate to be described in so brief a report as this must necessarily be. Many difficult points are involved in the drafting of a statute for the creation of a commission to exercise state-wide jurisdiction over public utilities of all kinds and the declaration of the duties and powers of such commission with respect to franchises, stocks and bonds, intercorporate relations of public utilities, rates, service, accounts and reports. If the department succeeds in impressing the country with the desirability of establishing efficient, able, high-minded and conscientious commissions, with ample facilities and powers to regulate the relations of public utilities with their patrons and the public, it will have accomplished a worthy purpose.

Preliminary to a final draft of the sample bill, pamphlets containing subdivisions of the bill were printed and mailed to those believed to be most interested and well qualified to make suggestions. In the preparation of those subdivisions or sections the provisions were almost wholly culled from existing statutes.

Much of this material was objectionable to the department, but was incorporated in the preliminary publications to call attention to the particular subject mentioned and to direct particularly the attention of those who believed the work the department was doing was necessary to the character of legislation that may be looked for when enacted by men unfamiliar with the question at issue and without facilities for acquiring necessary information. Of the material entering into the final revised sections, every topic, paragraph, line and word has been or will be carefully weighed by members of sub-committees and of the executive council. Almost invariably the matter passed upon receives unanimous approval.

The department has prepared a work of monumental importance in its compilation and analysis of existing statutory enactments. This work was undertaken as a foundation for the bill. In magnitude it has far surpassed the early expectations of the department. The federal laws and the laws of all the states relating to the regulation of railroads and other public utilities by commissions have been compiled and analyzed. The statutes of the several jurisdictions have been dismembered and the various sections have been classified under upward of three hundred topics. The several parts of the compilation and analysis have been printed for the use of the department and have been distributed widely to public utilities, commissions and friends of the department who have been interested in its work. This material will be gathered together into a single volume of upward of 1200 pages, which will contain elaborate cross-references, scope notes, subject and section indices and other explanatory and analytical matter. The department has received many compliments on this work from persons familiar with the subject who have had an opportunity to examine the several parts and to acquaint themselves with the manner in which the compilation and analysis has been prepared. Plans have been suggested and are under consideration whereby the compilation and analysis of laws may be revised after the 1913 Legislatures have concluded their sessions.

The department has had an extended investigation made of certain phases of the regulation of public utilities in England. Dr. Robert H. Whitten, known particularly for his recent work on the valuation of public utilities, spent some four months in England as an investigator for the department, and his report, covering about 200 pages, will be regarded, we think, as a valuable contribution to the subject of regulation of utilities.

During the course of the year investigators of the department have visited in person the railroad and public service commissions of practically all of the states east of the Rocky Mountains, excepting those of the Southern States. All of the commissions have been urged to co-operate with the department in the preparation of the compilation and analysis of laws and in the drafting of the bill, and much of the success of the enterprise is due to the assistance afforded by commissions.

ORGANIZATION OF THE WORK

The department retained as its director of investigation Dr. John H. Gray, of the University of Minnesota. Dr. Gray assisted in the municipal ownership investigation and in the preparation of the report of the commission of the federation of 1907. He has been assisted by a permanent staff of six men. Prof. Bruce Wyman, of the Harvard University Law School, has been identified with the investigation throughout as its counsel, and all of the work of compiling the statutes was done under his direction by a staff recruited for that purpose at Cambridge.

In conducting its activities the department has maintained a complete organization independently of the National Civic Federation. Separate offices have been maintained, which have housed a staff of investigators and clerical and other assistants numbering fourteen.

Under an arrangement with the federation, the department has had the benefit of the services of a member of the permanent staff of the federation throughout the year in the solicitation of funds. The department welcomes this opportunity to express its appreciation of the interest and desire to co-operate evidenced from the start by the officers and employees of the National Civic Federation.

The financing of the work of the department was undertaken by the department itself. The total cost of the investigation to date has been about $55,000. Of this large amount about $40,000 has been raised by voluntary subscription. The undertaking could not have rounded out to a successful conclusion had it not been for the diligent effort and untiring zeal of the chairman of the ways and means committee, Col. Franklin Q. Brown; the treasurer, F. C. Walcott, and the members of the committee. The list of contributors exceeds 100 in number and is representative of practically all of the larger interests in the public utility field, excepting the steam railroads. All who have been approached for subscriptions have considered the matter in a spirit of fairness and desire to co-operate in a useful work which has been particularly gratifying to the department.

Under the plan of organization adopted for the department, the chairman of the department is also chairman of the executive council or board of directors. It gives him pleasure to have this opportunity to give public utterance to the appreciation he has for the manner in which the members of the executive council have performed their difficult and sometimes arduous duties. Seven sub-committees, to which have been assigned particular parts of the proposed bill, are represented in the executive council by their chairmen, and on these chairmen has fallen a large part of the burden of the investigation. [Names of the members of these sub-committees were published in the ELECTRIC RAILWAY JOURNAL of Dec. 14, 1912.—Eds.]

The department has benefited largely from the experience and advice of a large, unorganized staff of public utility and commission experts, who have responded gratuitously to the calls of the department for comments and criticisms on the various parts of the sample bill and of the compilation and analysis. Many busy men have devoted much time and thoughtful consideration to the printed matter which has been sent to them for their criticism. The department has attempted in every way possible to interest actively in the work on which it has been engaged all men who by their training and experience are particularly qualified to assist in so important a task as drafting a sample bill. Many of this voluntary staff have been enrolled in one or more of the sub-committees, but fully as much suggestive and critical material has been received from men entirely outside of the formal organization of the department as from those inside. It should be a matter of gratification to the National Civic Federation that this department has succeeded in interesting vitally in an undertaking sponsored by the federation so large a number of individuals in all parts of the country.

Mention should be made of the spirit of fairness with which all who have commented on the proposed sections of the bill have approached the subject. With suggestions, both written and oral, running into the hundreds, it is probably fair to say that no partisan expression has been received by the department at any stage. This is profound evidence of the mutuality of interest that exists in this undertaking, so far as the public and the corporations are concerned.

Arrangements will be made for the widespread distribution of the sample bill in the various parts of the country where public utility legislation is pending. The investigation has already consumed more time than was originally allotted to it and is fast approaching the period where its greatest usefulness will not be realized unless the bill is forthcoming in the immediate future. It is confidently expected that the department will be able to report this bill to the National Civic Federation within a few days.

GOVERNMENT MEDIATION IN RAILROAD LABOR DISPUTES

BY SETH LOW, PRESIDENT NATIONAL CIVIC FEDERATION

The philosophy of socialism is radically different from the philosophy of the American Federation of Labor, because socialism distinctly seeks to overthrow the institution of private property, so far as that relates to the control of the agencies of production and distribution, including land. As distinguished from the American Federation of Labor, therefore, I call the socialist party a destructive party and not a constructive party, because its whole emphasis at the present time is placed upon the destructive work of substituting state ownership for private ownership of the agencies for production and distribution.

The methods of the Industrial Workers of the World are frankly revolutionary, as their aim is revolutionary, and when this is understood it is easy to understand also the measures which they support.

So far, in America, the great body of the American Federation of Labor and of the great railway brotherhoods are distinctly non-socialistic. The unceasing effort of the socialists in America, and of the Industrial Workers of the World, is to change all this. If the employers of America wish to strengthen the forces in the labor world that are not seeking a revolution, they can do so by working with the trade unionists to bring about constantly improving conditions for their employees. If the employers are blind, however, or indifferent, the employers of America may easily drive the great conservative body of labor unionists into the arms of the extremists. The socialists and the Industrial Workers of the World are preaching everywhere a class struggle and proclaiming from the housetops that the workman and his employer have no interests whatever in common. All honor to those American workingmen who, in the face of such persuasion and denunciation, decline to accept the doctrine of a class struggle, as if the citizenship of the United States either is or should be broken up into classes. It is easy to bring about a class struggle in countries where well-defined classes have always existed. It ought to be, and it is, hard to do it in a country like this, which recognizes no classes in its citizenship.

In the recent arbitration in this country between the railroads and the Brotherhood of Locomotive Engineers, the representatives of the public on that arbitration board formulated the proposition that there should be an Interstate Wages Commission to regulate wages, precisely as there is an Interstate Commerce Commission to regulate railroad charges. The logic of the proposal is undeniable. Its practicability is a different matter. Arbitration that is compulsory is highly useful, because when it is voluntary both parties agree to abide by the results; but compulsory arbitration is impossible, because not the community itself can compel men to work unless they are willing to work. If the problems of modern transportation cannot be solved without repeatedly exposing civilized countries to such dangers as that from which England emerged two years ago, during its railroad strike, by the narrowest margin, it may come to this, or something like this, for I am perfectly persuaded that the rights of society as a whole are paramount to the rights of any group of citizens, no matter how large and no matter how essential are their services. I allude to this only in order to emphasize the obligation resting on both employers and employees to carry on their controversies in such a manner and in such a spirit as will make these great calamities infrequent and as will reduce to a minimum the suffering that is inseparable from industrial war. The great aim, in my judgment, should be so to inform public opinion on the merits of any pending controversy that public opinion may be able to enforce prompt and just settlements.

In the pending controversy between the railroads and the firemen both sides are willing to arbitrate all their differences, but the firemen demand that the arbitration shall be carried on as contemplated by the Erdman act, so that witnesses may be sworn and perjury punished if it shall take place, while the railroads stand for an arbitration such as was held, by agreement, with the engineers. In this controversy I think the firemen are clearly right. I think the American people are not only willing that railroad employees should be paid good wages, I think the people are desirous that such wages should be paid. I also believe that the people are entirely willing that higher freight rates and higher passenger rates should be allowed by the Interstate Commerce Commission, if necessary to allow good wages to be paid to railroad employees. The trouble is that up to this time the railroads have not been able to convince either the Interstate Commerce Commission or the public that they are not able to pay such wages without an increase in freight rates and passenger rates. When the railroads can make that demonstration I expect to see higher freight rates and higher passenger rates allowed. In this matter it may easily be that the railroads are handicapped by the popular suspicion, aroused by old-time practices now largely abandoned, because no longer sustained by public sentiment, if they ever were. Unhappily, railroading is still so complicated with financiering that railroad management shares in the popular distrust which has been aroused as to the fairness, in the large sense, of many financial methods and many financial deeds. These public impressions, unhappily, cannot be quickly or easily eliminated from the situation. The railroad managers themselves, however, can help very much to dissipate them.

I commented a year ago upon the McNamara trials and convictions. It is not necessary to repeat what I said then. All resort to violence to prevent non-union labor from earning its living and to destroy property on which non-union labor has been employed is a crime only less heinous than murder, for when you take from a man his means of support you really take his life. The methods of this particular union of the American Federation of Labor, therefore, so far as the records now show, were in effect a resort to anarchy and were absolutely inconsistent with the philosophy, with the ideals and with the practice of the American Federation of Labor as a whole. No body of men in the country is so much interested in denouncing these methods as the organized trade unionists of the United States, for these methods were a betrayal of all that the American Federation of Labor stands for.

At Indianapolis labor union men have been tried and convicted for the transportation of dynamite contrary to law. At Lawrence, Mass., the president of the American Woolen Company and others are under indictment for planting dynamite illegally in places where, if found, it would help to discredit the good name of laboring men. Enough mischief has been done already at Lawrence without adding to the harm already done the infinite mischief of allowing laboring men to believe that there is one law for the labor union man who transports dynamite illegally and another law for the president of the American Woolen Company if he acts illegally. I have not the slightest intention of assuming that this gentleman is guilty of the charge on which he has been indicted. What I am striving to urge is the importance of his prompt trial under this indictment, unless the mischief that began with the Lawrence strike is to spread all over the United States like a pestilence.

Reference to the work of the department on regulation of interstate and municipal utilities leads me to say a few words on some of the business questions which are commanding public attention at the present time. Many here can remember when it was considered just as legitimate and just as necessary that there should be competition between gas companies as in commercial business. In the matter of gas this meant more tearing up of the streets, often parallel lines of pipe in the same street, larger capitalization than was necessary, and poorer rather than better service. In the matter of telephone service competition means that every subscriber must have two or more telephone instruments on his desk. By almost common consent it is now agreed that in the matter of public utilities there must be monopoly. The accepted alternative, therefore, is to have public ownership and operation or private ownership and operation under government regulation. The work of this department of the National Civic Federation takes it for granted that the practical question at the moment in the United States, all over the country, is how to regulate to the best advantage privately owned companies which are carrying on these public utilities. Beyond all doubt public opinion at the present time has definitely reached this stage, and if public control is successful, public opinion is likely to remain indefinitely in this stage. If public regulation breaks down, however, all of these public services are likely to be carried on everywhere some day by public officials on behalf of the public.

During the last two decades there has been a tremendous swing toward the concentration of control into single corporations in some, not to say in many, of the great industries of the country. The impressive fact is that this swing toward concentration of control has taken place in the very teeth of the law of Congress popularly known as "the Sherman anti-trust law." It is certainly true that since the most recent decisions of the Supreme Court of the United States in the interpretation of this law the tendency to new concentration has received a serious check. On the other hand, the law did not suffice to prevent the great concentration already entered into, and the law is only now attempting to restore, after the concentration has taken place, as nearly as possible the situation which existed before this concentration was begun. This is a process full of difficulty, which has been well described as the "attempt to unscramble an egg," and, unhappily, it involves costly consequences to multitudes of stockholders, who innocently supposed that what was done under the nominal authority of some state in the Union, and done without being challenged by the federal authorities at the time, was something in which they might reasonably take part. Such a situation reveals vividly the condition of governmental chaos which has prevailed in this country because of the attempt to control the corporation that does interstate business by the state that incorporates it while giving the control of the business that it does to the Congress of the United States. It is not a question whether the states or the Union can control interstate business to greater advantage. The thing that experience unequivocally condemns is the attempt to control the agent by one government and the thing that the agent does by another.

In my judgment, the United States must control the corporations which do interstate business on a large scale, either through the grant of a federal license for state-created corporations doing interstate business or by substituting national incorporation for state incorporation in such cases.

It appears to be clear that as to private business, as well as in the matter of public utilities, one may follow either one of two plans. You may preserve competition or you may permit monopoly. In any given business if you wish to preserve competition you must destroy monopoly. In other words, you cannot have competition and monopoly at the same time. You may, however, in certain cases have a monopoly regulated by law, if that be desirable, and yet keep competition in every other business. If, then, it is the desire of the American people to prevent monopoly in any line of private business, no matter what, there should be a law which will cause a loss of property to anyone taking part in the monopoly. This business of breaking up combinations and leaving the property, as far as possible, in the ownership of the same stockholders is merely playing with the situation.

Personally, I favor the appointment of an Interstate Trade Commission which shall have the oversight of large interstate business, very much as the Interstate Commerce Commission is charged with the duty of regulating interstate railroads; except that I would not give, at the outset, any authority to the Interstate Trade Commission to fix prices. I should hope that, with good judgment on the part of such a commission, the evil day when that might be attempted might be postponed indefinitely. Although I believe that the proposed Interstate Trade Commission should have nothing to do with prices, I believe that the same method of procedure that is followed by the Interstate Commerce Commission with respect to railways would enable the commission to apply any general rule embodied in the law to the particular detail complained of in any controversy. The Supreme Court seems to me to have decided that "all restraint of competition is not necessarily restraint of trade." If that proposition is a permissible interpretation of the Sherman anti-trust act as it stands, such an Interstate Trade Commission, if it received a mandate from Congress to enforce this law, would decide in every particular case brought before it whether the proposed combination or agreement really restrained or could restrain competition sufficiently to deserve condemnation under the Sherman anti-trust law.

I read many years ago—I think it was in the "Reminiscences" of Hugh McCulloch—this statement: "that it would have been no use to invent the railroad one hundred years before it was invented, because one hundred years before it would have been impossible to command money enough to build a railroad." The moral of this quotation is that at the present time world business is done upon a large scale and world business cannot be done by agencies too small to carry it on. Therefore, if the United States is to bear its part honorably in the world commerce, outside of this country, our business men must be permitted to compete upon terms that make competition possible. This is an added reason, in my judgment, why such a development as I have last described of the Sherman anti-trust law is greatly to be desired. It would enable the country, I believe, to command its share of the commerce of the world, while absolutely protecting the country from commercial monopoly at home.

INDUSTRIAL MEDIATION LAWS

BY MARCUS E. MARKS, CHAIRMAN INDUSTRIAL MEDIATION DEPARTMENT

One of the greatest economic problems of our day is the wise and peaceful adjustment of wage conditions to harmonize with the growing cost of living and the higher standards of life which popular education has properly encouraged among the working people. Discontent is bound to be general when the employed find the purchasing power of their wages inadequate to meet legitimate needs.

Our country has been very backward in the provision of machinery adapted to prevent conflict during the process of adjustment of changing conditions. Both workingmen and employers are now at a loss where to turn for advice and assistance when restlessness assumes acute manifestations. Strikes often occur because the workingmen know of no better way to attempt to secure justice.

Recognizing this situation, a new department of the National Civic Federation has been organized to stimulate new and forward the development of our present industrial mediation laws, both federal and state.

This new department has been subdivided to consider three different subjects:

(1) The Erdman act.

(2) A model state mediation act.

(3) An improvement in the relation between government employees (federal, state and city) and the respective governments.

The Erdman act was devised to bring about mediation and voluntary arbitration between our interstate railroads and their employees. As it has stood the experimental test well, and as it has been the means of preventing many strikes, without a single case of failure, we may now take courage to consider not only an increase in the number of conciliators as recommended but a further extension of the scope of the act. At present it affects only train operatives; it does not apply to workers in the railroad shops nor maintenance-of-way workers, and does not include clerks, telephone and telegraph operators.

It may be well to consider an amendment of the Erdman act so as to embrace these classes under its provisions.

The Erdman act might also at a future day be extended to embrace river, lake and coastwise transportation, express business and the telegraph and telephone lines having interstate connections. Since the plan has been found practicable it would seem wise to spread its benefits as far as possible without weakening its existing service.

In order to make the New York act a model for uniform state adoption, a few amendments are suggested:

First, there are certain occasions when a special board could serve better than the standing Board of Mediation. On such occasions it is proposed that the Governor may be appealed to by the Commissioner of Labor to appoint a special board of three or more persons.

It is suggested that the State mediator act as counsel during the proceedings, in order to give the new board the benefit of the experience and machinery of the State officials.

Further, there are occasions when a labor difficulty extends beyond the borders of a single state and yet does not fall under the head of interstate commerce.

It is suggested that, in the new bill, the mediator of one state be authorized to co-operate officially with the mediators of other states affected.

The salaries of the state mediators are at present entirely too low to compensate men of the character and experience required to deal successfully with the important problems of the industrial world. Under the model bill, a substantial addition to salaries should be provided.

In the State of Massachusetts a bill has been prepared by the committee of industrial relations of the Boston Chamber of Commerce, which provides for investigation and publicity in all labor disputes. In case of dispute between public service corporations and their employees no strike is permitted during the investigation. In private business, while the investigation and the publicity are also made compulsory, there is no penalty provided for strikes during the period of investigation.

The strike and the lock-out are crude, barbaric and wasteful; they prove nothing of value and settle nothing permanently; they show only which side is the stronger or has the greater power of resistance, not which side is right. After the conflict, angry passions rankle in the breasts of the defeated; the fire is but temporarily smothered. On the other hand, the settlement of differences in an enlightened manner, by investigation and mediation, and, when voluntarily agreed, by arbitration, brings out the facts and establishes justice. This is the only true and final settlement of any differences between men.

WORKMEN'S COMPENSATION LAWS

BY AUGUST BELMONT, CHAIRMAN DEPARTMENT ON COMPENSATION FOR INDUSTRIAL ACCIDENTS AND THEIR PREVENTION

The National Civic Federation has reason to congratulate itself upon the headway made toward securing the substitution of workmen's compensation for employers' liability laws. It has been pushing its educational propaganda on this subject since December, 1908, preceding the appointment of the first state commission—that of New York, which had for its purpose a study of the subject of employers' liability and work accidents. Since that time, other state commissions have come into existence and have reported with recommendations, in some instances the legislation having been enacted and in others the states having failed to act affirmatively. In some, new workmen's compensation commissions are now at work, while in several, such as Louisiana and Texas, commissions have been authorized, and in others the department of labor is taking the active part in preparing legislation and securing its introduction in the state legislatures. In seventeen states no action whatever has been taken, which leaves a wide field for our educational endeavors. In fifteen states workmen's compensation acts have been enacted, some elective and two providing for state insurance, all being in the experimental stage. Some are operating very satisfactorily, as, for example, in Michigan, where 90 per cent of the employers have elected to work under the act, and it has resulted in materially aiding our accident prevention work by stimulating employers to safeguard all dangerous places. We are watching with especial interest the state insurance plans of Ohio and Washington, which actuarial experts claim will not stand the test of time.

The Congressional commission, after exhaustive research and public hearings, adopted the underlying principles of the federation's model workmen's compensation act for its bill designed to provide an exclusive remedy and compensation for accidental injuries to railroad employees.

The federation is earnestly working for the adoption of that federal act, which has passed the Senate and is pending before the House judiciary committee, believing, if it is enacted into law and declared constitutional by the United States Supreme Court, that state legislation along the same line will be stimulated.

In Germany, as in this country, employers' liability laws preceded the movement for workmen's compensation, which, in its best form, represents a direct tax upon the industry. Germany had evils under the common law, which granted no compensation in the frequent cases where persons were killed or wounded, either by chance or through their own imprudence.

We in the Civic Federation are following the English system, where the adoption of the principle of workmen's compensation, succeeding again employers' liability laws, did not come until a much later date than in Germany—namely, in 1897. All other civilized countries to-day have adopted the principle of workmen's compensation. It has been said that, theoretically, it is unsound to require the employer to pay for industrial accidents when he is not at fault, but the old employers' liability system under which fault must be proved by the employee has been found in practical experience not to work satisfactorily. The states in this country having workmen's compensation acts of some character are: Arizona, California, Illinois, Kansas, Maryland, Massachusetts, Michigan, Nevada, New Hampshire, New Jersey, New York, Ohio, Rhode Island, Washington and Wisconsin.

While fifteen states have made a start toward securing just workmen's compensation laws, with forty-eight stars in our national emblem, the balance sheet indicates the pitiful fact that in the majority of our states the wage earners injured in industry are left still to the tender mercies of charity and to litigation through long-delayed damage suits. We, therefore, have remaining a social problem for earnest consideration.

Also unsolved still is the question as to how constitutionally there may be put upon the statute books compulsory workmen's compensation laws automatically bringing relief to all injured workmen and their dependents.

Thirty-eight states this year have legislative sessions and are looking toward the possibility of the enactment of the federal bill previously mentioned. Only two states—California and Ohio—have amended their constitutions to permit the passage of compulsory workmen's compensation laws.

In the meantime, the federation is circulating, as a temporary expedient, an elective workmen's compensation act, prepared especially for introduction in New York State, which represents the conclusions of proper committees in the federation's New York State council and national workmen's compensation department, after frequent conferences at which there were present employers, labor representatives and experts who have made a special study of the subject, and which has been indorsed by the national executive committee. It has been drafted in the light of experience and under conditions as they seem to obtain in various states, as far as this general question of compensation has gone. To those interested in framing elective legislation in other states, this draft is recommended as a useful guide. We have taken the schedule of rates as determined upon by the Pennsylvania commission, with some points from the federal bill, and we have adopted the plan satisfactorily put in operation in Michigan, for permitting a choice on the part of the employer between four plans for the payment of compensation, and, if insurance be made compulsory, that all forms allowed should be subject to equally strict state regulations without discrimination in favor of any one or more of the forms.

At the several conferences mentioned, both public and informal, representing all concerned, it has been unanimously agreed that there are three things essential to the interests of the workman:

(1) That the right to compensation and the amount of it for particular injuries or deaths be so definite as to leave as little room as possible for controversy or difference of opinion as to the injured workman's right to and amount of compensation.

(2) That the workman or his family be so protected in the making of their settlements after injury that advantage cannot be taken of them or an unjust or delayed settlement forced upon them.

(3) That the workman and his dependents be secured against the insolvency of the employer or other contingency, so that the payment of his compensation will be sure and certain.

Much must be said for the splendid work of some of the commissions, notably the one in the State of Pennsylvania, which has just issued a comprehensive report showing a careful study of the question, and the Connecticut commission, which has formulated a bill to be introduced in the Legislature at this session and which should have the earnest support of all. In Colorado, Delaware, Iowa, Minnesota, Missouri, Nebraska, North Dakota, Oregon and West Virginia commissions also are at work and have called upon us for assistance. California is preparing to introduce a compulsory act which is being formulated by its Industrial Accident Board. Wisconsin has its board, which is doing excellent work in educating employers in the matter of accident prevention, an effort being furthered also by the Board of Awards particularly of the State of Washington, and also of the State of Ohio.

Some of the greatest accident prevention work on the part of our states is being done by Illinois, Wisconsin and the State of Washington. In the two latter remarkable safety bulletins are being circulated throughout the states, to interest employers and workmen in accident prevention, there being instructions upon safeguarding devices, and in general how to prevent accidents.

Our model safety act committee, while believing that we have an excellent draft outline of a model safety law, has undertaken to secure suggestions to aid in developing and perfecting it.

We are co-operating with the American Bar Association and the Uniform State Law Commissioners in attempting to perfect our compulsory model workmen's compensation act, and we shall keep abreast of the times, ready to adjust ourselves to changing conditions.

Our earnest effort is to take into account the sentiment of the workmen in connection with having their compensation guaranteed.

State legislative commissions which have been at work are learning of the difficulties still in the way of passing a compulsory workmen's compensation act, except in California and Ohio, where recent amendment to the constitution will permit such legislation. Pennsylvania will undertake to amend its constitution and New York has already started in that direction.

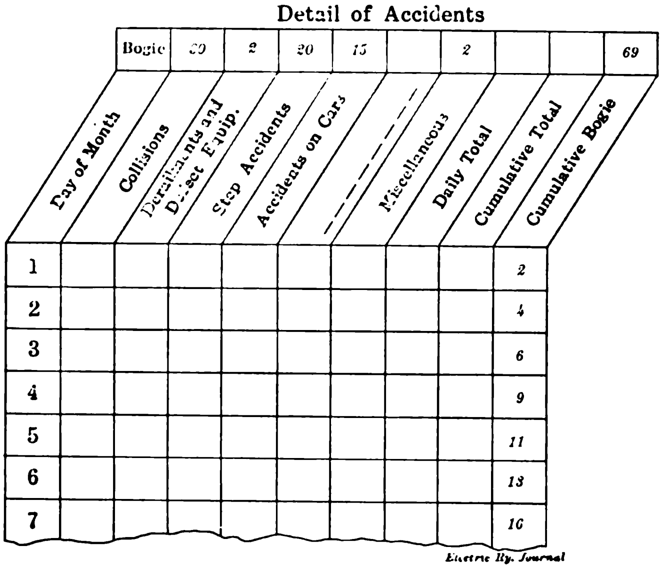
It is the preference of the National Civic Federation that, if possible, at some time compulsory workmen's compensation acts should be put on the statute books of the various states, believing that a law exclusive in its remedy and providing for automatic compensation of injured wage earners through the compulsory principle would be just, both to employee and employer.

OPERA AND CAR SERVICE

In a suit brought at New York last January by E. T. Stotesbury, of Philadelphia, to recover money given to Oscar Hammerstein, the noted operatic manager, the latter made an interesting statement which shows how even a luxury like grand opera is dependent upon the local electric railway service. Mr. Hammerstein testified that his Philadelphia opera house had been a profitable venture until the outbreak of the carmen's strike on the Philadelphia Rapid Transit Company. This strike began on Feb. 19, 1910, and was declared off on the following April 17. After the service had been crippled for a few weeks Mr. Hammerstein was obliged to close the opera house, owing to lack of patronage. The substance of his testimony on this point was that those who came to the opera in their own vehicles formed so small a percentage of the total that performances without good street railway transportation for patrons were financially impossible.

SAFETY WORK IN SEATTLE

The Puget Sound Traction & Light Company, one of the pioneers in the establishment of safety committees, has adopted a very ingenious method of stimulating interest in the work of safety and in the reduction of accidents on its lines. The idea of a central safety committee was broached about a year ago by the management of the company, and on Jan. 2, 1912, a notice was issued to all employees announcing the appointment of a central safety committee. This notice read as follows:


Detail of Accidents

Day of Month	Collisions	Derailments and Defect Equip.	Step Accidents	Accidents on Cars	— — —	Miscellaneous	Daily Total	Cumulative Total	Cumulative Bogie
Bogie	29	2	20	15		2			69
1									2
2									4
3									6
4									9
5									11
6									13
7									16

Electric Ry. Journal

Form of Table Used for Classifying Accidents on Cars from Jefferson Carhouse, September, 1912

NOTICE TO EMPLOYEES

"Seattle, Wash, Jan. 2, 1912.

"To All Employees:

"Accidents cost the company money and the public loss and pain and suffering. Our duty both to the public and to the company is to be vigilant in discovering and removing causes of accidents. While the present shows gratifying improvement over the past in the discovery and removal of causes of accidents and the lessening of the expense on account thereof, still by increased vigilance much further improvement can be made along the line of preventing accidents. For that reason it has been decided by our company to organize what are to be known as safety committees, the organization to consist of two kinds of committees. One which has already been organized is known as the central safety committee.

"The central safety committee is composed of the following: Mr. George Carson, general claim agent, chairman; Mr. A. L. Kempster, superintendent of railways; Mr. G. A. Richardson, superintendent of transportation; Mr. A. D. Campbell, superintendent of rolling stock and shops; Mr. W. S. Sallee, superintendent of ways and structures; Mr. G. E. Quinlan, operating superintendent, light and power department; Mr. G. B. Harrington, superintendent of mines; Mr. D. W. Henderson, superintendent of division No. 1; Mr. J. D. Nice, superintendent of division No. 2.

"The other committees it is proposed to organize are to be known as division safety committees, it being intended to organize a division safety committee at all six carhouses, the organization to be started at first at the North Seattle carhouse. It has been decided that this division safety committee shall be composed of the station master as chairman, one man from the substation, one man from the trolley line department, one man from the mechanical department and eight trainmen, making a total of twelve men. The personnel of this division safety committee will be announced at once and notice sent to the members, the selection having already been made.

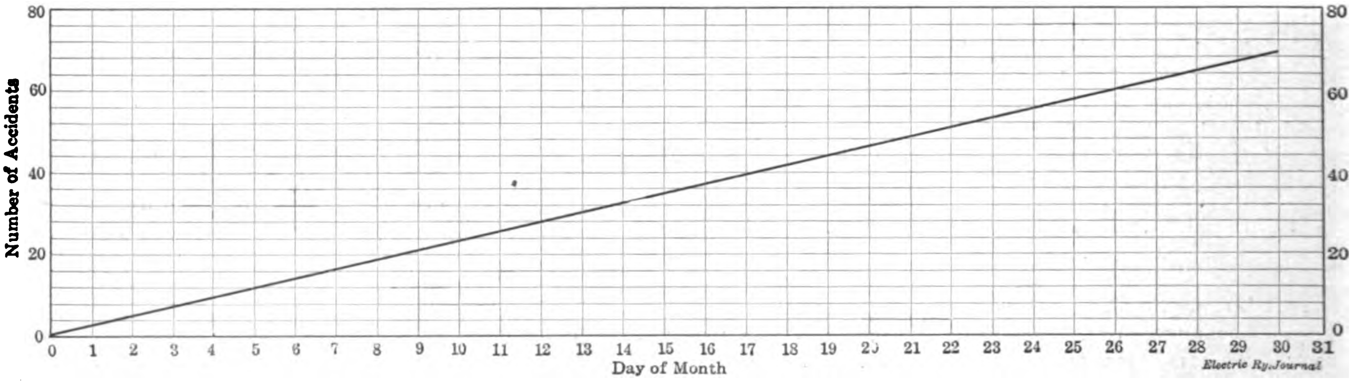
"The duties of the members of the division safety committee shall be as follows: To keep a continual lookout for anything that might cause or tend to cause accidents and, having discovered same, to report it promptly, on blanks that will be furnished, to the chairman of the division safety committee, whose duty it will be to forward such reports promptly to the chairman of the central safety committee, by whom they shall be at once forwarded to the head of the department concerned for action. When the matter reported has been acted upon, notice of action taken will be sent to the chairman of the division safety committee, who shall advise the member who made the original report of the action taken.

"The idea, as most of our men no doubt know, of men in the ranks reporting defects and causes of accidents is not a new one. It has been done in the past continually and great benefit has been derived therefrom. The organization of these committees is for the purpose of providing a channel through which not only members of the committees but all other employees can present, in a proper and orderly manner, suggestions and recommendations for greater safety and improvement in conditions and methods. The management has not only invited suggestions but has solicited them and is thereby afforded the benefit of ideas and observations of the men who actually do the work in the ranks.

"This, it is felt, will bring the officers of the company and the men closer together, something always very disirable.

"The following are suggestions of matters to be reported by members of the division safety committee: Defective cars, defective track, defective tools or machinery, defective platforms and landings, defective bridges and trestles, defective buildings, overhead defects, obstructions near the track where a passenger is liable to be hit, and all other matters that might tend to cause accidents. Of course, emergency matters and defects requiring immediate attention will continue to be reported as heretofore.

"One of the most important duties that members of the



Graphical Record of Accidents Bogie at Jefferson Carhouse for September, 1912 committee will be called upon to do is to watch the work of new men entering the service, or of the comparatively new men, and when such men are disposed to be negligent in operation, owing to excessive speed or failure to slow down as required by rules when passing cars, or rough handling of cars, either in stopping or starting, or other matters of similar nature, either through ignorance of the rules or other cause, it will be the duty of men on the committee to go to them in a friendly way and tell them about matters in connection with operation in which they are not proficient and matters about which they might be careless. Of course, if the man spoken to did not respond to the advice given him, it would become necessary to report the matter to the proper authority, and if a man should continue to be careless after sufficient warning had been given, it would become necessary to remove him from the service, as none of the men can afford to have a careless man among them.

"It has been decided that the time of service on division committees shall be six months, thus giving opportunity to a large number of men to serve within a year or two.

"It is the belief of the company that the men appointed on these committees will in the future largely recruit the vacancies occurring in higher positions, and also that service on these committees will tend to develop men to fill higher positions.

"It is intended that the division committees shall meet at least once each month, the company paying them for the time consumed in attendance at the meetings, and also that meetings shall be held between the division committees and the central committee at times to be decided upon, for the purpose of discussing matters of interest in the prevention of accidents.

"It is also believed that this organization, in the bringing together of the officers and employees of the company in this intimate way, will result in more friendly and closer relations between them; that conditions will improve and accidents will be greatly reduced, and that we shall secure what everybody desires, namely, greater safety and less accident expense."

The work of this safety committee was briefly described in the report of the committee on safety leagues read before the American Electric Railway Claim Agents' Association at Chicago last month by George Carson, claim agent of the company and chairman of the committee. This report was published on page 809 of the Electric Railway Journal for Oct. 11, 1912.

One of the plans followed by the committee is to compile records of accidents on the lines operating from each carhouse and establish a "bogie" for future months. To determine the bogie in the first place the safety committee took the records of accidents for each carhouse for the preceding five months and selected the month which was most free from accidents. The accidents were then classified in the following divisions:

(1) Collisions; collisions between cars, collisions with vehicles, collisions with persons and animals.

(2) Derailments; split switches and other derailments, defective car, slot or track.

(3) Step accidents; boarding or alighting from moving cars, boarding or alighting from stationary cars.

(4) Accidents on cars; passengers injured on cars from motion of cars, ejections, disputes, clothing damage.

(5) Miscellaneous; not covered in other classifications.

Each division was then urged to keep its accidents down to bogie.

At first the plan was admittedly an experiment, but it was found at the end of the first month that the different carhouses finished very near their bogie lines. The same bogie was then continued for another month, and at the end of that time all of the carhouses had finished slightly below the standard set. The committee then established new bogie lines, having for their bases the better records made during the previous month. This plan has been continued. The records obtained for each month are posted in the carhouses in both numerical and graphical form. Both forms are shown in the accompanying illustrations. The records for each carhouse are kept by the station master, and if there should be any error in tabulation the trainmen are sure to notice it and to bring it to the attention of the station master. The adoption of the bogie for the different lines is in the hands of a sub-committee of the safety committee, consisting of the division superintendent, a member from the claim department and a member of the safety committee.

The company is considering the possibility of awarding a trophy to the carhouse making the best showing during a specified time. This has not been definitely decided.

KEEPING TRACK OF FEEDERS

BY G. H. M'KELWAY, ENGINEER OF DISTRIBUTION, BROOKLYN RAPID TRANSIT SYSTEM

The drawing of maps showing the routes and locations of all feeders leaving the power station, with data as to their size, taps, etc., is not part of the work of the engineering force of the small railway, if there should be such a force, because there the number of the wires is so small that anyone can easily learn and remember all about them.

But as the original single line grows into a system of lines the matter grows in importance. Not only are there more feeders to remember, but the men working on them are not able to become so familiar with them as on the little line, and the men of one division will have very little or no first-hand knowledge of the wiring on another portion of the system. With the larger systems taking in one or more cities where underground as well as overhead construction will be needed, the subdivision of the work will become even greater, as different gangs will be employed on the two classes of work. While on these large systems the linemen may never have to work in any sections but their own, yet there is often a great advantage in being able to call a neighboring crew to the assistance of one with more work in its section than it can handle alone and, at any rate, the engineers need all of the information possible in regard to the wiring layout on all portions of the system. Therefore more or less elaborate and efficient methods for keeping track of the data are often introduced.

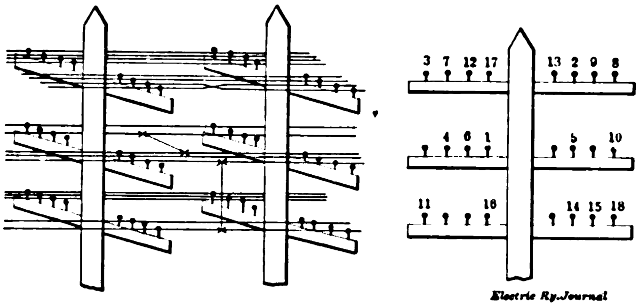


Fig. 1—Method of Recording Overhead Wires

In keeping track of the feeders themselves, there are two general methods. One is by drawing sections of the line at all places where the layout changes and representing on a map the pole or conduit line by a single line. In the other a line is drawn on the map for each wire, and these lines are placed in relation to each other to show the location of the wires or cables on the arms or in the conduits.

The four illustrations give an idea of how the different classes of records may be kept. In Fig. 1 the map is merely a succession of drawings of pole heads either connected by the wires or with the numbers of the feeders placed at the pins instead of a drawing showing the connections between the poles.

In Fig. 2 a similar plan to be used with underground cables is shown. Here a section of the ducts is given, and the number of each cable is placed in its proper duct. In order that there may be no confusion as to whether the section shown is on one side of the manhole in question or on the other, the bottom line of the ducts is extended out at the sides. Therefore the person looking at the section will always easily know which is the bottom. Such sections need only be made for those holes in which the cable layout changes, and in that case the number of the manhole is placed beside the section.

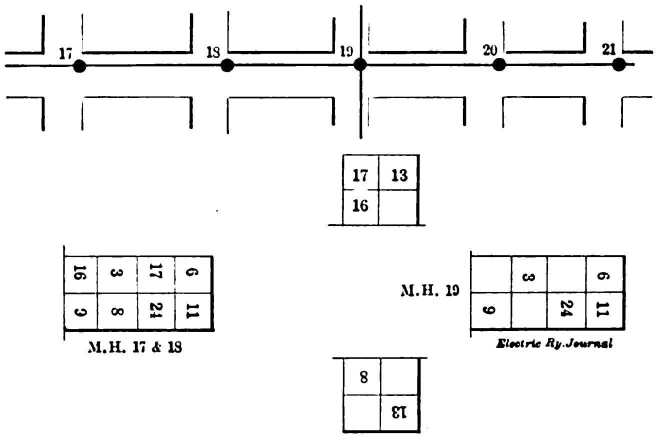


Fig. 2—Method of Recording Underground Cables

Fig. 3 and Fig. 4 give the same layouts as Fig. 1 and Fig. 2, but here the wires are shown as lines and their spacing gives their location upon the poles or in the ducts. The methods for the overhead and underground cables are not exactly the same, for in the first instance a sort of bird's-eye view is taken of the wires and those on the lower arms are placed outside of the upper, although the two sides of the pole are kept separate. When the cables in the ducts are shown, each layer is given separately, but no attempt is made to show on which side of the center line the cables are placed except as this can be seen by their positions in the layers.

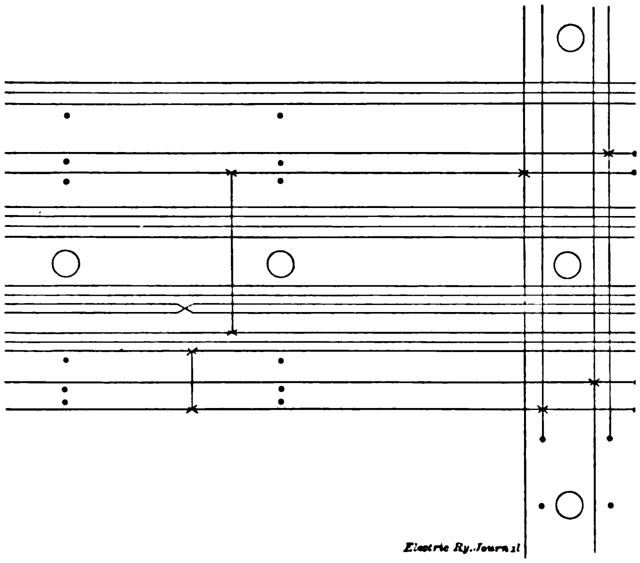


Fig. 3—Diagrammatic Scheme for Layout Shown in Fig 1

In order to understand the relationship between the feeders and the lines fed by them it is well, in the case of direct-current feeders connecting with the trolley wires, to show the trolley wires with the section insulators and insulated crossings on the same map as the feeders. Where the maps are drawn on tracing cloth so that a number of persons can be supplied with blueprints of them, it is well to draw the trolley wire in red or use a dotted line for it, so that in either case it can be distinguished from the feeders, and to show the insulated crossings and circuit breakers at their proper locations. A common symbol for an insulated crossing is a cross with the ends of the arms enlarged, while a diamond is often used to represent a circuit breaker.

If only two sizes of wire are used, it is easy to differentiate between them by using a heavy line for one size and a light one for the other. There is danger of mistake, however, if this plan should be tried with more than two sizes, and in such a case it will be found to be best to mark the size of the wire where it can be easily seen.

There is also another way of keeping track of the wires by giving each pin on each arm, or each duct, a number and then making out tables for different portions of the line. These tables should have two columns, one for the name or number of the feeder and the other for the number of the pin or duct which it occupies. This plan, however, is only to be recommended in special cases such as at power stations or similar locations which can be accurately described. Even there it has no advantage over the others, and for general work is much inferior to them.

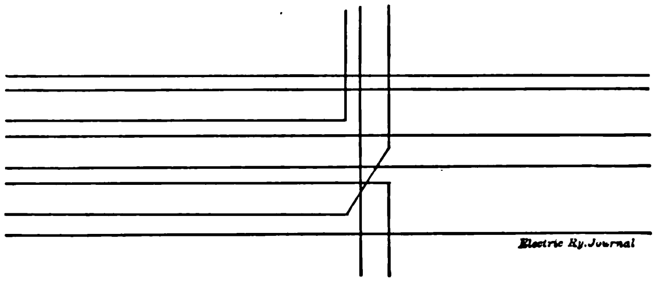


Fig. 4—Diagrammatic Scheme for Layout Shown in Fig. 2

It will be found that the system of lines is best adapted to overhead feeders, while the use of the sections will be found preferable with underground cables. While the ordinary blueprint is often very much of a puzzle to the man with no technical education or shop experience, yet the feeder prints described above are so simple that any man of ordinary intelligence will have very little difficulty with them after they have once been explained to him.

MEXICAN HYDROELECTRIC DEVELOPMENT

Work on the hydroelectric system of the Mexican Northern Power Company on the Conchos River, about 17 miles from Santa Rosalia, Mexico, which was held up for a time owing to the activities of the rebels in that section of the country, is again under way, and it is expected that the project will be finished about July 1, 1913. The Mexican Northern Power Company is a Canadian concern, with its principal office in Montreal, and, in additioin to furnishing energy to a subsidiary company, the Mexican Securities Corporation, Ltd., of Halifax, Nova Scotia, it will build transmission lines to Chihuahua, Parral, Jiminez and other cities, besides carrying on a central-station business in each of those cities on its own account. The dam now nearing completion at La Quoila is stated to be one of the largest masonry structures in the world. Its height will be 261 ft. and its width at the crest 19 ft., the width of the bottom being 200 ft. The reservoir it will create will have a storage capacity of about 28,000,000,000 cu. m, which will flood an area of 58 sq. miles. Besides this main dam a subsidiary dam 2610 ft. long and 108 ft. high is being built about half a mile from the main dam.

The hydroelectric station, it is stated, will have a rating of more than 100,000 hp. The company has also in contemplation the irrigation of 200,000 acres of land in the valley of the Conchos River. Messrs. S. Pearson & Son of London, Eng., are the contractors for the enterprise. Mr. P. L Bloston is the general superintendent, and Mr. William B. Buller is chief engineer of the work.

CO-OPERATIVE BUYING FOR THE EMPLOYEES OF THE INTERBOROUGH RAPID TRANSIT COMPANY AND NEW YORK RAILWAYS COMPANY

The managements of the Interborough Rapid Transit Company and New York Railways Company, having come to the conclusion that a great deal of benefit would accrue to their employees if the latter made use of their combined purchasing power, are taking active steps toward the organization of a co-operative depot for the purpose of procuring foodstuffs at cost to employees.

The first announcement of this plan was made by T. P. Shonts, president of each company, at the recent ball of the New York Railways Association, and his outline of the plan was very favorably received by the employees at that time.

However, in order to determine positively the sentiment of the men, a bulletin was issued on Jan. 24, by Frank Hedley, vice-president and general manager, explaining the plan and giving an outline of what the companies proposed to do in order to establish it. This bulletin is published below:

"The officers of this company have for some time past carefully reviewed and considered the purchasing power of the wages of this company's employees for procuring the necessary supplies such as meats, groceries, vegetables, etc., and to determine how much these commodities, if furnished to our employees for the actual cost, would reduce the present high cost of living.

"We have determined that a sure way of reducing the cost of living is for the company to procure for its employees and their families the eatable stuffs necessary, and this at the actual cost to the company.

"In order that the company may get a direct expression from the men regarding the operation of stores of this character upon the properties of the company, each employee is requested to vote 'yes' or 'no.' The company does not desire to open the store if the employees do not want it, but, if enough of the employees do feel that they would like to see the experiment tried, the company will be glad to undertake it. A vote of all the employees will be taken at the various carhouses of the company on Jan. 30, 1913, between the hours of 8 a. m. and 6 p. m., and each employee, upon presentation of his pass or identification card, will be entitled to cast one ballot either for or against the proposed plan. No names will be signed to the ballots, and each man may feel free to express his own views with the knowledge that no one can tell how he voted.

"Each employee should fully understand that he is absolutely free to patronize the store or not to patronize it."

On January 30 a vote of all the employees of each company was taken, each man being provided with an employee's ballot in the form shown herewith. On the ballot were submitted two questions, one regarding the desirability of the plan and one regarding the family of the voter, so that the company could distinguish between the votes of married men or those who had others dependent upon them and the votes of single men and that proper weight might be given to the wishes of the former class. The vote was taken on January 30 on account of the fact that this was the regular company pay day, when practically all of the employees reported at the various offices of the company.

NEW YORK RAILWAYS COMPANY

EMPLOYEE'S BALLOT

Do you desire that this company open a store for the purpose of procuring for its employees at actual cost, meats, groceries and vegetables, in accordance with Notice No. 24, dated Jan. 24, 1913?

Answer————————
(Please answer "Yes" or "No.")

To further aid the company in deciding this matter, please state whether you have any person or persons directly dependent upon you so that it would be for your interest to take advantage of this opportunity of procuring provisions cheaply.

Answer————————
(Please answer "Yes" or "No.")

The result of the vote was overwhelmingly in favor of the plan, and in consequence the officials will proceed at once to modify the carhouse of the New York Railways Company at Fiftieth Street and Eighth Avenue so that part of it can be utilized for the co-operative store, which will naturally have to be extensively equipped with refrigerators, counters, storerooms and the like. This location was selected on account of its central position on the lines of the Interborough Rapid Transit Company and New York Railways Company, and if the demand for supplies at this point warrants the extension of the system, other depots will be located as soon as possible at each one of the various carhouses or shops of the companies near where large numbers of the employees have their homes.

It is planned to carry in these depots all classes of foodstuffs which are not of an extremely perishable character. Staple groceries, meats and the less perishable vegetables, such as potatoes, turnips, carrots, etc., which do not spoil quickly will be carried in several different grades and at several different prices so that the employees will have an opportunity for a wide choice. Canned goods will also be carried to some extent, depending largely upon the demand for them.

All purchases are to be made through the purchasing departments of the companies. On account of the very thorough organization of these departments they will be in position to obtain for the distributing depot the best prices in the market, and this fact, together with the advantage that supplies for a large number of persons will be regularly purchased, will manifestly effect very material savings. Approximately 20,000 employees will be in position to take advantage of this opportunity, 7000 of them being on the line of the New York Railways Company and 13,000 on the elevated and subway lines of New York. No profit of any kind is to be charged by the company, and in fact not even overhead charges are to be entered against the new department. The direct labor of handling material in each depot will, of course, be charged against the new department in its books, but no further charges will be entered aside from the exact cost of the materials purchased.

Purchases will be made at present in the open market from wholesale dealers, and, in fact, wherever possible they will be made direct from the producer, thus absolutely eliminating the profits of the middleman.

All sales will be made on a cash basis, as the employees are paid in cash every week. No accounts of any kind will be carried in order to reduce the system to the most simple possible basis. No delivery system will be inaugurated and the employees or their representatives will be required to call for goods in person. While this arrangement will undoubtedly limit the patronage at the depot which will first be installed, at Fiftieth Street, it is not expected to affect the patronage when the system of depots is extended to include all the various points around which the employees' homes are grouped.

It is planned at present to permit any member of the family of any employee to make use of the depot, although the plan by which this is to be worked out without opening the way for imposition on the part of the general public has not yet been decided on. The companies are not intending to go into the grocery business in any sense of the word, nor do they intend to come into competition in any way with the existing stores in regular trade, with the possibility of destroying such businesses. The companies do feel, on the other hand, that a very material reduction in the cost of living can be made for their employees by the simple process of organizing their enormous buying power, and this plan is to be carried out in the manner just described.

CONCLUDING SESSIONS OF WOOD PRESERVERS' ASSOCIATION

An account was published in the last issue of this paper of the meeting on the morning of Jan. 22 of the American Wood Preservers' Association. The Wednesday forenoon session of the association was confined largely to subjects of interest to operators of timber-treating plants. The first paper on the program was that by R. S. Belcher, Atchison, Topeka & Santa Fé Railroad, Somerville, Tex., entitled "Some Experimental Treatments with Reference to the Effect of Initial Air Pressure on Penetration of Creosote." In the discussion which followed it was shown that penetration was better with initial air pressure than without it. It was also brought out that the pressure must vary with the timber, some kinds of wood requiring greater pressure than others to obtain the same quality of penetration.

The next paper on the program was that by Dr. Hermann von Schrenk on "The Requirements for Successful Timber Treatment." This paper was published in abstract last week. In the discussion which followed J. H. Waterman, superintendent timber preservation Chicago, Burlington & Quincy Railroad, Galesburg, Ill., emphasized the importance of treating only sound timber and that which had been properly prepared for treatment. He said that it was important that the timber should be in proper condition before treatment if the maximum results were to be obtained. He stated that the success of the industry depends upon the quality of the treated timber and the length of service it will give. The members of the association discussed briefly the advisability of drafting a resolution urging the members to refuse to treat timber which had not been properly seasoned or prepared for treatment and decided to refer the question to the resolutions committee.

The paper by David Allerton on "The Preliminary Treatment of Timber to Insure a More Even and Satisfactory Impregnation with Creosote" was the next on the program. This paper dealt largely with treating-plant conditions and the discussion was brief. A paper by George W. Saums on "The Treatment and Care of Floors" was also read and briefly discussed.

Following the reading of J. H. Waterman's paper on "Preservation of Lumber for Car Construction," published in abstract last week, the discussion was along the lines of the methods to employ to secure the best result. It was urged that the empty cell process be used instead of the full cell as the treated timber would be in better condition to handle. The question then arose as to the determination of the life of the timber to be used—whether it depended on decay or mechanical wear. If the latter was the more detrimental, it was deemed wise to use zinc chloride wherever possible when it would give sufficient life in service to last during the mechanical life of the timber.

Another paper on the program for the Wednesday morning session was on "Sap in Relation to Properties of Wood," by S. J. Record, assistant in the School of Forestry at Yale. In summing up his paper he showed that winter-cut timber was better than summer-cut, not because the sap was down but because the winter-cut timber seasoned more slowly and as a result did not check so badly. He also said that winter-cut timber would withstand decay longer than summer-cut, because the fungi were not so active at that time and the condition of the sap was such as to prevent their growth.

The last two papers were those by L. B. Moses, manager tie and timber department of the Kettle River Company, St. Louis, on "The Mutual Interests of Railroads and Commercial Companies in the Work of the Association," and by W. F. Goltra, president of the W. F. Goltra Tie Company, Cleveland, Ohio, on "The History of Wood Preservation."

Wednesday afternoon's session included subjects covering the preparation and handling of ties, timber, piling and poles at the treating plants. The first paper was that by W. W. Eldridge, piece-work inspector Chicago, Burlington & Quincy Railroad, Aurora, Ill., entitled "The Piece-Work or Unit System of Handling Ties and Timbers." He described how the piece-work system had been worked out on his road and the results he had obtained from its use. His experience indicated that the piece-work system was much cheaper and more efficient than the day-rate basis.

F. M. Bond, in charge of wood preservation at the Forest Products Laboratory, Madison, Wis., presented the next paper, entitled "Some Tests to Determine the Effect Upon Absorption and Penetration of Mixing Tar with Creosote." Because of the length of time required to make each test and the fact that insufficient time had been allotted to prepare the data, the results obtained were not conclusive. The purpose of the paper, however, was to start discussion so that the method and results obtained up to this time could be criticised and the future tests benefit as a result.

C. P. Winslow, engineer wood preservation Forest Products Laboratory, Madison, Wis., read his paper, entitled "The Transmission of Air Pressure in Cross Ties." The tests included ties made from red oak, soft maple, hemlock and Douglas fir. Ties were procured from steam roads and were selected with a view to obtaining ties showing the minimum amount of seasoning checks. As the title would indicate, the purpose of the tests was to determine how quickly the maximum vacuum or pressure could be created in the interior of a tie as in the tank. The relative merits of the wood used as determined by the tests were as follows: red oak, soft maple, hemlock and Douglas fir. The Douglas fir fell considerably below the other three in both the pressure and vacuum tests, while the red oak practically equaled the tank pressure and vacuum in all tests. The results obtained, in the author's opinion, were not conclusive but indicated to a limited extent what might be expected from an exhaustive study of this subject. In summing up he said that the tests indicated that the time required to get the maximum result inside the timber varied inversely as the pressure, and that the time required to permeate certain wood could be greatly reduced if the pressure was increased.

As the time was growing short, the discussions on the next papers in order were brief. These papers were as follows: "Adzing and Boring Ties and the Cost of Installing Plants of This Kind," by J. A. Lounsbury, vice-president Greenlee Brothers & Company, Chicago; "Natural and Artificial Seasoning of Douglas Fir for Treatment," by F. D. Beal, St. Helen's Creosoting Company, Portland, Ore.; "The Treatment of Douglas Fir with Creosote," by G. A. Coleman, Coleman Creosoting Works, Seattle, Wash.; "Efficient Handling of Ties and Materials at Treating Plants and Efficient Handling of Ties for Seasoning," by A. M. Smith, superintendent Ayer & Lord Tie Company, Argenta, Ark., and "Preparing Timber for Treatment in the Gulf States," by R. L. Allardyce, superintendent International Creosoting & Construction Company, Texarkana, Tex.

The sessions of the association held Thursday, Jan. 23, were spent in discussing the merits of wood block paving as well as the methods of manufacture. The program included the following papers: "How Nearly Does the Modern Yellow Pine Block Pavement Approach the Ideal Pavement and What Improvement Can We Suggest?" by H. L. Collier, engineer Yellow Pine Manufacturers' Association, St. Louis, Mo.; "Timber for Creosoted Block Paving," by H. E. Davis, promoter Creosoted Wood Paving Block Association, Chicago, and "Laying Wood Block Pavement," by H. S. Loud, chief engineer United States Wood Preserving Company, New York. J. E. Rhodes, secretary-manager of the National Lumber Manufacturers' Association, and George K. Smith, secretary Yellow Pine Manufacturers' Association, gave brief talks concerning the relation of the lumber industry to the Wood Preservers' Association and urged co-operation between all in the interests of the whole industry.

At the business session held Thursday afternoon resolutions were adopted protesting against the placing of creosote on the 10 per cent import duty list. Upon motion it was decided to send a copy of these resolutions to every Congressman, and it was urged that each member take up the question personally with the Congressman for his district. A committee was also appointed to wait on the ways and means committee of the House of Representatives for the purpose of offering personal protest. Resolutions were adopted approving the existing plan of controlling forest reserve and urging a continuation of federal control. The association also passed a resolution indorsing the methods employed by the United States Forest Service and another resolution complimenting the American Forestry Association on its work pertaining to conservation.

Probably one of the most important actions taken by the association at this session was one protesting vigorously against specifications requiring the treatment of timber which is not sound or properly seasoned or where a preservative of first quality or the proper amount of impregnation is not called for.

Up to this time the work of the association has been handled by individuals, the members being requested by the program committee to discuss certain subjects at the annual convention. This method has not been entirely satisfactory, and it was decided at this convention that a committee should be appointed to report its recommendations as to a standard committee organization. The committee's report recommended an organization similar to the American Railway Engineering Association and advised the appointing of five standing committees. These recommendations were briefly discussed and adopted.

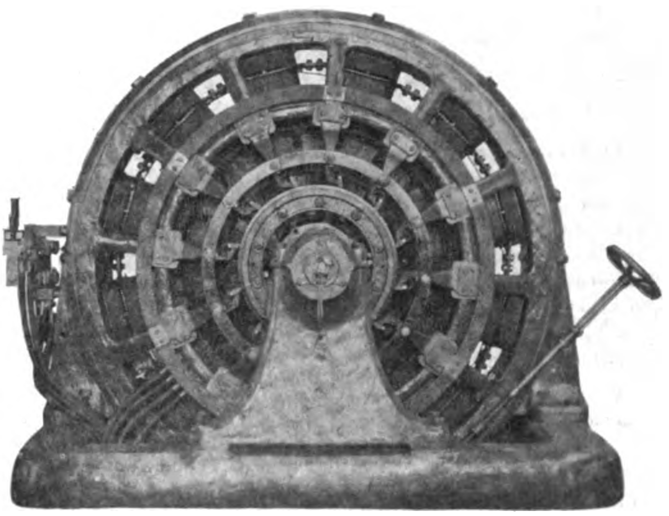
As a token of appreciation of the work done for the association, Howard F. Weiss, director Forest Products Laboratory, Madison, Wis., and C. W. Berry, superintendent treating plant Union Pacific Railroad, Laramie, Wyo., one of the organizers of the association, were elected to honorary membership. At the conclusion of this session it was decided that the next annual meeting would be held at New Orleans, and the following officers were elected for the ensuing year: A. E. Larkin, manager Republic Creosoting Company, Minneapolis, Minn., president; J. H. Waterman, superintendent timber preservation Chicago, Burlington & Quincy Railroad, Galesburg, Ill., first vice-president; E. B. Fulks, chemist American Creosoting Company, Chicago, second vice-president; G. E. Rex, manager treating plant Atchison, Topeka & Santa Fé Railway, Topeka, Kan., third vice-president, and F. J. Angier, superintendent timber preservation Baltimore & Ohio Railroad, Baltimore, Md., secretary and treasurer.

TWELVE-POLE, 1,000 KW, SIXTY-CYCLE ROTARY CONVERTERS

The Housatonic Power Company operates at its substation No. 1 at Waterbury, Conn., two 1000-kw, sixty-cycle rotary converters of non-commutating-pole design, which are especially notable for the small number of poles for their capacity and frequency. Compared with previous designs, the number of poles has been reduced from twenty to twelve and the speed raised from 360 r.p.m. to 600 r.p.m. These machines have now been in service for about one year, and so far they are reported to be showing excellent commutation and efficiency on the fluctuating loads common to electric railway service.

These 1000-kw rotary converters are six-phase machines and operate in parallel with four 500-kw sixty-cycle, six-phase converters previously installed in the same station, all of the apparatus being of General Electric Company manufacture. They supply power for the traction system of the Connecticut Company in Waterbury. Three-phase current of a potential of 33,000 volts is received from the main power station of the Housatonic Power Company and transformed by six 350-kva oil-cooled transformers to 430 volts. The rotaries are started from the a. c. side only and deliver direct current at 600 volts. The transformers have two 2½ per cent full capacity taps below 33,000 volts and two 2½ per cent full capacity taps above 33,000 volts in the primary and one-third and two-thirds voltage starting taps in the secondary. They are designed with 15 per cent inherent reactance. The rotaries are compound-wound and are built for standard carrying capacities of 150 per cent load for two hours or 200 per cent load momentarily.

The brushes employed on the collector rings are of the "Metite" type, recently brought out by the General Electric Company, and are made by combining fine copper and graphite with suitable binders. They look like solid copper, are self-lubricating and are designed to eliminate all cutting of the collector rings and the frequent cleaning which is necessary with the copper-leaf brush.



D. C. End of 1000-kw Rotary Converter

The side of the frame carries a four-pole, double-throw field break-up switch for the shunt field. This opens up the field in several places to reduce the strain on the insulation caused by the high potential induced in the fields during a. c. starting and also provides a means of obtaining the proper polarity. The normal operating position of the switch is up. The down position is used for reversing the polarity of the machine when it comes up wrong from a. c. starting. A single-pole, single-throw equalizer switch and a double-pole, single-throw negative switch are also mounted on the magnet frame.

As previously stated, these six-phase diametrically connected machines are started from the a. c. side only. Alternating current is applied direct to the armature winding at a reduced voltage obtained from the one-third and two-thirds voltage taps on the low-tension side of the transformers. After the machines have reached synchronous speed, the right polarity has been obtained and the fields have been excited on the first starting tap, two-thirds and then normal voltage is applied.

Electric railway companies should not forget that they are obliged by federal law to file returns of their financial operations with the commissioner of internal revenue on or before March 1. Corporations which have not received blanks can obtain them by application to the collector of internal revenue of their district.

LONDON LETTER

(From Our Regular Correspondent)

St. Paul's Cathedral is once more very much in evidence in circles interested in the development of tramways in London. A few years ago it was proposed to construct a large sewer in the vicinity of St. Paul's, but the newspapers succeeded in having the route of this sewer diverted. It was successfully contended that the subsoil might easily be drained by the construction of underground work in the vicinity and the foundations of the cathedral be thus endangered. The same complaints are now being made about the construction of a tramway across the new St. Paul's Bridge and an underground subway close to the eastern walls of the cathedral. Sir Francis Fox has presented a report to the Dean and Chapter in which he declares that the construction of a subway in the vicinity of the cathedral would be fatal to the safety of the structure. In the meantime the parliamentary committee of the London County Council has deferred coming to a decision as to this subway, and it is stated that the whole question of danger to St. Paul's arising from vibration is to be privately inquired into by the Home Office, as the present heavy motor omnibuses and other heavy mechanically propelled vehicles also contribute to this danger.

It has been decided by the London County Council to replace two of the 5000-hp. reciprocating engines in the tramway power house at Greenwich with two turbines of 11,000 hp each. The two new turbines and their accessories will cost £128,000. It is only six and a half years since the reciprocating engines were installed. The Glasgow Corporation has already installed several turbines of as large sizes as were available at the time of ordering, and the Corporation there now has under consideration plans to install two additional turbines of 7500-kw capacity. Howden & Company, Glasgow, have already supplied the Manchester Corporation with turbines of 6000 kw and 7500 kw respectively, and are building for the same client an exhaust steam turbine of 5000 kw, said to be the largest turbine of this kind built in the United Kingdom. The same makers are also building a 15,000-kw turbine for the Manchester Corporation.

The London County Council is making serious efforts to meet the keen and growing competition of the motor omnibuses by reducing fares and extending the system of return tickets which was recently introduced. For journeys for which the ordinary fare is 2d. or more the return fare is 1d. less as compared with the cost of a single ticket each way. For the forty weeks of the financial year to Jan. 1 the decrease in tramway receipts totaled £82,820 on an aggregate of £1,664,410. While the receipts of the tramways steadily decline, those of the underground railways and the buses continue to increase. New routes are continually being opened by the motor buses, and these vehicles, numbering about 4000, are now running on practically every highway in London.

The tramways department of the Liverpool Corporation has begun public trials with new types of electric cars. The new cars, of which there are two types, were designed by C. W. Mallins, the general manager. The aim has been to avoid the delay which occurs at present owing to the fact that passengers entering and leaving the cars have to use the same platform, the same entrance and exit to and from the lower level and the same staircase for the upper floor. In the new cars a double stairway has been adopted. In one case, also, there are two gateways, and in the other three, so that the passengers who are leaving are separated from those who desire to enter. On the small car the platforms and doors are in the usual place, at either end, but the platforms have been made longer. On the larger bogie-truck cars the platform is placed in the center, is entered from the left side only and is divided into three parts, by barriers and gates which are controlled by the conductor. There are three gateways opening on to the street, and passengers entering by the middle one have a clear passage to either half of the lower deck or upstairs by the stairway which is reserved for them. Passengers leave the car on either side of this entrance and have a clear passage whether from upstairs or down. The tramways department has also been running lately a motor bus which, for Liverpool, at any rate, is of a new type. Motor buses have been running for some years between Liverpool and Woolton, but the old type, run by petrol alone, was not satisfactory. They are now being replaced by electric-petrol buses of 40 hp, in which the internal-combustion engine drives a dynamo which supplies current to the motors.

In connection with the proposed absorption of the City & South London Railway by the London Electric Railways, both companies have deposited bills in Parliament asking for power to carry out the project and for permission to carry out the construction work necessary to establish a physical connection between the two systems. The London Electric Railways desires power to construct about 1¼ miles of new tube railway to connect the present terminus of the City & South London line at Euston with the Hampstead branch and the Highgate branch of the Charing Cross, Euston & Hampstead Railway near the point of junction of these branches at Camden Town. The company also proposes to increase its capital to provide funds to cover the cost of the extension. On the other hand, the City & South London Railway is applying for power to enlarge the tunnels throughout the whole length of its line from Euston to Clapham, a distance of 7½ miles. As the carrying out of the work may possibly necessitate temporary suspensions of traffic or the temporary closing of stations, the company seeks to be absolved in that event from liability. It is also applying for authority to issue additional stock to provide funds to carry out this work. The company will also ask for permission to sell its existing rolling stock, which will be out of date on the reconstructed line, and to apply the proceeds to the purchase of new rolling stock and the re-equipment of its railway and shops.

The Great Northern, Piccadilly & Brompton Railway is experimenting with a new type of car by which it hopes to load and unload passengers with less delay than at present. For some weeks the company has been experimenting with systems of center doorways. Three types have been tried, of which the most successful has been a double swing door. In addition to the end doors there are doors in the center of each side of the cars, and in place of sliding open as is the case on the Metropolitan and the District Railways, which also use cars with center doors, the doors of the new cars of the Great Northern, Piccadilly & Brompton Railway open inward. The doors are under the control of the conductor from his platform, and there is no danger of the train starting while passengers are in the act of boarding or alighting, as each doorway is connected with electric lights on the conductor's platform and in the driver's cab, which flash according to whether the doors are bolted or unbolted. In the event of the Piccadilly tube adopting the system for the cars of its trains, the Bakerloo and the Hampstead & Highgate lines would probably adopt similar cars.

The Metropolitan Underground Railway has been celebrating its jubilee. This railway was opened in January, 1863, with 3½ miles of line extending from Bishop's Road to Farringdon Street. Fifty years ago 134 trains passed through the Baker Street station of this railway each weekday, whereas to-day the number is officially given as 1436.

The annual report of Arthur Ellis, manager of the Cardiff Corporation Tramways, is particularly interesting this year in view of the fact that the Corporation intends to promote a bill in Parliament to take other areas within its boundaries. Mr. Ellis suggests that powers be sought to deal with possible extensions of the tramway system, so that it will be unnecessary to promote a special bill in Parliament for this purpose later on. He favors obtaining power to run trolley omnibuses or petrol electric buses in the outlying sections. He maintains that the self-contained vehicle would be useful to ascertain what traffic would be obtained from any particular district before permanently installing a trolley omnibus system or a tramway. After being satisfied that there was sufficient traffic to warrant the necessary expenditure, the self-contained vehicle could be moved to some other district with the same object. On the general question of traction, Mr. Ellis maintains that practical experience during the past two or three years has shown that the trolley omnibus has great advantages.

A. C. S.

News of Electric Railways

Final Hearings on New York Subway Contract Forms

Final hearings on the forms of contracts for the proposed New York subways under the dual system of rapid transit were held by the Public Service Commission for the First District during the week ended Jan. 25, 1913. The commission is now considering various amendments to the contracts proposed at these hearings, and after adopting or rejecting such amendments will put the contracts in final form and transmit them to the Board of Estimate and Apportionment for approval. These contracts are to be made with the Interborough Rapid Transit Company and the New York Municipal Railway Corporation (Brooklyn Rapid Transit) for the operation by those companies of the new system and for a contribution by each company toward the cost of construction. The new system will represent an outlay by the city of New York and the companies in excess of $300,000,000 and will provide the city with a rapid transit system containing 630 miles of single track road, as against 296 miles of existing lines.

The Public Service Commission for the First District has called for bids, to be opened on Feb. 7 at noon, for the construction of Section No. 3 of the Woodside, Astoria and Corona rapid transit railroad. This section embraces what is known as the Corona branch, running from the Queens end of the Queensboro Bridge along Queens Boulevard, Greenpoint Avenue and Roosevelt Avenue to Sycamore Avenue, Corona. This road will be a two-track and three-track elevated railroad, owned by the city of New York and operated jointly by the Interborough Rapid Transit and the Brooklyn Rapid Transit companies. In that portion running through Queens Boulevard, which the city intends to make a wide and handsome thoroughfare, the structure will be of reinforced concrete of ornamental design. It is estimated that the road can be built within eighteen months. Bids for the construction of Section No. 2, the branch from the Queensboro Bridge to Ditmars Avenue, Astoria, also an elevated railroad, will be opened on Jan. 28. This branch also will be owned by the city and operated jointly by the companies previously mentioned.

Peter Witt and W. R. Hopkins Discuss Cleveland's Problem

Peter Witt, street railway commissioner of Cleveland, and W. R. Hopkins, president of the Cleveland Underground Rapid Transit Company, discussed the subject "The Street Transportation Problem in Cleveland" before the members of the City Club at the Hollenden Hotel, Cleveland, on Jan. 25. Mr. Hopkins said that subways will take care of the long hauls and leave the short hauls to the surface cars. In this way the company which operates the surface cars will be able to do so at a fare of 3 cents. Work on the subway lines in Cleveland will be begun at the earliest possible moment. The company which he represents would be willing to take over the suburban business from the Cleveland Railway if that was thought advisable, but he doubted whether East Cleveland would be willing to give up the surface lines even for the advantages of rapid transit. Hope had been given up of operating rapid transit cars over the Nickel Plate line west when it was decided to build a high-level bridge.

Mr. Witt asserted that 3-cent fares have come to stay. The company has a surplus, he said, instead of deficits. He referred to the accident and one or two other special funds that have been accumulated by careful operation and management. He has all along insisted that these should be turned over to make up deficits in other funds. Mr. Witt said the city made a mistake in transfer arrangements. The charge for a transfer should have been 3 cents. Mr. Witt said that the public was responsible for the overcrowding of cars. He asserted that people will board a crowded car instead of waiting for the one following which may be almost empty. He also said that the two-car trains operated on Euclid Avenue and East Ninth Street are not used as they should be because passengers still insist upon going to the Public Square to board cars. Many people walk several blocks to reach the square, because it has long been a terminal for most of the lines, and they believe they can secure seats there more easily than at any other point. He said that 1200 cars are needed instead of 900 cars, but that crowding could not be avoided with 2000 cars unless the people would co-operate with the management of the company. Mr. Witt defended his stop-elimination plan.

As a test the cars on the Fifty-fifth Street line of the Cleveland (Ohio) Railway will be operated as pay-as-you-leave cars after Feb. 1. No extensive changes in the cars will be made for the test. The conductor will have his station at the rear of the car and the fare box will be so located that free passage for the passengers may be obtained. Passengers will enter the cars by the front door and will pass out at the rear. The front doors are to be operated by the motormen and they will be responsible for passengers as far as that opening is concerned and will be expected to see that no passengers leave the car that way and escape the payment of fares.

Proposed Terminal Improvements in Newark

Thomas N. McCarter, president of the Public Service Corporation, has outlined plans for a terminal for the Public Service Railway near Broad and Market Streets, Newark, N. J., and for other improvements involving an expenditure of about $4,000,000. The proposed terminal building will front on Park Place and extend back to Pine Street, with outlets to North Canal Street and to Canal and East Park Streets. The structure will eventually be eight stories high and will contain a three-level system of entrance and exit for the cars of the Public Service Railway. The scheme contemplates direct communication between the terminal and the surface car lines from both east and west. On the east an elevated structure is to be erected, extending from Mulberry Street. On the west the communication will be by means of a subway that will have an outlet on property of the company fronting in Washington Street between Warren Street and the Morris Canal. The various extensions and the accompanying rerouting of certain lines and parts of lines will make necessary a readjustment of transfer privileges and this phase of the problem is being worked out so that the whole local street railway system in Newark will be as comprehensive and as great an accommodation to the traveling public as it reasonably can be made. The plan for the terminal has been worked out without reference to the use of the Morris Canal and is entirely independent thereof. Should the canal be abandoned and its roadbed become available for transportation, it will be entirely practicable, because of its proximity to the terminal, to use it in conjunction therewith. Nor does anything connected with the plan militate against the construction of subways on Broad and Market Streets, whenever the same shall become necessary. The terminal subway will cross Broad Street practically on the same level as the canal. A Broad Street subway would have to pass under this level, whether the canal be continued as a waterway or used for transportation purposes. A subway on Market Street would seek this same level.

Statement from Company in Regard to Extensions in Akron

Will Christy, vice-president of the Northern Ohio Traction & Light Company, Akron, Ohio, has addressed a letter, in part as follows, to F. W. Rockwell, Mayor of Akron, in regard to the differences between the city and the company over the matter of extensions:

"No opportunity has been given to the company to explain in detail its reasons for declining to accept the ultimatum presented to it by the city. There are always two sides to all questions, and in refusing to build the extensions demanded by the city you must be conscious of the fact that the company must have some powerful reasons for making such a refusal, especially as it ought to be, and is, more vitally interested in the growth of the city, as that means the growth of its traffic, than any other corporation, and all that the company asks is that it be permitted to present to any fair-minded committee its side of the question.

"The company has nothing to conceal; its reports are published every month, and it stands ready to deal with any body of men who are willing to treat it fairly and analyze its reports bearing upon its receipts and expenditures in Akron, and I am confident that such an analysis will show that the company, if it built the extensions asked for, could not get back even a fair rate of interest in twelve years, while the depreciation in the tracks would practically wipe out the investment in them.

"You are certainly conversant with the condition existing on East Market Street, where less than twelve years ago we put down new tracks and new pavement and are now compelled again to put down new tracks and new pavement at a cost of nearly $200,000, the expenditure of which will not add to our receipts. The company is not opposing your movement for city-owned extensions, but as a citizen I beg to warn you that you are going into a new and untried field which will fill your city offices with real estate speculators or their friends who will have allotments to sell.

"I also beg to say that no company could for many years earn operating expenses on some of the extensions talked of by you. The belt line extensions suggested by me are of immediate and far greater importance to the traveling public, in my judgment, than those you contemplate building, as your extensions to a great extent will go into outlying territory where a few people have purchased cheap lots which they are holding for a rise, and the extensions would only cause the opening up by land speculators of new allotments still further out, and thus continue the present over-speculation in lots. The speculators would then demand that the city continue to make further extensions to exploit their schemes at public expense."

The Mayor has replied to the letter from Mr. Christy. He agrees with some of the points which Mr. Christy made, disagrees with him on others and asserts that the city stands ready to reopen negotiations at any time the company is prepared to present a definite statement in regard to what it is willing to do. The Mayor, however, reiterates his opposition to an extension of the franchise. The Council has passed a resolution to retain Peter Witt, street railway commissioner of Cleveland, to act as an expert and to report to the Council on the situation which now confronts the city.

Statistics of Canadian Electric Railways

The statistics of electric railways in the Dominion of Canada for the year ended June 30, 1912, are made available through the report of J. L. Payne, comptroller of statistics, to A. W. Campbell, deputy minister of railways and canals for the Dominion. Mr. Payne explained that the statistics presented are incomplete, owing to failure on the part of the Montreal Tramways and the St. John Electric Company to report. Hence the figures in the tables below include the statistics of these roads for the year ended June 30, 1911, and of other roads for the year ended June 30, 1912. In every respect operations of the year show growth in all departments and a general extension of street railway interests.

The total track mileage for 1912, measured as single track, is 1723 miles, an increase of 136 miles. The capital liability amounted to $122,841,046, divided as follows: stock, $70,829,118; funded debt, $52,012,823. The statistics of earnings follow:

Car earnings:	
Passengers	$22,007,750
Freight	1,025,371
Mail and express	78,818
Other car earnings	67,022
Total car earnings	$23,178,693
Miscellaneous earnings:	
Advertising	$71,226
Rent of land and buildings	21,228
Rent of tracks	13,836
Rent of equipment	56,239
Sale of power	37,083
Other miscellaneous earnings	120,671
Total miscellaneous earnings	$320,287
Gross earnings from operation	23,499,250

This is an increase of $3,142,208.00 as compared with 1911. An interesting feature of this operating report, as compared with that of the previous ten years, is the steady rise of earnings from freight. In 1901 the total from this source was $95,082. In 1904 there had been an increase to $182,143, and in 1906 one to $288,105. In 1912 the earnings from freight reached $1,025,372, showing the extent to which that aspect of public service had grown in twelve years. Figures for the preceding years are not published in this connection because they are contained in an article contributed by Mr. Payne, comptroller of statistics for the Dominion of Canada, to this paper on page 42 in the issue of Feb. 10, 1912.

Following is the combined operating report for the fiscal year:

Earnings and income:		
Gross earnings from operation		$23,499,250.31
Operating expenses		14,266,674.63
Net earnings		$9,232,575.68
Miscellaneous income		1,617,017.78
Gross income		$10,849,593.46
Deductions from income:		
Taxes	$1,581,802.81	
Interest funded debt	1,570,202.02	
Interest floating debt	193,068.26	
Other deductions	188,582.57	
	$3,533,655.66	
Undistributed	1,378,906.56	
		4,912,562.22
Total net income		$5,937,562.24

The undistributed amount in this table relates to the British Columbia Electric Railway, which operates a lighting and power plant in addition to an electric railway. A separation is not made in the report of that company of items which would establish the real net income of the electric railway department by itself. The report adds:

"If the undistributed income had been added to net income, as was done in preceding years, the amount of the latter for 1912 would have been $7,315,937.80, as compared with $6,592,535.30 in 1911. It would not, however, be strictly correct to do that, since it represents a total from which proper deductions had not been made. The definitely known net income is the sum given in the statement, although it is probably below the actual amount."

The amount of dividends and bonuses paid during the year was $4,229,005. These payments were equal to 5.9 per cent on the total stock issue.

Following was the distribution of operating expenses in 1912, with a comparison for 1911:

	1911.	1912.
Maintenance of way and structures	$920,874.93	$1,228,972.10
Maintenance of equipment	1,758,289.10	1,859,939.21
Operations of power plant	2,001,543.00	2,535,576.10
Operation of cars	5,768,085.10	6,770,560.47
General	1,610,098.62	1,871,626.75
Total	$12,096,134.22	$14,266,674.63

During the year 488,865,682 passengers were carried exclusive of 125,453,320 transfers, showing an increase of 62,568,890 as compared with 1911. The carrying of these passengers involved a car mileage of 80,402,089. Freight, mail, and express business had a car mileage of 1,667,975. There was an increase of 8,867,961 in passenger car mileage and of 583,297 in freight car mileage over 1911. The number of tons of freight hauled was 1,435,525, as compared with 1,228,362 in 1911.

The number of cars owned at the end of the fiscal year by the different companies was 4478. The number of employees in the service was 14,760, as compared with 13,671 in 1911. The total of salaries and wages for the year was $9,261,370.26, as against $8,559,215.04 in 1911.

Conference of Governors of New England

The Governors of the New England States, with the exception of Governor Haines of Maine, who was detained at home by illness, discussed the railroad situation in New England at a conference at Boston, Mass., on Jan. 25, 1913. They agreed to the appointment of an unpaid commission to be made up of two citizens of each State, which shall make inquiry into the entire subject of railroad development and operation in New England. This is the resolution which was passed at the conference:

"Voted, That the Governor of each New England State be requested to appoint two citizens of his State as members of a New England railroad conference, to consider and report on the best modes of developing and operating the New England railroad system; the members of said conference to serve without compensation, but their necessary expenses to be paid by the State appointing them."

The Governors mapped out the work of the New England railroad conference as follows:

"The New England railroad conference will consider and report upon the general subject and in particular:

"1. The establishment of a permanent conference composed of the heads of the State commissions having supervision over railroads.

"2. The question of creating State directors in the management of the railroad system, and the general question of the participation of the public in the ownership and operation of transportation facilities, and the form of such participation.

"3. The consideration of means whereby the projected Grand Trunk extensions may be completed.

"4. Means of providing through transportation by way of Boston, and the consideration of the best means of accomplishing this, whether by tunnels or belt lines, or both.

"5. The project of electrifying the terminals, and providing adequate electric traction throughout crowded urban and suburban districts.

"6. A reasonable plan of interchangeable mileage, to be applied over the entire New England railroad system.

"7. A plan of uniform legislation providing for the unification of the corporate entity which manages the railroads in a manner which will make the legal fact of unification correspond with the actual control now exercised. This will involve a consideration of the whole question of whether the Boston & Maine shall remain a part of the New Haven system or can better serve New England as a separate system; the question of the elimination of the Boston Railroad holding company and the question to what extent, so far as the federal laws and the fixed policy of the several States permit, the railroads shall own and operate steamship and electric railway lines.

"8. In connection with such unification a plan to coordinate and unify all lines and services.

"9. The reduction of all leases of lines to absolute ownership.

"10. The consideration of means to make the railroad corporation amenable in its entirety to public control, in the manner of a domestic corporation doing business in each State.

"11. The consideration of uniform charters to the railroad corporation in each of the States in which it operates lines, with uniform reservations of power of control by the State."

Electrification of Chicago, Milwaukee & Puget Sound Railroad

While nothing definite has been decided in relation to the engineering details of the electrification of the main line of the Chicago, Milwaukee & Puget Sound Railroad between Harlowton, Mont., and Avery, Idaho, it is said to be not unlikely that 2400-volt direct-current motors will be used on the electric locomotives, energy being supplied to them by means of an overhead system. As previously stated, electricity will be purchased by the railroad from the Montana Power Company, Butte, which will generate it, normally, at hydroelectric plants. These generating stations are, or will be, located at Great Falls, on the Missouri River; at three sites on the same river near Helena, at a site on the Madison River, in the Rocky Mountains, and at Thompson Falls, on Clark's Fork. With a diversity of sources and excellent reservoir possibilities in some of the mountain sites, continuity of operation is anticipated.

The energy will be transmitted at 100,000 volts or thereabout and transformed to a lower voltage for distribution, and also probably changed to direct current, as mentioned. The electric zone of the railroad embraces 439 miles of single track with 11 or 12 miles of sidings. It includes that portion of the railroad extending from the plateau of eastern Montana over the passes through the main ranges of the Rocky Mountains. The railroad is excellently built, but in some cases grades of 2 per cent are encountered. The electric locomotives will haul both freight and passenger traffic. The electrification will be carried out under the direct supervision of C. A. Goodnow, vice-president.

New Line Opened in New York.—The Manhattan & Queens Traction Corporation placed in operation on Jan. 29, 1913, the portion of its line from Fifty-ninth Street and Second Avenue, New York, at the Manhattan end of the Queensboro Bridge, across the bridge, to Winfield, Long Island.

Fines Imposed in Heating Cases in Detroit.—Judge Connolly, at Detroit, Mich., recently assessed a fine of $100 on each of four counts against the Detroit United Railway on the charge of operating cold and unsanitary cars. Sanitary Engineer Williamson testified that it would be impossible to maintain the temperature above 45 deg. Fahr. in the side-door cars, some of which are still in operation.

Offer to Operate Toronto Civic Line.—Works Commissioner Harris of Toronto, Ont., has reported that the Toronto Railway is prepared to operate the St. Clair Avenue civic car line if paid 20 cents per car mile. This is the same rate the city pays for the operation of the Queen Street East line. By a vote of three to two the Board of Public Works has decided not to operate the cars of the Gerard Street civic line on Sundays until the Legislature has passed an act legalizing such operation.

Electrification of London & Port Stanley Railway.—The London (Ont.) City Council at its inaugural meeting named only one anti-electrification alderman on the board of the London & Port Stanley Railway, which consists of eight men. Seven of those whose names were on the electrification slate in the recent municipal elections were elected to the Council. Alderman Moore, upon whose motion the Council accepted the board as named by him, declared that the seven who were pledged to submit the question of the electrification of the line to the people were entitled to positions in direct charge of the line.

Mayor Recommends Compulsory Electrification of Buffalo Terminals.—Mayor Louis P. Fuhrmann, of Buffalo, N. Y., has recommended the passage by the City Council of ordinances to compel the railroads which operate into Buffalo to electrify their terminals and to exclude coal-burning locomotives from the city. The Mayor said recently: "I fixed the area of electrification between Fillmore Avenue and Ontario Street so that it would include all the railroads and still permit of coal-burning engines in the freight yards. There are reasons why it would be impracticable to attempt the use of electric locomotives for switching purposes in these yards."

Home Rule of Public Utilities Recommended in Seattle.—A. L. Valentine, superintendent of public utilities of Seattle, Wash., in his annual report to Mayor Cotterill, declares that general ordinances regulating public utility construction, maintenance and operation have met with continued reverses during the past year, and for this reason it is necessary that the power of control over these public utility companies be taken from the Public Service Commission either through the Legislature or by initiative petition. He suggests that the Mayor urge the City Council to send representatives to Olympia at the next session of the State Legislature to aid in securing home rule.

Indeterminate Grant Suggested in Cincinnati.—At a meeting of city officials and representatives of the Cincinnati Traction Company at the City Hall, Cincinnati, on Jan. 27, it was suggested that the company surrender its fifty-year franchise and accept an indeterminate grant, with all its property rights safeguarded and guaranteed. W. Kesley Schoepf, president of the company, agreed to make the proposal a basis in working out the details of a plan at future conferences. The proposition made at the meeting provides for the purchase of the property by the city, if that is deemed desirable. The city was represented by Mayor Hunt, John W. Peck, Public Service Director Price, City Solicitor Bettman and Councilman Heilker, while W. Kelsey Schoepf, president, and Walter A. Draper, secretary, represented the company. R. W. Harris, who prepared the re-routing plan, and William Cooper Proctor were also present.

Permanent Injunction Against Enforcement of Universal Transfer Ordinance in Chicago.—The city ordinance demanding universal transfers on the elevated railroads in Chicago was held to be invalid by Judge J. A. Baldwin, of the Circuit Court. A temporary injunction was granted against the enforcement of the ordinance in July, 1912, and the action of the court makes this injunction permanent. The court holds that the city has no statutory right to fix rates for steam and elevated roads. The opinion also held that the Legislature never delegated to the city the power to regulate rates of steam and elevated roads. This decision also affects the city's efforts to compel a readjustment of suburban railroad rates. Mayor Harrison has stated publicly that the city would take steps to appeal from the decision. In explanation of the court's decision it might be said that the elevated railways of Chicago were organized under the railroad act of the State and not under the street railway act.

Key Route Improvements.—The Key Route plans to construct a large railway terminal at Oakland, Cal. It is proposed to construct a six-track pier from the shore line of Oakland to the Key Route mole, a distance of 3½ miles, at an approximate expense of $2,000,000. This means the trebling of the present rail facilities over tidewater. The new pier is being constructed primarily with a view to accommodating the Oakland & Antioch Railroad, which has made a traffic agreement with the Key Route Sytem. The officers of the Key Route, convinced that the present mole will be insufficient adequately to handle the traffic which they think is bound to accrue from the Sacramento Valley with the opening of the through line of the Oakland and Antioch, are furthermore preparing an extensive enlargement of the present mole facilities. These plans include a greater train shed and a vast extension of the present trackage facilities of the Key Route involving an additional expenditure of more than $5,000,000 before the opening of the 1915 exposition.

Progress in Philadelphia.—The Philadelphia *News Bureau* concluded a recent article on the work of the Stotesbury-Mitten management in rehabilitating the Philadelphia Rapid Transit Company as follows: "The company is now on the best of terms with its men. Labor unrest was the greatest direct danger that ever threatened the company. The incorrigible 'soreheads' have been eliminated and the rest have been won over simply by treatment that has been not only fair, but more than fair. Every promise of the new management to the men has been kept ahead of time, and every conductor and motorman, through the operation of the 22 per cent wage fund, has been given a proprietary interest in the company's success. It is doubtful whether there has ever been a more tactful and successful handling of a difficult labor situation than Mr. Mitten's feat in transforming, in less than two years, what was little better than a mob of 7000 dissatisfied, suspicious and mutually hostile men into a compact, harmonious and loyal organization of efficient employees. The benefit accruing to the company from this change can hardly be estimated."

Result of Operation of Geary Street Municipal Railway.—The gross receipts of the Geary Street Municipal Railway, San Francisco, Cal., for the first seventeen days' operation of this road amounted to $10,460, or an average of $616.47 per day. This amount is not quite sufficient to cover operating expenses and interest on bonds. At present a seven-minute headway is maintained, but this will be reduced to five minutes as soon as additional rolling stock is received. On Feb. 11 an agreement with the United Railroads of San Francisco becomes effective by which transfer privileges will be extended between the municipal line and the United Railroads at Fillmore, Divisadero, Larkin and Kearny Streets. Utility companies having underground structures on Market Street are now engaged in removing them to make way for the extension of the municipal railway on that street. The supervisors contemplate letting the contract for this extension on Feb. 11, and expect the line to be complete within forty-five days of the date of beginning work, which is the time limit specified in the contract. The utilities committee of the Board of Supervisors has received an estimate of the cost to build a cross-town line on Van Ness Avenue from Market to Bay Street. The proposed line will be 2 miles long and include a double track laid in the center parking on a right-of-way 24 ft. in width.

New Pittsburgh Subway Ordinance.—Instead of passing the amended subway ordinance which has been before the Council of Pittsburgh, Pa., for some time, the majority which favors the passage of the ordinance had introduced into the Council on Jan. 21, 1913, a new ordinance which includes in its provisions all the changes which have been made from time to time in the original ordinance. The new measure has been referred to the public service and surveys committee, the intention being to have the measure confirmed by that committee without debate and then passed. The original bill has been passed on second reading two or three times, referred back to committee and turned over to the law department for amedment a half dozen times. Simultaneously resolutions were adopted calling upon the different subway companies to demonstrate their financial responsibility, asking them to file their acceptances of the bill and its provisions, the one that accepted to receive the franchise for the construction of the subway. One company presented a new ordinance instead. A. E. Anderson, of the Pittsburgh District Company, handed in a paper which he has since insisted was an acceptance. The Pittsburgh Subway Company filed an acceptance conditional on the passage of the ordinance by a specified time. The majority finally succeeded in having the Pittsburgh Subway Company's name inserted in the ordinance as the grantee of the franchise, and the new ordinance will be put through with the hope that it will prove invulnerable in the courts.

Installation of Interlocking Plant Ordered.—The Public Service Commission of the Second District of New York, has ordered the International Railway, Buffalo, N. Y., to install in Union Road in Cheektowaga an interlocking device and plant which shall control and regulate the crossing of its tracks over the tracks of the Lehigh Valley Railroad and the Erie Railroad. The International Railway is required to submit plans to the commission for its approval on or before Feb. 1, 1913, and to construct and place the plant in operation not later than July 1, 1913. The expense of constructing, maintaining and operating is to be borne by the International Railway. After hearings and investigations the commission found an interlocking plant to be necessary at the crossing in question in order to promote the safety and convenience of the traveling public and the employees of the railroads. It developed that the International Railway is bound by a contract with the Lehigh Valley Railroad to install crossing protection upon demand of the chief engineer of the Lehigh Valley Railroad. This demand was made and an interlocker was constructed at an expense of about $5,000, which cost was paid by the International Railway. After the construction of this plant it was inspected by the electric railroad inspector of the commission, who pronounced it dangerous to operate by reason of the proximity to the tracks of the Erie Railroad. The result was that neither the International Railway nor the Lehigh Valley Railroad has put the interlocker in operation.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

COLORADO

Representative Persons has introduced into the House a bill to extend the authority of the Railroad Commission to all public service corporations and to increase the power and scope of the commission.

INDIANA

The bill introduced into the Senate to prohibit the drinking of intoxicating liquors on railroad and interurban railway cars has been passed. A bill has been introduced into the House to extend the jurisdiction of the Railroad Commission to street railways and interurban railways within town and city limits. A bill has also been introduced into the House to make it unlawful to require motormen to perform any other duties than those immediately incident to the proper operation of their cars. The bill, if passed, would prevent motormen from assisting in handling express and baggage. Another House bill provides that no official or employee of a street railway or an interurban railway shall be eligible to election to the City Council of any city through which the company with which he is connected operates.

A workmen's compensation bill has been introduced in the State Legislature by Representative Hayes, of Jasper County. The measure was drafted by Emory B. Sellers, Monticello, United States district attorney under President Cleveland. The measure defines dangerous trades and provides that the employer must pay the disabled workman 50 per cent of his weekly wage not longer than eight years nor in an amount exceeding $3,500. If the workman is disabled for life, he is to receive from his employer 50 per cent of his weekly wage for ten years, or in a sum not exceeding $5,000. Jurisdiction would be vested in an industrial court consisting of a circuit judge, a county clerk and sheriff. Only American laborers or those who have filed naturalization papers would be entitled to protection under the law.

KANSAS

After a two hours' debate on Jan. 22 the House by a vote of ninety-five to twenty-four decided in favor of leaving the State Public Utilities Commission appointive by the Governor, as at present, instead of making it elective by the whole people. A bill had been introduced to make the commissioners elective like other state officers. The utilities committee of the House returned a majority report in favor of the bill and a minority report against it. The minority report was adopted.

MASSACHUSETTS

Among the bills which have been filed recently are the following of interest to electric railways: A bill requiring the street railways of the State to arrange for eight hours' platform work for all conductors, motormen and trainmen as the basis of a day's work on Sundays; a bill requiring the placing of a cut-out switch at all stations where a third-rail is exposed, so that current may be shut off at any time; a bill giving the Railroad Commission power to require street railways to erect shelters to protect waiting passengers from rain or snow at such places as may be designated by the municipal government and approved by the board; a bill requiring the Boston Elevated Railway to equip all elevated cars with folding platforms, so that it will be impossible for employees or passengers to fall between the cars when passing from one to the other; a bill requiring the installation of iron or steel railings at elevated platforms to prevent persons being crowded off the latter upon the tracks; a bill giving the Railroad Commission power to order street railways to lay temporary tracks around obstructions which will last over one month; a bill requiring third-rails to be guarded so as to protect persons against the danger of accidental contact; a bill giving the Railroad Commission power to order the installation of escalators where stairs over 30 ft. in height have to be used by passengers; a bill requiring the Railroad Commission to fix the standing capacity for passengers of every car used in street railway transportation and to limit the car to the capacity so fixed; a bill to prohibit the use of prepayment cars; a bill for more uniform fares between Dedham and Forest Hills, and a bill requiring the use of street cars seating more than thirty-nine passengers each.

NEW YORK

Senator Griffin has introduced a bill to repeal the provisions of the Wagner law of last year permitting the city of New York to go into partnership with a railroad corporation in the construction, operation and equipment of subways. Assemblyman Thomas E. Willmott has introduced a bill to prevent the construction of a crosstown elevated line by the Brooklyn Rapid Transit Company through the Greenpoint section. A bill introduced by Assemblyman Jackson, of Buffalo, provides for regulation of sale of stocks, bonds or other securities. It establishes the office of commissioner of corporations, term five years, to have jurisdiction over investment companies.

OHIO

Representative Herbert S. Bigelow has introduced a bill in the House which provides that in the event of the purchase of public utility properties by municipalities only the physical value shall be considered and nothing shall be allowed for franchises.

A bill has been introduced into the Legislature by Representative Mills, of Cuyahoga, which provides for the valuation of the physical property of the public service corporations. The commission is to have blanket power to investigate utilities and make valuations that it may ascertain the reasonableness of rates and charges. The bill fixes the facts to be ascertained as follows: (1) The present value of each parcel of land used by any such utility, by comparison with the values of contiguous and neighboring parcels of land; (2) the added value, if any, by reason of ownership by such utility of one or more of said parcels so that a continuous right of way for transportation is thereby produced; (3) the present reproductive cost of all property, other than land, necessary for the use of such utility; (4) depreciation from present reproductive cost of such other property for age, condition, obsolescence or for any other cause, the amount for each class of depreciation to be specifically set forth; (5) the present net value of such other property to be derived by deducting the sum of the amounts for such depreciations as shall be determined upon from the net reproductive cost.

Senator Green, of Coshocton, has introduced a workmen's compulsory compensation bill. Besides making contribution compulsory, it provides that an employer shall pay the total insurance instead of 90 per cent, as at present. An employer who has five or less employees is exempt from the operation of the law, though he may take advantage of it and thereby exempt himself from prosecution in the courts.

A bill has been drafted under the instructions of the city officials of Cincinnati as a substitute for the measure introduced in the Legislature to revoke the franchise of public utilities companies having franchises for a period greater than twenty-five years.. The substitute bill will give cities practical supervision over such companies, with power to order the construction of extensions and improvements. If the orders for extensions are not obeyed the city is to have power to issue bonds for the construction of extensions, the companies to furnish service over them and pay a rental that will cover interest on the bonds and establish a sinking fund that will redeem the bonds within a certain period of time. Provision is also made to pay for the extensions in case the city should purchase the property as a whole. Under the proposed substitute the City Council would have full authority over the routing of cars and other matters relating to operation and the company in Cincinnati would continue to pay the city 6 per cent of its gross receipts annually.

PENNSYLVANIA

The bill favored by Governor Tener creating a public utility commission has been introduced in the Legislature. It contains six articles. Articles 1 and 2 describe the public service companies and their duties, Article 3 deals with the powers of the corporations and forbids their creation or consolidation without the commission's approval. Article 4 describes the commission, which is to be made up of five commissioners, to be appointed by the Governor. Article 5 defines the powers of the body and Article 6 describes the practice and procedure before the commission. Appeals from its orders are to be taken to the Common Pleas Court of Dauphin County, subject to further appeal to the Supreme Court.

PROGRAMS OF ASSOCIATION MEETINGS

Illinois Electric Railways Association

The annual meeting of the Illinois Electric Railways Association has been postponed indefinitely. The date for the annual meeting of this association was set for Jan. 31, 1913, but owing to the fact that it conflicted with the midyear meeting of the American Electric Railway Association in New York, it was deemed advisable to put the meeting off until a later date.

Central Electric Railway Association

The annual meeting of the Central Electric Railway Association will be held at the Hotel Washington, Indianapolis, Ind., on Feb. 27 and 28, 1913. The executive committee will meet on the evening of Feb. 26 in the office of the secretary of the association. The annual meeting of the Central Electric Traffic Association will be held in the office of the chairman of the association on Feb. 26, 1913.

Financial and Corporate

Stock and Money Markets

January 29, 1913.

Nearly all of the important issues traded in on the New York Stock Exchange sustained some amount of loss to-day, but part of the losses in the leading issues were recovered in the late dealings. Rates in the money market to-day were: Call. 2¾@3 per cent, with the last loan at 3 per cent; sixty days, 3@3¼ per cent; ninety days, 3¾@4 per cent; four months, 4 per cent; five and six months, 4@4¼ per cent.

In the Philadelphia market utility issues were strong and active to-day despite the heaviness in Steel common and Reading common.

The Chicago market was irregular to-day, change of fractions to about a point being equally divided between gains and losses. Chicago Railways purchase money 4's dropped nearly two points, but other bonds were steady.

In the Boston market trading continued dull and heaviness developed late in the session and was maintained up to the end.

The Baltimore market was fairly active to-day. The demand for traction bonds continued good.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 22	Jan. 29
American Brake Shoe & Foundry (common)	92	93⅝
American Brake Shoe & Foundry (preferred)	131	133⅞
American Cities Company (common)	47½	47½
American Cities Company (preferred)	77	a77
American Light & Traction Company (common)	405	*405
American Light & Traction Company (preferred)	108	108
American Railways Company	40¼	40½
Aurora, Elgin & Chicago Railroad (common)	44¾	44
Aurora, Elgin & Chicago Railroad (preferred)	86¾	86¾
Boston Elevated Railway	113¼	113¾
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	65	65
Boston & Worcester Electric Companies (common)	7	7
Boston & Worcester Electric Companies (preferred)	40	40
Brooklyn Rapid Transit Company	89⅝	91
Capital Traction Company, Washington	122	121
Chicago City Railway	150	150
Chicago Elevated Railways (common)	30	35
Chicago Elevated Railways (preferred)	90	91
Chicago Railways, ptcptg., ctf. 1	94	96
Chicago Railways, ptcptg., ctf. 2	24½	24
Chicago Railways, ptcptg., ctf. 3	8	7½
Chicago Railways, ptcptg., ctf. 4	2½	3
Cincinnati Street Railway	118	118½
Cleveland Southwestern & Columbus Ry. (common)	*5⅛	*5⅛
Cleveland Southwestern & Columbus Ry. (preferred)	*33	*33
Cleveland Railway	104	105
Columbus Railway & Light Company	55	59
Columbus Railway (common)	81¾	*81¾
Columbus Railway (preferred)	83¾	84½
Denver & Northwestern Railway	118	118
Detroit United Railway	75	80
General Electric Company	182¼	142¼
Georgia Railway & Electric Company (common)	123½	125
Georgia Railway & Electric Company (preferred)	83	83
Interborough Metropolitan Company (common)	17⅜	19
Interborough Metropolitan Company (preferred)	61	63¾
International Traction Company (common)	*38	*38
International Traction Company (preferred)	*99	*99
Kansas City Railway & Light Company (common)	18	18⅜
Kansas City Railway & Light Company (preferred)	40	*40
Lake Shore Electric Railway (common)	*9	*9
Lake Shore Electric Railway (1st preferred)	*91	*91
Lake Shore Electric Railway (2d preferred)	*25½	25½
Manhattan Railway	131¼	131½
Massachusetts Electric Companies (common)	17	17½
Massachusetts Electric Companies (preferred)	75	76
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*25	*25
North American Company	80	80¾
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	100	100
Philadelphia Company, Pittsburgh (common)	50	49½
Philadelphia Company, Pittsburgh (preferred)	44	43
Philadelphia Rapid Transit Company	27	26¾
Portland Railway, Light & Power Company	68½	68½
Public Service Corporation	116	116
Third Avenue Railway, New York	38¼	38⅞
Toledo Railway & Light Company	1½	2
Twin City Rapid Transit Co., Minneapolis (common)	106¾	106¾
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	23½	23½
United Rys. Inv. Company (common)	33	32
United Rys. Inv. Company (preferred)	60	60
Virginia Railway & Power Company (common)	51	51¾
Virginia Railway & Power Company (preferred)	89	92¼
Washington Ry. & Electric Company (common)	85½	86
Washington Ry. & Electric Company (preferred)	90¼	90
West End Street Railway, Boston (common)	80½	80
West End Street Railway, Boston (preferred)	97½	96½
Westinghouse Elec. & Mfg. Company	74¾	74½
Westinghouse Elec. & Mfg. Company (1st preferred)	117½	116

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*Last sale.

Consolidation of Beebe Syndicate Lines Proposed

The Public Service Commission of the Second District of New York has received an application from the Rochester, Syracuse & Eastern Railroad, the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Electric Railroad for approval of a joint agreement of consolidation as the Empire United Railways, Inc. The names of the directors of the new corporation are Hendrick S. Holden, James M. Gilbert, William K. Pierce, Edward Joy, Willis A. Holden, Charles M. Warner, Charles A. Lux, Burns Lyman Smith, William Nottingham, Albert E. Nettleton, and Clifford D. Beebe, Syracuse, N. Y.; Fidelio K. Hiscock, North Yakima, Wash.; Edwin D. Metcalf, Auburn, N. Y.; Ferdinand W. Roebling, Jr., Trenton, N. J., and Cadwell B. Benson, Minetto, N. Y. The officers are: President, Clifford D. Beebe; vice-presidents, Hendrick S. Holden, Cadwell B. Benson, Edwin D. Metcalf; treasurer, Willis A. Holden, and secretary, Charles A. Lux.

The railroads which it is proposed to consolidate are controlled and operated by the so-called Beebe Syndicate. The Rochester, Syracuse & Eastern Railroad runs from Rochester to a point near the western end of Syracuse, where its tracks join the tracks of the Syracuse, Lake Shore & Northern Railroad, which owns and operates an interurban electric railroad extending from Syracuse to Oswego, including the Oswego city system. The Auburn & Northern Electric Railroad runs into Auburn from its connection with the Rochester, Syracuse & Eastern Railroad in Port Byron.

The Rochester, Syracuse & Eastern Railroad has an authorized capital stock of $8,500,000, of which 25,000 shares are preferred stock and 60,000 shares are common stock. The Syracuse, Lake Shore & Northern Railroad has an authorized capital stock of $4,000,000, of which 15,000 shares are preferred and 25,000 are common stock. The Auburn & Northern Electric Railroad has an authorized capital stock of $1,500,000, of which 5000 shares are preferred and 10,000 shares are common stock, and of which capital stock 2000 shares of preferred stock and 2000 shares of common stock only have been issued and are outstanding.

The capital stock of the new corporation is to be $11,600,000, of which $2,000,000 will be first preferred stock, $2,300,000 will be preferred stock and $7,300,000 will be common stock. The first preferred stock is to be entitled to non-cumulative dividends not exceeding 6 per cent, payable as and when declared by the directors out of the net earnings of the company before any dividends shall be declared or paid upon the preferred or common stock. The preferred stock will be entitled to non-cumulative dividends at not exceeding 6 per cent, payable out of the net earnings of the company remaining after the payment of the dividends upon the first preferred stock before any dividends shall be declared or paid upon the common stock of the company. The manner of converting the capital stock of each of the corporations into the capital stock of the new corporation is as follows: The preferred stock of the Syracuse, Lake Shore & Northern Railroad shall be convertible into first preferred stock of the new company, share for share. The preferred stock of the Rochester, Syracuse & Eastern Railroad shall be convertible into first preferred and preferred stock of the consolidated company. Upon the surrender of any outstanding certificates of the preferred stock of the Rochester, Syracuse & Eastern Railroad there shall be issued to the holders certificates for an amount equal to 11 per cent of the par value of the first preferred stock and certificates for 92 per cent of the par value of the preferred stock of the consolidated company. The common stock of the Rochester, Syracuse & Eastern Railroad shall be convertible into common stock of the consolidated company in an amount equal to 80 per cent of the par value of the common stock of the new company. The preferred and common stock of the Auburn & Northern Electric Railroad shall be convertible into the first preferred stock of the consolidated company upon the surrender of certificates of the preferred stock of the company, share for share of the first preferred stock of the consolidated company and 12½ per cent of the new company's stock for common stock of the old company.

The roads are so situated with reference to each other that they can be operated more satisfactorily as one company.

Listings on the New York Stock Exchange in 1912

In an article "Listings on the New York Stock Exchange During 1912," published in its issue of Jan. 25, 1913, the *Commercial and Financial Chronicle* says that, notwithstanding the remarkable development in general trade that gathered strength as the year 1912 advanced, the total amount of bonds listed on the New York Stock Exchange representing new capital, though reaching a larger aggregate than in 1911, was less than in 1910 by more than 20 per cent, or $120,000,000, and fell about 37 per cent, or $265,000,000, below the total of 1909. The electric railway bonds, while still in the aggregate quite a little below the amount of the railroad issues, approach much nearer to the total of the latter than ever before, the comparison being between $177,000,000 and $209,000,000.

Attention is called to the fact that "electric railway" bonds or stocks nowadays more and more commonly cover not only railway issues but light and power properties as well. Instances cited in this connection from the table are the $10,000,000 of bonds of the Virginia Railway & Power Company and about $18,000,000 of bonds of the Portland Railway, Light & Power Company, Portland, Ore., and its constituents. Other large issues of electric railway bonds referred to in the table, in addition to the issues of the Virginia Railway & Power Company and the Portland Railway, Light & Power Company, are the $22,000,000 of collateral trust 5's of the Chicago City & Connecting Railways, $10,000,000 of convertible 5's of the Philadelphia Company, $17,000,000 of first mortgage 4½'s of the New York, Westchester & Boston Railway, $16,375,000 of refunding 4's and $32,000,000 of income 5's of the New York Railways and $15,375,000 of 4's and $22,500,000 of income 5's of the Third Avenue Railway.

The total of the electric railway stock issues for the year was $109,405,900, compared with $141,226,600 for 1911. Among the important electric railway note issues brought out during the year were the following: Brooklyn Rapid Transit Company, $40,000,000; Dallas Electric Corporation, $1,000,000; Gary & Interurban Railway, $350,000; Indianapolis, New Castle & Eastern Traction Company, $800,000; Interborough-Metropolitan Company, $2,039,520; Montgomery Light & Traction Company, $650,000; Montreal Tramways & Power Company, $5,000,000; Oakland Railways, $2,500,000; Portland Railway, Light & Power Company, $5,000,000; Puget Sound Traction, Light & Power Company, $7,500,000; Republic Railway & Light Company, $2,000,000; Rochester, Syracuse & Eastern Railroad, $1,137,114; Savannah Electric Company, $1,000,000; United Railroads of San Francisco, $2,350,000; West Virginia Traction & Electric Company, $1,250,000.

Philadelphia Equipment Securities Company Organized

The Philadelphia Equipment Securities Company organized on Jan. 27, 1913, by electing the following directors: Arthur E. Newbold and Horatio G. Lloyd, of Drexel & Company; George H. Frazier, of Brown Brothers & Company; Edward B. Smith and Thomas Newhall, of Edward B. Smith & Company. The following officers were elected: Arthur E. Newbold, president; Thomas Newhall, vice-president; Gerald Holsman, treasurer; J. Clifford Rosengarten, secretary. The Philadelphia Equipment Securities Company will issue car trust bonds secured by equipment trust certificates created by electric railways and railroads in connection with their purchases of equipment. Before undertaking the purchase of an issue of trust certificates it will require a satisfactory statement of the earnings and resources of the railway, evidence that the purchase of the new cars is warranted, and that the railway is in a position properly to maintain the property. The Securities company will agree with the railway as to specifications for cars, trucks, motors and complete equipment, in order to be sure that the cars are of types suitable for general use and that the design, materials and workmanship are such as will insure long life. The Securities company will supervise the creation of car trust certificates which in amount will equal, say, 75 per cent of the cost of the cars and equipment. It will deposit the car trust certificates with a trust company and will issue its own 5 per cent serial gold bonds secured by the deposit of the certificates.

Dividend Payments of New York State Roads

The records for the Public Service Commission of the Second District of New York show that for the year ended June 30, 1912, the electric railways of the State which are under the jurisdiction of that body paid dividends amounting to $2,992,834 on common stock and $586,744 on preferred stock. The companies and the rate of dividends are as follows:

Auburn & Northern Electric Railroad, 3 per cent preferred; Auburn & Syracuse Electric Railroad, 6 per cent preferred; Binghamton Railway, 5 per cent common; Cohoes Railway, 4.5 per cent common; Hornell Traction Company, 4 per cent common; International Railway, 4 per cent common; New York & Stamford Railway, 1.75 per cent common; New York State Railways, 6 per cent common, 5 per cent preferred; Orange County Traction Company, 2⅛ per cent preferred; Oneida Railway, 3 per cent common; Plattsburg Traction Company, 6 per cent common; Schenectady Railway, 6 per cent common; Syracuse & Suburban Railway, 3.75 per cent common; Syracuse Rapid Transit Railway, 4 per cent common, 6 per cent preferred; Utica & Mohawk Valley Railway, 5 per cent common, 5 per cent preferred; Troy & New England Railway, 4.5 per cent common; United Traction Company, 2 per cent common; Western New York & Pennsylvania Traction Company, 6 per cent preferred.

Application of the Pacific Electric Railway to Issue Bonds

The Pacific Electric Railway, Los Angeles, Cal., has applied to the Railroad Commission of California for authority to issue refunding mortgage fifty-year gold bonds to the amount of $7,034,000. The application states that the company proposes to apply the proceeds from the sale of the bonds to the following improvements which are already under way:

Extensions and branches	$3,428,518
Additional main tracks	43,567
Tunnels, bridges, etc	444,609
Real estate	39,976
Stations, shops, etc	156,788
Light and power plants	216,962
Water and water rights	940
Rolling stock	1,554,911
Additions and betterments	699,410
Total	$6,585,682

Against this amount the company has already issued bonds to the amount of $930,348, leaving a balance against which it now desires to issue bonds to the amount of $5,655,333. The company desires also to issue bonds against new work which has been projected but not yet begun, as follows:

Construction	$530,940
Equipment	117,160
Additions and betterments	1,076,130
Total	$1,724,230

The projected improvements cover the principal lines of the Pacific Electric Railway in southern California. The larger items enumerated in the application are as follows: Improvements to Covina-San Dimas line, $53,000; Riverside-Colton-San Bernardino line, $408,000; Glendale-Burbank line, $53,000; Lankershim extension, $236,000; Magnolia Avenue line, $76,000; Pasadena city lines, $97,000; San Bernardino extension, $1,424,000; Van Nuys extension, $42,000; Dominguez town site line, $46,000; San Pedro-Hermosillo line, $42,000; Torrance line, $42,000; Van Nuys extension, $42,000; Van Nuys-San Fernando line, $213,000; Van Nuys-Owensmouth, $215,000; Watts-Homeward line, $108,000; Santa Ana-Orange line, $64,000; South Pasadena cut-off, $150,000; tunnels, bridges, etc., $444,000; stations, shops, etc., $156,000; Redlands-San Bernardino line, $43,000; San Bernardino-Highlands line, $105,000; Alamitos-Bay City line, $24,000; Covina line, $34,000; Gardena-Strawberry Park line, $17,000; Hawthorne-El Segundo line, $161,000; Pasadena local lines, $40,000; Santa Ana line, $76,000; Uplands-San Antonio line, $25,000; Del Rey-Redondo line, $87,000; Hermosa Beach line, $44,000; Redondo Beach line, $175,000; Whittier-La Habra line, $105,000.

In addition the application enumerates improvements throughout the entire Pacific Electric system which the company proposes to make from the proceeds of the bonds.

Chicago Surface and Elevated Railway Merger Proceedings

In compliance with its instructions, the sub-committee of the local transportation committee of the Chicago City Council has recommended a plan of reconciling the real estate valuations as presented by the city and the elevated railways. It was the sense of this committee that the Chicago Real Estate Board should appoint three of its members to review the valuations as presented by both parties interested and make recommendations as to what they consider a fair reconciliation of the two valuations. This recommendation was approved, and in pursuit of the request of the local transportation committee, the Chicago Real Estate Board appointed the following gentlemen to serve on the reconciliation committee: Edward M. Willoughby, Marvin A. Farr and John F. Wallace. In view of the fact that those negotiating the general merger are doing so with a view to referring it to the people at the spring election, the members of the real estate committee were urged to place their recommendation before the local transportation committee as soon as possible.

Amarillo (Tex.) Street Railway.—The property of the Amarillo Street Railway has been sold to Henry L. Doherty & Company, New York, N. Y.

American Railways, Philadelphia, Pa.—An initial quarterly dividend of 1¾ per cent has been declared on the new preferred stock of the American Railways, payable on Feb. 15, 1913, to holders of record of Jan. 31, 1913.

Aroostook Valley Railroad, Presque Isle, Me.—The Quebec Extension Railway is seeking incorporation with a capital stock of $4,000,000 for the purpose of taking over the Aroostook Valley Railroad.

British Columbia Electric Railway, Vancouver, B. C.—The London *Economist* notes in its issue of Jan. 4, 1913, the "issue of £750,000 of 4¼ per cent perpetual consolidated debenture stock at 98, ranking *pari passu* with the existing stock. The total authorized issue is limited to the amount of share capital issued and paid up for the time being. The stock is secured by a first floating charge on the undertaking, subject to £223,600 first mortgage debentures and £104,100 Vancouver power debentures. The company was formed in 1897, and the prospectus gives the net earnings for eight years back, showing a continual rise. Dividends of 8 per cent have been paid on the ordinary capital for the past five years. The issued share capital is £3,600,000 in equal amounts (£1,200,000) of 5 per cent cumulative preference, 5 per cent preferred ordinary and deferred ordinary stock. The stock is well secured on the present basis of earnings, but the comparatively low yield of £4 7s does not allow much scope for appreciation."

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Eli M. West, receiver of the Columbus, Delaware & Marion Railway, has applied to the court for permission to issue $25,000 of receivers' certificates to provide funds to extend the power plant in Marion.

Columbus Railway & Light Company, Columbus, Ohio.—An agreement is reported to have been reached which it is believed will result in a settlement of the differences which have existed since the original proposition was made for the reorganization of the Columbus Railway & Light Company. The plan contemplates the elimination of the leasing scheme and the organization of a company to include all of the interests concerned. For the purpose of working out the details of the plan a committee made up of two men selected by each of the interests was chosen as follows: W. C. Willard and F. R. Huntington, representing the Columbus Railway; Adolph Theobold and John Seibert, representing the Columbus Light, Heat & Power Company; George Hardy and Randolph S. Warner, representing the Columbus Traction Company, and C. M. Clark and C. G. McMeen, representing the Columbus Railway & Light Company. The committee elected Mr. Huntington as chairman and Mr. Willard as secretary. The details of the plan have not been made public, but it is said that one of the new conditions is the exchange of the common stock of the Columbus Railway for the common stock of the new company share for share. The stock of the Columbus Railway & Light Company will, it is said, be assessed $20 a share and exchanged on the basis of six shares of stock of the new company for every ten shares of stock now held.

Detroit (Mich.) United Railway.—The Detroit & Port Huron Shore Line Railway, operated by the Detroit United Railway under the name of the Rapid Railway System, has been authorized by the Railroad Commission of Michigan to increase the amount of its outstanding capital stock from $2,000,000 to $2,075,000, to reimburse the Detroit United Railway for expenditures made for extensions and improvements.

Federal Light & Traction Company, New York, N. Y.—White, Weld & Company, New York, N. Y., are offering for subscription at 98 and accrued interest 6 per cent debentures of the Federal Light & Traction Company, due March 1, 1922, to yield 6.25 per cent. The total authorized issue is $1,500,000.

Frederick (Md.) Railroad.—Announcement has been made by President E. L. Coblentz of plans for the consolidation of the Frederick Railroad, the Hagerstown Railway, the Frederick & Hagerstown Power Company and the Frederick Gas & Electric Company.

Gary & Interurban Railway, Gary, Ind.—The Gary & Interurban Railway has been incorporated in Indiana with a capital stock of $5,000,000, of which $1,000,000 is preferred and $4,000,000 is common stock, to consolidate the Gary & Interurban Railway, the Gary Connecting Railways, the Valparaiso & Northern Railway and the Goshen, South Bend & Chicago Railroad. The officers of the new company are: Frank M. Gavit, Whiting, president; Alexander Miller, Chicago, vice-president and general manager.

Georgia Railway & Power Company, Atlanta, Ga.—Louis B. Magid has withdrawn the suit for $2,181,000 against the Georgia Railway & Power Company which he was prosecuting in the federal court and the suit which he brought in the state court to dissolve the company. Attorneys representing Mr. Magid say that an agreement has been reached between Mr. Magid and the officers of the company for an adjustment of the differences out of court. Mr. Magid charged in the suit before the federal court that the Georgia Railway & Power Company did not carry out a contract entered into by him with the Atlanta Power Company previous to the merger.

Indiana Railways & Light Company, Kokomo, Ind.—Spencer Trask & Company, New York, N. Y., are offering for subscription at 94 and interest to yield 5.40 per cent a limited amount of first and refunding mortgage sinking fund 5 per cent thirty-year gold bonds of the Indiana Railways & Light Company. The bonds are dated Dec. 10, 1912, are due Jan. 1, 1943, and the total amount now outstanding is $1,180,000 out of an authorized issue of $5,000,000. The new company is a consolidation of the Kokomo, Marion & Western Traction Company, the Kokomo, Frankfort & Western Traction Company and the Kokomo Public Utility Company.

Indianapolis, Columbus & Southern Traction Company, Columbus, Ind.—John W. Suverkrup and W. B. Treadway have been elected additional directors of the Indianapolis, Columbus & Southern Traction Company, the property of which is leased to the Interstate Public Service Company.

La Crosse (Wis.) City Railway.—It is understood that the protective committee of bondholders of the La Crosse Water Power Company has exercised the option which it has had on the property of the La Crosse City Railway and that the plans will now be carried out which have been under way for some time to merge the La Crosse Water Power Company, the La Crosse City Railway and the Winona Railway & Light Company. The incorporation of the Wisconsin Railway, Light & Power Company, Milwaukee, Wis., recently by N. F. Adams, J. B. Black and J. G. Hardgrove is reported as one of the steps in the proposed deal.

London & Port Stanley Raiway, London, Ont.—The City Council of London, Ont., has referred to its finance committee a motion that the city apply to Parliament for an act which would enable the city to foreclose the mortgage which it holds against the property of the company. The plan of the author of the new measure would then be to have the city purchase the property at the foreclosure sale and bond the railway to provide funds to equip the line with electricity.

Mississippi Valley Electric Company, Iowa City, Ia.—The Mississippi Valley Electric Company, which has been formed by J. O. Schulze, president and general manager of the Iowa City Electric Railway, and his associates, is reported to have arranged to take over the property of the Iowa City Electric Railway and the Mankato (Minn.) Electric Traction Company. The Mississippi Valley Electric Company is capitalized at $1,450,000.

New England Investment & Security Company, Springfield, Mass.—Lawrence Minot has resigned as a trustee of the New England Investment & Security Company.

New Midland Power & Traction Company, Cambridge, Ohio.—The property of the New Midland Power & Traction Company has been sold to the United Service Company, Scranton, Pa. It is understood that plans are being made by the new owners to build a transmission line to connect Cambridge, Coshocton and New Philadelphia. New officers have been elected for the New Midland Power & Traction Company as follows: F. B. Atherton, Scranton, Pa., president; Philip Barnhard, Scranton, vice-president; George G. Brooks, Scranton, secretary and treasurer. The directors of the company are: F. B. Atherton, Scranton; Philip Barnhard, Scranton; George G. Brooks, Scranton; E. A. Crawford, Coshocton, and C. W. Bedford, Scranton. On Feb. 1, 1910, the United Service Company purchased the light and power plant in New Philadelphia previously operated by the Tuscarawas County Electric Light & Power Company.

Northwestern Ohio Railway & Power Company, Toledo, Ohio.—The Northwestern Ohio Railway & Power Company, which purchased and assumed control of the property of the Toledo, Port Clinton & Lakeside Railway in July, 1912, has reorganized as follows: W. S. Barstow, New York, N. Y., president; J. B. Taylor, vice-president; O. Clement Swenson, secretary and treasurer; C. N. Hawley, general freight and passenger agent and auditor; O. R. Sturzinger, superintendent; E. A. Burrill, general manager.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—John Black, of Sheridan, Black & Company, Baltimore, Md., and his associates are reported to have arranged to purchase the holdings of Reese Blizzard and the late C. H. Shattuck in the Parkersburg, Marietta & Interurban Railway. The deal is said to involve 988 shares of a total of 8000 shares of stock outstanding, the purchase price being $148,200, or $150 a share.

Pottsville (Pa.) Union Traction Company.—The stockholders of the Pottsville Union Traction Company on Jan. 27, 1913, voted to increase the bonded indebtedness of the company from $1,250,000 to $2,250,000 to provide funds for improvements.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—E. W. Clark & Company, Philadelphia, Pa., announce that more than 85 per cent of the $3,500,000 of common stock of the St. Joseph Railway, Light, Heat & Power Company has been deposited under the offer of $60 a share made for the stock by Henry L. Doherty & Company, New York, N. Y., and the sale to the latter firm is declared operative. An initial payment of $10 a share will be made on Feb. 1, 1913. A second payment of $15 a share will be made on Aug. 1, 1913, and from this payment E. W. Clark & Company will deduct a commission of $1 a share. A third payment of $15 a share will be made on Feb. 1, 1914, and the final payment of $20 a share will be made on Aug. 1, 1914. Deferred payments until Feb. 1, 1914, bear 5 per cent interest and after that date 6 per cent interest, but the purchasers may anticipate any or all payments.

San José (Cal.) Terminal Railways.—The Railroad Commission of California has authorized the San José Terminal Railway to issue $200,000 of bonds for the construction of an electric railway from San José to Alviso, at tidewater. Arrangements have been made with an existing boat line to handle traffic between Alviso and San Francisco.

Twin City Rapid Transit Company, Minneapolis, Minn.—The annual meeting of the Twin City Rapid Transit Company was held in New York on Jan. 28, 1913. The principal statements in the report of the company for the year ended Dec. 31, 1912, as presented at the meeting, compare as follows with those contained in the report for the year ended Dec. 31, 1911: Gross receipts for 1912, $8,208,967, as against $7,811,193 for 1911; operating expenses for 1912, $4,198,001, as against $3,906,716 for 1911; net revenue for 1912, $4,010,966, as compared with $3,904,476 for 1911; dividends for 1912 on preferred and common stock, $1,416,000, as against $1,416,000 in 1911; surplus from operation for 1912, $1,065,735, as against $1,002,347 for 1911; appropriations for renewals in 1912, $775,000, as against $750,000 for 1911; income account surplus, 1912, $290,735, as against $252,347 in 1911. The office of general manager of the company held by Horace Lowry has been abolished and Mr. Lowry has been elected first vice-president; John R. Mitchell has been elected second vice-president, and A. M. Robertson has been elected third vice-president. E. W. Decker, president of the Northwestern National Bank, Minneapolis, has been elected a director to succeed the late Judge M. B. Koon.

Underground Electric Railways, London, Eng.—The holders of more than 75 per cent in the aggregate of the ordinary, preferred ordinary and deferred ordinary stock of the Central London Railway and of considerably more than 75 per cent of the ordinary stock of the City & South London Railway having agreed to transfer their holdings pursuant to the proposals made recently by the Underground company, the offer has become operative.

Vicksburg Light & Traction Company, Vicksburg, Miss.—Elston, Clifford & Company, Chicago, Ill., are offering at par and interest $200,000 of ten-year debenture gold bonds of the Vicksburg Light & Traction Company.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., 2½ per cent, preferred.

United Power & Transportation Company, Philadelphia, Pa., $1.79.

ELECTRIC RAILWAY MONTHLY EARNINGS

JACKSONVILLE (FLA.) TRACTION COMPANY.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus
1m.,	Nov.	'12	$17,214	*$22,451	$5,237	$10,602	$15,840
1 "	"	'11	45,703	*27,814	17,889	9,196	8,693
12 "	"	'12	565,002	*375,023	189,979	117,420	72,559
12 "	"	'11	571,855	*349,358	222,496	96,414	126,082

JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.

1m.,	Dec.,	'12	$49,723	$27,980	$21,743	$12,541	$9,202
1 "	"	'11	44,311	24,795	19,516	12,922	6,594
12 "	"	'12	533,548	315,927	217,621	152,753	64,868
12 "	"	'11	468,550	274,822	193,728	152,740	40,988

KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.

1m.,	Nov.,	'12	$57,649	*$30,512	$27,137	$19,370	$7,767
1 "	"	'11	50,808	*32,746	18,063	17,127	935
5 "	"	'12	331,096	*184,424	146,672	90,496	56,176
5 "	"	'11	313,155	*187,307	125,848	87,655	38,193

NORTHERN TEXAS ELECTRIC CO., FORT WORTH, TEXAS.

1m.,	Nov.,	'12	$169,151	*$85,063	$84,088	$24,662	$59,426
1 "	"	'11	133,202	*73,348	59,854	21,681	38,174
12 "	"	'12	1,762,985	*928,360	834,625	261,738	572,887
12 "	"	'11	1,607,690	*882,274	725,416	245,384	480,032

PADUCAH TRACTION & LIGHT CO., PADUCAH, KY.

1m.,	Nov.,	'12	$25,550	*$16,934	$8,617	$7,306	$1,311
1 "	"	'11	23,455	*14,384	9,072	7,069	2,003
12 "	"	'12	285,494	*190,848	94,646	86,095	8,551
12 "	"	'11	262,758	*159,255	103,502	80,698	22,804

PENSACOLA (FLA.) ELECTRIC CO.

1m.,	Nov.	'12	$24,560	*$14,219	$10,341	$6,377	$3,964
1 "	"	'11	25,602	*15,162	10,441	5,092	5,349
12 "	"	'12	285,900	*177,224	908,676	76,470	32,206
12 "	"	'11	287,969	*178,756	109,214	59,876	49,338

PUGET SOUND TRACTION LIGHT & POWER CO., EVERETT, WASH.

1m.,	Nov.,	'12	$710,309	*$368,174	$324,134	$169,277	$154,858
11 "	"	'12	7,588,206	*4,355,594	3,232,613	1,803,274	1,429,339

SAVANNAH (GA.) ELECTRIC CO.

1m.,	Nov.,	'12	$63,440	*$46,699	$16,740	$16,695	$45
1 "	"	'11	63,331	*47,425	15,906	15,395	511
12 "	"	'12	740,690	*547,841	192,849	193,037	188
12 "	"	'11	688,103	*503,152	184,951	184,030	921

TAMPA (FLA.) ELECTRIC CO.

1m.,	Nov.,	'12	$62,146	*$32,604	$29,541	$4,466	$25,075
1 "	"	'11	60,318	*30,654	29,664	4,484	25,180
12 "	"	'12	753,428	*394,869	358,559	53,515	305,044
12 "	"	'11	672,187	*371,036	301,151	59,288	241,863

*Includes taxes.

Traffic and Transportation

Street Railway Service in Milwaukee

John H. Roemer, chairman of the Railroad Commission of Wisconsin, has written a letter in part as follows to Alderman W. C. Wehe of Milwaukee in regard to the inquiry which the commission is conducting into the question of service furnished by The Milwaukee Electric Railway & Light Company:

"It was my wish that a general order could be entered covering the headway on all the lines in Milwaukee by Sept. 1, 1912. Since then the multiplicity of complaints that have reached the commission has rendered a general order impossible. To increase the headway on certain lines will only increase the congestion and render the service less desirable than at present. The situation is being studied carefully by Mr. Larson and others of our engineering staff. There can be no service that will be reasonably adequate until the franchises which the commission has recommended are granted and the lines built in accordance therewith. About Dec. 1, 1912, the commission recommended to the Council that the following franchises be granted to the company: On Wells Street from Eleventh Street to West Water Street; on Seventh Street from State to Wells Street; on Sixth Street from Wells Street to Grand Avenue; on Twenty-seventh Street from State Street to National Avenue; on Mason Street from Jackson to Marshall Street; on Marshall Street from Mason to Wisconsin Street; on Cass Street from Mason to Wisconsin Street.

"These franchises were recommended after an extended study had been made of requirements of the situation. It is the purpose of the commission to make definite orders for betterment of the street car service, but no great improvement is possible until a system of rerouting can be evolved which will relieve portions of the congested district downtown. You can readily understand that to try to decide upon a system of rerouting before we know what streets the company will be permitted to occupy with its tracks is quite impossible. We have made tentative plans for rerouting, but cannot issue orders, nor can we make these plans public, until we know positively what the Council will condescend to grant in the way of franchises.

"It is not only necessary that franchises be granted but it is equally important that the question of the particular service to which tracks shall be put be excluded from the ordinances granting the franchises and be left entirely to the commission. It is especially necessary that these franchises be free from conditions and restrictions which are of very little benefit to the city but which serve to render it unwise for the company to accept them. When the necessary franchises are granted in the proper form, the commission can compel the company to furnish service throughout the city that will be reasonably satisfactory to all its patrons. In the meantime the commission must necessarily confine regulation to minor details with a view of alleviating the most aggravated conditions.

"In this connection it is the purpose of the commission to issue temporary orders very soon relating to several matters of detail which it is believed will render the service somewhat more satisfactory until general orders of a permanent nature can properly be made. Of course you realize that the average citizen does not, and in the nature of things cannot, appreciate the difficulties that are involved in a complex system of street railway service in a great city. He knows that the service he is receiving is inadequate and should be improved. He also realizes that it is the duty of the railroad commission and the company to improve the service. I will advise you within a few days in regard to what requirements will be made for the present on certain lines which seem to have the poorest service in the city."

Strike of Linemen in Macon Abandoned.—The linemen of the Macon Railway & Light Company, Macon, Ga., have abandoned the strike which they brought to force the company to increase their wages. They have agreed to return to work at the old rate of $3 a day.

New Mileage Book of the Chicago, South Bend & Northern Indiana Railway.—The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is preparing to place on sale in the near future 600-mile books, which it is proposed to sell at $8.75, making the rate 1¾ cents per mile.

Accident at Lockport.—One man was killed and a score were injured, two probably fatally, in a collision between a passenger train and a freight train on the International Railway at Lockport, N. Y., on Jan. 25, 1913. The freight train was standing on the main line about half a mile south of the company's station when the passenger train of two cars crashed into it.

Illinois Central Decides to Reduce Round-Trip Rates.—The Illinois Central Railroad has decided to restore the round-trip fare rates which were in effect before Jan. 1, 1913, but to continue in force the recent increase in single fares. The old rate on round-trip fares is a little less than 1½ cents per mile. The change in the round-trip rates proved very unpopular.

Question of Service in New York.—The Board of Aldermen of New York has adopted a resolution "demanding" that the Public Service Commission "issue effective orders" for better service on the surface car lines of the city. The resolution also calls on the commission to furnish the board with a record of service for the past six months and "an explanation of the steps it takes to see that the companies maintain an efficient schedule."

Detroit Fare Cases to Be Heard in the Fall.—The United States Supreme Court has consented to a postponement of the "workingmen's ticket case," involving the fare over the lines of the United Railways, Detroit, Mich., from Jan. 27, 1913, until such time as the "5-cent fare case" comes up on the docket in October. The cases will then be consolidated and argued as one. Both cases involve the question of fare over the company's line between Detroit and Fairview.

Interurban Terminal System of Indianapolis Inspected.—Charles E. Taylor, Mayor of Little Rock, Ark., J. H. Hollis and George Pardee, Little Rock, visited Indianapolis recently to study the operation of the interurban electric railways which are run into that city and the method of operation of the Indianapolis traction terminal station in the interest of the city of Little Rock, where franchises are pending before the City Council for the operation of interurban lines into the city.

Collision on New York Elevated Railway.—In a rear-end collision on Jan. 25, 1913, on the Third Avenue elevated line of the Interborough Rapid Transit Company, New York, N. Y., at Thirty-second Street one person was killed and a score or more were injured. Traffic on both the up-town and the down-town lines of the elevated railway was interrupted for a period of several hours as a consequence and service was also delayed on the Third Avenue Railway, which parallels the elevated railroad.

Increase in Wages in San Antonio.—Effective on Feb. 1, 1913, the San Antonio (Tex.) Traction Company increased the wages of its trainmen as follows: First six months, 20 cents an hour; next twelve months, 21 cents an hour; next twelve months, 22 cents an hour; next twelve months, 23 cents an hour; next twelve months, 24 cents an hour; next twelve months, 25 cents an hour; next twelve months, 26 cents an hour. The wages heretofore paid were: First year, 20 cents an hour; second year, 21 cents an hour; third year, 22 cents an hour, etc., up to 25 cents an hour, that being the maximum.

Maintaining Service in Spite of High Water.—During the recent floods which have been inundating the lowlands in the valley of the Ohio River and its tributaries many electric railways have been maintaining schedule under difficulties. On the branch of the Fort Wayne & Northern Indiana Traction Company's line between Lafayette, Ind., and the rural districts on the west side of the Wabash River approximately 2000 ft. of track has been entirely under water. At its deepest points the water was 18 in. above the rails. In order to give service over this branch motors were set upon the floor of an old trailer well out of reach of the water and arranged to drive the car from that position.

Denver Ordinance to Require Heating of Car Vestibules Vetoed.—Mayor Arnold of Denver, Col., has vetoed the ordinance to require the Denver City Tramway to install heating apparatus in the vestibules of its cars. The veto message to the Council was accompanied by a letter from John A. Beeler, vice-president and general manager of the company. Mr. Beeler explained that it would be physically impossible to comply with the ordinance within the time limit of thirty days. He said that the company was building a stepless car which provides for a system of heating the vestibule as required in the ordinance, and that the company proposes to submit the matter of heating the vestibules to the motormen and to be guided by the opinion of the men as expressed in a vote.

Increase in Fare up to Patrons.—The Morris County Traction Company, Morristown, N. J., which operates into Elizabeth over the tracks of the Public Service Railway as far as the station of the Central Railroad of New Jersey, has submitted to its patrons the matter of the fare to be charged by the company in that city. The company is willing to continue the service into the city if the passengers within the city limits will agree to an extra charge of 2½ cents for the service within the city, or it will operate only to the city line, charging a fare of 5 cents from Union to that point. An effort was made to have the Public Service Railway reduce the charge which it exacts for the operation of the cars of the Morris County Traction Company over its Elizabeth lines, but that company did not feel that it could consistently consent to a reduction.

Employees Before New York Commission.—Members of the joint conference board of the Amalgamated Association of Street & Electric Railway Employees of America met with the members of the Public Service Commission for the Second District of New York recently and requested the commission to take up with street and interurban railways in New York State the installation of certain devices to safeguard employees in operating cars and the public using them. These suggestions included equipping double-truck cars in cities with air brakes, vestibuling rear ends of closed cars, uniform location of sand-box levers, placing sand boxes on all cars, substitution of convertible car with aisle through center for the open cars with running boards, stools for motormen and conductors, block signal systems on interurban lines and uniform headlights. The men said that they deemed it advisable to bring these matters to the attention of the commission at this time so that it might be guided in its investigations of conditions in New York State.

English Inspection Party.—A party of eight London bankers, including E. Mackay Edgar, the active head of Sperling & Company, London, Eng., left New York on a special train on Jan. 23, 1913, for a two weeks' tour of the country for the purpose of inspecting various public utilities, some of which have been financed in part by banking houses represented by the visitors. James Mitchell, president of the Alabama Interstate Power Company, who came over from London with the party, W. W. Freeman and F. Darlington, vice-president and consulting engineer respectively of the same company, have also gone with the visitors on the tour. The itinerary includes Montreal, Toronto, Niagara Falls, St. Louis, Joplin, Denver, Keokuk, Nashville, New Orleans and Birmingham. Among the properties to be visited are those of the Utilities Improvement Company, the Cities Service Company, the Mississippi River Power Company, the Consolidated Cities Traction, Light & Power Company, the American Cities Company and the Alabama Interstate Power Company. It is understood that after their return to New York the visitors plan to inspect the public utilities of Mexico and Cuba before leaving for home.

Decision of Commission in Complaint Against Ohio Road.—The Public Service Commission of Ohio has rendered a decision in the complaint of the Ralston Steel Car Company and others against the Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio. The commission found that the allegations that the rates of fare were unreasonable were not sufficiently definite to justify any order in this connection and that the complaint that the company refuses to sell tickets in Columbus according to law and to receive its own tickets between two points going in either direction was not sustained by the evidence. The commission has, however, ordered the company to renew and put in proper repair all bonds which connect its rails from the corporate limits of Columbus to the eastern terminus of the road, and to provide cross-connecting bonds between its rails at intervals of not more than 1000 ft. throughout the entire length of the road. This work is to be completed within ninety days. The company is also ordered to secure and place in service within four months from the date of the service of the order at least one freight car equipped with motors. The commission has also ordered the Columbus, New Albany & Johnstown Traction Company to overhaul and repair two of its passenger cars.

Aurora, Elgin & Chicago Freight and Express Folder.—The Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has issued a booklet to acquaint the shipping public with the fact that the company is handling freight in carload and less than carload lots, as well as express matter. Carload freight is received at the Fifty-second Avenue terminal steam track situated at Fifty-second Avenue and Harrison Street, Chicago. Cars also may be loaded on the various steam tracks and private sidings on any steam road in Chicago. In addition to this information, the folder supplies the shippers with information as to belt-line connections, connecting steam roads, steam tracks and industries served by the electric line. It also states that less than carload shipments will be received at the Fifty-second Avenue freight house in Chicago, as well as at the different stations along the line. The express service on the Aurora, Elgin & Chicago Railroad includes two round trips daily between Aurora and Elgin, and one round trip between Aurora and Yorkville. Wagon pick-up delivery service is maintained at Aurora, Batavia, Geneva, St. Charles and Elgin. Traffic agreements have been made with the Joliet & Southern Traction Company, with connections at Aurora, and the Chicago, Ottawa & Peoria Railroad, with which it connects by way of the Joliet & Southern Traction Company at Joliet. It also has a through traffic agreement with the Chicago, Aurora & De Kalb Railroad, the Elgin & Belvidere Electric Company and the Rockford & Interurban Railway.

Service in Rochester.—At a meeting held in the office of Mayor Edgerton of Rochester, N. Y., on Jan. 23, 1913, to consider street railway service in the city there were present the Mayor, E. J. Cook, general manager of the New York State Railways, Rochester Lines; Charles R. Barnes, of the Public Service Commission of the Second District of New York, and the members of the law and the railroad committees of the City Council. Mr. Cook said that the company was expending $8,000 to maintain a department for the sole purpose of learning wherein the service of the company could be improved. All complaints that were received were investigated carefully. Mr. Barnes said that very complete records were kept by the company of the trend of traffic, and that he had verified with the inspectors of the commission many of the data in the possession of the company. It would not be practicable for the commission to go into every city in which it has jurisdiction and attempt to do the amount of checking that has been done by the Rochester company. Mr. Barnes said that after the rerouting was put into effect in Rochester recently the service was checked to determine whether the relief given was sufficient, and this checking revealed that on every line in the city the service was inadequate owing to the irregularity of the car movement. Mr. Barnes continued: "In regard to the steps taken to determine the cause of this irregularity I will say that Mr. Cook and I have made plans to learn the cause of delay to every car, and as soon as this work is done, which will be in two or three weeks, I shall be able to tell just how much added service is needed and at what time of the day it should be given. So far the investigation has shown that there are three main causes of the delay to the running of cars. The first of these is the operation of the carhouse in State Street. The second cause is congestion due to the interurban cars being routed through the center of the city. The third and most important is the fact that the city has outgrown the single-track lines and every single-track line in the city should be double-tracked."

Personal Mention

Mr. H. E. Jackson, who has been train dispatcher of the Central California Traction Company, San Francisco, Cal., has been appointed trainmaster of the company, a newly created position.

Mr. A. M. Robertson was re-elected secretary of the Twin City Rapid Transit Company, Minneapolis, Minn., at the annual meeting in New York on Jan. 28, 1913, and was in addition elected third vice-president of the company.

Mr. F. A. Miller has resigned as superintendent of power and equipment of the Central California Traction Company, San Francisco, Cal., to accept a similar position with the Oakland, Antioch & Eastern Railroad, with headquarters at Oakland, Cal.

Mr. W. E. Rose, who has been connected with the Richmond, East Shore & Suburban Railway, Richmond, Cal., has been appointed master mechanic of the Central California Traction Company, San Francisco, Cal., in charge of rolling stock, shops and carhouses.

Mr. E. C. Davis, who has been connected with the Central California Traction Company, San Francisco, Cal., as a lineman, has been appointed superintendent of power of the company, in charge of all substations, overhead lines and the signal system. Power is rented by the company from the American River Electrical Company.

Mr. John S. Kennedy has resigned as secretary of the Public Service Commission of the Second District of New York and will leave the service of the State some time prior to March 1. Mr. Kennedy has been secretary of the commission since its inception and was formerly connected with the Railroad Commission of the State of New York.

Mr. R. F. Cummins has resigned as secretary and general manager of the Marion, Bluffton & Eastern Traction Company, Bluffton, Ind. Mr. Cummins has been connected with the company since the road was placed in operation about six years ago. Mr. L. C. Davenport, receiver of the company, will act as general manager for the present.

Mr. Frank H. Miller, superintendent of motive power of the Louisville (Ky.) Railway, has been elected president of the Engineers and Architects' Club of Louisville for the coming year, to succeed Mr. Theodore A. Leisen, chief engineer of the Louisville Water Company. Mr. Samuel Riddle, superintendent of transportation of the Louisville Railway, has been elected first vice-president and a director of the organization.

Mr. George A. Northcott has been appointed superintendent of the Otsego & Herkimer Railway, Hartwick, N. Y., to succeed Mr. Claude O. Weidman, who has become connected with the Morris County Traction Company, Morristown, N. J. Mr. Northcott was connected with the Detroit (Mich.) United Railway for many years, and for the last six years has been superintendent of the London & Lake Erie Railway & Transportation Company, London, Ont.

Mr. Horace Lowry, who has been general manager of the Twin City Rapid Transit Company, Minneapolis, Minn., was elected first vice-president of the company at the annual meeting held in New York on Jan. 28, 1913. Mr. Lowry was appointed general manager of the company on Jan. 1, 1912. He is the only son of the late Thomas Lowry, former president of the company. A portrait and biography of Mr. Horace Lowry were published in the ELECTRIC RAILWAY JOURNAL on Jan. 6, 1912.

Mr. H. H. Geiger has been appointed superintendent of transportation of the Wilmington & Philadelphia Traction Company, Wilmington, Del., to succeed Mr. William H. Hitchcock, who, as previously noted in the ELECTRIC RAILWAY JOURNAL, has become connected with the Trenton & Mercer County Traction Corporation, Trenton, N. J. Mr. Geiger has been connected with the Wilmington & Philadelphia Traction Company for twenty-three years. He started as a driver in the horse car days and about eight years later was made office clerk. He was subsequently appointed chief dispatcher and then served as assistant superintendent and as division superintendent.

Mr. Alexander Shane, for the past two years general manager of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., resigned that position recently to become associated with the safety bureau which has been instituted in Chicago to have supervision over the electric railways and other properties controlled by the Middle West Utilities Company, which was organized by Samuel Insull and Martin J. Insull. Mr. Shane has been identified with railway work for forty-five years past, and is particularly well fitted for a position on the safety bureau, which will play an important part in the operation of the Insull properties hereafter. The Indianapolis, Columbus & Southern Traction Company was recently taken over under lease by the Insull interests.

Mr. N. P. Baker has been elected treasurer of the International Railway, Buffalo, N. Y. Before becoming connected with the International Railway Mr. Baker served in various capacities with steam railroads. On Jan. 1, 1906, he resigned as superintendent of a division of the Maine Central Railroad to become superintendent of the Niagara Falls division of the International Railway with headquarters at Niagara Falls, N. Y. He continued in this capacity until August, 1906, when he was appointed assistant general manager of the company. On Jan. 15, 1910, he was elected treasurer of the International Railway and on April 15, 1911, was appointed superintendent of the Niagara Falls, the Buffalo & Lockport and the Olcott divisions. On Jan. 1, 1913, he was again elected treasurer of the International Railway.

Mr. Joseph K. Choate, general manager of the Morris County Traction Company, Morristown, N. J., has also been elected vice-president of the company. Mr. Choate was formerly general manager of the Otsego & Herkimer Railroad. He was born on Aug. 22, 1854, in Salem, Mass., and was graduated from the University of Colorado. He began his career as a civil engineer and entered railway work in 1881 with the Pennsylvania Railroad as supervisor of track on the New York division. Subsequently he served with the Erie Railroad, the Erie & Wyoming Valley Railroad, the Union Pacific Railroad and the Nevada Central Railroad. In 1900 he engaged in independent consulting engineering work. In this connection he acted as consulting engineer to the Otsego & Herkimer Railroad and in 1907 was made general manager of the company.

Mr. Frank F. Fowle has resigned from the McGraw Publishing Company as one of the editors of the *Electrical World* and will resume his electrical engineering practice with offices in New York. Mr. Fowle was graduated from the Massachusetts Institute of Technology, electrical engineering course, in 1899. He was connected with the engineering department of the American Telephone & Telegraph Company in New York from 1899 to 1903 and with the railway department of the same company in New York from 1903 to 1906. From 1906 to 1908 he was with the operating department of the American Telephone & Telegraph Company as manager of the Chicago territory of the long-distance system with headquarters in Chicago. From 1908 to 1912 he was in business in Chicago as a consulting electrical engineer. Upon the retirement of Mr. W. D. Weaver as editor of the *Electrical World* on May 1, 1912, Mr. Fowle became one of the joint editors in charge.

Mr. J. N. Bidwell, whose appointment to the signal department of the engineering staff which jointly serves the Railroad Commission of Wisconsin and the Wisconsin Tax Commission, to succeed Mr. M. H. Hovey was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 20, 1912, was born at Buffalo, N. Y., and was educated in the schools of that city. His early experience included work on the construction of the dam in the Merrimac River at Concord, N. H.; service with the New York Central & Hudson River Railroad and with the International Traction Company, Buffalo, N. Y. He entered signal work as a draftsman for the General Railway Signal Company in February, 1906, and subsequently filled the positions of office engineer for the Illinois Central Railroad, draftsman for the Rock Island Lines and construction foreman for the American Railway Signal Company. He was appointed assistant in the signal department of the engineering staff of the Wisconsin commissions in May, 1910.

Mr. A. D. Furlong, whose election as vice-president and appointment as general manager of the Springfield Consolidated Railway, Springfield Gas Light Company and

Springfield Light, Heat & Power Company, Springfield, Ill., were noted in the ELECTRIC RAILWAY JOURNAL of Jan. 11, 1913, entered the service of the Hodenpyl, Hardy & Company syndicate in the summer of 1906 as a collector in the gas and electric light department of the Pontiac (Mich.) Light Company. Later he filled the position of stenographer to the local manager of the Pontiac Light Company. Subsequently he held the positions of bookkeeper and chief clerk and secretary and general manager of the same company. On Feb. 1, 1912, he left the employ of the Pontiac Light Company to assume the position of general superintendent with the Springfield properties. He succeeds Mr. A. A. Anderson, resigned, as vice-president and general manager of the Springfield Gas Light Company, the Springfield Consolidated Railway and the Springfield Light, Heat & Power Company.

Mr. Chester P. Wilson, vice-president of the Interstate Public Service Company, which is a subsidiary of the Middle West Utilities Company and operates the property of the Indianapolis, Columbus & Southern Traction Company under lease, will take over the duties of general manager of the latter company, succeeding Mr. Alexander Shane, who, as noted elsewhere in this column, has become associated with the safety bureau which will have supervision over the electric railways and other properties controlled by the Middle West Utilities Company. Mr. Wilson was formerly general manager of the Rockford & Interurban Railway, Rockford, Ill., which is controlled by the Union Railway, Gas & Electric Company, and has been connected with the Des Moines (Ia.) City Railway and Inter Urban Railway, Des Moines; the Lackawanna & Wyoming Valley Railroad, Scranton, Pa.; The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.; Sioux City (Ia.) Railway and the Camps Bay, Cape Town & Sea Point Tramway, Cape Town, South Africa.

Mr. H. D. Walbridge, who has been elected president of the Harrisburg (Pa.) Railways, which has taken over the property of the Central Pennsylvania Traction Company, Harrisburg, Pa., is a member of the firm of H. D. Walbridge & Company, New York, N. Y., bankers. Mr. Walbridge has long been connected with public service corporations. He has been president and director of the Jackson (Mich.) Gas Company, Kalamazoo (Mich.) Gas Company, Pontiac (Mich.) Light Company, Saginaw (Mich.) City Gas Company, Saginaw Valley Traction Company, Saginaw, Mich.; Bay City Traction & Electric Company, Bay City, Mich.; Springfield (Ill.) Consolidated Railway, Evansville Gas & Electric Light Company, Evansville, Ind.; Peoria Gas & Electric Company, Peoria, Ill., and Williamsport (Pa.) Gas Company, and has been vice-president and director of the Bay City (Mich.) Gas Company, director of the Saginaw-Bay City Railway & Light Company, Saginaw, Mich.; Springfield Railway & Light Company, Springfield, Ill., and a number of other electric railway and light properties.

Mr. A. R. Whaley has been elected vice-president of the New York, New Haven & Hartford Railroad, in charge of transportation. He succeeds Mr. H. J. Horn, who is to become operating vice-president of the Boston & Maine Railroad. Mr. Whaley is at present manager of the Grand Central Terminal, New York, and general superintendent of the electric division of the New York Central & Hudson River Railroad. He was born in Rhode Island. In 1877 he became a freight brakeman on the Providence & Worcester Railroad. He served as baggageman, conductor, station master, assistant train master and general yard master, and upon the road's consolidation with the New Haven system in 1891 he was put in charge of train crews, with headquarters in Providence. In 1898 he was made general agent of the terminals at Providence and in 1899 was promoted to the superintendency of what had then become the Worcester Division. Afterward Mr. Whaley became superintendent of the New York Division of the New York, New Haven & Hartford Railroad in charge of the operation of that road from New York to New Haven. In 1907 he assumed his present position, and took charge not only of the operation of the Grand Central Terminal and the electrified zone of the New York Central & Hudson River Railroad, but of the detail involved in the reconstruction of the terminal.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Yarmouth Light & Power Company, Ltd., Yarmouth, N. S.**—Incorporated in Nova Scotia to take over the property of the Yarmouth Street Railway, Ltd., and the Yarmouth Electric Company. Officers: Willard M. Kelley, president; Edgar K. Spinney, vice-president; John T. Murphy, W. H. Covert, Blake G. Burrill and C. C. Hichards. John T. Murphy, Halifax, is managing director.

***Poland Street Railway, Youngstown, Ohio.**—Incorporated in Ohio to build an electric railway between Poland and Youngstown. Capital stock, $1,000. Incorporators: George E. Rose, E. Mason Wick, John T. Harrington, U. C. Deford and J. W. Blackburn.

***Dominion Traction & Lighting Company, Ltd., Toronto, Ont.**—Incorporated in Ontario with a capital stock of $12,500,000. Headquarters, Toronto.

Wisconsin Railway, Light & Power Company, Milwaukee, Wis.—Incorporated in Wisconsin presumably to take over the properties of the La Crosse City Railway, the Winona Railway & Light Company and the La Crosse Water Power Company. Incorporators: N. F. Adams, J. B. Black and J. G. Hardgrove, all of Milwaukee, Wis.

FRANCHISES

***Martinez, Cal.**—Frederick E. Brooks has asked the Council for franchises to build two lines. One projected line is to run from Martinez to Bay Point, and the other would enter Walnut Creek, pass through Danville, thence run south and east to Haywards and thence to Livermore.

Orange, Cal.—The Pacific Electric Company, Los Angeles, has received a franchise from the Council in Orange for a line in that place.

Richmond, Cal.—The San Francisco-Oakland Terminal Railways has received a franchise from the Council over Ashland Avenue in Richmond.

San José, Cal.—The San José Railways has asked the Council for a franchise in San José on West Santa Clara Street.

Hastings, Fla.—The Palatka-Hastings Interurban Railway, Palatka, has asked the Council for a franchise in Hastings. This 10-mile line will connect Palatka and Hastings. C. A. Dupont, president. [E. R. J., Jan. 25, '13.]

Jacksonville, Fla.—The Jacksonville Traction Company has asked the Council for a franchise to extend several of its lines in Jacksonville.

Pocatello, Idaho.—L. R. Martineau and J. B. Browning, Salt Lake City, have received a franchise from the Council to build a line in Pocatello. The franchise asked of the Pocatello Council by Lyman Fargo and W. S. Kasiska was not granted. Power is to be developed on the Portneuf River at Lawa Hot Springs. [E. R. J., Dec. 28, '12.]

Laporte, Ind.—The Northern Indiana Railway, South Bend, Ind., has asked the Council for a franchise in Laporte. The plan is to build a belt line to pass through the subway, catering largely to the north and west portions of Laporte. Arrangements have been made for the removal of the company's tracks from the old to the new Madison Street and the new city roadbed has been constructed.

East Liverpool, Ohio.—The Tri-State Railway & Electric Company has asked the Council for a franchise to double-track the Newell Street line and build a loop in East Liverpool.

Ottawa, Ont.—The Ottawa & Morrisburg Electric Railway has received permission to enter the city of Ottawa. The company will begin construction in the spring on its line between Ottawa and Morrisburg, via Leitrim, South Gloucester, Ormond and Winchester. J. G. Kilt, president. [E. R. J., Jan. 4, '13.]

Ottawa, Ont.—The Ottawa Electric Railway has received permission to extend its lines in Ottawa South. About 3 miles of track will be built.

Sherman, Tex.—T. F. Mackmiller, representing the Gainesville, Whiteboro & Sherman Railway, Dallas, has received a franchise from the Council in Sherman. This line will connect Gainesville, Whitesboro and Sherman.

Eau Claire, Wis.—The Chippewa Valley Railway, Light & Power Company has received a franchise from the Council on Madison Street to a point on the Chippewa Road and north on Starr Avenue to Omaha Street in Eau Claire.

TRACK AND ROADWAY

Montgomery Light & Traction Company, Montgomery, Ala.—An extension will soon be built by this company to the site of the new Capital City Country Club on the Woodley Road in Montgomery.

Burlingame, Cal.—Work has been begun on the 3-mile interurban railway from Easton station in Easton to the foothills overlooking the north Crystal Springs. Edison-Beach storage battery cars will be operated. It is expected to extend this line later in Easton and Burlingame. Ansel M. Easton, Burlingame, is interested. [E. R. J., Oct. 12, '12.]

Pacific Electric Railway, Los Angeles, Cal.—It is announced that this company has made arrangements for the extension of the present Riverside-Arlington line to Corona, a distance of 9 miles. Property owners have agreed to arrange for the necessary right-of-way and terminal facilities, both in Corona and Arlington, and as soon as the deeds can be prepared construction will be begun. The company has placed in operation its new Mendocino Avenue line in Pasadena from the present Lake Avenue terminus to the Altadena Country Club and ending at the Country Club Park near Eaton's Canyon.

Southern Pacific Company, San Francisco, Cal.—Work will be begun this spring on a 4-mile branch of this company's line from Dominguez Junction to Torrance.

Tidewater & Southern Railroad, Stockton, Cal.—Grading has been begun by this company on Ninth Street in Modesto for the extension from N Street along Ninth Street to the Tuolumne River. Work has been begun to close the gap in the line at Modesto, and in time the connection with the Central California Traction Company's Tracks at Pilgrim and Taylor will be made. The company has further plans touching its route through Stockton.

Bridgeport & Danbury Electric Railway, Bridgeport, Conn.—The Public Utilities Commission has granted this company a certificate that it had complied with charter requirements which called for the completion of 25 per cent of the construction of the railway at the close of last December. The line is completed as far as Long Hill but has not yet been placed in operation. Arrangements have been made to secure power from the Bridgeport power house for the operation of the lower part of the line. Work on the construction of the line from Long Hill to Danbury will be begun in the spring. [E. R. J., Dec. 21, '12.]

Connecticut Company, New Haven, Conn.—This company has begun laying its tracks in Bridge Street across the new concrete bridge over the Naugatuck River, to connect with those on the west side in Ansonia.

St. John's Electric Company, St. Augustine, Fla.—Preliminary work will be begun at once by this company on the extension of the South Beach line.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has placed in operation its line between Urbana and Rantoul. It has arranged to rent power from the Illinois Traction System.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—Permission has been received by this company from the Board of Public Works to build new tracks over Oriental Street in Indianapolis. Rails will be ordered at once.

Tri-City Railway & Light Company, Davenport, Ia.—This company will be asked to consider plans for extensions of its lines in Davenport prepared by the city.

Union Traction Company, Independence, Kan.—An interurban line from Bartlesville to Kansas City is projected by this company. Work will be begun within a short time in extending the line southward to Bartlesville. It will extend from Independence through Caney and Dewey. The right-of-way has been obtained as far as Caney, and engineers are now at work on the lines from Caney southward. An extension is to be built to Bartlesville. Next year the line will be built southward to Ochelata, Ramona and Tulsa, Okla. The company is to build an extension from its northern terminus to Kansas City in 1914, according to announcement.

Arkansas Valley Interurban Railway, Wichita, Kan.—Plans are being made by this company to build a 2-mile line from Newton to Bethel College.

Louisville (Ky.) Railway.—This company has commenced the construction of the proposed line in Louisville extending from Twenty-sixth and Slevin Streets, the present western terminus of the Main Street line, to Thirtieth and Alford Avenues, in Youngstown.

Louisiana Traction & Power Company, Lafayette, La.—A committee of citizens from Grand Coteau and Sunset has presented plans to this company to extend its lines through Grand Coteau and Sunset.

***Shreveport, La.**—A. K. Clingman, Keithville, and associates plan to build an electric railway to connect Homer, Minden and Shreveport. The plan is to take over the Clingman and Kinnewbrew enterprise, which failed for lack of funds, and the 20 miles of roadbed graded for it.

***Brandon, Man.**—The Manitoba government will be petitioned by the city for a charter to build and operate a number of electric railways radiating from Brandon.

Bay State Street Railway, Boston, Mass.—This company is asked to consider plans to extend its County Street line in Boston as far east as Horton. The citizens of West Centralville will again ask the company for an extension across Aiken Street bridge and along Aiken Street.

Boston & Western Electric Railway, Boston, Mass.—This company has asked the committee on street railways for permission to use the right-of-way of the Central Massachusetts Railroad at Weston Centre and Cherry Brook in Weston and at Tower Hill in Wayland. The route of this line will be between Boston, Waltham, Wayland, Weston, Sudbury and Maynard. [E. R. J., Aug. 31, '12.]

United Light & Railways Company, Grand Rapids, Mich.—This company has completed plans for improvements on its various subsidiary properties in 1913, and something over $500,000 will be spent on the new work, in addition to the regular appropriations for maintenance. Included in the new work will be a 4-mile extension of the railway lines at Cedar Rapids.

Saginaw-Bay City Railway, Saginaw, Mich.—Among the improvements planned by this company during the year will be the construction of new track on Washington Avenue in Saginaw from Holland Avenue south to the Père Marquette tracks. This stretch of street is to be repaved, and while this work is in progress the old rails will be taken up and replaced with 100-lb. rails.

Minneapolis (Minn.) Street Railway.—Plans are being made by this company to extend its Cedar Avenue line, its Monroe Street line and its Western Avenue line in Minneapolis. A new line is being contemplated from Lake Harriet loop at Forty-third Street on Upton Avenue to Fiftieth Street in Minneapolis.

Minneapolis & Northern Suburban Railway, Minneapolis, Minn.—This company's 18-mile line between Minneapolis and Anoka has been completed by the J. F. O'Neill Company, Minneapolis, and will soon be placed in operation. The company has contracted to deliver 5000 cars of material for the construction of the Coon Creek dam, and work will be begun at once to build a 1½-mile spur from the Dunn property to the dam site.

Laurel Light & Railway Company, Ellisville, Miss.—This company is under contract with Ellisville to complete the Laurel-Ellisville Interurban connecting the two cities by the first of October. Cross-ties for the line are now being cut and the clearing of the right of way has been completed to Tallahala Creek. [E. R. J., Jan. 18, '13.]

***Jackson, Miss.**—Application will shortly be made by Indiana capitalists for a franchise and right-of-way for an interurban electric railway which they plan to build between Jackson and Canton. The Board of Supervisors of Madison County has granted a franchise and right-of-way to the promoters, but no action has yet been taken by the City Council of Canton. D. Lott is interested.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—This company placed in operation on Jan. 21 the Excelsior Springs division of its line between Excelsior Springs and Kansas City.

Butte (Mont.) Electric Railway.—Orders have been placed by this company for material to build an extension in the southwestern section of Butte.

Cincinnati (Ohio) Traction Company.—This company has placed in operation two new lines in Cincinnati.

Rapid Transit Interurban Company, Tecumseh, Okla.—Surveys have been made by this company from Tecumseh to Sulphur and plans are being made to extend this line to Oklahoma City.

Humber Valley Railway, Toronto, Ont.—This company has filed plans with the Ontario Legislature for approval of its plans to build a double-track electric railway through the Humber Valley from Lambton to the mouth of the Humber River and along the shore to Sunnyside. This line will be built by Home Smith and the Toronto Land Corporation.

Portland, Eugene & Eastern Electric Railway, Portland, Ore.—Orders have been placed by this company for 127-lb. girder rails to be used for the double tracks on Fourth Street and on Jefferson Street in Portland.

Memphis (Tenn.) Street Railway.—This company will soon begin the construction of two extensions in Memphis, one from the Central Avenue line along Barksdale Street to Cooper Street and the other from the Florida Street line on Trigg Avenue to Livermore Street and thence South to Riverside Park.

***Temple, Tex.**—Plans are being considered by E. P. Turner and associates to build an electric railway between Temple and Marlin. Several surveys of this line have been made, and it is stated that the plan is to make this a link in an interurban line between Dallas and Austin, following no particular railroad.

***Waco, Mooreville & Temple Interurban Railway, Waco, Tex.**—Application for a charter will soon be made by this company to build a 35-mile line to connect Robinson, Bell Falls and Blevins. Information can be obtained from the Business Men's Club at Waco.

Washington Electric Railway, Vancouver, Wash.—This company has filed a $10,000,000 mortgage to secure a twenty-five-year 6 per cent bond issue, of which $2,000,000 will be used for immediate construction of the line which will connect Vancouver and Tacoma, via Chehalis, Centralia and Olympia. The Equitable Trust Company, New York, is trustee. [E. R. J., Jan. 18, '13.]

Ohio Valley Electric Railway, Huntington, W. Va.—The proposal made by this company specifies that the right-of-way from Ashland to Russell shall be secured by Ashland business men and that the city of Ashland shall give the company a ten-year street-lighting contract upon the present terms for this service, as well as a twenty-year franchise to enter Ashland with its power lines.

Wheeling (W. Va.) Traction Company.—Engineers are going over the proposed extension of this company's line from Barton to St. Clairsville and from St. Clairsville to Neffs, Ohio. The company has been asked to consider plans to extend its line through Maynard, Jug Run, Crescent and Provident, Ohio.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company has laid out an extensive program of improvements on its properties in and near Eau Claire for the present year. The building of an interurban line between Eau Claire and Altoona, a railway extension to the North Side factory district and the building of a loop in the downtown district to be used by the Chippewa-Eau Claire interurban cars so as to relieve congestion on the main business street are projected.

SHOPS AND BUILDINGS

Northern Electric Company, Chico, Cal.—Plans are being made by this company to begin work on a new freight depot in Oroville. A passenger station will be constructed later by the company in Oroville.

Pacific Electric Railway, Los Angeles, Cal.—This company plans to build a passenger station on North Main Street, in Santa Ana.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has received permission from the Board of Public Works for the construction of a new carhouse and tracks on Oriental Street in Indianapolis in the near future. The cost is estimated to be about $300,000.

Tri-City Railway & Light Company, Davenport, Ia.—This company has been asked to consider plans to build a new depot on Market Square in Davenport.

Louisville & Interurban Railway, Louisville, Ky.—This company has begun the construction and equipment of its new depot at Second Street and Main Street in Shelbyville.

Minneapolis & Northern Suburban Railway, Minneapolis, Minn.—This company plans to build a new passenger station at Anoka.

Public Service Railway, Newark, N. J.—The carhouses of this company's Bergen Street line in Newark were destroyed by fire on Jan. 24. The loss is estimated to be about $100,000. The company has outlined plans for a new terminal near Broad and Market Streets, Newark. The proposed terminal building will front on Park Place and extend back to Pine Street with outlets to North Canal Street and to Canal and East Park Streets. The structure will eventually be eight stories high and will contain a three-level system of entrance and exit for the cars of the company. The scheme contemplates direct communication between the terminal and the surface car lines from both east and west. On the east an elevated structure is to be erected, extending from Mulberry Street. On the west the communication will be by means of a subway that will have an outlet on property of the company fronting in Washington Street between Warren Street and the Morris Canal.

Piedmont & Northern Railway, Charlotte, N. C.—This company plans to build a new carhouse at Greenville. The structure will be 66 ft. x 200 ft., one story and of brick and steel construction.

Portland, Eugene & Eastern Railway, Portland, Ore.—It is reported that this company plans to build a passenger depot in Albany. Plans are being prepared by this company to build new repair shops in East Portland in the near future.

Rhode Island Company, Providence, R. I.—Plans are being considered by this company to build a waiting station on Exchange Place, in Providence.

Southern Traction Company, Dallas, Tex.—Land has been purchased by this company for a station site at Hillsboro and for an extension to the Waco terminal.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Plans are being considered by this company to build a new interurban terminal station between Main Street and West Temple Street in Salt Lake City. W. C. Orem, Newhouse Building, Salt Lake City, general manager.

POWER HOUSES AND SUBSTATIONS

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—Plans are being made by this company to build its new power plant between Lone Star and Fowler, about 8 miles from Fresno. The power will be generated by steam turbines and the output will be about 3000 hp. The cost of the plant will be about $100,000.

Pacific Gas & Electric Company, San Francisco, Cal.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for two 400-kw, 125-volt d.c., 600-hp, 2200-volt, three-phase, 60-cycle, 495 r.p.m. induction motor-generator exciter sets for its power house.

Alton, Granite & St. Louis Traction Company, Alton, Mo.—Plans for a new power house at Alton have been adopted by this company.

Tidewater Power Company, Wilmington, N. C.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 500-kw, 600-volt d.c., two-phase, 60-cycle rotary converter and two 275-kva, 10,000-volt, single-phase, 60-cycle I.O.S.C. three-phase to two-phase Scott connected transformers and switchboards.

Cleveland (Ohio) Railway.—This company has placed in operation its new Harvard substation in Cleveland to supply the electric lines east of the Ohio River with additional power. Power is being purchased from the Cleveland Electric Illuminating Company.

Manufactures and Supplies

ROLLING STOCK

Dallas (Tex.) Consolidated Railway has ordered through Stone & Webster, Boston, Mass., a double-truck work car.

Southern Iowa Traction Company, Centreville, Ia., will, it is reported, install electric storage battery cars on its line from Alvia to Centreville.

Public Service Railway, Newark, N. J., lost thirteen cars and two snow plows in a fire which destroyed the Bergen Street line carhouse of the company on Jan. 25, 1913.

American Railways Company, Philadelphia, Pa., has ordered from the St. Louis Car Company ten city cars for the Joliet (Ill.) lines and nine suburban and eight city cars for the Huntington (W. Va.) lines.

Southern Traction Company, Dallas, Tex., has issued specifications through J. F. Strickland Company, Dallas, for twenty-two passenger cars and is asking that all proposals be submitted by Feb. 5. The cars are to be approximately 53 ft. long and arranged to seat fifty-six passengers. They will be equipped with GE-225 four motor equipment and Westinghouse AMM. air-brake equipment.

TRADE NOTES

Joseph Dixon Crucible Company, Jersey City, N. J., is mailing to the trade its new catalog which briefly describes and illustrates the numerous Dixon products, including graphite, crucibles, paint, lubricants, pencils, etc.

Union Switch & Signal Company, Swissvale, Pa., has appointed W. W. Talbert its sales engineer in the central district, with headquarters at Chicago, to succeed W. M. Vandersluis. J. F. Talbert has been appointed superintendent of construction for the central district, to succeed W. W. Talbert.

J. S. & W. S. Kuhn, Pittsburgh, Pa., investment bankers, announce the election of the following officers: James S. Kuhn, chairman of the board of directors; L. L. McClelland, president; W. S. Kuhn, vice-president; W. G. Audenried, Jr., vice-president; A. B. McCaughey, vice-president; H. C. Ward, secretary; James K. Duff, treasurer.

Kellogg Switchboard & Supply Company, Chicago, Ill., has authorized an increase in its capital stock from $1,000,000 to $2,000,000. The directors have ordered the distribution of a stock dividend of 25 per cent, payable in the ratio of one share for each four held as of Jan. 28. The remainder of the $750,000 of the new stock will be held in the treasury for future needs.

R. C. Hour and C. W. Davson, both of whom are directors in the Warner International & Overseas Engineering Company, Ltd., London, Eng., are making an extended trip through this country for the purpose of introducing the Warner non-parallel axle truck on the steam railroads of the United States. This device as applied to single-truck cars is well known in the electric railway field, and as it has recently been adapted for use with bogie trucks, its reduction of tractive effort, its elimination of side blows damaging alike to truck and roadbed, and its ability to follow rough track without any tendency to climb the rail, make it exceedingly advantageous for use under the heaviest classes of rolling stock.

Indianapolis Brass Company, Indianapolis, Ind., is operated on a profit-sharing plan. All of the employees share in the net profits of the company in proportion to the amount each man has earned during the year. On Jan. 18 this company gave its thirty-four employees approximately $1,000. The amount each received ranged from $16 to $62. Accompanying each check covering this additional amount was a letter which read as follows: "This money is not a gift or a bonus. It represents something which you have earned and which is not counted in your wages or salary. By making your work count for economy in time and material and efficiency in labor, you have cut the corners and made a profit for the business. Another year is now up to you at this time."

Nachod Signal Company, Philadelphia, Pa., announces repeat orders for automatic signals from the following companies: Lehigh Valley Transit Company, six signals for the Philadelphia-Allentown high-speed division entering Philadelphia, via Norristown; the Wheeling (W. Va.) Traction Company, sixteen signals, making forty-six Nachod signals on this road; New York State Railways, third repeat order for two signals at Rochester, N. Y.; American Railways Company for the Roanoke Railway & Electric Company, Roanoke, Va., nineteen signals for the Salem-Vinton division, making forty in all; Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, eighteen signals, making in all seventy-six on this road. The following orders were also placed for Nachod signals: New Jersey & Pennsylvania Traction Company, Trenton, N. J.; fourteen signals to equip its Trenton-Princeton division; Hudson Valley Railway, Glens Falls, N. Y.; Transit Supply Company, Minneapolis, Minn.; Southwest Missouri Railroad, Webb City, Mo. (type HD for double track); Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.; Texas Traction Company, Dallas, Tex.; East St. Louis & Suburban Railway, East St. Louis, Ill.; Easton (Pa.) Transit Company; Wilkes-Barre & Hazleton Railway, Hazleton, Pa.; Gray's Harbor Railway & Light Company, Aberdeen, Wash.; Muskegon Traction & Lighting Company, Muskegon, Mich.; Galesburg & Kewanee Electric Railway, Kewanee, Ill.; Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.; International Railways, Buffalo, N. Y.; Southern Wisconsin Railway, Madison, Wis.; Pittsburgh Construction & Supply Company, Washington, D. C., fourteen signals. Signals have been sent to France for E. H. Cadiot et Cie. and G. S. Albanese, and to Spain for the Tranvia de Cadiz, San Fernando y Caracas; also to the Christchurch Tramway Board, New Zealand. Trolley contactors for operating various devices were sold to the Utica & Mohawk Valley Railway, Utica, N. Y.; the Virginia Railway & Power Company, Richmond, Va., and the Philadelphia (Pa.) Rapid Transit Company.

ADVERTISING LITERATURE

Brookfield Glass Company, New York, N. Y., has issued a booklet which illustrates its various types and sizes of Brookfield insulators.

Sprague Electric Works of General Electric Company, New York, N. Y., has issued Catalog No. 117, which gives a brief outline of the principal Sprague Electric products, including generators, switchboards, motors, exhaust fan outfits, hoists and electric fans.

The J. G. Brill Company, Philadelphia, Pa., prints in the January issue of *Brill Magazine* an illustrated biography of Edward G. Connette, president of the International Railway, Buffalo, N. Y. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Buffalo, N. Y.," "Novel Prepayment Cars for Muskogee, Okla.," "Interesting Prepayment Cars for Michigan United Traction Company," "Incline Cars for Bahia, Brazil," "Prepayment Cars for Springfield, Ill.," "Interurban Passenger and Baggage Cars for Illinois Railway," "Combination Baggage and Freight Car for Toledo & Western Railroad," "Suburban Cars for Nazareth, Pa.," "Closed Cars for New Jersey Shore Resorts."

NEW PUBLICATION

Drawings from Proceedings Verein Deutscher Ingenieure. Berlin, 1913. Paper bound. Price to teachers and students of technical schools, 29 cents; to members of the Verein, 44 cents; to others, 58 cents.

This leading organization of German engineers has recently undertaken the publication in binder form of drawings known as "Tafelblätter." These are simply groups of drawings on particular topics as taken from the proceedings of the association. The sheets are printed on one side only and are of whatever size may be necessary to make the illustrations perfectly legible. The first folder contains sheets Nos. 1 to 8, relating to different kinds of rolling stock and equipment, such as steam car passenger construction in the United States and the gasoline-electric construction of the Prussian State Railroads. The second folder contains sheets Nos. 9 to 16, relating to cranes, pneumatic-tube transportation, pumps, etc. Some of these sheets should prove of value even to those who do not get the text which accompanied their original publication.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, FEBRUARY 8, 1913 No. 6

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office.............................1570 Old Colony Building
Philadelphia Office.........................Real Estate Trust Building
European Office.....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

VALUES IN THE CITY OF ST. LOUIS

The total represented by the St. Louis Public Service Commission as the fair value of the property of the United Railways Company of St. Louis shows an appalling difference when compared with the value claimed by the company. The conclusion reached by the commission as a result of its valuation of the property is that the fair value at present is, in round figures, $37,600,000, while the company shows a total capitalization, bonds and stock, of $101,300,000. The reasons why the commission takes the low figures named are set forth in the abstract of its report which is published in another part of this issue. The purpose of the activities of the commission in this case appears to be to place before the Municipal Assembly, to which it reports, data regarding the affairs of the railway company. In other words, the commission is a local body acting entirely as the representative of the Assembly. It investigates and reports, and such action as may be taken as a result of its report is taken by the Municipal Assembly. The company is not seeking to recapitalize, to reorganize or to change its rates. The position of the Electric Railway Journal concerning great differences in the results of valuation of a property by representatives of the public and of a corporation concerned is that so far as possible outstanding securities should be protected. The argument in favor of this course is not that it rewards any who are morally or legally responsible for the creation of securities that did not represent actual investment, but that it protects those in the community who, for the most part, were innocent purchasers of the same securities for cash in later years. Wherever possible the regulation of values by commissions that have the power of such regulation should begin with the values added in the future and not with the values represented by securities issued in the past, unless, as in the remedy proposed in Buffalo, with a fair protection of existing securities, part of the earnings of the years to come may be used to retire some of the old capitalization.

THE USE OF TICKETS WITH P. A. Y. E. CARS

The description of the large terminal building for surface cars planned by the Public Service Railway which appears elsewhere in this issue brings up the question of the value of advance payments by means of a ticket booth system on a railway where pay-as-you-enter cars are used exclusively. In this case the decision to erect a terminal building is primarily due to the extreme conditions of congestion in the city of Newark, N. J., where, owing to the restricted area of the business district, it has actually become a physical impossibility to get enough cars through the city to handle the rush-hour crowds. Under such circumstances it is natural that the plans for the terminal should include an advance-payment scheme, so that a car may be loaded promptly upon arrival and sent out upon another trip with the least possible delay. This plan, while of course not new, is one which could be used more often than it is. It is applicable, of course, only to points where a large proportion of the load gets on at one or two stops, or, as is expected to be the fact in the case in point, where the entire load gets on at one place. The opportunity for time saving by advance-payment systems or the general use of tickets is shown by the figures and records of the average time required by different numbers of passengers to board cars of different types published in recent issues of this paper. These have shown that the time required to load thirty-five passengers on pay-as-you-enter cars of four representative cities was about one minute. To load the same number of passengers on a non-prepayment car appeared to average surprisingly close to thirty seconds. Manifestly, if prepayment cars are used, and no city system would to-day consent from choice to the use of the old system of fare collection, it would be idle to expect to maintain a regular one-minute headway on a line including a loading point at which thirty or forty passengers might board. Assuming, however, the universal use of tickets, this headway could easily be maintained, for the loading of the cars would then be quite comparable to that of a non-prepayment car with a loading time of only thirty seconds. In practice, where it is possible to encourage the use of tickets in place of the payment of cash fares their partial use at congested points would seem to provide at least a means for increasing schedule speed.

LOSSES IN MULTI-CLASS FARE SERVICE

Those American electric railway companies which believe that some extra profit is possible through the operation of cars de luxe with an extra fare will be interested in the present discussion on the proposed electrification of the Berlin Stadtbahn in so far as the question of class fares is concerned. The facts brought out in this discussion have demonstrated forcibly the economic absurdity of charging more than one rate of fare unless the equivalent for the higher fare is a faster service, say, like the "limited" train of the American interurban railway. Even in Germany, where the feeling of class is still so sharply defined, the opinion is gaining ground that the slightly better grade of upholstery which now constitutes the difference between the second-class and the third-class cars in Europe does not warrant a 50 per cent increase in fare. "First-class" cars are not operated on the Stadtbahn or on the other urban rapid transit lines in Germany, so that the discussion there has been confined to the relative merits of "second-class" and "third-class" cars only. Hence, when the Prussian State Railways announced that the cost of electrifying the Stadtbahn and of eliminating the present annual deficit of $200,000 would have to be met by an increase of fares throughout, one privy councilor, W. A. Schulze, a keen railway economist, proved that a good part of this deficit would be wiped out if only one class of cars was used instead of two. He also showed that the annual gross earnings per car of the third-class cars are 75 per cent more than those of the second-class cars and that the mileage obtained per car is 150 per cent more with the third-class than with the second-class cars. Mr. Schulze's statements are certainly borne out by the experience of the rapid transit systems in London, Berlin and Hamburg, where the higher fare cars have proved to be unprofitable, if not an actual hindrance to most effective operation. The tendency of the times is also indicated by the fact that a two-class system is not used at all on the later underground tube lines of London and that the management of the new Hamburg rapid transit system proposed originally to install single-class operation. This plan was rejected, but its wisdom is proved by the result, because while the standard two-car train of the Hamburg system has 25 per cent of its space reserved for second-class passengers, the actual proportion of such travel to the total riding is only 11 per cent on business days and not more than 15 per cent on holidays.

THE BOSTON ELEVATED ORGANIZATION

The growth of a large electric railway system, particularly of one embodying many classes of service, brings an interest to the problems of organization which is necessarily absent on a small road, although many of the principles of administration are similar in each case. For this reason more than ordinary interest attaches to the recent changes in the organization of the Boston Elevated Railway, which were described in a recent issue.

In its present status the Boston organization marks a decided increase in subdivided responsibility among its higher officers. The relation of the executive committee of the board of directors and the president to the administration of the company has undergone no change from the practice of recent years. But the increasing size and complexity of the system have required the separation of constructive adminstration from that of transportation and maintenance, and the placing of the first vice-president in charge of many features of the company's business, including immediate charge of the task of directing the important extensions of the company's elevated and subway system, with the organization of separate bureaus of transportation and maintenance, is the logical outcome of the extraordinary development of rapid transit in Boston in the past few years. The situation is somewhat analogous to that which dictates the subdivision of responsibilities among the vice-presidents of a large steam railroad system under the heads of construction, transportation, etc., although it does not as yet require so complete a division of labor among the executive officers.

The placing of the second vice-president in direct charge of the bureau of transportation and the further establishment of a maintenance bureau under a chief, both reporting directly to the president of the company, are also natural steps under the Boston conditions. This insures a broad oversight of the work of each group of departments forming a bureau, and at the same time it does not preclude a striking degree of co-operation among subordinate officials. The methods of insuring this co-operation are of much interest and are well illustrated by the requirement of the company that in certain cases subordinate department heads shall report through an officer ultimately responsible to the chief of another bureau before reaching their own immediate executives. There is established in this way an intersection of the lines of responsibility whose principal purpose is the interchange of information at the point of contact. Thus, the roadmaster of rapid transit lines reports to the chief engineer of maintenance of way through the superintendent of rapid transit lines. The latter is chiefly concerned with operating problems, but it is considered by the company to be to its advantage that he should have full information concerning maintenance work in his department no less than direct knowledge of transportation matters in this branch of the service. Again, division trackmasters are responsible through their respective division superintendents to the chief engineer of maintenance of way, and this arrangement goes far to break down the walls between individuals in the service and give men established in a stated bureau a knowledge of what is going on outside their immediate responsibilities. A transportation officer to whom a maintenance official reports en route to the latter's superior does not exercise any substantial executive powers in such a case, but as the business connected with maintenance crosses his desk he obtains a running idea of the daily situation which is of great value, and, conversely, the man who reports to him gets the benefit of the transportation official's constant touch with the conditions prevailing in the transportation service.

Nothing in the organization hinders the performance of special duties by either of the vice-presidents in addition to their tasks as bureau heads. Thus, the second vice-president continues in charge of the public relations of the company along the lines previously practised, besides serving as chairman of the company's efficiency committee. In the event of special circumstances arising which require the benefit of the first vice-president's experience, there may easily be assigned to him such tasks as the president deems necessary. The changes made have been planned to strengthen the company's organization as a whole by an equitable distribution of its administrative burdens, and if further modifications should become necessary, there appears to be nothing in the existing subdivision of responsibility to prevent their being made.

THE HUDSON TUNNEL SYSTEM RE-FINANCING

It is to be hoped that, notwithstanding the natural disappointment at the inability of the Hudson & Manhattan Railroad to earn enough money to meet its requirements, the property will be restored financially without the adoption of any graver measures than are proposed in the plan for the readjustment of the debt. The idea which gave birth to the tunnel project was daring and unique, and the fact that it has been supported by bankers of stability and high standing shows that it met the tests which financiers are accustomed to impose upon new enterprises.

The Hudson system, of course, cannot be gaged by the ordinary standards that are applied to railways of the usual type. It is an electric line but without the same conditions of traffic or territory that are found in either an interurban or an urban property. It is like an electric line in that its revenue must be received largely from passenger traffic. It is, in short, a railway devised to meet what it was believed would come to be a public demand for a special form of service. It has not the potential possibilities of increase of traffic by its own efforts which are held by the railway of the usual urban or interurban type. Its traffic consists almost entirely of commuter travel between Manhattan Island and the stations of some of the great trunk lines extending to New Jersey points. If it had a part in the proposed scheme of subway development in Greater New York, it would open up new avenues of traffic. Under present conditions, however, it is restricted very closely to the same sources of travel upon which it relied at the commencement of operation. The joint arrangement by which through trains are operated between lower Manhattan Island and Newark, N. J., in connection with the Pennsylvania Railroad was necessarily an innovation which involved some experiment and risk because it meant, in connection with the new Manhattan terminal of the Pennsylvania Railroad, a disturbance of old-established avenues of traffic. The other new project of the company, the proposed extension from Thirty-third Street and Sixth Avenue, Manhattan, to the Grand Central Terminal, will undoubtedly divert some traffic from existing carriers, but to a large extent this will be of the same specialized character which now marks the great bulk of travel on the property.

The reports in relation to the Hudson terminal property made by Mr. Calderwood and Mr. Menden, of the Brooklyn Rapid Transit System, bear out the opinions which are held generally. That is to say that the property is "of first-class construction, fully equipped and in good physical condition." They believe, moreover, that the various developments in transit facilities and possibilities in the great traffic and terminal districts in and surrounding New York will result in an increase in gross earnings at a higher rate than the normal 6 per cent which is the average increase in Greater New York. This expectation is not based on a further increase in the rate of fare, and President McAdoo of the Hudson & Manhattan company says that this will not be asked. The only increase in rates which was made was borne by the traffic without detrimental effect, and the next remedy, apart from the readjustment now proposed, is an increase in the density of traffic with resultant improvement in net earning capacity.

PUBLIC AND PRIVATE EFFICIENCY

Municipal ownership and operation of public utilities is like everything else in the respect that it must stand or fall on its own merits. This belief that the wisdom or otherwise of municipal ownership should not be decided in accordance either with the ideas of rabid opponents or indiscriminate advocates naturally results in an effort to tell the truth about the successes as well as the failures of the policy. It results also in an effort to throw such light as we can get on both sides of the problem. But so strongly do opponents and advocates hold their opinions, or prejudices rather, on this subject that a judicial attitude is almost offensive to both.

It cannot be overlooked, nevertheless, that there is, to say the least, significant coincidence in the fact that the New York Central Railroad was opening its colossal new terminal at a time when New York was in the throes of an already ten-year-old discussion of its subways. As a specimen of municipal inefficiency the handling of the subway situation is certainly as good an example as is the building of the Panama Canal of a great public work well and speedily done by governmental means after the failure of the French interests.

While New York has been talking about the completion of its subway system, the Pennsylvania Railroad and the New York Central have completed tunnels and terminals involving problems and expenditures as great as, if not greater than, are called for in the subway enterprise. The manner in which these corporations attacked the unknown difficulties of terminal electrification, found the money for their vast building operations and put through whole projects costing, together, not less than $350,000,000 certainly affords a striking contrast to the handling of the subway situation and one that argues impressively for the superior efficiency of private enterprise. Had any transportation company been as slow to provide for growing traffic as the city of New York has been to do the subway building which the municipal ownership advocates would not allow any grasping corporation to perform, such a company would have deserved all the censure that it would have got from a dissatisfied public.

It cannot be answered that the subway undertaking involved prohibitive costs or considerable engineering difficulties, yet the subways are hardly begun while the railway improvements are completed and waiting for the subways that were promised to feed the railway terminals and distribute the passengers who use them. In spite of this, strong opposition to the subway contracts has been made, partly on the ground that they would prevent municipal operation for years to come. The chairman of the New York Public Service Commission calls the eleventh-hour attempt to wreck the dual subway system "the slimiest, dirtiest, most contemptible political move ever attempted in this city." In fact it is an exhibition of the unreasoning municipal ownership advocate and the political trickster pulling the same oar, which, though not a new spectacle, is hardly one well calculated to make adherents for the belief that governmental agencies can build and operate railways or other public utilities better than a corporation will do the work.

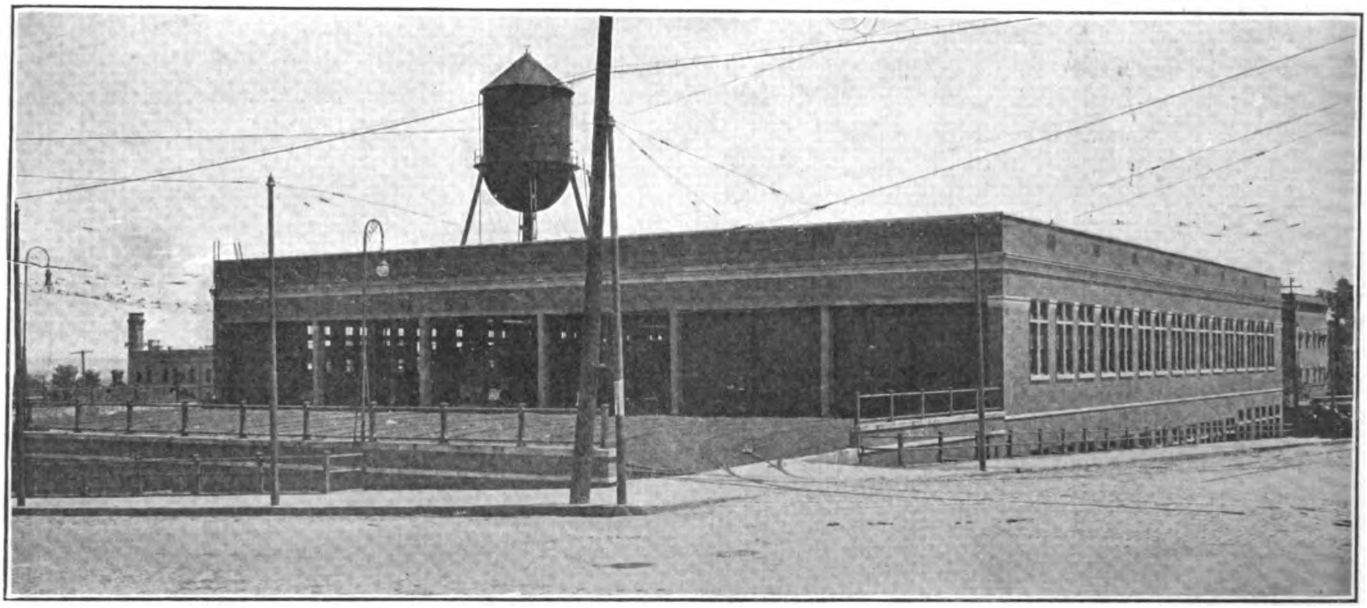
Pierce Street Carhouse of the Omaha & Council Bluffs Railway

A Description of a Double-Deck Carhouse of Reinforced Concrete Construction Embodying a Number of Novel Features —The Article Also Describes Economies of Location and Design, as Well as the Trainmen's Quarters and Accessories

The operation of a street railway in a city where grades as steep as 5 and 10 per cent are common is far from ideal, yet there are possibilities of economy on a system confronted by these difficulties which do not exist where street grades are comparatively level. By taking advantage of these natural physical conditions in the selection of a site for the Tenth and Pierce Streets carhouse in Omaha, Neb., the Omaha & Council Bluffs Street Railway Company was able to obtain a building of maximum storage capacity at a minimum cost. A two-story carhouse, which was the design used in this instance, may be built at a much lower cost per unit of storage capacity than a one-story building when the track approaches involve no additional expense. The cost of the foundation in the two-story building is only slightly in excess of that required for a one-story structure, and the additional expense necessary to support the load coming from cars in storage on the second floor is practically offset by the reduction in roof area. The capacity of the heating plant may be reduced, and probably the greatest saving comes from the reduction in the amount of real estate required for a given storage capacity. The latter consideration was particularly true in the selection of a site for the Tenth and Pierce Streets carhouse, as it is centrally located, being only two blocks from the Union Station and just outside the business district.

The selection of this site offered possibilities other than that in station design. It is situated at a point where the transportation department may send out extra cars on short notice to handle the passenger traffic from excursion trains stopping at the Union or Burlington station. The distance between this carhouse and the steam road stations is so short, in fact, that it is possible for a traffic inspector to determine the amount of passenger traffic to be handled upon the arrival of the steam road trains and then order the cars out of the carhouse.

As the name of the carhouse would indicate, it is situated between Tenth and Eleventh Streets on Pierce Street. The frontage on the latter is 264 ft., and that on the two former is 147 ft. The second floor does not cover the entire ground floor area, but is 179 ft. in length by 147 ft. in width. This arrangement permitted the special work leading to the twelve storage tracks on the second floor to be installed on the roof over the first floor. It also allowed open storage space for about two cars on each track leading into the building. If at any time the company desires to inclose this open space, the cost of the additional building will be comparatively small, as the first story was built with this change in view.



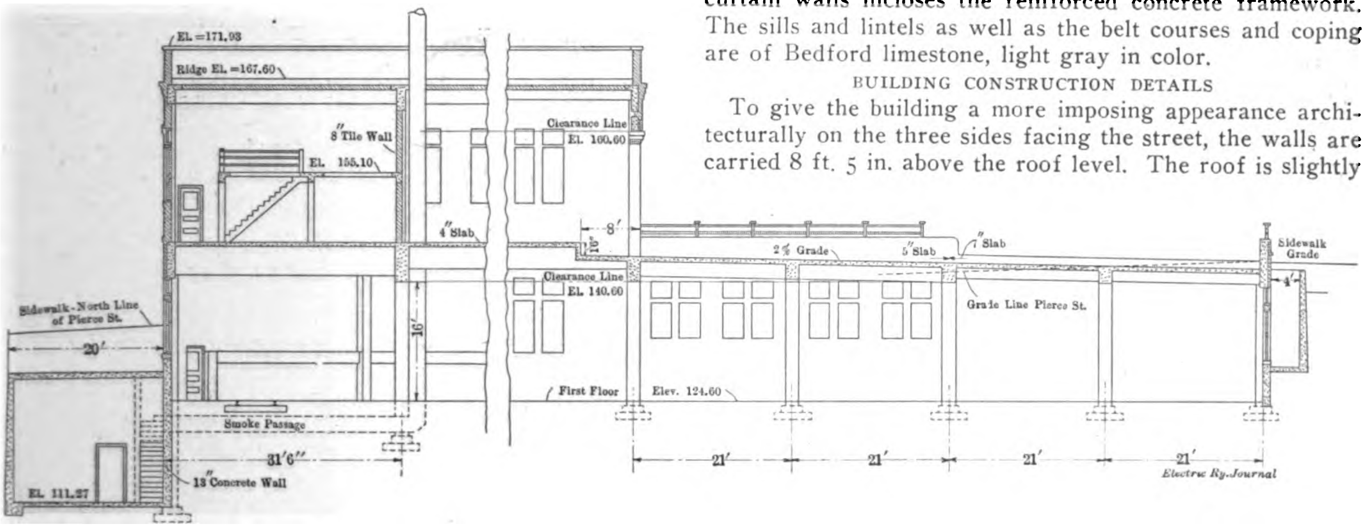
Omaha Carhouse—Exterior View from Eleventh Street Side

A 5.83 per cent ascending grade on Tenth Street and a 3.45 per cent grade on Pierce Street permit cars to enter the first floor at the northeast corner of the building and to gain access to the second floor from the southwest corner. A single track from the double-track line on Tenth Street leads into the first-floor entrance, where it branches through special work into twelve storage tracks. In a similar way the approach to the twelve storage tracks in the second story is by way of a single lead off the Eleventh Street line.

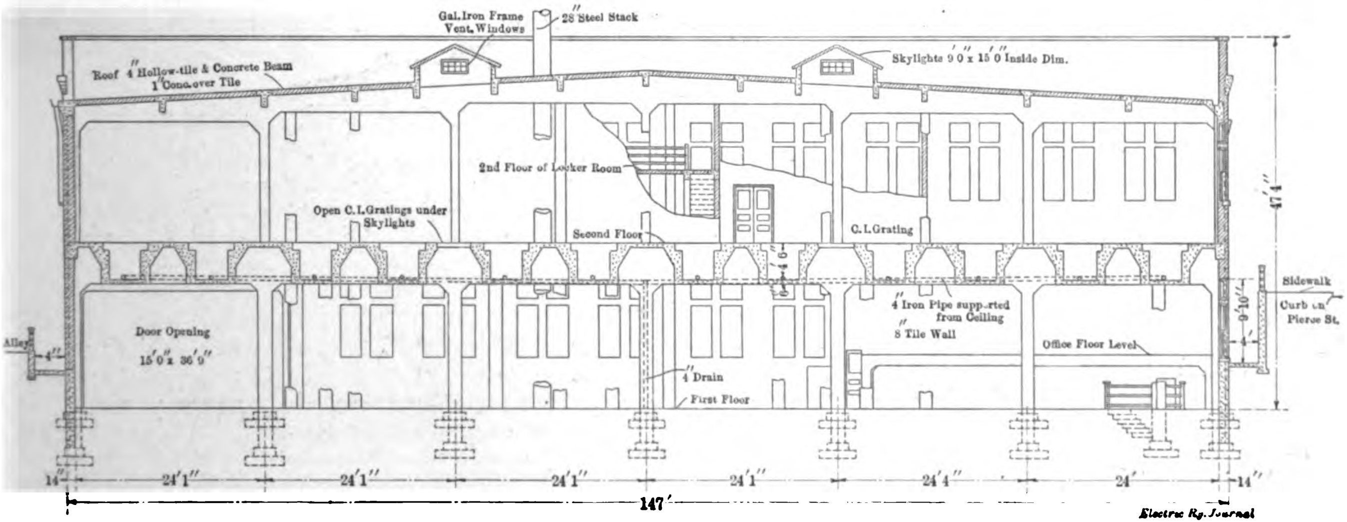
BUILDING FOUNDATIONS AND FRAMING

When the site for the carhouse was prepared the excavation was carried down to the level of the first floor. The difference in elevation between the first floor and the sidewalk level made it possible to utilize the space under the sidewalk areas for storerooms on the Pierce Street side, and a part of the space under the sidewalk on Tenth Street was made available for a boiler room and vault by excavating to a depth of about 12 ft. below the first-floor level. This difference in elevation also made it necessary to inclose three sides of the property with a concrete retaining wall, which also serves as the building foundation. In order to provide sufficient natural illumination for the first floor 4-ft. areaways were constructed to extend to the level of the first-story windowsills. As these areaways encroached upon the sidewalk, it was necessary to surmount the outer retaining wall with a 4-ft. guard fence built of two runs of pipe and cast-iron posts.

Heavy concrete foundations and pedestals support the reinforced-concrete building framework. The reinforced concrete columns supporting the second floor are 20 in. square, reinforced with Kahn bars. They are spaced at approximately 20-ft. intervals longitudinally and at intervals varying from 24 ft. to 25 ft. 5 in. transversely with the building. The columns on the second floor are 14 in. square and rest directly on the columns rising from the first floor. The floor beams and cross girders supporting the second floor are so arranged that the rails of each storage track come directly over the center of a floor beam. These floor beams or stringers under the track are made of concrete 12 in. thick and 30 in. deep, reinforced by the Kahn system. The cross girders are 4 ft. 5⅜ in. deep and 20 in. thick. The spacing of the floor beams permitted the construction of a 4-in. reinforced concrete slab floor, and as the track stringers have a depth of 6 ft. from the first to the third row of columns at the Eleventh Street end of the second story, a 40-ft. inspection pit was provided. These pits are of the suspended type, with a 6-in. reinforced-concrete slab floor, and they provide 4 ft. 6 in. clear head room from the top of the rail to the pit floor. To provide drainage for these suspended pits a 4-in. iron pipe is supported from the ceiling of the first floor, and drain connections are made to it from each of the pits.


El. =171.93
Ridge El. =167.60
8" Tile Wall
El. 155.10
Clearance Line
El. 160.60
4" Slab
8'
16"
2% Grade
5" Slab
7" Slab
Sidewalk Grade
Clearance Line
El. 140.60
Grade Line Pierce St.
4'
Sidewalk-North Line of Pierce St.
20'
16'
First Floor
Elev. 124.60
Smoke Passage
31'6"
13" Concrete Wall
El. 111.27
21'
21'
21'
21'
Electric Ry. Journal

Omaha Carhouse—Longitudinal Elevation of Ends of Building, Showing Second-Floor Approach from Eleventh Street


Gal. Iron Frame Vent. Windows
28" Steel Stack
Roof 4" Hollow-tile & Concrete Beam 1" Conc. over Tile
Skylights 9'0" x 15'0" Inside Dim.
2nd Floor of Locker Room
Open C.I. Gratings under Skylights
Second Floor
C.I. Grating
47'4"
4'6"
Sidewalk
Curb on Pierce St.
9'10"
4"
4" Iron Pipe supported from Ceiling
8" Tile Wall
Office Floor Level
Door Opening 15'0" x 36'9"
Alley
4"
4" Drain
First Floor
14"
24'1"
24'1"
24'1"
24'1"
24'4"
24'
14"
147'
Electric Ry. Journal

Omaha Carhouse—Transverse Cross-Sectional Elevation

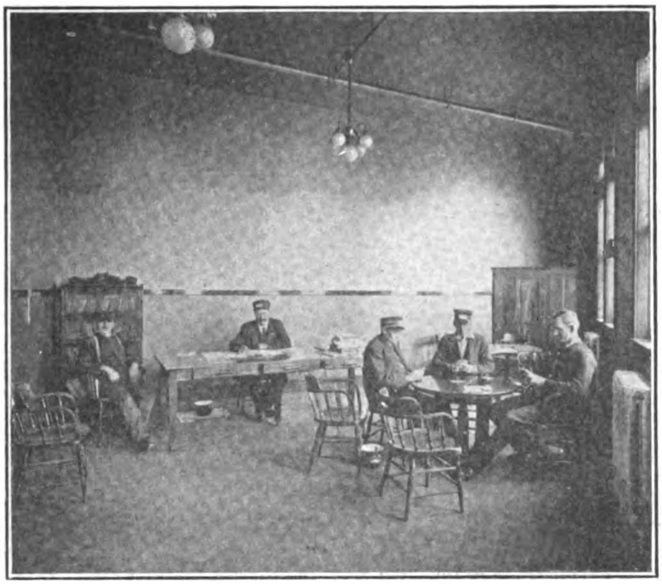
The reinforced concrete framework supporting the 4-in. hollow tile roof was constructed with concrete purlins spaced on 10-ft. centers and supported on concrete cross girders which rest on the building columns. A 1-in. coating of concrete, properly waterproofed, covers the hollow tile sheathing used in the roof construction.

Dark red-face brick laid in white mortar in the 13-in. curtain walls incloses the reinforced concrete framework. The sills and lintels as well as the belt courses and coping are of Bedford limestone, light gray in color.

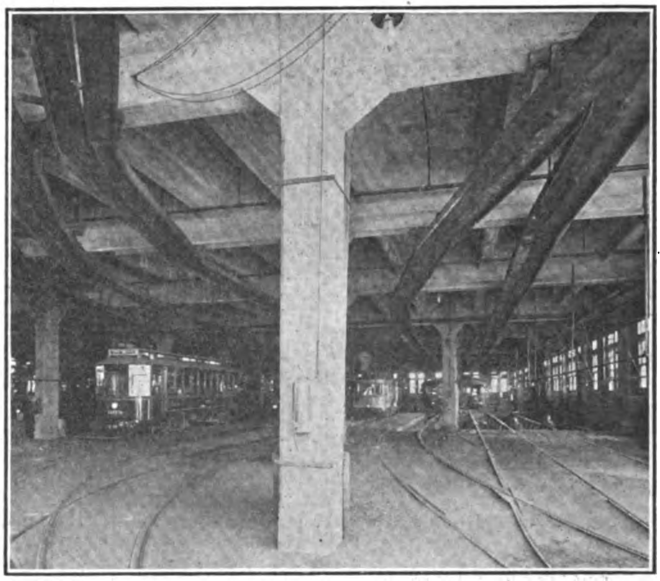
BUILDING CONSTRUCTION DETAILS

To give the building a more imposing appearance architecturally on the three sides facing the street, the walls are carried 8 ft. 5 in. above the roof level. The roof is slightly peaked at the center line of the building and slopes 1 in. in 18 in. to the Pierce Street and alley sides. The extension of the building walls above the roof level on Pierce Street necessitated special construction to provide proper drainage. This was done by making the reinforced concrete girders which support the roof next to the wall triangular in section so that 6-in. x 9-in. gutters could be molded in them below the roof level. These gutters are lined and flashed with copper, and the down spouts connect to the building drainage system by way of spouts along the inside of the Pierce Street wall. In addition to the practically continuous glass window areas on three sides of the building in the second story, six skylights of 9-ft. x 15-ft. inside dimensions were provided in the roof. These skylights are of the usual gabled design with the side walls formed of reinforced concrete. The sashes in the roof are fixed and are glazed with wire glass, and two pivoted 18-in. x 40-in. galvanized iron-frame sashes, one at each end of the skylight opening, provide ventilation for the building.

Inspection pits 50 ft. in length are provided under each of the storage tracks on the first floor about half way back in the building. To provide pits over which cars may be run in making running repairs, a single pit, 75 ft. in length and of sufficient width to take in three tracks, was constructed under the three north tracks on the first floor. The tracks are carried over this pit on pedestals, the design of which is standard for this company. The designed details of this special pit construction are shown in the illustrations. These details also show the method of providing a removable rail for the wheel pit. The removable rail is 7 ft. 2 in. in length, pivoted at one end by means of a 2-in. steel pin which extends 18 in. into the pit pedestal. The upper portion of the pin is bent to a horizontal position so that it may be bolted to the removable rail section. By releasing the locking device at the opposite end the removable rail section may be swung out of the way, allowing the wheel to be dropped into the pit. By providing an angle stop 3 in. x 5 in. x ½ in. on the side of the rail opposite the pivot and locking mechanism, a uniform track gage is maintained.



Omaha Carhouse—A Corner of the Employees' Reading Room



Omaha Carhouse—Interior View from First-Floor Entrance

Omaha Carhouse—Exterior View from Tenth Street

TRACK ARRANGEMENT

An unusual feature in the track layout is that practically all the special work on the lower floor level is laid down inside the building. Although but little of this special work is available for car storage purposes, it was necessary to resort to this kind of arrangement in order to utilize the whole of the property. The second floor over these tracks was not lost in a similar way, as the stub storage tracks at this level enter from the opposite end of the building. The first-floor building columns were spaced so as to give proper car clearance, and the tracks beyond the special work are arranged in pairs with an 11-ft. spacing between the tracks of each pair and a 13-ft. 1-in. spacing between tracks in adjoining pairs. The single 36-ft. 9-in. entrance on the first floor and the entrances on the second floor are inclosed by rolling steel doors which are operated manually.

In providing for the special work and tracks leading into the second story by way of the roof over the first story, the roof and second floor for a distance 8 ft. inside the building were dropped 16 in. below the second-floor level. This allowed the top rail outside the building to conform to the elevation of the rail inside and at the same time permitted a deposit of 6 in. of ballast under the ties. The roof slab under these tracks was increased in thickness from 4 in.

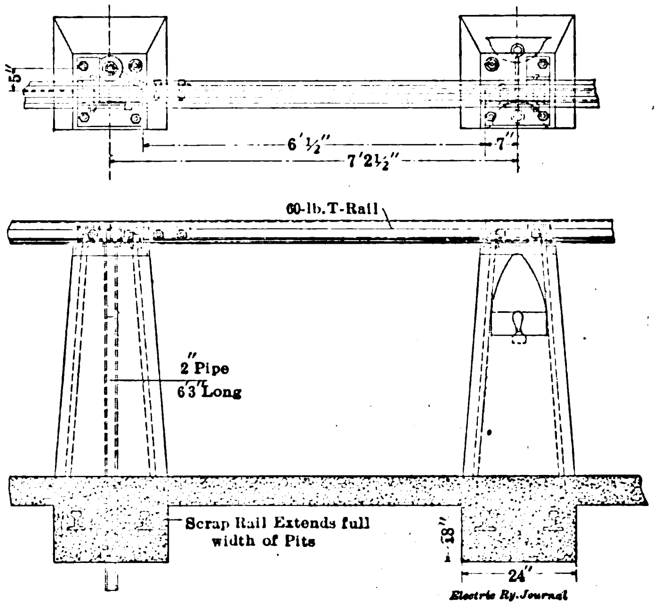
to 5 in. over the first two panels outside the building and to 7 in. in thickness over the two panels supporting the ladder track and turnouts. In addition to this increase in the thickness of the slab, the net metal area reinforcing it was increased in section to transmit the load with an ample factor of safety to the floor beams and concrete cross girders. The upper portion of the slab received a heavy coating of pitch and was sloped at 0.2 per cent to the Eleventh Street side of the building, where outlets to the sewer system were provided. This roof area is inclosed by allowing the building walls to project 24 in. above the top of the rail and surmounting the wall with a 4-ft. pipe fence.

INTERIOR WIRING

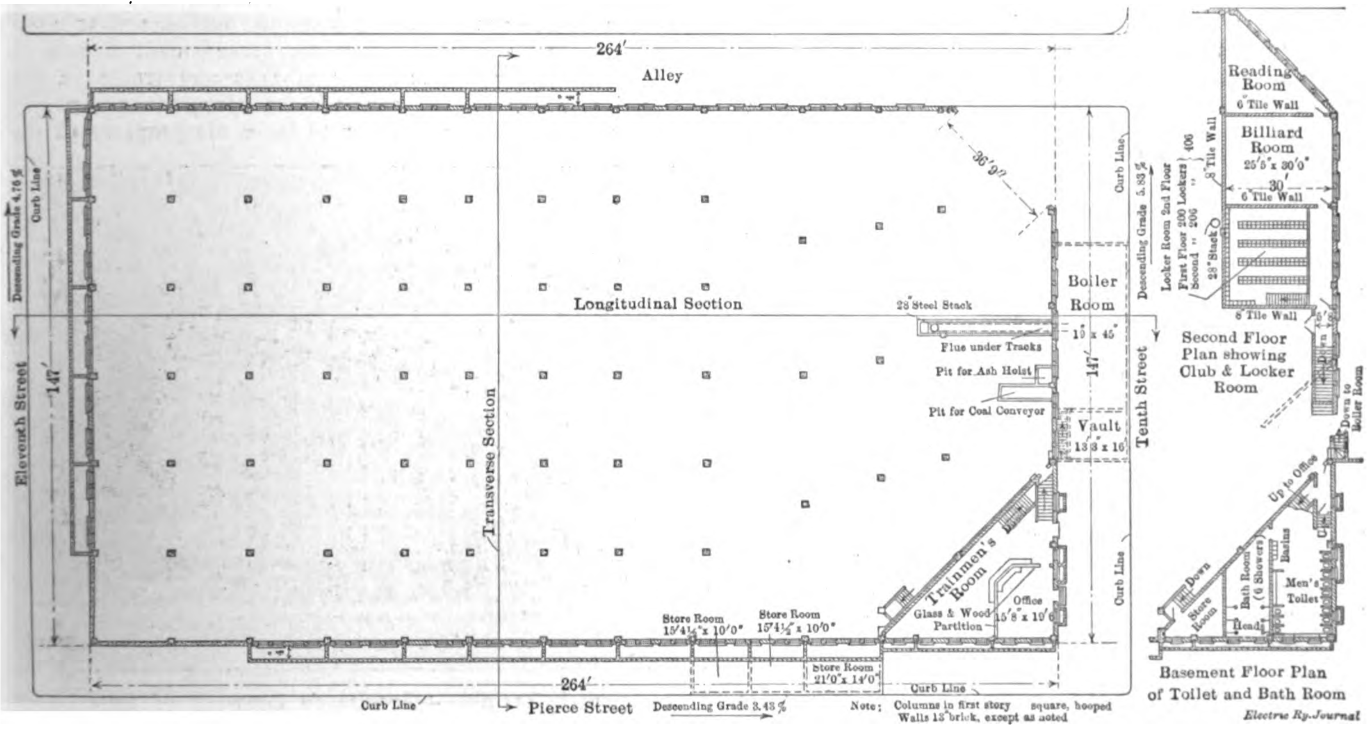
Artificial illumination is supplied in the car storage bays by inclosed arc lamps supported on hook bolts embedded in the reinforced concrete building frame. All the lighting circuits are carried in steel conduit laid in the concrete during the process of construction. The trolley wire within the building is mounted in wooden trolley troughs, suspended from the cross girders. This trough is of extra width in order to prevent a flying trolley pole from damaging the concrete and overhead network of pipes employed in the wet sprinkler system. The trolley wire is dead-ended on either side of the entrance doors, and a connection passes through the wall above the openings. The bottom flange of each rolling door is provided with a V-shaped section of sheet steel which passes over the insulated dead ends of the trolley, thus providing a continuous runway for the trolley wheel when the car is entering the building.

SPRINKLING SYSTEM

To reduce the fire hazard, as well as the insurance rate on the contents of the building, a complete system of the wet type of sprinkler was installed at the time the building was constructed. As will be noted in the illustration, the height of the outlets is exactly the same as the center of the car windows. The sprinkler system is connected direct to the city water mains, but to provide a reserve supply for use in emergencies a 50,000-gal. steel tank was included in the fire protection equipment. This tank is supported on a steel tower which rests directly on the building columns, four of which are enlarged sufficiently to support the additional load. This reserve water supply tank is connected to the city water system and is kept filled at all times. To prevent the water in the tank from freezing at low temperatures a steam pipe coil incased in a cast-iron cylinder is installed at the bottom of the tank. A 2-in. pipe leads to the upper portion of the tank from this cylinder, which provides radiation near the water surface. In addition to the sprinkler system, ordinary hand chemical fire extinguishers have been installed at convenient points in the carhouse.


5"
6'½"
7"
7'2½"
60-lb.T-Rail
2" Pipe
6'3" Long
Scrap Rail Extends full width of Pits
18"
24"
Electric Ry. Journal

Omaha Carhouse—Details of Drop Pit


264'
Alley
36'9"
Curb Line
Descending Grade 4.76%
Eleventh Street
147'
Longitudinal Section
Transverse Section
28" Steel Stack
Flue under Tracks
Pit for Ash Hoist
Pit for Coal Conveyor
Boiler Room
19' x 45'
Vault
13'8" x 16'
Tenth Street
Descending Grade 5.83%
Trainmen's Room
Office
15'8" x 19'6
Glass & Wood Partition
Store Room
15'4½" x 10'0"
Store Room
15'4½" x 10'0"
Store Room
21'0" x 14'0"
Pierce Street
Descending Grade 3.43%
Note: Columns in first story square, hooped
Walls 13" brick, except as noted
Reading Room
6" Tile Wall
Billiard Room
25'5" x 30'0"
30'
6" Tile Wall
8" Tile Wall
Locker Room 2nd Floor
First Floor 200 Lockers
Second " 206
406
28" Stack
8" Tile Wall
5'8"
Down
Second Floor Plan showing Club & Locker Room
Down to Boiler Room
Up to Office
Down
Store Room
Bath Room (6 Showers)
Head
Basins
Men's Toilet
Basement Floor Plan of Toilet and Bath Room
Electric Ry. Journal

Omaha Carhouse—Plan of First Floor

HEATING PLANT

As noted in the beginning of the article, the steam-heating plant is located under the sidewalk on Tenth Street. The connection to the stack from the boiler room is by way of a 3-ft. square concrete duct underneath the first floor which leads to a point where the 28-in. steel stack could be located conveniently. The heating plant is of the direct-radiation type, with a horizontal boiler and built-up pipe coil radiation mounted on the building walls. No heat was provided in the second-floor car storage space, but six cast-iron grates 7 ft. wide by 8 ft. 6 in. long were built in the floor, thus allowing natural circulation to keep the temperature in this portion of the building below that outside.

This arrangement was considered practicable because it was contemplated that the second floor would be used only for storing cars not required in regular service.

The location of the boiler room 12 ft. below the first-floor level necessitated a system of conveyors for delivering coal to the boilers and removing ash. The coal conveyor is arranged so that coal may be cast on it from a car set on one of the leads to the carhouse storage track, which in turn drops it into a bin immediately in the rear of the boilers. A bucket conveyor was installed to handle the ash. This is charged through a hopper beside the boilers, and since it is equipped with an unloading device and spout at the upper end, the ash may be dropped into wagons or cars set on the carhouse ladder track.

TRAINMEN'S QUARTERS AND CARHOUSE OFFICES

In addition to the provision of storage for approximately eighty-five cars, spacious trainmen's quarters and offices were included in the building design. Three important city lines—namely, the Farnam, Harney and Dodge lines—are operated out of this carhouse. These lines require about seventy-five passenger cars and five mail cars for regular service and three sweepers for use during the winter months. The average total number of trainmen reporting for duty at this point at the present time is 199. The carhouse organization includes a day and a night foreman reporting to the superintendent of transportation, who have supervision over ten day men and eight night men, required to clean and place the cars and take care of the stoves during the winter months. The carhouse office and trainmen's quarters occupy the Tenth Street part of the building. This portion of the building on the first floor is that which could not be reached by storage tracks. The space is triangular in shape and is occupied by the carhouse foreman's office and trainmen's waiting room. Directly under this, in a space similar in area, are the trainmen's toilet and bath rooms. Both of these are finished with plain white sand-finish plastered walls and concrete floors.

The trainmen's club rooms occupy the Tenth Street front of the second floor. These include a triangular-shaped reading room directly over the track entrance from Tenth Street and an adjoining rectangular room, 25 ft. x 30 ft. in size, which is used as a billiard and pool room. A view of one of these rooms is shown in the illustrations. To provide ample locker space in the room adjoining the billiard room, 25 ft. x 30 ft. in size, an intermediate floor or gallery was constructed. The head room, being in excess of 18 ft., permitted this kind of arrangement, which practically doubled the available locker space. The complete locker installation includes 200 sheet-steel lockers on the first floor and 206 on the second floor.

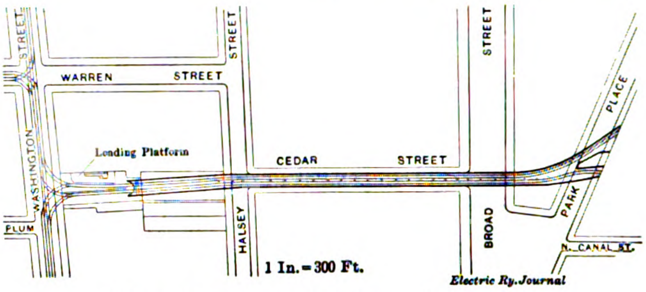
In addition to the forces mentioned which report to the transportation department, seven repair men and inspectors are employed at this carhouse. The day force consists of five men who take care of running repairs and two men are maintained on the night force to handle emergency work. The workbenches and hand tool lockers occupy a space immediately back of the running repair pit in the northwest corner of the first floor. Heat and artificial light have been provided in one of the storerooms under the sidewalk on Pierce Street, and this is being used as a locker room by the car repairmen. These men also have access to the trainmen's toilet.

The Pierce Street carhouse was designed by the engineering department of the Omaha & Council Bluffs Street Railway Company and was built by contract under its supervision.

The Italian railway administration is to call for tenders to convert to electric traction the line from Monza to Lecco. In addition, orders have been placed for fifty-eight electric locomotives, which will serve partly for this line and partly for the Giovi tunnel line. The section from Monza to Milan will be subsequently electrified.

PROPOSED STREET RAILWAY TERMINAL FOR NEWARK

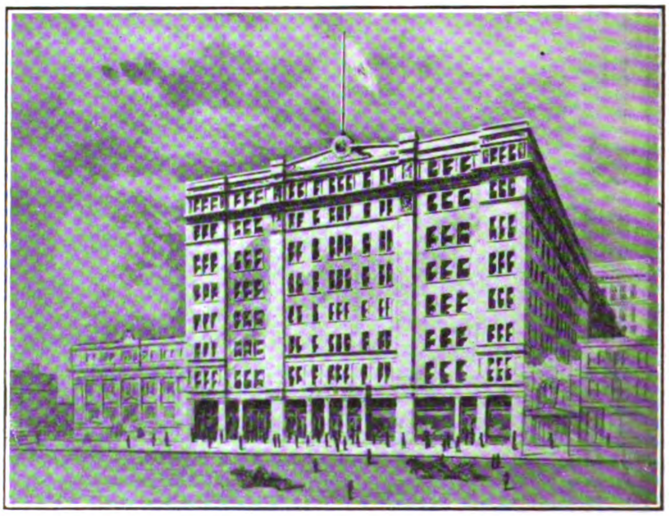
The Public Service Railway of New Jersey is planning the erection of a terminal building for its surface lines in the city of Newark, at a cost of approximately $4,000,000. It is expected that this scheme, together with the necessary rearrangement of routes in the business district, will finally solve the street railway transportation problem of Newark and its suburbs, a problem to which a vast amount of attention has been devoted for several years past.



Newark Terminal—Plan of Subway

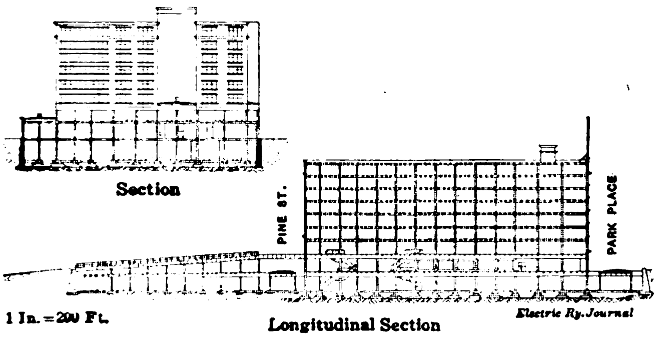
It is believed by the officials of the Public Service Railway that the terminal will effectually relieve the traffic congestion at Broad and Market Streets and will provide for additional service to all outlying points, notwithstanding the steadily increasing demands, for many years to come. By this plan the number of cars now operated within the congested zone can be doubled, the magnitude of the task which confronts the railway company being shown by the fact that during the last year the street cars in the Essex division carried 150,000,000 passengers, an average of more than 410,000 a day.

The terminal will front on Park Place, occupying a space of 180 ft. on that thoroughfare. Its ground plan will be commodious but somewhat irregular in shape as shown by the accompanying plan. A unique, and what is believed to be a very effective, arrangement has been worked out for the handling of cars and traffic in the terminal building. No cars will be operated on the surface and no tracks will enter or leave the property at the street level on Park Place. The Park Place frontage will be occupied by a handsome, substantial office building of steel, limestone and terra cotta. It is designed to be eight stories above the ground but will be carried only six stories high at first, with walls strong enough for the additional stories when needed. The building will be utilized entirely for terminal purposes and also as the home offices of the Public Service Railway.



Newark Terminal—Architect's Drawing of Exterior

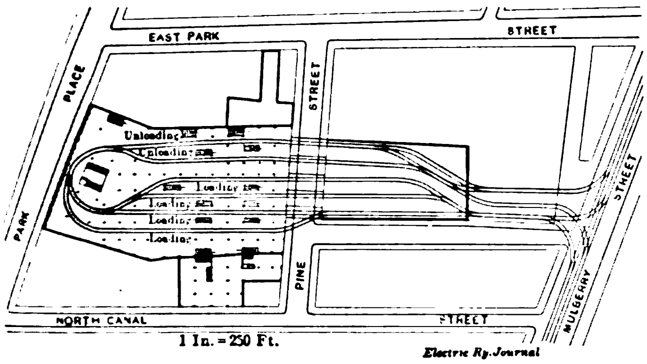
To keep cars off the surface in the terminal it is planned to bring lines from the west through a subway into the building on a sub-surface level. Lines from the east, north and south will be brought by way of Mulberry Street onto the company's property at grade and will then ascend a trestle, crossing the intervening street overhead and into the terminal building proper on what may be called the second floor. The subway to the terminal from the westward is regarded as one of the most important features and the plan was adopted only after careful study had demonstrated that no other would afford real relief. The subway is designed for two tracks but widens out to provide for five tracks on the sub-surface or basement of the terminal.


Section
PINE ST.
PARK PLACE
1 In.=200 Ft.
Longitudinal Section
Electric Ry. Journal

Newark Terminal—Sectional Elevations of Building

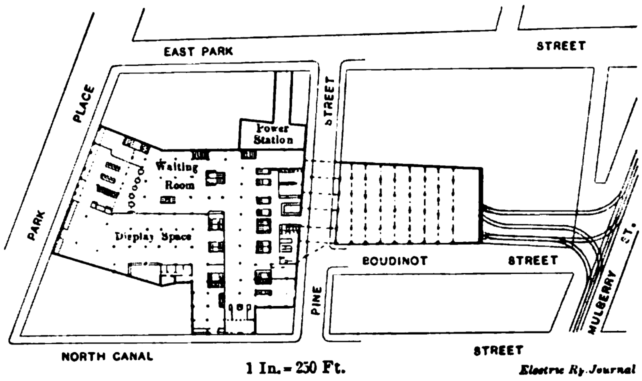
Of these five tracks, two will be for unloading and three for loading, the cars turning a loop after discharging their passengers and being brought into position for the start of their outward trips. Separate platforms will be provided for all tracks, each one long enough to accommodate several cars at one time, and independent stairways for incoming and outgoing traffic will prevent confusion and minimize crowding. On their outward or westward journeys the cars will return through the subway to the surface at Washington Street and proceed north or south over their respective routes.

For cars that will enter the terminal from Mulberry Street two tracks will be laid across the sidewalk on the west side of that thoroughfare, and these will ascend the proposed elevated approach and spread to five tracks crossing Pine Street and to six tracks on the second floor of the terminal building. Two of these will be unloading tracks and the other four will be loading tracks, the loops for this layout being on the Park Place end of the building. The unloading tracks will have separate platforms, each about 200 ft. long, and the loading platforms, also separated, will range from 190 ft. to 240 ft. in length. Like the subsurface platforms, these overhead platforms will have independent stairways for incoming and outgoing traffic so as to avoid confusion. The stairways will lead from and to the concourse on the ground floor, the elevation being only about 12 ft.


EAST PARK
STREET
PLACE
PARK
STREET
Unloading
Unloading
Loading
Loading
Loading
Loading
STREET
PINE
MULBERRY
NORTH CANAL
STREET
1 In.=250 Ft.
Electric Ry. Journal

Newark Terminal—Plan of Elevated Floor

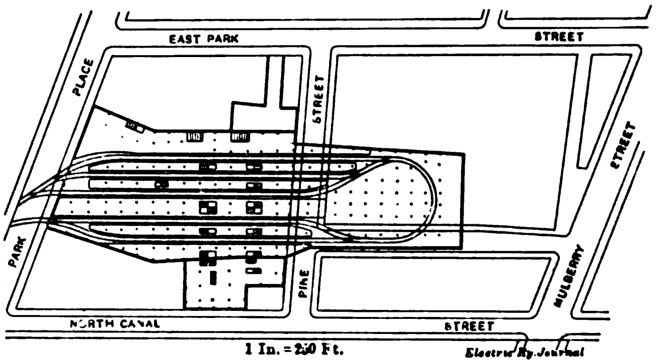
About 25,000 sq. ft. will be given over for the concourse. The main entrances and exits will be on the Park Place level at the northerly end of the building. Ticket booths and ticket choppers will be provided as at all terminal stations and illuminated signs will designate the stairways leading up or down to the various lines of cars. There will be plenty of seats, a modern retiring room for women, a smoking room for men, a parcels and information booth, telephone and telegraph booths, soda fountain, news stand, bootblacks' stand, station master's and starter's offices and such other conveniences as the operation of a large terminal calls for. There may be a few retail shops.


EAST PARK
STREET
PLACE
PARK
STREET
Power Station
Waiting Room
Display Space
BOUDINOT
STREET
PINE
MULBERRY ST.
NORTH CANAL
STREET
1 In.=250 Ft.
Electric Ry. Journal

Newark Terminal—Plan of Ground Floor

Adjoining the concourse will be the showrooms and commercial offices of Public Service Gas Company and Public Service Electric Company. These will occupy about 18,000 sq. ft. of space and will take the place of the quarters now provided. An exit from the concourse and one from the showrooms will be provided in the extension to North Canal Street, and the strip extending to West Park Street will be used for the heating plant and such apparatus as will be necessary to operate the elevators, the vacuum cleaning outfit and other mechanical needs of the proposed office building.

The Public Service Corporation and its allied gas, electric and railway companies require about 100,000 sq. ft. of floor space for the executive, operating, engineering, commercial and accounting forces housed in the present home office. To meet existing needs and allow for expansion the proposed building was designed as an eight-story structure. As the sub-surface, most of the surface and all of the second floor will be devoted to terminal uses, this would have provided six floors for office purposes. As each floor will have an area of 25,000 sq. ft., all six will not be necessary at once for the exclusive use of the corporation, hence the decision to build only six stories above ground at the outset. As the demands for more space come in the future a seventh and an eighth floor can be added when needed. The main entrance to the office floors will be through a spacious lobby located on Park Place, between the showroom and the entrance to the concourse.


EAST PARK
STREET
PLACE
PARK
STREET
STREET
PINE
MULBERRY
NORTH CANAL
STREET
1 In.=250 Ft.
Electric Ry. Journal

Newark Terminal—Plan of Basement

Report on United Railways of St. Louis

Public Service Commission of the City of St. Louis, After Investigation Regarding Finances of the Company, Sends Report to the Municipal Assembly—Valuation of the Property

A report on the United Railways Company of St. Louis has been made by James E. Allison, chief engineer and member of the St. Louis Public Service Commission, and has been transmitted by the commission to the Municipal Assembly of the city of St. Louis. It deals with the financial operations and valuation of the company and is to be followed by another report in which questions of service will be considered.

CAPITALIZATION

In taking up the subject of capitalization the report says in part:

"The total capitalization of the company in stock and in bonds assumed or issued by it is: Capital stock (preferred and common), $41,900,300; bonds (assumed and issued), $59,480,000; total, $101,380,300. A liberal valuation as made by the commission shows the present property to have a fair value of $37,638,668. The result of a comparison of the capitalization and the commission's valuation shows the company to have a capitalization in excess of the fair value of the property as fixed by the commission of $63,741,632.

"The commission's report shows a value of the whole property equivalent on a mileage basis to $81,645 per mile of single track, which is very liberal, especially when considering the facts that 110 miles of track of the total of 461 miles is suburban construction and that the company buys approximately 45 per cent of its power and has therefore no investment in generating plants for that portion of the power used.

"The capitalization of the company is on the basis of $219,914 per mile of single track."

VALUATION

In regard to valuation the report says in part:

"The term 'fair value' is used herein to designate the amount upon which the company should earn a reasonable return. The term is used because of its general adoption in court and commission decisions. The term 'just amount' or 'just capital' would more nearly express the true aim of the work.

"It is evident that 'fair value' cannot be measured by the face value of the bonds and capital stock issued by the company, for the issue of securities by public service corporations has frequently been known to bear but small relation to the real amount of capital actually invested in the business, and to assume such a measure of value without investigation would be a failure of duty on the part of a public service commission.

"Neither can the true 'fair value' be measured by the market value of the securities, for this market value is generally based largely upon the earning power of the plant, and the earning power in turn is based in great part upon the charges which the company is able to make to the consumer. The charge to the consumer may be excessive and the company may be earning exorbitant profit, or the reverse may be the case and the company may be losing money.

"The fact is that the justice or injustice of the charges to the consumer is the principal object of investigation, and if it is admitted at the start that a valuation based upon the unrestricted earning power of the plant is to be taken, then there is nothing to regulate, and there can be no such thing as unjust charges for public service.

"In a public hearing before the commission the company, through its attorney, set up the claim that the value of the property should be determined either by the face value or the market value of the stocks and bonds outstanding. The commission believes that this is not the proper method of arriving at the 'fair value' to be earned on, and the commission is strongly supported in its opinion by the decisions of the courts and of other commissions.

"The commission in its valuation has relied mainly upon original cost as the theory most calculated to bring about a just result. So far as the cost of labor and material entering strictly into the track, overhead work, generating plants, etc., are concerned, there would be little difference in results whether present cost, average cost or original cost were used, but the commission believes that in trying to determine the amount of property upon which a public service company is entitled to a reasonable return from the public, the circumstances under which that property was created and placed in the public service should be taken into account. This view leads to the use of the original cost theory where practical, but it is not always possible nor desirable rigidly to apply a theory, and the commission has not attempted to do so in this case at all points.

"After the commission had arrived at a tentative valuation of the physical property, the company had the opportunity of going over the work in complete detail, and a great deal of time has been consumed in so doing.

TABLE I.—PUBLIC SERVICE COMMISSION ESTIMATED FAIR VALUE OF TOTAL PRESENT PROPERTY

1.	Expense of organization	$398,152.00
2.	Interest on organization expense	24,720.00
3.	Real estate	2,109,067.30
4.	Cost of construction	30,237,174.88
5.	Contingencies	1,371,200.40
6.	Engineering	1,065,978.54
7.	Interest during construction	1,123,964.11
8.	Taxes during construction	237,860.70
9.	Insurance during construction	70,549.82
10.	Working capital	1,000,000.00
	Total	$37,638,667.75

"Table I shows the total valuation of the company's existing property both in the city and in the county.

"Table II is a comparative table showing the company's estimate of items as shown in Table I and also some additional items not allowed by the commission.

TABLE II.—ESTIMATED FAIR VALUE OF TOTAL PRESENT PROPERTY COMPARISON OF COMMISSION AND COMPANY ESTIMATES

	Commission Estimate	Company's Estimate	Company Estimate Above Commission Estimate Amount	Company Estimate Above Commission Estimate Per Cent
Expense of organization	$398,152.00	No est. submitted	....	..
Interest on organization expense	24,720.00	No est. submitted	....	..
Real estate	2,109,067.30	$3,603,198.48	$1,494,131.18	70.9
Cost of construction	30,237,174.88	32,063,160.68	1,825,985.80	6.0
Contingencies	1,371,200.40	3,206,316.07	1,835,115.67	133.8
Engineering	1,065,978.54	1,763,473.83	697,495.29	65.5
Interest during construction	1,123,964.11	6,371,932.99	5,247,968.88	467.0
Taxes during construction	237,860.70	1,340,992.92	1,103,132.22	464.0
Insurance during construction	70,549.82	502,411.30	431,861.48	612.0
Working capital	1,000,000.00	No est. submitted	....	..
Expenditure on suburban garden	....	40,615.03	Not allowed	..
World's fair terminals	....	118,339.79	Not allowed	..
Track and overhead material removed from streets	....	345,312.62	Not allowed	..
Total	$37,638,667.75			

"Although it had full opportunity to do so, the company has presented no total figures as to its estimate of the fair value of its property other than to make the claim that such fair value should be either the face value or the market value of its stocks and bonds. This report therefore gives no total purporting to represent the total claim of the company for its idea of the 'fair value' to be earned on.

Table II is merely the comparison of such detailed claims as were made by the company."

The report then discusses various items appearing in the totals of the valuation, saying in part:

EXPENSE OF ORGANIZATION

"The books of the company show that it spent $198,152 as expense of organization, or, rather, of reorganization. It might be objected that this item, being for reorganization of existing companies, does not enter into the investment placed in the service of the public, but the commission believes that the consolidation of the numerous street railway companies into one system was and is distinctly an advantage to the public, and therefore considers that this item should be admitted in the 'fair value.' The commission has estimated that $200,000 should cover all legitimate organization expense of the several companies prior to the consolidation.

INTEREST ON ORGANIZATION EXPENSE

"With the $200,000 allowed for the original organization of the predecessor companies, there is a probability that much of it may have been expended some time before the properties came into operation, and the commission has therefore made an allowance of $24,720, or 6 per cent compound interest for two years, to cover the periods of construction.

REAL ESTATE

"In the appraisals of private right-of-way in the city lies the chief difference of opinion between the appraisers. Excluding these items, the difference between the appraisals of city real estate is only 20.9 per cent, which is not an unusual difference of opinion on the values of such property.

"In their report the appraisers of city real estate for the company say: 'In our appraisement of these rights-of-way we have not considered them with reference to their special value to the United Railways Company, but at what we consider a fair and reasonable value of the property for any interurban or steam railway, subway or power transmission line, or other corporation that might wish to enter the city of St. Louis. In our judgment, if similar rights-of-way were to be acquired to-day they could not possibly be secured at as low figures as we have made.'

"Above all other reasons for not allowing the high values claimed under the company's theory is the fact that these apparently continuous strips of property are not in reality continuous for the use of any public utility without the franchise right to cross the intersecting streets, and even should the city consent to such uses as contemplated in the company's theory, the value created in that case would be largely a 'franchise value,' and not a real estate value. Franchises given free by the public cannot be valued against the public in rate or regulation cases, and in the opinion of the commission the theory of the company's appraisers as applied to right-of-way is not admissible in this case, as it clearly includes a franchise value.

"The value of the lands in right-of-way in this case should be measured by that of the contiguous property, for they are in fact merely a number of parcels of real estate between intersecting streets, unless the franchise right to cross the street is allowed to enter into their value.

"It is apparent that in assigning present value to land the commission is departing from the theory of original cost, and possibly making a concession to 'market value' as distinguished from 'just amount.'

"Universal custom has sanctioned the allowance of the increase in value of real estate and so far there is no decision of the courts or commissions which does not recognize it.

COST OF CONSTRUCTION

"In the item of construction costs of physical property it appears that the company's estimate does not show any greater difference in results (6 per cent) from that of the commission than could be expected from two appraisals both carefully made, but of course from slightly different points of view. The close agreement between the two estimates would have been even closer were it not for the item of grading, this item being the one on which there is a large percentage disagreement and a large difference in money.

"There is no question in the mind of the commission that expenditures made by the companies in full width grading of the streets should be included in 'fair value.' Such expenditures, unless made by the companies, would have had to be made by the city, and the public is to-day enjoying the benefit of the work paid for by the companies."

CONTINGENCIES AND ENGINEERING

The percentage estimates of the commission are shown in Table III. The total amount estimated by the commission for contingencies was $1,371,200 as compared with the estimate of $3,206,316 by the company. The total amount estimated by the commission for engineering was $1,065,979 as compared with $1,763,474 by the company.

TABLE III.—ESTIMATES OF COMMISSION FOR ENGINEERING AND CONTINGENCIES—PER CENT

		Engineering	Contingencies
1.	Buildings other than power plants	5	*
2.	Power plant buildings	5	*
3.	Power plant mechanical equipment	5	5
4.	Power plant piping	5	5
5.	Power plant switchboards, cable, conduits and power wiring	5	5
6.	Substation electrical equipment	5	5
7.	Substation switchboards, cable and conduits	5	5
8.	Storage batteries	*	*
9.	Air stations	5	5
10.	Machine shop equipment	5	5
11.	Cars	2	3
12.	Track, special work and paving	3	5
13.	Grading	*	*
14.	Bridges	5	7½
15.	Distribution system	5	5
16.	Miscellaneous mechanical equipment	5	5
17.	Miscellaneous piping, sewering, etc	5	5
18.	Miscellaneous wiring, etc.	5	10
19.	Miscellaneous machine shop equipment	5	5
20.	Miscellaneous expenditures	*	*
21.	Small tools, patterns, etc	1	5
22.	Furniture and fixtures	1	5
23.	Automobiles, wagons and horses	1	—

* Varying allowances.

The report continues: "In the valuation of most public utilities the records of engineering expense are in such condition that this item is generally estimated at a conventional percentage of total construction cost. This method, however, is open to criticism, from the fact that in different classes of utilities the grade and amount of engineering skill required differs materially, and even in the same class of utilities the proportions of the different kinds of equipment vary with each plant and the engineering expense varies correspondingly.

"The company claimed an allowance of 5 per cent on total cost of construction as estimated by it.

"The commission considers that an allowance of $1,065,979 as estimated by its engineers is ample to cover any possible engineering costs for one installation of the plant of the United Railways Company.

"In making its application of costs and prices to the inventory the commission's engineers have made large allowance for contingencies as they worked out the details of the valuation of different items and classes of items, but as a matter of precaution against possible injustice to the company, further allowances are added to the detailed allowances already made.

"The company in presenting its claim for contingencies simply made a blanket claim that 10 per cent on the cost of construction should be allowed. In making the extension for this claim the commission's engineers have taken 10 per cent of the company's total claim for cost of construction.

INTEREST DURING CONSTRUCTION

"In making its claims for interest during construction the company simply states that in its opinion it would take five years to build a plant such as it owns, and that therefore an allowance of interest at 6 per cent for the 'mean time,' or two and one-half years, should be made on the entire cost of construction to cover the item of interest during construction. The result of the computation based on these claims is 15 per cent of its claim for costs of construction, being the somewhat remarkable sum of $6,371,932.

"The property of the United Railways Company represents the continuous development and operation of the street railway industry of the city from its inception, and the property being in continuous operation, each particular part of the equipment as it was constructed to provide for growth or renewal could go into operation within a comparatively short time after it was installed. The period of non-return, therefore, should be approximately the time necessary to make the installation and the interest during construction calculated accordingly.

"Table IV shows the commission's allowance for interest during construction on different classes of equipment.

TAXES AND INSURANCE DURING CONSTRUCTION

"In presenting its claim for taxes and insurance during construction, the company has made the same error as in interest during construction, i. e., it assumes that these items should be calculated on the basis of two and one-half years. The commission has used the same method as it did in calculating interest during construction, and for the same reasons.

Table IV.—Commission Estimate of Total Interest During Construction at 6 per Cent per Annum

		Mean Time	Amount
1.	Real estate	*2 years	$260,680.72
2.	Buildings other than power plants	**	79,123.26
3.	Power plant buildings	**	58,763.81
4.	Power plant mechanical equipment	6 months	60,441.14
5.	Power plant piping	6 months	10,026.07
6.	Power plant switchboards, cable, conduits and power wiring	6 months	5,097.80
7.	Substation electrical equipment	6 months	14,930.96
8.	Substation switchboards, cable and conduits	6 months	4,611.11
9.	Storage batteries	6 months	6,422.67
10.	Air stations	3 months	1,716.52
11.	Machine shop equipment	3 months	3,216.39
12.	Cars	3 months	103,065.58
13.	Track, special work and paving	6 months	363,232.65
14.	Grading	**	25,555.26
15.	Bridges	3 months	7,257.92
16.	Distribution system	6 months	82,923.13
17.	Miscellaneous mechanical equipment	2 months	860.96
18.	Miscellaneous piping, sewering, etc	1 month	928.30
19.	Miscellaneous wiring, etc	6 months	1,103.60
20.	Miscellaneous machine shop equipment	1 month	554.31
	Interest on Engineering and Insurance.		
21.	Buildings other than power plants	9 months	4,748.91
22.	Power plant buildings	9 months	2,239.80
23.	Power plant mechanical equipment	6 months	3,022.05
24.	Power plant piping	6 months	501.30
25.	Power plant switchboards, cable conduits and power wiring	6 months	254.89
26.	Substation electrical equipment	6 months	746.54
27.	Substation switchboards, cable and conduits	6 months	230.55
28.	Storage batteries	6 months	128.86
29.	Air stations	3 months	85.82
30.	Machine shop equipment	3 months	160.82
31.	Cars	3 months	2,061.31
32.	Track, special work and paving	6 months	10,896.98
33.	Grading	9 months	1,954.29
34.	Bridges	3 months	362.90
35.	Distribution system	6 months	4,146.15
36.	Miscellaneous mechanical equipment	2 months	43.05
37.	Miscellaneous piping, sewering, etc	1 month	46.42
38.	Miscellaneous wiring, etc	6 months	55.19
39.	Miscellaneous machine shop equipment	1 month	27.72
40.	Insurance		1,738.40
	Total		$1,123,964.11

* As real estate is generally paid for in cash and notes at the time of purchase, full time instead of mean time is used.

** Varying periods of time.

WORKING CAPITAL

"In making its allowance for working capital the commission considered the store accounts of the company for different periods and made a liberal addition, and then added what it considered a liberal amount necessary for the company to have in hand to carry on the operation of its property. The estimated items were: stores, $450,000; cash, $550,000; total, $1,000,000. It is of course conceded that at times the company must have in bank larger sums than $550,000 to meet its interest on bonds and similar obligations, but such accumulations are in the nature of undivided profits ready for distribution and are not considered as capital engaged in the service of the public.

ABANDONED PROPERTY

"The company made a claim for certain items of expenditure. The commission considers that all of these items should properly have been charged off to depreciation or amortized during past operations, and that they are clearly not allowable as part of the present capital of the company in the service of the public.

FRANCHISE VALUE

"The most important, and in itself a sufficient, reason for not allowing franchise value in a rate or service regulation case is the simple fact that the franchises were given free by the public. They cannot then with justice be valued against the public in establishing rates, fares or quality of service.

SUPERSEDED PROPERTY

"In its valuation of the property of the United Railways Company the commission has made no allowance for superseded property, but while it has found that the circumstances of this case do not justify such an allowance, it does not take the ground that an allowance for superseded property should never be made.

Table V.—Cost of Original Equipment

Cable Equipment	
53.5 miles cable track at $65,000 per mile	$3,477,500
Cable machinery, etc., at $27,500 per mile	1,471,250
255 grip cars at $900 each	229,500
483 open and box cars at $1,325 each	639,975
Four work cars at $1,250 each	5,000
Real estate	....
Buildings	....
Paving	....
Total	$5,823,225
Horse Car Equipment	
161.3 miles track at $12,000 per mile	$1,935,600
898 horse cars at $800 each	718,400
4,075 horses and mules at $100 each	407,500
Buildings, etc.	560,000
Real estate	....
Paving	....
Total	$3,621,500
Steam Road Equipment	
Track, buildings and right-of-way	$296,500
Six locomotives at $5,000 each	30,000
Ninety-five passenger cars at $2,500 each	237,500
Thirteen freight and baggage cars at $1,000 each	13,000
Total	$577,000
Grand total	$10,021,725

"In trying to determine the amount of superseded property in the history of the street railways of St. Louis now comprising the system of the United Railways Company, the commission is confronted by a very great scarcity of reliable data, as the books and records of nearly all of the old companies have been destroyed or are not available. The commission has therefore been forced to use such data as it could find, whether official or not. While the data upon which conclusions were based may not have been all that could have been desired, the commission believes the results to be approximately correct and calculated to bring a substantially just result.

Table VI.—Value Saved from Cost of Original Equipment

Cable Equipment		
53.5 miles cable track at $20,000 per mile		$1,070,000
255 grip cars at $700	$178,500	
483 open and box cars at $1,125	543,375	
Four work cars at $1,050	4,200	
75 per cent of	$726,075	= 544,557
Total		$1,614,557
Horse Car Equipment		
4,075 horses and mules at $100		$407,500
Buildings		280,000
Total		$687,500
Steam Road Equipment		
Tracks, buildings and right-of-way		$150,000
Grand total		$2,452,057

"Table V shows the process of arriving at the final figures of the loss caused by changes in equipment due to transition from one system of traction to another.

"Table VI is intended to show the value of property saved from the original equipment by reason of its being salable at approximately full value, or because it could be and was used under the new system.

"In the changes from cable to electric traction, cable track was adapted to the use of electric equipment, but the saving was not the full cost of a cable track, but only the cost of an electric track suitable to take its place. This saving is here estimated at $20,000 per mile.

"It is known to the commission that in the transformation from the cable to the electric system a great number of cable cars were adapted to suit the new system—in fact, some of the cars, or rather their adapted bodies, are still giving good service and value has been allowed for them in the total valuation of the United Railways property. In trying to arrive at net loss from superseded property, the sums as set out in Table VI are supposed to be the value saved from the cars by reason of their continued use or adaptation to the electric system. The values used are the same as those used by the commission for the adapted parts in making up the values of the present equipment, and it is assumed that 75 per cent of the old car equipment was so adapted.

TABLE VII.—COST OF PROPERTY DISCARDED FROM ORIGINAL EQUIPMENT

Cable Equipment	
53.5 miles cable track, loss $45,000 per mile	$2,407,500
Cable machinery, loss $27,500 per mile	1,471,250
Cars	329,918
Total	$4,208,668
Horse Car Equipment	
161.3 miles track	$1,935.600
898 cars	718,400
Buildings	280.000
Total	$2,934,000
Steam Road Equipment	
Track, buildings and right-of-way	$146,500
6 locomotives	30,000
96 passenger cars	237,500
13 freight and baggage cars	13,000
Total	$427,000
Grand total	$7,569,668

"It is assumed that the horses, being a marketable commodity, could be realized on at approximately full value and that part of the value of the old equipment saved to the company.

"In dealing with the buildings of the horse-car system it was assumed that half the original cost would be saved by use in the new system or by sale.

"In dealing with adapting old equipment to the new conditions in the case of a small superseded steam railroad it is assumed that $150,000 in right-of-way buildings and track material was used. It is known to the commission that even as late as 1903 a quantity of the old narrow-gage T-rail was still in use on parts of this road, and it is reasonable to suppose that considerable quantities of it were adapted to the electric system.

TABLE VIII.—VALUE OFFSET BY WEAR EXTRACTED BEFORE SUPERSESSION AND SAVINGS IN MAINTENANCE AND REPLACEMENT

Cable machinery, 25 per cent	$367,813
Cable cars, 25 per cent	82,480
Horse car equipment, 50 per cent	1,467,000
Steam road equipment, 40 per cent	170,800
Total	$2,088,093

"The road is in the county and was not until recently brought up to a modern standard, i. e., after full wear had been extracted from old material.

"Table VII shows the loss in original equipment after the saving has been deducted from the original cost, i. e., Table VII represents the cost of property discarded, including an allowance of $45,000 per mile as lost value in reducing the cable track from original cost of $65,000 per mile to the value of electric track at a cost of $20,000 per mile, without paving.

"Table VIII represents as nearly as can be calculated the wear extracted before supersession, or the equivalent savings in depreciation charges and maintenance and replacement expenditures caused by the replacement of old equipment by new equipment in the property under consideration. As this saving is caused by the supersession it should be taken as an offset to gross losses in determining the net loss, and it is here so treated.

TABLE IX.—NET LOSS CAUSED BY CHANGE OF EQUIPMENT

Cost of original equipment		$10,021,725
Value saved from original equipment	$2,452,057	
Value offset by wear extracted and saving in maintenance and replacement	2,088,093	
		4,540,150
Value actually lost by supersession		$5,481,575

"Table IX shows the deduction to be made from the cost of the original equipment to arrive at the nearest measure of the net loss occasioned by the supersession of property under consideration. Having obtained this loss of $5,481,575, our next step is to determine whether or not the company has been able to recoup itself for the loss and could reasonably be called upon to consider it amortized, or whether, not having had the opportunity to do this, the loss must be capitalized or its amortization taken into account in future returns.

"The net earnings of the United Railways Company during the years from 1900 to 1911 inclusive were $30,490,919; the net earnings of the property, including the years when it was under lease to the Transit company, were $38,495,516. In either case the earnings are large when based upon the real investment actually in the service of the public, and it is plainly apparent that the company has had ample opportunity to recoup itself even in those years for a much larger loss from superseded property than is evident from the tables. The amount paid in dividends on preferred stock alone is more than sufficient to have offset the losses from superseded property.

"The commission does not consider that under the circumstances the company or the property has sustained a loss by reason of revolutionary changes of equipment which it has not recouped from its earnings. The commission, therefore, makes no allowance for superseded property in the valuation of the company's investment in the service of the public.

COST OF ESTABLISHING BUSINESS

"In considering an allowance in this case for cost of establishing business, the commission has in mind the fact that street railway companies seldom if ever make expenditures strictly to solicit business, and that losses by deficit of return when chargeable to cost of establishing business must be confined to the years immediately following the inception of the enterprise.

"It is very possible that some of the original companies now absorbed by the United Railways Company may have passed through a period of initial loss to establish business, but how much of this loss may be attributed to building roads at the time unnecessary to the public service and built only to pre-empt territory from competing roads cannot be now decided. Nor is it possible now from existing records to determine definitely the amount, if any, of such early deficit in returns.

"The commission, however, has abundant evidence that there has been ample opportunity to recoup from subsequent earnings any losses which could reasonably have been charged to cost of establishing business, and it has therefore made no allowance for such an item.

BOND DISCOUNT

"If throughout the history of the street railways of St. Louis the letter and the spirit of the laws of the State had been observed, the property as it now exists would have a bonded indebtedness not to exceed approximately one-half the fair value now placed upon it by the commission. The balance would be represented by stock whose face value in money had actually gone into the service of the public in the purchase of labor and material and in legitimate expenses of creating the property, and it can well be assumed that under such conservative financiering the credit of the company and the safety of the investment would have made any discount on bonds unnecessary.

"In the case of the United Railways Company, the commission does not consider an allowance for bond discount to be admissible.

DIVISION INTO CITY AND COUNTY PROPERTY

"The county system of the United Railways Company should be classed more as a suburban system than as an interurban system, and acts, in the opinion of the commission, largely as a facility for the city's population in its excursions into the county, in addition to serving the business of the city as a feeder from the suburban population. If, therefore, it appears that this county system is not self-supporting and profitable but must rely upon its being a part of the property as a whole in order to show a reasonable return on the investment, the commission believes that it is only fair to include its value with that of the city system in estimating the just amount to be dealt with in any ordinances or regulations imposed by the city.

"There appears to be no separate record kept by the company of operating expenses chargeable respectively to the county and city business, and in fact such a division in accounts would be very difficult to apply except by estimate. The commission has therefore been forced to make an estimated division of operating expenses based on car miles and car hours operated.

TABLE X.—COMMISSION ESTIMATE OF RATE OF ANNUAL DEPRECIATION OF PHYSICAL PROPERTY.

	Depreciation, per cent, per year
Buildings other than power plants	2
Power plant buildings	2
Power plant mechanical equipment	6⅔
Power plant piping	6⅔
Power plant switchboards, cable, conduits and power wiring	6⅔
Substation electrical equipment	6⅔
Substation switchboards, cable and conduits	6⅔
Storage batteries	5
Air stations	6⅔
Machine shop equipment	6⅔
Cars	5
City straight track	6⅔
City special work	11.1
County straight track	5
County special work	5
Bridges	6⅔
Distribution system, conduits	2
Distribution system, cable, wiring, wood poles, etc	5
Distribution system, iron poles	4
Miscellaneous mechanical equipment	6⅔
Miscellaneous piping, sewering, etc	6⅔
Miscellaneous wiring	5
Miscellaneous material and supplies	6⅔
Miscellaneous machine shop equipment	6⅔
Small tools, patterns, etc	12½
Furniture and fixtures	5
Automobiles, horses and wagons	10

"These figures show an operating expense for the county lines of 97 per cent of the earnings, from which it is evident that these lines are operated at a loss when the investment is taken into consideration. The property is well managed and the cause of loss is the low rate of fare charged.

"As the operation of these county lines is of great value and convenience to the citizens of St. Louis, and as they are for all practical purposes except taxation an integral part of the St. Louis transportation system, the commission believes that the investment in them should be taken into account in any regulation of the United Railways Company and that the earnings and expenses of both city and county properties should be treated as one.

DEPRECIATING TO OBTAIN JUST AMOUNT

"If market value were established as the basis upon which to determine public regulation, there could be no stability of values, and hence, as an inevitable consequence, heavy risk charges to be paid by the consumer.

"Fortunately, the most respectable authorities agree in considering market value as an unfit basis for public regulation, yet we find that many of them in dealing with depreciation in rate cases evidently have in mind the question, 'How much is this property worth in the market?' rather than 'What is the just amount upon which return should be calculated?'

"The commission believes that in seeking just amount rather than market value in rate cases, there are conditions under which a public utility property should not be depreciated to arrive at the just amount upon which returns should be based, and it believes that in case of the United Railways Company these conditions apply.

RATE OF RETURN

"It is the opinion of the commission that if the securities of the United Railways were issued on the basis of the amount found by its investigation to be the true capital invested in the service of the public, a return of 6 per cent on the capital would be ample to induce investors to enter the business and take all existing risks. As for past risks not due to financiering methods, the commission believes that they have been fully compensated for by past profits.

"If the securities of the company were issued only on the true capital and were divided into one-half bonds and one-half stock, as is usual and permissible under the laws of the State, there is little doubt that these bonds, secured by the entire system of the United Railways property and amounting to less than $19,000,000, would sell on a 5 per cent basis or better. This assumption is borne out by the market price of underlying bonds now outstanding. With bonds drawing interest of only 5 per cent on one-half the capital, the other half in stock would earn dividends of 7 per cent under an allowance of 6 per cent returns upon the whole capital.

GENERAL CONDITION OF THE PROPERTY

"The physical condition of the property of the company is on an average at least normal in efficiency and is improving through the performance of what may be called deferred maintenance. The deferred maintenance on tracks and paving, from a rigid inspection and estimate made by the commission, appeared to be approximately $587,732, or about 5 per cent of the cost of its construction. Since this inspection a considerable amount of track has been relaid or is now being relaid. The cars of the system, while not throughout a modern equipment, are as a whole at least in the normal state of efficiency to be expected from piecemeal installation. Some of the rolling stock which is nearing replacement has been allowed to become unsightly to the public by lack of attention to paint and seat repair, which would at small expense have made the cars satisfactory public vehicles to the day of their replacement.

"The power plant equipment, while not modern, is serviceable and likely to remain so for many years to come. The capacity of the power plants is small for such a system, owing to the purchase of approximately 45 per cent of the power from the Union Electric Light & Power Company.

EARNINGS AND DEPRECIATION CHARGES

"Disregarding the burdens caused by over-capitalization, the United Railways of St. Louis, as shown by the earnings and operating expenses, is an exceptionally good property. The management is efficient, the income assured and the net earnings large.

"The company's charge for depreciation in 1911, as it enters into the operating expense, was $1,191,415. This is only 3.9 per cent of the depreciable property and does not appear large enough to be a safe depreciation charge in such a property. In the present case, the commission is of the opinion that the safer course, regardless of methods of calculating, would be to adopt the larger figure as shown in its estimate of the annual depreciation, which amounts to 5.3 per cent of the depreciable property. The rates for the various classes of physical property used by the commission are shown in Table X.

CONCLUSION

"Deducting the reasonable return on the investment from the net earnings, we find that the company is earning $1,069,480 in excess of a reasonable return.

"If the company is to be limited to a reasonable return, there are three methods by which this excess may be corrected: First, by its absorption in taxes to the city or by profit sharing with the city; second, by a reduction of fares; third, by regulations requiring better service, or it may be done by a combination of any two or all three methods.

"In the opinion of the commission, the first steps in legislation in this case should be along the line of requiring a better service to the public, and with this in view, it has made exhaustive investigations into the present condition of the service, and has prepared data for guidance in efforts to improve the service."

The report is signed by the three members of the commission, Joseph L. Hornsby, chairman; James A. Waterworth and James E. Allison.

DERAILMENTS ON CHICAGO ELEVATED

Two derailments of cars have occurred recently on the Chicago Elevated Railways, and although no one has been seriously injured the company and the Harbor and Subway Commission have made investigation into the causes. The results are summarized in a report recently submitted to the Commissioner of Public Works by William Artingstel, G. B. Robinson and S. Gold, and the causes of the derailment are analyzed.

The derailment principally considered in the report was that of a car on the Chicago & Oak Park Elevated on Jan. 8, and statements were obtained from the trainmen, by Robert W. Hunt & Company, who examined the equipment, and by others. The most interesting document, however, is a report by A. K. Shurtleff, office engineer Chicago, Rock Island & Pacific Railway, who discussed the general subject of operation of trains on curves where it is not possible to have any super-elevation of the outer rail. This was the case on the curve at which the car was derailed, because the curve crosses a section of straight track.

Mr. Shurtleff points out that, in addition to the centrifugal force, which would favor derailment, a car on such a curve tends to leave the track because of the grinding of the wheel flanges against the outer rail owing to the unequal length of the inside and outside rails of the curves. As the wheels are fixed rigidly to the axles there is a tendency for the inside wheel to travel at as great a distance on the track as the outside wheel. This tendency throws the front axle of the truck at an angle with the radius of the curve, the inside front wheel being ahead of the radial position of the outside front wheel and the flange of the outside wheel is placed at an angle with the rail and presses hard against it. The shorter the radius the greater the angle between the flange and rail and the greater the tendency to climb over the rail. The rear axle of the truck assumes as nearly as possible a position radial with the curve, provided the gage of track is correct. With this condition existing the flange of the forward outer wheel of the truck is always pressing hard against the outside rail and seeking any opening that may exist in it to escape and proceed in a straight line unless there are restraining influences other than the running rails of the track.

Mr. Shurtleff continues that the forward truck of the first car and the rear truck of the last car are more apt to derail than other trucks of the train where the conditions of the wheels are equal. This is owing to the "pull" through the drawbars of the train having a slight tendency to force the cars toward the inner rail, each car "leading" the other except that the forward car must depend entirely on its front truck for guidance and the rear truck of the last car is in the position of the small boy at the end of the string in the old-fashioned game of "crack the whip."

The report then considers the practical measures for guarding against these conditions as follows: First, the use of guard rails placed in such a position as to assist in guiding the wheels around the curve and draw the flange away from bearing hard against the outer rail. The guard rail that performs this duty is the one placed adjacent to the inside rail. Its function is to engage the back of the inside wheel at the time the flange of the outside wheel is against the running rail. To perform this function it is absolutely necessary that this guard rail be rigidly fixed so that its position with reference to the outside running rail is always maintained. The report says that the great tendency of trackmen is to maintain a given throatway between the guard rail and its adjacent running rail and that they overlook the fact that the real function of these inside guard rails is to protect the wheel running on the opposite rail. A slightly tight gage of track in such cases renders the guard rail useless. Where inside guard rails are used adjacent to both track rails it is necessary to place them so that the distance between the throatway sides of the rail heads is never greater than the minimum standard allowance back to back of wheels; otherwise there will be strong tendency to derailment. The elevated railway track on the curve under consideration has the two inside guard rails throughout, so that their full value, when properly used, has evidently been recognized.

The position of these guard rails with reference to the running rails which they are supposed to protect is also considered in the report, particularly through the crossing on which the derailment occurred. Mr. Shurtleff found upon examination that the track gage at certain points was narrow and at one place too wide properly to perform its service, and that at one place the inside guard rail was too close to the outside track rail to prevent a strong tendency of the wheel flange to strike a frog point and derail. With the guard rails apparently too far apart properly to clear the distance back to back of wheels and with the unbalanced centrifugal force throwing additional weight on the outside rail, the report found that the tendency would be for the inside wheel to mount over the guard rail, thus allowing the outer wheel to catch the middle frog point.

In conclusion the commission recommended:

First—A maximum speed not to exceed 8 m.p.h. at all curves on crossings where it is not feasible to provide super-elevation, as established by standard engineering practice.

Second—That the maximum speed on any curve where there is super-elevation of the outside rail shall be determined by the amount of super-elevation and the degree of curve.

Third—That operation of motors in multiple be forbidden until the car has cleared the curve.

Fourth—That suitable targets be placed at the proper points on tangent track to indicate when the last car has cleared the curve.

Fifth—That special guard rails be provided at all curves.

Sixth—That struts and ties be used to hold all running and guard rails in proper relation to each other.

Seventh—That while rounding curves conductors and trainmen be compelled to remain on the platform of their car.

RAIL INSPECTION FOR THE INDIANA UNION TRACTION

The Indiana Union Traction Company, so far as is known, is the first electric railway to arrange for a special inspection of its rails at the rail mill. This plan has been followed by steam railroads for some time on account of the trouble with broken rails in steam railroad service. Briefly, the plan for pursuing this work consists in the placing of inspectors during both day and night in the steel works, in the blowing mill, in the rolling mill and finally at the testing machine. These inspectors make full reports of all matters coming under their observation on the operation followed in the treatment of every piece of steel rolled into the rails. They call the attention of the mill men to the deviations from recognized good practice and provide a definite history of all matters pertaining to a rolling mill order. This work is being undertaken for the Indiana Union Traction Company by R. W. Hunt & Company.

PROPOSED CO-OPERATIVE STORE AND OTHER IMPROVEMENTS IN PHILADELPHIA

In Bulletin No. 11 just published by the Philadelphia Rapid Transit Company the plans of the company in regard to the possible establishment of a co-operative store or stores for the benefit of the trainmen are announced. Before carrying out the plan, the co-operative committee, which is made up of representatives from the management and the employees, will make an estimate of the possible savings to the men from such a store. To do this the committee expects to request a statement, to be made out as accurately as possible, of their housekeeping expenses from at least 1000 of the men who have been sufficiently long in the service to have become settled in their manner of living. These expenses are to be for the month of January, 1913, and the information will be filled out on printed forms as follows:

1. Rent .... $
2. Foodstuffs, i. e., meats, groceries, milk, eggs, butter, fruit, ice, produce ....
3. Heating and lighting..
4. Clothing ....
5. Insurance, i. e., life, health, fire and endowment............
6. Household effects, i. e., carpets, rugs, curtains, furniture, kitchenware ....
7. Miscellaneous, i. e., entertainment, dues, charities, taxes, interest, etc. ....

Total .... $

This information, when secured, should enable the co-operative committee to make a fairly accurate estimate of the savings to the motormen and conductors which could be made by co-operative buying in the event of a satisfactory method of distribution being secured.

NEW BOOK OF RULES

The co-operative committee on Jan. 21 unanimously approved the new edition of rules for motormen and conductors. These rules will go into effect Feb. 15. One of the rules prohibits smoking, spitting or the carrying of partly consumed cigars or cigarettes into closed cars at any time and confirms the announcements on the placards which appeared in all of the company's cars on the morning of Jan. 21. The text of this placard was published on page 172 of the Electric Railway Journal for Jan. 25. This crusade was undertaken in the interest of public health at the suggestion of Dr. Joseph S. Neff, director department of public health and charities. The city government, the newspapers and the general public have evidenced great interest in the successful outcome of this endeavor.

The conductors are instructed to be courteous but firm in the carrying out of this rule and, when necessary, to hand to an offending passenger who does not promptly respond to the request to comply with the rule a card bearing the text of the placard, as published in the issue of Jan. 25. It is thought that the handing of this card to offenders will in most cases render further action unnecessary.

VENTILATION AND SANITATION

The company is also making a strong effort in the direction of ventilation and sanitation of its cars. According to the bulletin, the problem of ventilation of the near-side cars used in Philadelphia has been carefully worked out, with the result that this type of car is recognized as being most scientifically heated and ventilated. The ventilating features have been subjected to a test by Dr. Neff, who reported that the ventilators are capable of removing 35,053 cu. ft. of air per hour. This is equivalent to 381 cu. ft. per passenger per hour on the basis of a total load of ninety-two passengers. The bulletin calls the attention of the employees to the fact, however, that opinions of passengers as to what constitutes proper ventilation are often so diametrically opposed as to make it impossible for the conductor to meet the demands of all who desire that their wishes in the matter of ventilation shall have prompt attention. The company also disinfects its cars daily and is giving special instructions to its employees as to the methods of proper braking, so as to reduce noise.

TIMETABLE DEPARTMENT

The schedules of the men are also being overhauled by the timetable department for the purpose of making nine hours the minimum for scheduled runs, except for trippers and Sunday timetables. It is intended that all runs shall be from nine to eleven hours in length, all to be completed within a maximum of fourteen consecutive hours. Deviation from this rule will, in future, be permitted by the timetable department only in cases where it is found that better runs, more to the liking of the men, can be produced.

RAILROAD-TERMINAL ELECTRIFICATION INVESTIGATION IN CHICAGO

In the report for the year 1912 of the committee on smoke abatement and electrification of the Chicago Association of Commerce, Jesse Holdom, chairman, says that substantial progress has been made by the committee, through the work of the chief engineer and his staff, during the year. However, it is impossible at this time even to foreshadow the recommendations which the committee may make finally. Much of the investigation so far has related to the smoke-abatement phase of the subject and has consisted of tests of air pollution, examinations of locomotive engines and smoke-producing plants in the city and an investigation into the quantities of coal arriving in Chicago and the amount consumed in the various industries. Scientific tests have been made in an endeavor to ascertain the amount of smoke and gases produced by a ton of coal burned in locomotive service.

The Diesel oil engine has been investigated both in this country and abroad. Judge Holdom also reports that George Gibbs, of the firm of Gibbs & Hill, of New York, consulting engineers for the committee, has given his opinion that the Diesel engine is not practically workable for switching or yard service, and that its ultimate value in express railroad service is uncertain. Mr. Gibbs said that he had been collecting data for some time on operating costs of electric traction in heavy railroad service, particularly in connection with the electrification of the Pennsylvania terminals in New York. Mr. Gibbs has investigated the railroad electrification in Europe and thinks that the conditions abroad are so different from those in Chicago that, beyond the working out of some of the technical difficulties, foreign practice is not applicable to Chicago. There is no uniformity of standards abroad, and nothing has been done in the electrification of terminals.

The chairman notes that in a letter sent to Mr. Burt, chief engineer of the committee, in September last, Thomas A. Edison asserts that there is "no difficulty in making storage battery locomotives to do terminal work." Judge Holdom says that this is encouraging for the policy of electrification and that Mr. Edison may possibly demonstrate in time the correctness of his conclusions.

Mr. Gibbs is quoted as follows: "The data which are now assuming shape in this office make it possible for the first time for us to begin to see daylight in outlining the entire problem, and we shall soon reach a point where we can proceed on the scheme for electrification, its cost and operating results. There has been a vast amount of work done, and upon very systematic lines, and I believe this work of preparation has been necessary and justified."

Judge Holdom emphasized the fact that conditions in the East are no criterion of railroad electrification in Chicago. He says: "Chicago is on a scale of ten to a unit in the East, its freight yards and terminals presenting problems differing radically from those found in the Eastern cities." The chairman says the problem depends for its solution on whether electrification is mechanically feasible, safe and efficient, and whether it is financially practicable. At this time none of these questions can be answered, although great progress has been made toward their final solution.

The matter of the character of motive power remains to be solved. Judge Holdom's exact language on this point is of interest. He says: "Aside from the Diesel internal-combustion engine, there are numerous other engines in the experimental stage whose powers are not yet known and whose capacity for practical operation has not yet been determined. Whether overhead construction, or third-rail, or electrical engines, or storage batteries, or gas-electrical motor engines (now in the experimental stage in the shops of the General Electric Company, Schenectady, N. Y.), will prove to be most useful and practical depends on time and the ultimate results reached by those who are constructing and exploiting them."

It is interesting to note that from the organization of the committee on June 30, 1911, to Dec. 31, 1912, there had been expended on the investigation $221,599.97, all of which has been paid by the railroads represented by the General Managers' Association. The average number of employees on the chief engineer's staff during eleven months of 1912 was sixty-six.

AWARD OF CONTRACT FOR ELECTRIFICATION OF MELBOURNE SUBURBAN SYSTEM

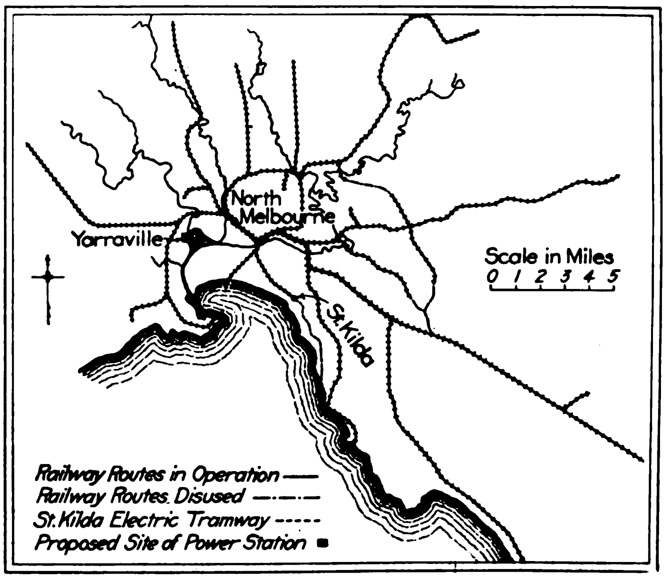
The important announcement was made this week that the contract for the electric equipment for the electrification of the suburban railways about Melbourne, Australia, had been awarded to the General Electric Company. The work will be carried out on a 1500-volt d.c. system, according to the recommendation of Merz & McLellan, consulting engineers, Westminster, London. An abstract of Mr. Merz's latest report, in which he recommended the high-tension direct-current system, was published in the ELECTRIC RAILWAY JOURNAL for Dec. 7, 1912. An abstract for an earlier report, in which Mr. Merz recommended electrification in general, was published in the issue for Oct. 3, 1908.

Melbourne is the capital of the State of Victoria in Australia. It has a population including suburbs of about 500,000 persons and is the most important municipality in Australia. The local tramway system is operated mostly by cable and is owned by a corporation whose franchise soon expires. It is expected that this system will be taken over, either by the municipal government or the state government, and then probably electrified. The present contract does not relate to the tramway system in Melbourne but to the suburban steam lines that form part of the steam railroad system, which is owned and operated by the Victorian government.

The report recommending 1500-volt electrification, published in the issue of this paper for Dec. 7, was based upon tenders on different systems of electric traction submitted by all of the large manufacturers of electrical apparatus, and the contract which has been received by the General Electric Company comprises 400 motor car equipments, consisting of four motors each, 800 control equipments, 400 of which are for trailer cars, and 400 air compressor equipments. This is the largest single order ever placed for electric railway apparatus.

The mileage of the suburban lines included in the scheme is made up of 150 route miles, or 289 track miles, of running roads and 34 miles of sidings. Power will be supplied from a central station at Yarraville, a suburb of Melbourne, in the form of three-phase alternating current at twenty-five cycles per second, and will be transmitted at 20,000 volts to twelve substations at various points on the system, where it will be converted into the operating direct current of 1500 volts. The high-tension transmission is by underground cables from the power house to the important substations in the central area, and by overhead wires, erected on the same structures which carry the railway track conductors, to the outlying substations. Overhead conductors will be used throughout the system for supplying current to the trains, which will be equipped with roller pantograph collectors. The complete equipment of the railways involves the expenditure of $12,000,000 in round numbers, and Mr. Merz figures that the saving from electric operation will amount to about $600,000 in 1915 over the former steam-operated lines.

Normal trains, weighing about 180 tons, will consist of two motor coaches and two trailer coaches. The tracks are 5-ft., 3-in. gage. The suburban traffic amounted to 70,000,000 passengers in 1908; the figure the past year exceeds 90,000,000 and in 1917, when it is expected that the conversion to electric operation will be entirely completed, it is estimated that the suburban lines will carry 150,000,000 passengers per annum. The present plans are accordingly based on provision for this probable increase in the passenger traffic, but all parts of the electrification scheme are arranged so as to be capable of extension from time to time as the traffic subsequently grows. Heavy traffic during the rush hours of morning and evening will be cared for by increasing the length of trains, although for this initial service it is the intention to have the maximum train consist of six coaches.


North Melbourne
Yarraville
Scale in Miles
0 1 2 3 4 5
St. Kilda
Railway Routes in Operation ——
Railway Routes Disused — - —
St. Kilda Electric Tramway -----
Proposed Site of Power Station ■

Melbourne Suburban System of Victorian Railways

The motors, numbering 1600 in all, which will be installed in the 400 motor coaches will be of new design throughout. They will be known as Type GE-237, will be provided with commutating poles, and will be rated 140 hp each at 725 volts. They will be operated two in series on 1500 volts. These motors will be self-ventilating by centrifugal fans, cast integral with the pinion-end armature-core head. The motors will be arranged for top-field control so as to have a running speed of 52 m.p.h. over level track on express runs.

The control equipments, of which 800 will be required, will be of the Sprague General Electric Type M form with relay automatic control.

The losses from moisture in coal, according to the *Bulletin* of the Institute of Operating Engineers, are too often neglected. In a cargo of 800 tons, 1 per cent of increase in the moisture content may mean a loss of $40 or $50, to which must be added losses due to evaporating and superheating this moisture in the furnace. The "mine moisture" of bituminous coal shipped to the New York markets averages approximately 2 per cent. Moisture in excess of this amount is usually caused by rain and leakage in boats during transportation, so that the allowable moisture in a sample should be limited to about 3 per cent.

RECOMMENDATIONS FOR SAN FRANCISCO CARS

As a supplement to Part 1 of his report on the design of the new United Railroads' motor car, B. J. Arnold has submitted to the San Francisco Board of Supervisors, under date of Jan. 20, 1913, an analysis of the loading arrangements of the present rolling stock. In this Mr. Arnold presents detailed recommendations by which the present car bodies may be retained in service for some years to come and still be made more useful to the company and also more useful and comfortable to passengers, especially with reference to rapid loading and unloading. An abstract of Mr. Arnold's summary follows:

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

1. The three improvements essential to the electric car equipment are (a) an increase in platform loading capacity; (b) better unloading facilities; (c) improved seating arrangement. To secure the principal result there are only two alternatives—either lengthen the platform or else remodel the platform fixtures and remove the end bulkhead; possibly both will be advisable in some cases. Mr. Arnold believes that these changes will result in increasing the speed of passenger movement at least 25 per cent.

2. Observations indicate that the time for loading and unloading is entirely too great. Entrance passages should be enlarged, particularly on the short-platform cars, and at least the full width of the entrance step (i. e., from the outer grab handle to the stanchion) should be preserved in the platform passageway as far as the last step or entrance door into the car body. In general, this result may be accomplished by changing the shape of the guide railing, and on the shorter platform cars by moving the controller away from the entrance.

3. Inasmuch as the use of the prepayment fare box is established, end bulkheads in cars with narrow bulkheads should be removed to provide the additional entrance way made necessary by this method of fare collection. In this manner a "California" type car may readily be developed by locating the bulkheads within the car body, forming a closed central section with open end compartments.

4. If a fare box is to be used, the elimination of the end bulkhead is essential, but in this case moving the controller to the side, although desirable, will not be absolutely necessary. On the other hand, if the fare box is not used, it will be unnecessary to take out the end bulkhead, since moving the controller will provide considerable platform space. In any case, the clear entrance way to the car body should generally exceed 24 in.

5. Lengthening of platforms is preferable if the cars are in sufficiently good condition to warrant the expenditure, but the change would not be worth while unless each platform could be lengthened at least 12 in. If none of these improvements is carried out, the short platform cars should be retired to outlying or cross-town service, where traffic is lighter.

6. The closed section of the "California" type cars should have cross seats, but in the end compartments the maximum amount of storage space should be provided to accommodate short-haul riders. This necessitates the use of a longitudinal seat on that side of the car where passengers enter. In the all-inclosed class at least 50 per cent of the seating capacity should be in cross seats, instead of the present all-longitudinal plan.

7. During stormy weather, protection by windows or curtains must be provided in the "California" type cars for passengers using the open sections, otherwise more than half of the seating capacity of the car is rendered unavailable when maximum capacity is demanded by rush-hour loading.

8. In cars from which the end bulkheads are not removed, the stanchion in the middle of the door opening should be set out 6 in. or 8 in. from the end sill to increase the entrance and exit passageways.

9. The "Cleveland" fare box frame will provide the maximum storage space on short platform cars using this method of fare collection. If the fare box is not used, the present type of guide railing altered in shape may be retained, but any rail of this type should be cut off at least 24 in. from the step or provided with the "Oakland" radius (movable) rod in order to make the entire step available for emergency loading.

10. Any form of guide railing or fare box stanchion should be movable, so as to be located behind the motorman on the forward end to protect him from interference by standing passengers during lurches of the car, at the same time clearing the forward platform of obstructions.

11. Rapid unloading at the forward end should be facilitated as follows: (a) Removal of the stanchions now dividing the door opening (unless bulkheads are removed) to give a less obstructed exit way; (b) moving the exit gate next to the bulkhead in order that passengers alighting may not have to force their way through a crowded platform; this will also have the effect of decreasing the necessary length of safety stations on the street; (c) providing a gate at least 30 in. wide, say of a sliding type, which does not interfere with passengers standing on the platform.

12. All cars should be provided with automatic folding steps at the forward exits and lift steps at the rear entrances. With all steps raised except that under the conductor's control, accidents will be greatly reduced.

13. On the flush-platform "California" type cars the principal improvements should include the remodeled guide railing, storm curtains in the open sections and a seating arrangement approximating the Geary street car plan,* except that in such a narrow car two rows of cross seats should not be used in the closed section; also the projecting steps on these cars, or any other type, should be replaced by automatic folding steps to prevent accidents.

14. On the 1300 class the platforms should be lengthened and the car converted into the prepayment type if it is to be operated on any important lines.

15. Power brakes should be used on all double-track equipment, especially that operating within the congested districts. The expense of new brake installation on cars that have been in service ten years or more would not be warranted, but such equipment should be immediately retired to outlying districts.

16. Cable cars of the Powell Street lines should have additional capacity, and these short cars should be immediately converted into the "California" type by the addition of another open section. Double-end operation should be provided for. In the design of new cable equipment the adoption of the prepayment center-entrance type should receive serious consideration, with the object of reducing accidents and obstructions of streets.

17. For hill-top lines encountering long grades much in excess of 10 or 12 per cent, a special type of car should be developed, of light construction and equipped with power track brakes such as the magnetic type; this car to be from 35 ft. to 40 ft. in length and to seat about thirty-six people.

LOADING TIME

In the general discussion, the question of loading time is considered. With the abrupt vertical grades and necessary platform overhang in San Francisco, the United Railroads Company has established a platform length of 7 ft. 4 in. If this length is taken advantage of to the fullest extent, as has been done in the Municipal Railway car, it would be sufficient.

For loading conditions in San Francisco, sufficient storage space should be provided on the platform to accommodate an average group of ten and a maximum of twenty-five passengers waiting to pay their fare. For average groups of ten passengers, the loading time for the best of the San Francisco cars is 27.5 per cent slower than the latest equipment operated in Oakland, and for the short platform type 65 per cent slower, or twice as slow as the standard cars of Chicago, which are built with 8-ft. 4½-in. platforms.

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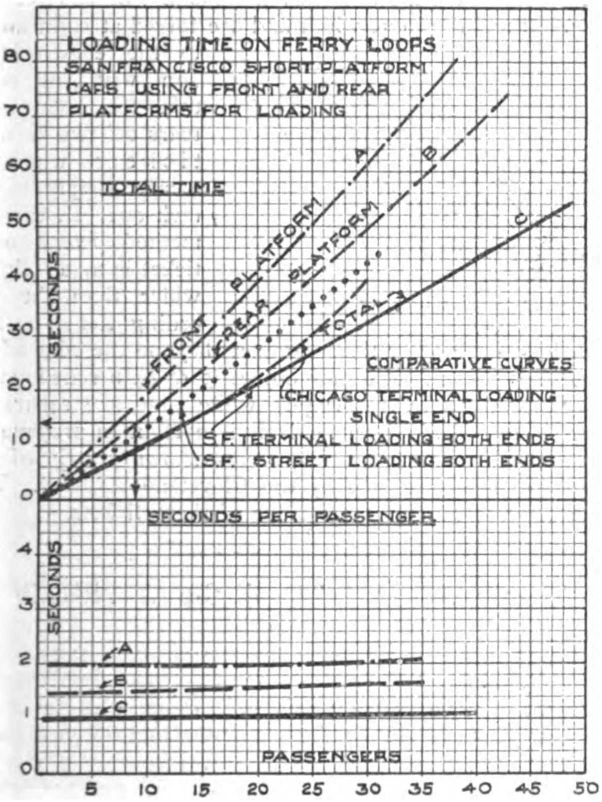
*For description of this car see ELECTRIC RAILWAY JOURNAL for Feb. 24, 1912.

In Report No. 6 it was recommended that at terminals and heavy loading points the front exit, as well as the rear entrance gate, should be used for loading, with extra conductors stationed at these points to receive additional fares. This plan has been put into operation by the United Railroads with very satisfactory results, and the total time of terminal loading has now been reduced to a point practically equivalent to that of the Chicago standard car loading along the street by the usual rear entrance.

Observations show that although the front gate requires 25 per cent more time to load than the rear, the total loading is reduced to about one second per passenger. In other words, by this expedient the present short platform car has increased in loading speed by one-third. However, for the average street loading conditions the speed is necessarily slower, as shown by the dotted line in the accompanying curves, for the reason that passengers alighting at the rear end use part of the platform step, so that for equal conditions the San Francisco car loading at both ends is about one-third slower than the Chicago standard loading at the rear end only.



Comparison of Passenger Handling Speeds on Cars in Chicago and San Francisco

Thus far the results of the new Geary street car, which car can carry twenty to twenty-five passengers on the rear platform, indicate that the principles herein expressed are correct, and that by the provision of ample storage space the loading speed of these cars under normal conditions will probably approximate that of the long-platform cars used in Chicago.

REPORT ON BRAKE EQUIPMENT

The subject of brake equipment concludes the report after a detailed survey of each type of car now used by the United Railroads. In San Francisco air-brake equipment is used on all electric cars with the exception of thirty-nine double-truck and sixty-three single-truck cars of the original "California" type. This does not include the cable cars, all of which are equipped with hand wheel and track brakes. Of the equipment now controlled by hand brakes, the double-truck cars weigh from 32,000 lb. to 34,000 lb. equipped but without passenger load, and the single-truck types weigh about 14,000 lb. equipped; double-truck cars operated by air brakes, from 38,000 lb. to 80,000 lb., equipped. In analyzing the accident account of street railways operating hand and air brake cars in some of the large cities of the country, it appears that there is a more or less clearly defined line which constitutes a practicable limit for the operation of these two types of brake equipment. The factors of type and weight of car, scheduled speed, character of territory traversed, kind of street traffic encountered, prevalence of bad rail conditions, etc., make it impossible, however, to establish a definite limit for universal application.

The standard Chicago car with air-brake equipment is able to stop within a distance of 145 ft. under maximum brake application when running at the maximum motor speed of about 24 m.p.h. Comparative braking tests in New York City, made upon a car weighing 38,000 lb. and running at a speed of about 17 m.p.h., showed an average braking distance of 114.2 ft. for air brakes, and 141.6 ft. for hand brakes. The minimum distance observed was 105 ft. for air and 128 ft. for hand brakes. This means that the air brakes stop the car within 2.8 lengths and hand brakes within 3.5 lengths. Recent discussion of this subject resulted in an order issued by the New York Public Service Commission of the First District to equip all double-truck surface passenger cars weighing over 37,000 lb. with power brakes and geared hand brakes, which order was further modified with the intention that in the future all new equipment should be furnished with both power and hand brakes. This order undoubtedly contemplated the exclusive installation of double-truck cars within the city.

In San Francisco those cars which are not equipped with power brakes have two types of lever hand brakes: (1) wheel brake, (2) track brake. The track brake undoubtedly gives additional security over the ordinary hand wheel brake. Moreover, the hand brake cars are of the older styles and will unquestionably be retired in the near future. Consequently it is not a justifiable expense to equip all of these older cars with air brakes. If any line may be drawn, the single-truck cars should be allowed to run with their present brake equipment and also any double-truck cars now in service that have had more than ten years' wear. All of these cars, however should be kept off the principal thoroughfares and should be used on the outlying lines. The San Francisco company's reported practice of using power brakes on all cars over 33,000 lb. in weight, equipped, is satisfactory. If, however, it is determined to operate any new cars of lighter weight, Mr. Arnold would still recommend that power brakes be used on all double-truck equipment.

For so-called hill lines, where the necessities of routing require operation over grades much in excess of 10 per cent to 12 per cent, it would be hazardous to attempt to operate a fast schedule without the assistance of some form of power brake, especially for a large car of forty seats or more which will probably weigh in excess of 40,000 lb. Although it is true that in San Francisco climatic conditions are such that a clean rail is usually available on which air brakes would be safe, yet the occasional occurrence of slippery rail and the danger of overrunning stops through too rapid coasting down grade invite serious accidents. It is recommended that careful study be made of the magnetic track brake for meeting such conditions. It has been successfully applied in Los Angeles, Portland and Seattle with heavy cars on grades as high at 14 per cent. It is possible, with this equipment, on a level track to stop a heavy car running at 21 m.p.h. practically within its own length, i. e., within less than 50 ft. This is far beyond the limits of the usual air-brake equipment.

MEETING OF COMMITTEE ON EQUIPMENT

The midyear meeting of the committee on equipment of the Engineering Association was held on Saturday, Feb. 1, at the New York headquarters of the association. The committee members present were F. R. Phillips, chairman, Pittsburgh, Pa.; J. M. Bosenbury, Peoria, Ill.; E. W. Holst, Boston, Mass.; L. M. Clark, Indianapolis, Ind.; R. N. Hemming, Anderson, Ind.; W. R. McRae, Toronto, Ont., and J. P. Barnes, Syracuse, N. Y.

The first discussion was subject 1, wires and cables for car equipment. It was the consensus of opinion that the report should not attempt to give a detailed specification as to quality and kind of cables, etc., but should preferably be a study of manufacturing and insurance aspects and the influence on maintenance due to various trolley connections, car cables and motor leads. The sub-committee on this subject consists of W. R. McRae, Toronto, and D. E. Blair, Montreal, Que.

Subject 2, storage battery car operating data, was assigned to E. W. Holst, Boston, and J. M. Bosenbury, Peoria, Ill. The work of this sub-committee will be supplementary to the 1912 report on self-propelled cars. It will be devoted chiefly to verifying operating data, summarizing the progress of the past year and bringing the bibliography of this subject down to date.

The committee then considered topic 4, revision of brakeshoe standards, upon which a report was submitted by L. M. Clark, Indianapolis, Ind., and W. R. McRae, Toronto, Ont. The suggestion for revision, including removal of discrepancies, had been made by A. T. Clark, superintendent rolling stock and shops United Railways & Electric Company, Baltimore, Md., owing to some clearance difficulties which he had experienced in trying to adapt the association brakeshoe standards to his conditions. It was the sense of the committee that further study should be made of brakeshoe design to see whether such difficulties could not be obviated without materially changing the present standards.

Subject 6 assigned to the committee relates to the investigation of the differences in the standards of the American Electric Railway Association and the Central Electric Railway Association. Mr. Hemming said that, with the exception of brakeshoe length and one or two other matters, the Central Electric Railway Association had voted on Nov. 21, 1912, to accept the standards of the American Electric Railway Association in place of its own. Messrs. Hemming and Clark will report in detail upon this subject at a later date.

Subject 3, refinement of specifications for solid steel wheels, was next considered in connection with subject 5, standard car wheel measuring tapes, gages and templates. Messrs. Holst and Barnes constitute the sub-committee on both of these subjects. As to subject 3, Mr. Holst asked for more time on this matter before making a report in order that he might draw his conclusions from a longer trial.

Mr. Barnes stated that at a meeting of the American Society for Testing Materials held in Pittsburgh Dec. 16, 1912, the representatives of the society had objected to those clauses in the Engineering Association's wheel specification which relate to mating for uniform carbon content and weight tolerance. Mr. Phillips pointed out the necessity of having one or more representatives of the Engineering Association at the meetings of the Testing Society in order to insure a full hearing for the standards desired by the electric railway interests. There was a general discussion by the committee on the mating of wheels and the connection between weight and dimensional tolerances. Mr. Barnes said he would prepare a report covering in detail the matter of tapes, gages and templates for wheels after receiving some promised data on that subject from the M. C. B. Association.

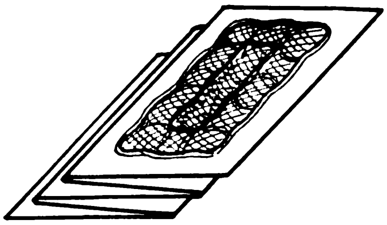
The last matter taken up was subject 7, specifications for air-brake hose, in line with the suggestion of W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, who had found that the M. C. B. specifications for hose did not meet the excessive vibration and swaying of electric railway trains. This subject has been assigned to Mr. Bosenbury and F. G. Grimshaw, Pittsburgh, Pa. It is proposed to prepare a specification covering the quality of rubber entering into such hose.

Upon request of the committee on standards, Mr. Phillips will review the specification of heat-treated carbon steel axles.

The meeting was then adjourned.

NEW METHOD OF FOLDING TICKETS

The Cleveland Railway has recently adopted a novel method of folding tickets which are sold in strips. The method employed is covered by a patent issued to Louis P. Lipps, Cleveland. The object of the invention is to make it easy to detach a single ticket. Usually, of course, such tickets are of the same width and are folded at right angles to the edge of the slip, with the result that the user often tears off two or more tickets when he means simply to detach one. In the new method every other ticket is made slightly wider than the preceding ticket so that the edge of the outer ticket projects beyond the edge of the next inner ticket. Another object is to help schedules by reducing delays by passengers while they are separating their tickets. This is particularly important in prepayment cars. The accompanying engraving shows a strip of five tickets such as are sold by the Cleveland Railway. This company has ordered 100,000,000 of these tickets.



Package of Cleveland Tickets

TRAMWAY STATISTICS IN GREAT BRITAIN

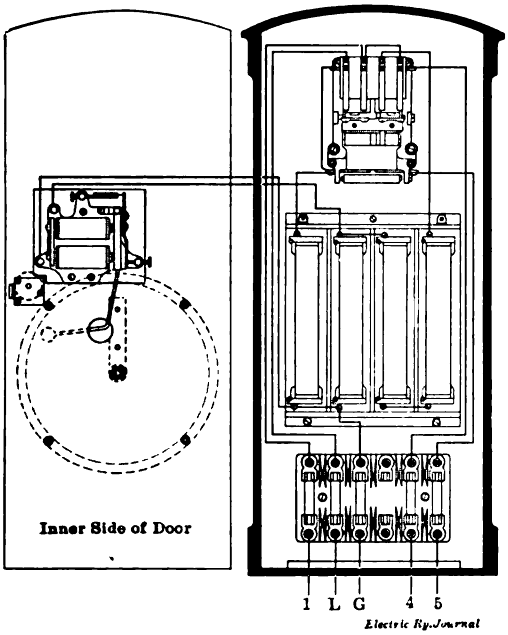
The statistics of the tramways and light railways in Great Britain and Ireland for the past year, published by Parliament, have just appeared. The statistics cover the calendar year of 1911 for the companies and the year ended March 31, 1912, for the municipal railways. Of the 290 undertakings, 172 belong to local authorities and 118 belong to companies. The municipal enterprises, however, are much the larger and represent in net receipts £4,233,874 out of a total of £5,801,648. The municipal lines have a total length, measured as single track, of about 3020 miles, as compared with 1263 miles belonging to companies and private individuals. Some of the statistics are given in the accompanying table. These figures include 5 miles of trackless trolley system.

Statistics of Electric Railways in Great Britain and Ireland

	1911-12	1910-11
Total number of passengers carried........	3,127,318.732	2,907,177,120
Number of miles run by cars..............	323,354,389	310,494.243
Capital expenditure per mile of single track open:		
Lines and works........................	£13,623	£13,534
All items	£18,005	£17,873
Percentage of net receipts to total capital outlay	7.50	6.97
Percentage of net receipts to net capital outlay (eliminating amounts expended on construction or purchase of old lines and works now superseded)	8.15	7.60
Percentage of working expenditures to gross receipts	60.60	61.70
Passengers carried per mile of route open..	1,183,620	1,119,389
Passengers carried per car mile...........	9.67	9.36
Average receipts per passenger...........	1.079*d.*	1.089*d.*

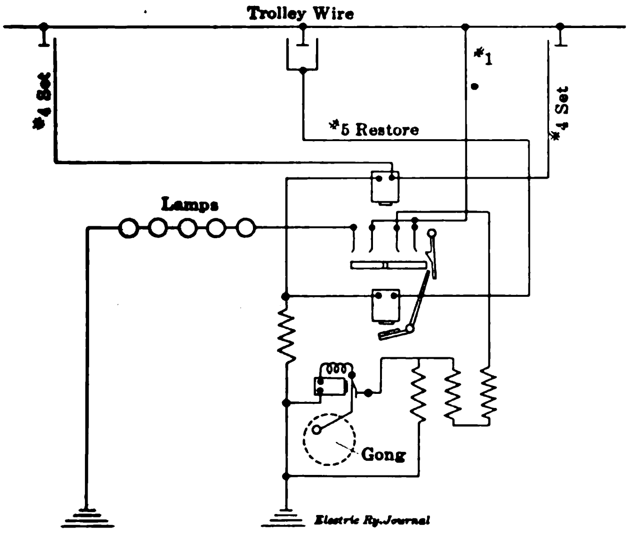
A SIMPLE TROLLEY CONTACT CROSSING SIGNAL

A new crossing signal of the trolley contact type has recently been placed upon the market by the United States Electric Signal Company, West Newton, Mass. As a result of fifteen years of experience and observation, its manufacturers have endeavored to reduce its design to the simplest arrangement compatible with satisfactory operation.



Trolley Contact Crossing Signal—Interior of Signal Casing

The housing is a cast-iron case with a 3-16-in. sheet-iron door securely hinged and provided with a Yale lock. The gong is 10 in. in diameter and is mounted on the outside of the box door, but the ringing mechanism is inside the case, the striker projecting through a small hole in the door and striking upon the inside of the gong. The main relay is of the wall type and mounted by four screws to the back of the case. Resistance is in tube form, mounted in a slate case and can be adjusted for any usual railway voltage. One-half ampere is used for operating.



Trolley Contact Crossing Signal—Wiring Diagram

One crossing equipment for single track usually consists of the signal and three trolley switches or contactors. The method of installation is to place the signal upon a pole as near the intersection of the track and the highway as possible, to place a double-acting trolley switch on the wire immediately over the crossing and one single-acting trolley switch over the track each side of the highway and at a suitable distance away, depending upon the maximum speed at the location.

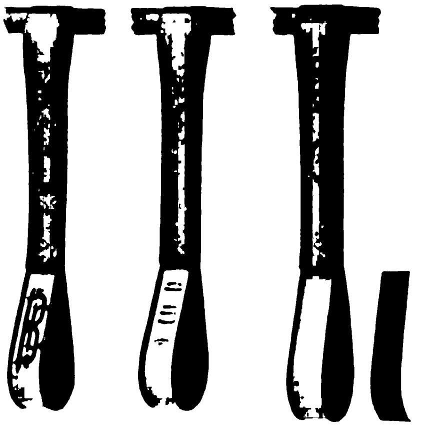
The switches at each side of the highway are for cutting the alarm into operation and operate according to the direction of the movement, while the double-acting switch immediately over the crossing restores for either direction.

In the operation of the signal a car approaching the crossing passes under one of the setting switches, momentarily closing a contact which energizes the setting magnet of the relay causing its armature to be attracted and mechanically latched in position. This operation closes a permanent feed from trolley across contact points on the relay to the bell and through resistance to ground.. Upon reaching the crossing the car passes under the restoring switch and momentarily makes a contact which energizes the restoring relay and unlocks the mechanical latch above mentioned, allowing the armature of the setting magnet to fall by gravity. This opens the circuit to the trolley feed, thus restoring the signal to the inoperative condition. For double-track protecting the operations are the same except that four switches are required.

Terminals are provided to which a bank of lamps can be connected to illuminate a danger sign at the crossing or any other lamp arrangement such as the use of red lights on the highway each side of the crossing. If desired, a semaphore blade attached to the signal case can be designed to remain in the danger position normally and to indicate "clear" when the signal is in operation, thus showing the condition of the signal to the crew of an approaching car before the crossing is reached.

SANITARY CAR STRAP WITH ADVERTISING FEATURE

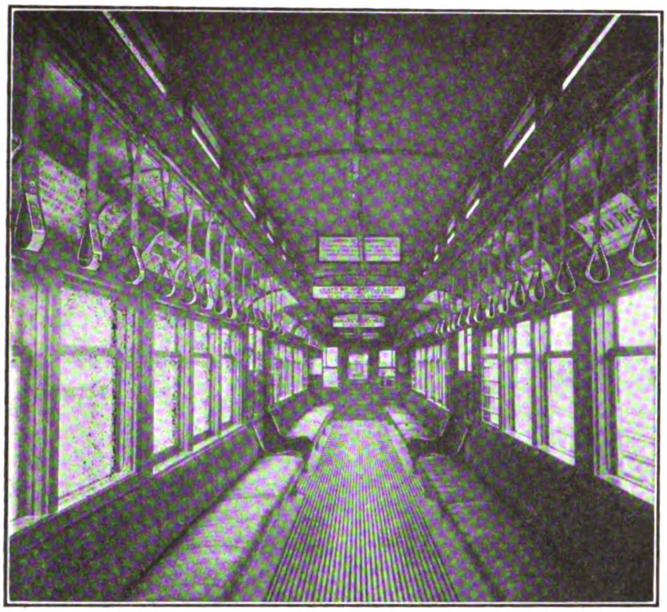
The accompanying halftones illustrate a car strap which has been patented by John F. Newton, Jr., Public Service Advertiser Company, Boston, Mass., in response to a need of improved sanitary car fittings for standing passengers, combined with striking publicity features. The novel feature of the strap is a handle or depending loop made of steel with a dipped velvet rubber finish, on the outside of which is a facing of a non-inflammable, transparent material known as "cellon," forming a surface above an advertising strip of paper which carries any desired pictorial or printed display. The cellon gives to the surface of the handle a polish resembling an enamel finish and it is moisture-proof. When no advertisement is inserted the strap handle can be finished to match the interior of the car. The edges of the handle are rounded and molded to provide the maximum of comfort, which is obtained by the use of even two or three fingers. A trial installation has been in service on several elevated cars of the Boston Elevated Railway for eleven months. One of the accompanying views illustrates the equipment as installed in one of these cars. The handle of the strap is 4½ in. deep and 2½ in. in diameter, the width being 1⅜ in. In the Boston trial installation the monogram of the Boston Elevated Railway Company has been placed in the adver-



Strap with Advertising Feature

tising space of the handle as shown in the illustration.

The handle is fastened to the strap by two nickel-plated rivets with nickel-plated washers, and can be detached easily by the use of an implement which pulls down the handle from the leather. The elevated car strap is 19 in. long and 1⅜ in. wide, its thickness being 3/16 in. The straps in the "velvet finish" equipment are of the best bridle leather, tanned from four to six months and provided with rounded edges. The surface car strap of the Advertiser company is 12 in. long and of the same material. With the handle it will withstand a pull of over 2000 lb. The handle is practically unbendable and weighs but 2 oz.



Interior of Car, Showing Appearance of Advertising Straps

The straps are carried on a 1¼-in. polished cherry rod terminating at each end in circular plates with bronze facing carrying the railway's engraved monogram, eight such plates being used per elevated car, as the rods are not carried past the doors. The latter arrangement leaves a clearer passage at the entrances and exits and enables the traffic to be loaded and unloaded with shorter stops. The straps cannot be moved longitudinally on the rods, as they are held in place by a bronze bracket behind each strap on the rod itself. This prevents any marring of the handle finish and the massing of straps in front of any advertising card in the racks.

The Public Service Advertiser Company's present plan is to install and maintain the straps free of charge to the railway company, the revenue being derived from the advertisers on a rental basis per strap. The handles are maintained in perfect sanitary condition by being wiped with sulpho-naphthol at least weekly.

A NEW RAIL BOND

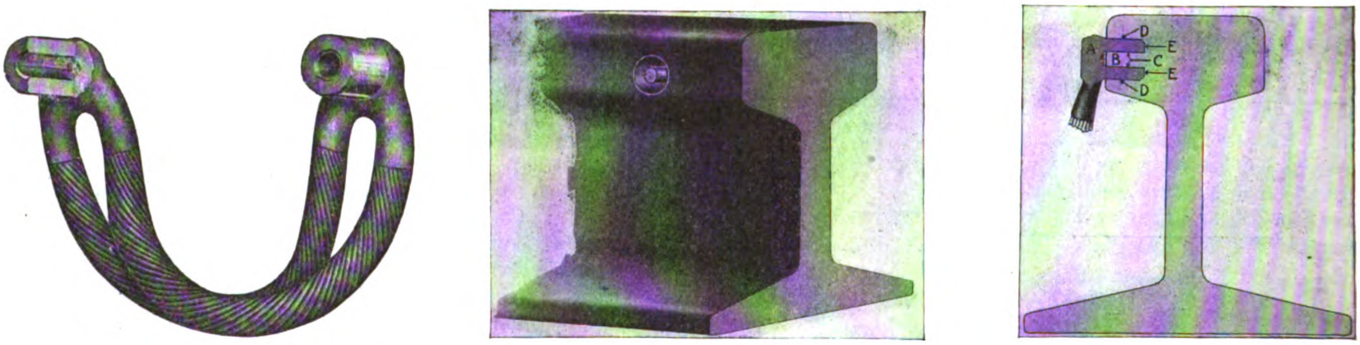
An entirely new method of securing contact is used in a bond just placed on the market by the Ohio Brass Company, of Mansfield, Ohio. This is known as the "type J" all-wire rail bond. Reference to the illustrations will show the novel features of construction, all of which are patented. In the application a pin in formed in the center of an annular hole drilled in the rail by a hollow cutter. This pin fits into a hole drilled in the bond terminal and, as the pin is an integral part of the rail, it makes a current-carrying contact on the inside of the terminal in addition to that secured on the outside as in the ordinary bond.

The bond is installed on the ball of the rail by driving the terminal home with a hammer. This operation compresses the copper and causes it to grip both the outer surface of the hole and the central pin. Mechanically, the bond is thus permanently attached.

Electrically, the contact surfaces marked *C*, *D* and *E* on the illustration are more than sufficient for the capacity of the bond. The contact surface *C* on the pin *B* is absolutely protected against moisture and other corrosive elements, as it is far removed from the outer surface of the rail.

A special hollow milling cutter is provided for forming the annular hole in the rail. It is made of high-speed steel, and facilities are provided for quickly and accurately regrinding it in the field. A motor-driven machine has been developed for use in the installation of this bond. It drills two annular holes simultaneously, one on each side of the joint, feeding the cutters automatically. When the holes are finished the cutters are backed out rapidly without stopping or reversing the motor.

The machine can be quickly clamped to the rail or released, and it is mounted on wheels for moving along the track. Two men can easily lift it from the track to allow cars to pass. The motor is especially designed for this service and operates on a 550-volt d.c. circuit with a maximum current consumption of approximately 2 amp. The controlling switch is located on top of the machine within easy reach of the operator. Two men can mill the holes while a third cleans the holes, installs the bonds, removes crossing planks, etc.



New Rail Bond—Views Showing the Bond, the Annular Hole in Ball of Rail and the Bond in Place

An electric railway which recently installed many thousands of these bonds reports that under ordinary conditions three men can install from 125 to 150 bonds in a ten-hour day. At present the bond is made only in No. 0000 capacity and is designed for use on 60-lb. and heavier rails.

There is an open market for manufacturers of all countries for all material for the Brazilian government railways, and rails are purchased in Europe and America without preference, depending entirely on price. On the other hand, when possible, roads owned by English companies naturally give preference to their own manufacturers for locomotives and other rolling stock as well as machine tools.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES, FRANCHISES

Connecticut.—Earnings Tax on Capital—What Is Capital?

An ordinance granting a horse railway company the right to operate by electricity provided as a condition that the company should pay a 2 per cent gross earnings tax when its net earnings should exceed 6 per cent on the capital actually invested in stocks or bonds, or both. Held, that such condition referred to the amount contributed by stock and bond holders to the corporation's liabilities and not to the capital actually invested for construction and equipment. Therefore a complaint in a suit to recover such taxes, alleging that the income exceeded 6 per cent of the capital actually invested by the company for the construction and equipment of its railway lines, etc., was insufficient to show an accrual of the liability to pay. (City of Waterbury v. Connecticut Ry. & Lighting Co. et al., 84 Atlantic Rep., 723.)

Indiana.—Right to Cross Steam Road—Tracks.

A street railway is not an additional burden to the easement which the general public has in a street. Hence it may cross the tracks of a steam railway laid on such street subject to no conditions other than those to which the general public is subject. The priority of the steam road in constructing its tracks gives it no advantage, it being assumed that it constructed its tracks with the understanding that a street railway might be located upon the highway. (Baltimore & O. S. W. R. Co. v. Cincinnati, L. & A. Electric St. R. Co., 99 Northeastern Rep., 1018.)

Massachusetts.—Taxation—Bridge and Approaches—Street Railroad Property.

Where a street railway company which was authorized by St. 1899, Chap. 293, to construct a bridge across a river between two cities and to construct its railway on the bridge, etc., constructed the bridge, acquired a strip of land extending from the bridge to a highway and maintained on the bridge and land appliances for the operation of a street railway, the bridge and land were real estate within general tax law (St. 1909, Chap. 490), Sec. 3, and were subject to local taxation in the absence of any law to the contrary. (Connecticut Valley St. Ry. Co. v. City of Northampton, 99 Northeastern Rep., 516.)

Michigan.—Street Railroads—Maintenance of Streets—Police Power.

A municipality in granting franchises to a street railroad company to construct and maintain its roads in and upon the streets and highways cannot surrender or circumscribe its right to exercise its general police powers, and such grants must be accepted upon the implied condition that they are subject to such power. A municipality is the judge of the necessity for repairing the pavement or repaving its streets, and it may require such grantee to conform to any reasonable changes which may be determined to be necessary for the protection of the public. (City of Detroit v. Detroit United Ry., 138 Northwestern Rep., 216.)

Michigan.—Rights Acquired in Streets After Expiration of Franchises.

A municipal corporation is not estopped from insisting on the expiration of franchises to a street railway company by the inaction of its officials while the company was expending large sums of money in betterments and replacements instead of ordinary repairs, especially where the municipality had no right to prevent the company from making improvements or to require them to be made.

Upon the expiration of a franchise granted by a municipality to a street railroad company, the property in the public streets used in the maintenance and operation of the railway belongs to the company and may be removed by it, and it is entitled to notice to remove it within a reasonable time, and the municipality has no arbitrary power to proceed at once by force to effect such removal.

A street railway company by continuing to occupy the streets after the expiration of a franchise granted by the municipality does not create a nuisance in the streets. (City of Detroit v. Detroit U. Ry., 137 Northwestern Rep., 645.)

Nebraska.—Right-of-Way—Rescission of Grant by Land Owner.

Where a suburban land owner, in consideration of the location, construction and dedication of an interurban railway and boulevard across his premises, enters into a written contract to convey to the street railway company a part of his land for right-of-way purposes but afterward seeks to rescind his contract on the ground of fraud or mistake, he must act promptly and make known his intention to rescind upon his discovery of the facts. (Ensign v. Citizens' Inter. Ry. Co. et al., 138 Northwestern Rep., 718.)

New Jersey.—Street Railroads—Construction and Maintenance—Liability for Injuries.

By the general principles of the common law a railway company, having the right to construct tracks in the public street, must lay its tracks in a proper manner and keep them in a proper state of repair, but the liability of such a company for failing to keep the surface of the street in repair does not result from the mere fact that the corporation has been vested with a franchise or license to use the public street. The liability to maintain the pavement, as such, if it exists, must rest upon some statute or ordinance imposing such a duty or must arise out of the obligations of a contract, and in the absence of statute, ordinance or contract creating such duty, a railway company is not liable to one of the traveling public who is injured by stumbling over one of its tracks which is exposed by reason of the highway becoming depressed at the place of the accident, when such depression in the street has not been occasioned by the negligence of the company. (Johnson v. Public Service Ry. Co., 85 Atlantic Rep., 165.)

New York.—Passenger Rates to District Within City Limits Acquired by Annexation.

The consolidation of Brooklyn, including the former town of Jamaica, which in 1889 was outside of Brooklyn but was afterward incorporated therein as a part of Greater New York City, did not take from a railroad company the right to collect 10 cents above the regular fare on its line between Brooklyn and Jamaica, under Laws 1889, Chap. 38, which gives any steam railroads the right to collect an excess charge of 10 cents over the regular fare from any passenger who pays his fare in the car, "except where such passage is wholly within the limits of any incorporated city." Greater New York Charter (Laws 1901, Chap. 466), Sec. 1538, provides that franchises theretofore granted by any of the united and consolidated municipalities shall be restricted to their respective limits before consolidation, so that by analogy the obligations of a railroad company should not be extended by the consolidation. (Hogan v. Long Island R. Co., 138 New York, Supplement 47.)

New York.—Acquisition of Franchise—Consent of Municipality—Modification of Franchise.

A street railroad company, operating a railroad between the villages of W. and M. under a franchise authorizing it to charge a 10-cent fare between those villages, executed a mortgage which provided that part of the proceeds of the bond issue secured thereby should be devoted to the development of extensions, and that property and franchises thereafter acquired should be covered by such mortgage. Thereafter the village of M. and an adjoining town granted a franchise for an extension of the road beyond M., on condition that only a single fare of 5 cents should be charged between the terminus of the proposed extension and W. The mortgage was afterward foreclosed and the property, including the extension, sold in separate parcels; the extension and the line between M. and W. being included in different parcels. Held, that the franchise for the extension modified and superseded the old franchise, so far as the village authorities were interested in and could contract for the reduced rate, whether or not it had any application to the fare for a continuous passage between W. and any point short of or beyond M. (Public Service Commission et al. v. Westchester St. R. Co., 99 Northeastern Rep., 536.)

Pennsylvania.—Rates of Fare—Agreement for Extension of Street Railway.

Where an ordinance is passed granting a street railway company terms for an extension, and providing that the rate of fare shall not exceed 5 cents per single fare, or six tickets for 25 cents, such being the rate of fare before the passage of the ordinance, neither the railway company nor another company to which it has leased its lines can abolish the sale of six tickets for 25 cents from points on the two lines for which the extension was allowed by the city. (City of Reading v. United Traction Co. et al., 84 Atlantic Rep., 666.)

Pennsylvania.—Carriage of Goods Required if Right of Eminent Domain Exercised.

Under act June 1, 1907 (P. L. 368), conferring on street railways the power of eminent domain and providing that any company availing itself of such right shall be a common carrier of express matter, etc., whenever a street railway serves notice on a landowner of its purpose to condemn his land and files its petition and bond in court, it becomes bound as a common carrier of light freight. (Keys v. Uniontown Radial St. Ry. Co., 84 Atlantic Rep., 1109.)

Washington.—Fares to School Children—Acquiescence by Parties in Construction.

Where a franchise granted an electric company providing that school children should ride for half fare had been construed by the parties to apply only to children attending the common schools and not to students of the State University and of business colleges, the status of the parties was fixed, and the company could neither recede from its position nor the city add thereto, the contract being executed, except in so far as it is measured by time. (State ex rel. City of Seattle v. Seattle Electric Co., 128 Pacific Rep., 220.)

LIABILITY FOR NEGLIGENCE

Colorado.—Prima Facie Evidence of Negligence.

Excessive speed of a street car that struck an automobile, the failure to sound a gong or bell and the passing of cars at a street intersection, all contrary to ordinance, are each sufficient to warrant a jury in finding that a street car company was negligent. The duty to stop, look and listen is not rigidly applied in the case of street railways. (Phillips et al. v. Denver City Tramway Co., 128 Pacific Rep., 460.)

Georgia.—Car Started by Unauthorized Person During Absence of Motorman.

A street railway company may be held liable for an injury due to the failure of its motorman to exercise extraordinary care in protecting a passenger from injury. In the exercise of this care the carrier is required to anticipate that children of tender years will not act with the prudence of maturity and are generally inclined to be inquisitive, meddlesome and venturesome. Hence a jury may be authorized to find that a motorman who left his car, which was operated by electricity, in such condition that the car could be easily started or set in motion by a child passing by was guilty of culpable negligence as to passengers who were permitted to remain in the car while awaiting the arrival of a connecting car of the same street car company on which they were to proceed to their destination. (Valdosta St. Ry. Co. v. Fenn, 75 Southeastern Rep., 984.)

Kentucky.—Assumption by Employee of Risk While Riding on Running Board.

An electric railroad employee in riding on an open motor car in the performance of his duties assumed the risk of being injured through such jerks as were ordinarily incident to prudent operation of the car, and it was unnecessary to warn him against such dangers where he was seventeen years old and possessed of fair intelligence. Hence in an action by him against the company for injury received in falling from the car while walking along a running board on one side of the car, caused by a jerking of the car, it was error to give an instruction submitting an issue as to the dangerous condition of the car and negligence in failure to warn him, since such conditions did not cause his injury, he having no work to perform in operating the car. (Central Kentucky Traction Co. v. Smedley, 150 Southwestern Rep., 658.)

Maine.—A Derailment Shows Sufficiency of Evidence of Negligence.

When, in a suit against an electric railway company, it is shown that an electric car was derailed and the plaintiff, a passenger, was injured in consequence of the derailment, that is sufficient evidence prima facie of the defendant's negligence. The burden of explanation then falls upon the defendant. (Berry v. Atlantic Shore Ry., 84 Atlantic Rep., 740.)

Massachusetts.—Crossing Accident with Unregistered Automobile.

An automobile not registered in the name of its owner is unlawfully upon the highway, and a street railroad company owes to a person in it no other duty that that of abstaining from injuring him by wantonness or recklessness. (Love v. Worcester Consol. St. Ry. Co., 99 Northeastern Rep., 960.)

Massachusetts.—Injury to Child Twelve Years Old.

The failure of a boy twelve years old to look and listen for a street car before taking a position beside the track, where he was struck by a car, did not render him negligent, as a matter of law, so as to bar recovery. (Angelary v. Springfield St. Ry. Co., 99 Northeastern Rep., 970.)

Massachusetts.—Liability for Defective Culvert Maintained by Municipality.

A street railway company was liable for injury to a passenger from the giving way of a culvert in consequence of a heavy rain following a severe snowstorm, though the culvert had existed long prior to the construction of the tracks and had been subsequently maintained principally by the municipality. (Sawin v. Connecticut Valley St. Ry. Co., 99 Northeastern Rep., 952.)

Michigan.—Dangers Caused by Snow Piled on Street.

Where a company operating an electric railway in a public highway has thrown the snow from its tracks on the other portion of the highway, rendering it impassable and making it necessary for travelers to drive on the tracks, it is the duty of its employees in operating its cars to have regard to such conditions and take reasonable precautions to avoid accidents rendered more probable thereby. (Hibbler v. Detroit United Ry., 137 Northwestern Rep., 719.)

Michigan.—Street Railroads—Operation—Duty Toward Pedestrians.

The motorman of a street railroad car when running at proper speed is not required to check the car whenever a pedestrian approaches the track, but may assume, if the distance is sufficient for a crossing to be made safely, that he will so cross, and that if it is insufficient he will maintain a position of safety and not place himself in a position of danger by attempting to cross. But when the motorman becomes advised, or in the exercise of due care should become advised, of the pedestrian's peril, he must use all means within his control to avert injury. (Gradyszewski v. Detroit U. Ry., 138 Northwestern Rep., 225.)

Missouri.—Injuries to Servant—Safety of Switch.

When a switch is so constructed that street cars were operated over it thousands of times in safety and a car would have passed over it safely if the motorman in charge had kept it under control as it approached the switch and stopped at the post indicating a safety stop, the switch, as a matter of law, was reasonably safe. (Glenn v. Metropolitan St. Ry. Co., 150 Southwestern Rep., 1092.)

Texas.—Injuries to Person Employed by or Assisting Servant.

Where the agent of a traction company at its substation promised plaintiff that he would pay him if he helped clean the electrical machinery, and plaintiff looked to the agent for his pay, neither contemplating that he should become an employee of the company, the company was not liable to him for injuries from the machinery. (Blalack v. Texas Traction Co., 149 Southwestern Rep., 1086.)

Virginia.—Burden of Proof in Case of Derailment.

Where an injury to a passenger happens as the result of a derailment, the burden of proof is upon the carrier to establish that there was no negligence whatever and that the injury was caused by inevitable casualty or by some cause which human care and foresight could not prevent, so that it was without fault. (Washington-Virginia Ry. Co. v. Bouknight, 75 Southeastern Rep., 1032.)

Washington.—Relative Duties to Passengers and Pedestrians.

A street railroad company must exercise reasonable care to protect pedestrians. But it owes the highest degree of care to its passengers and is not required to stop its car in an emergency for the protection of a pedestrian so suddenly as to cause greater hazard to its passengers than that to which the pedestrian is exposed. (Slipper v. Seattle Electric Co., 128 Pacific Rep., 233.)

News of Electric Railways

Report of Experts on the Result of Operation at Reduced Fare in Toledo

Nau, Rusk & Swaeringen, expert accountants of Cleveland, Ohio, have filed with Mayor Whitlock of Toledo, Ohio, their report covering the operation of the railway lines of the Toledo Railways & Light Company for a period of nine months from the date upon which the reduced fare schedule went into effect, comparisons being made with the results in former years for a similar period. Since Jan. 8, 1912, the Toledo Railways & Light Company has charged a 3-cent fare between 5.30 a. m. and 7.30 a. m. and between 4.30 p. m. and 6.30 p. m. During the remainder of the day six tickets have been sold for 25 cents and the cash fare has been 5 cents.

According to the report, in 1911 the actual result was 5,623,246 car miles traveled compared to 5,693,757 in 1912. The number of revenue passengers in 1911 was 27,537,158 compared to 32,036,470 in 1912. The receipts from passengers in 1911 was $1,309,926 as compared to $1,281,882 in 1912. The passenger receipts per car mile in 1911 were 23.29 cents compared to 22.51 cents in 1912. The revenue passengers carried per car mile in 1911 were 4.90, while in 1912 5.62 passengers were carried per car mile. The average fare paid by passengers in 1911 was 4.76, while in 1912 the average fare was 4 cents.

The table of earnings in the report for 1911 shows that the receipts from passengers were $1,309,926, the gross earnings $1,422,473 and the net earnings after the maintenance and operating charges are deducted, $487,294. In 1912 the report shows that $1,281,882 was received from passengers, the gross earnings were $1,399,507 and the net earnings were $305,044, which shows a reduction in the net earnings for the nine months in 1912 over the same period in 1911 of more than $182,000.

The report covers 120 typewritten pages, all but ten pages of which are devoted to figures covering the details of the company's business for the nine months as compared with the same period in past years. The following statements are taken from the report:

"We made a calculation, based upon a comparison of the first nine months in 1911 with the first nine months in 1902, which shows that the average increase, compounded annually, for the period from 1902 to 1911 was 2.63 per cent in car miles run and 5.85 per cent in revenue passengers carried. This compound curve of growth, for the nine months' period, appears to be typical of one based upon an entire year's period.

"Doubtless there is a stimulus of traffic due to the lower rate of fare and it cannot therefore be assumed that the same number of passengers would have been carried under the old rate as actually have been carried under the reduced rate. From a study of the figures it will appear that the average rate of fare per pay passenger has been reduced from 4.76 cents to an even 4 cents.

"It will also be seen that the number of passengers carried was nearly 3,000,000 more than expected, based upon the average annual increase for the last ten years, and that this increased number of passengers was carried by operating nearly 78,000 fewer car miles than was to be expected from the average increase of the past.

"Comparing the actual results under the lower rate of fare with the expected results under the old rate of fare, the table will show a reduction in passenger receipts for the nine months of less than $105,000 (an average of a little more than $11,000 a month) and, leaving out of consideration the expected and normal rate of growth, the passenger receipts for the nine months of 1912 were only $28,000 less than the receipts for the nine months period of 1911.

"As bearing upon the low fare experiment, it is shown that, even with the high operating and maintenance cost for the first nine months in 1912, there was left $305,044, or 5.35 cents per car mile, available for payment of taxes and interest upon the investment.

"In Cleveland the railway company's capital charges, including taxes, interest on bonds and floating debt and dividends upon its capital stock, amount to less than 6½ cents per car mile, and this includes taxes and interest on the power plant, which, under the conditions in Toledo, of purchasing power from the light department, should not be included as a charge against the net earnings of the railway department.

"Nowhere in this report has there been taken into account any charges either for taxes or for interest upon the company's bonded or floating debt or for interest upon the invested capital.

"The taxes paid by the company are shown upon its books as a charge against the combined net earnings of its four departments (viz., railway, light, heat and gas), and we did not attempt to separate or allocate the taxes chargeable to the railway department as distinguished from the other departments of the company.

"The company's capitalization, both of capital stock and of bonds and floating indebtedness, is shown upon its books against the enterprise as a whole and, even if the capital represented by the railway department could be separated from the aggregate capitalization, any attempt to separate the interest charges against the railway department of the company's business, in the absence of an actual appraisal of the property used by the railway department, would be of no value for the purpose of this investigation.

"It is for this reason that our report cuts off at the figure of 'net earnings' and does not take into account any charges either for taxes or interest and, in any consideration of the figures herein, taxes and interest will have to be estimated in order to determine the sufficiency of the net earnings shown herein to pay all taxes and interest upon the investment in the railway property."

Conference in Cincinnati on Indeterminate Grant Proposition

At a conference in the office of Mayor Hunt of Cincinnati, Ohio, on Jan. 30 W. Kesley Schoepf, president of the Cincinnati Traction Company, agreed to submit to the stockholders of the company a proposition to relinquish the fifty-year franchise in exchange for an indeterminate grant with all of the vested rights of the company guaranteed and protected. Under the agreement, any new contract that might be made will become operative only after it has been approved by a vote of the electors.

The company, under this proposition, is to take over and operate the proposed municipally owned terminal loop, continue to pay the city 6 per cent on its gross receipts and in addition divide with the city any surplus after dividends at a fair rate have been paid the stockholders. It is proposed that the operation of the property shall be supervised by a commission and that this commission shall determine when it is possible to reduce the rate of fare and also what improvements shall be made. Instead of asking the company to pay half its final surplus into the city treasury this commission may order a reduction in fare to correspond with the amount of surplus or may request the company to make extensions into territory which does not promise immediate returns. Mayor Hunt argues that good service is more important to the city than an income from the operation of the street railway. The officials of the company have furnished the city officers with a statement covering receipts and expenditures in accordance with a request made by Mayor Hunt at a former conference.

Through the influence of Mayor Hunt an effort is being made to induce the Legislature to enact laws that will enable Cincinnati to issue bonds for the construction of a terminal loop. Until the Legislature acts on this proposition, little can be done in the way of negotiations, as the city desires the company to consider the operation of a loop terminal in connection with other matters.

City Solicitor Bettman of Cincinnati is preparing a bill for the consideration of the Legislature which will operate to revoke the franchises of all public service companies in the State and invest them with indeterminate grants instead.

Councilman Peck, chairman of the utilities committee, has reported to the City Council that it would be very detrimental to the city to enact the Bigelow bill into a law. The stockholders of the Cincinnati Traction Company have property rights which must be respected. It would be a travesty on the home rule idea for the Legislature to enact a law that would take the authority to deal with public service companies out of the hands of the cities. Representative Bigelow stated in Columbus, following this report, that he is willing to have the bill amended to protect the investment in street railway property, but that the franchise should be revoked.

President Draper of the Cincinnati Chamber of Commerce has appointed a committee on interurban terminals consisting of George F. Dieterle, J. J. Heekin, J. Stacy Hill, Stewart Chillito, A. K. Nippert, W. A. Schell, Monte Goble, E. P. Marshall and A. P. Strietmann.

Question of Line on Euclid Avenue, Cleveland

J. J. Stanley, president of the Cleveland (Ohio) Railway, has replied to the suggestion of Street Railway Commissioner Witt that express service for East Cleveland be established on Superior Avenue and that two extra tracks be laid for that purpose, with a fare of 5 cents. Mr. Stanley declares that no express service will be furnished the suburb until it surrenders its franchise on Euclid Avenue which calls for the same fare as in the city. It is hardly probable that the village will do this, as the value of the express service under present circumstances would be rather uncertain.

Mr. Stanley stated recently that, as soon as it can be done legally, the company will lay track on Euclid Avenue between East Twenty-second Street and East Fifty-fifth Street. Business has recently invaded a portion of this section of the exclusive street and it is probable that the opposition to the line would not be so strong as it was some time ago when a similar proposal was made.

Regarding the earnings at the low rate of fare Mr. Stanley in his annual report says:

"The rate of fare throughout the year was 3 cents within the city limits. In 1911 the rate was 3 cents in the last seven months of the year and 3 cents plus 1 cent for transfers in the first five months. The average fare in 1911, including suburban fares, was 3.247 cents—in 1912, 3.18 cents."

A condensed earnings statement for 1912 follows:

Gross income		$6,679,772
Expenses of maintenance and operation	$4,935,574	
Taxes	366,591	
Interest	1,416,542	
		6,718,707
Deficit		$38,935

Bill Reported to Require Electrification at Boston Within Four Years

A bill reported to the Legislature by the Massachusetts legislative committee on railroads provides as follows:

"Section 1. Each railroad company operating a railroad by steam within or about Boston shall change said motive power to electricity on all its lines within a radius of 10 miles of its Boston terminal. After the time limit specified in Section 3 for completion of the work no steam locomotives shall be used on any such lines, within said limit, except as hereinafter otherwise provided for.

"Section 2. Each railroad company operating within Boston shall on or before Oct. 1, 1913, submit to the Railroad Commission for approval comprehensive and substantially complete working plans and specifications of such construction as shall be necessary for carrying out Section 1. The Railroad Commission shall approve said plans as presented or with such alterations as it shall require.

"Section 3. Electrification, as called for by the Railroad Commission, shall be commenced within three months after said approval and shall be prosecuted to the satisfaction of the Railroad Commission and completed within three years after said approval.

"Section 4. If at any time the Railroad Commission shall consider that any of the railroads are not prosecuting the work in a satisfactory manner, the commission may apply to the court for a mandamus to require such action as it deems necessary to that end or take such other action in law or equity as will secure compliance.

"Section 5. Any of the above-mentioned railroad companies which shall fail to comply with any requirement of this act shall pay into the treasury of the Commonwealth $10 per day for each and every locomotive operated within the district specified during the period of such failure to comply, unless the railroad commission shall certify that such failure is necessary."

Boston & Eastern Railroad Charter Granted

The Boston & Eastern Electric Railroad has been granted a charter by the Secretary of State, following advices transmitted by the Massachusetts Railroad Commission, to the effect that the company has complied with all the provisions of Chapter 516, Acts of 1906, relating to the formation and establishment of electric railroads. The granting of the charter ends proceedings extending over the past six years for permission to build a high-speed electric railroad 17 miles long between Post Office Square, Boston, and Beverly, Mass., including a tunnel under Boston Harbor and a private right-of-way from terminal to terminal. As finally determined the railroad is to be located in the cities of Beverly, Salem, Lynn, Chelsea and Boston and in the towns of Danvers, Peabody, Saugus and Revere. The line is to be double-tracked throughout, of standard gage, and will include a branch 3.5 miles long between the main line at Peabody or Salem and the town of Danvers.

The following final estimate of the cost of construction has been filed, excluding the cost of equipment, interest during construction and discount:

BOSTON & EASTERN ESTIMATE, 1913

Grading:		
Earth excavation east of High Rock, Lynn, 620,000 cu. yd., at 60 cents	$372,000	
Earth excavation west of High Rock, Lynn, 573,000 cu. yd., at $1.25	716,250	
Rock excavation, 246,000 cu. yd., at $1.90	467,400	
Rock tunnels, 85,372 cu. yd., at $5	426,860	
Changing pipes and sewers, excluding Boston	130,000	
Rip-rap, 16,700 sq. yd., at $1	16,700	
Retaining walls, portals, etc.:		
Plain concrete, 18,551 cu. yd., at $9	166,959	
Reinforced concrete, 53,600 cu. yd., at $12	643,200	
Waterproofing, ventilating and finishing Lynn subway	83,000	
		$3,022,369
Bridges (about 100):		
Plain concrete, 36,158 cu. yd., at $9	$325,422	
Reinforced concrete, 37,542 cu. yd., at $20	750,840	
Steel, 7,146 tons, at $85	607,410	
Wood trestle, 4,804 linear ft., at $30	144,120	
Cast-iron pipe, 52 tons, at $42	2,080	
Grading and paving streets	88,610	
		1,918,482
Ties, 126,000, at $1		126,000
Rail (90-lb.), 7,038 tons, at $32	$325,216	
Wood guard, 267,700 ft., at 6 cents	16,062	
		241,278
Track fastenings:		
Joints, 593 tons, at $32	$18,976	
Spikes, 151 tons, at $55	8,305	
Bonds, 40.76 miles, at $500	20,380	
		47,661
Special work:		
Ballast, stone, 112,595 cu. yd., at $1.50		168,892
Track laying, 215,000 ft., at 20 cents		43,000
Fencing, 135,460 ft., at 30 cents		40,638
Passenger stations (about 20 outside of tunnel)		153,500
Contingencies, 5 per cent		289,091
Cost of roadway, excluding tunnel		$6,070,911
Harbor tunnel and terminal, including engineering but not real estate or interest		3,893,785
Legal expense		375,000
Engineering		250,000
General expense		210,000
Real estate, including that for tunnel and terminal		2,175,000
Total		$12,974,696

Kansas City Franchise Negotiations Postponed

As neither the representatives of Kansas City nor the officers of the Metropolitan Street Railway were prepared to resume the franchise negotiations on Jan. 27, 1913, the date agreed upon some time ago by the interests involved, consideration of the matter has been postponed. Ford Harvey, one of the receivers of the company, said recently:

"We do not wish to resume negotiations just now because the report of our physical valuation is not yet printed. The work has been finished for some time, but the report comprises several hundred pages and we wish to have it in a presentable form. I do not think we shall be ready until about Feb. 15."

According to the Kansas City *Times*, the city is in about the same condition as the company in regard to the valuation reports. While the valuation for the city under the direction of L. R. Ash, city engineer, has been finished for some time, the real estate appraisers are not yet ready with their part of the report, and Edward P. Moxey, the expert accountant employed by the city to inquire into the finances of the company, is still at work.

Changes in the Personnel and Scheme of Organization of the Hudson & Manhattan Railroad

The Hudson & Manhattan Railroad, New York, N. Y., has announced the following changes in its personnel and scheme of organization, effective on Feb. 4, 1913, following the resignation of O. T. Boyd as assistant general manager and E. T. Munger as general superintendent:

T. P. Artaud has been appointed assistant general manager and will report to the vice-president and general manager. Darrow Sage has been appointed superintendent of power in charge of power house, substations and cables to their point of entrance into the tunnel and will report to the assistant general manager. P. V. See, superintendent of car equipment, will hereafter report to the assistant general manager. T. B. Whitney has been appointed engineer of way and structures and will report to the vice-president and general manager. C. S. Klumpp has been appointed superintendent of way and structures in charge of all maintenance, including signals and cables, also of the Hoboken shop and the building No. 137 Christopher Street, exclusive of substation, and will report to the engineer of way and structures. L. Muller has been appointed assistant superintendent of way and structures and will report to the superintendent. J. F. O'Rourke, superintendent of transportation, will report direct to the vice-president and general manager.

In the absence of the vice-president and general manager all departments are to report to the assistant general manager. The position of general superintendent has been abolished. The changes which are announced have been made with a view to more centralized management.

Detroit United Railway Willing to Sell to City

On Jan. 28, 1913, Corporation Counsel Lawson, of Detroit, Mich., announced at a meeting to discuss the construction of a cross-town line that he had prepared a proposal to the Detroit United Railway which will give it a day-to-day right to operate over all the streets on which its franchises have expired. He said that this agreement would pave the way for the purchase of the road when the city secures the right to own and operate it. The ordinance was introduced in the Common Council on the evening of Jan. 28.

The agreement carries with it the right of the city to purchase the property, including real estate necessary to its operation. If the city and company can not agree upon the purchase price, the matter is to be referred to the Wayne County Circuit Court. Under the proposed grant interurban passenger and mercantile express cars of interurban lines owned by the Detroit United Railway would be permitted to enter and leave the city from a convenient downtown terminal, the compensation to be fixed by the Wayne County Circuit Court if the city and the company could not agree upon terms. Pending the acquisition of the property by the city, the fare on interurban cars would be 5 cents; but transfers would have to be issued to and accepted from local lines. The fare on the city lines would be 5 cents or six for 25 cents, with special tickets good between 6.15 a. m. and 7.30 p. m., at the rate of eight for 25 cents. Transfers would have to be issued good over any line other than the one on which the fare was paid.

Mr. Lawson in explaining the ordinance said:

"The ordinance which I presented is simply my idea of the ultimatum that should be presented to the Detroit United Railway now that the company has been declared a trespasser in Fort Street. The city's message to the company now should be: accept this or get out of Fort Street."

At a conference in the office of the Mayor on Jan. 20, 1913, F. W. Brooks, general manager of the company, is reported to have stated the attitude of the company as follows:

"The Detroit United Railway has long recognized the need for more city lines. We know to-day that the city needs not less than 70 miles of new track to handle traffic properly. The company has been willing to build these extensions on a basis that is fair between man and man. We know the need of a west side line. It is not fair to ask the company to ask people to invest their money on a basis that will not promise an adequate return on the investment or even protection from loss of the money invested.

"While we have not been permitted to build extensions we have greatly increased our facilities. We have added new cars, new power houses and new carhouses in spite of the failure of the Council to pass a single ordinance to help us.

"You speak of municipal ownership. We are perfectly willing for the city of Detroit to take over the property. You can take the property any time you are ready to pay for it. We will sell at any time the city is ready to buy, but I would not recommend to my company building extensions on the basis of the existing 3-cent franchise."

Injunction Secured to Prevent Execution of New York Rapid Transit Operating Contracts

The situation in New York in regard to the signing of the contracts for the operation of the dual subway system was complicated on Feb. 4 by an injunction granted by Justice Hendricks against the execution and delivery of the contracts. This injunction was secured by a taxpayer for whom Clarence Shearn, who represents W. R. Hearst, acted as counsel. Argument on the motion of the Public Service Commission of the First District and the railroads to vacate the restraining order was heard before Justice Davis on Feb. 6, and at the conclusion of the argument the court suggested that as the case was certain to be carried higher the lawyers on both sides should try to arrange with the Appellate Division to hear the case immediately. Counsel representing the interests involved acted on the court's advice and Presiding Justice Ingraham of the Appellate Division set the hearing on appeal for Friday afternoon, Feb. 7, at 2 p. m.

Previous to the application being filed with the court for an injunction, Governor Sulzer nominated Justice Edward E. McCall of the Supreme Court of New York to succeed William R. Willcox as chairman of the Commission for the First District and the Senate immediately confirmed the nomination. Mr. McCall said at first that he would take office on Friday, Feb. 7, but is reported subsequently to have decided that he would not qualify for the office as long as the injunction to prevent the execution and delivery of the operating contracts remained unvacated. He is reported to have said that he understood that Mr. Willcox had several matters of commission work not connected with the contracts to clear up and that there was no advantage in his going over this work again.

The feature of the proposed contract to which perhaps the greatest objection has been raised is the plan to authorize the Interborough Rapid Transit Company to arrange with J. P. Morgan & Company as syndicate managers for floating an issue of $170,000,000 of bonds to be sold to Morgan & Company at 93½. In this connection Morgan & Company sent a letter to Mr. Willcox recently relative to the matter of the bonds. They say that so far as they can recall the issue of $170,000,000 of bonds which it is proposed to make is the largest single corporate transaction ever undertaken. The money must be authorized from year to year in amounts specified, the immediate commitment being final and definite, irrespective of conditions, financially or otherwise, which might obtain during the life of the contract. Unless the likelihood of a reasonable and substantial profit was held out no group of capitalists could have been found to undertake a contract of this size and importance. Accordingly Morgan & Company notified the Interborough Rapid Transit Company that they and their immediate associates would buy the issue at 93½, this being a basis to net them 5⅜ per cent per annum, and that they would plan to form a syndicate to take the bonds at 96, reserving to themselves and immediate associates a compensation of 2½ per cent in return for their original undertaking to purchase the bonds, for their work in forming and managing the syndicate and for the general service rendered in a transaction of such magnitude and complexity.

New Minnesota Line Placed in Operation.—The Mesaba Electric Railway has been completed and placed in operation between Hibbing and Gilbert, Minn.

Municipal Ownership Ordinance Introduced in Hamilton.—An ordinance has been introduced in the Council of Hamilton, Ont., providing that the city purchase the property of the Hamilton Street Railway and operate the lines with municipal power.

Preparing Emergency Fund to Meet St. Louis Mill-Tax Case.—According to the St. Louis *Times* the United Railways, in order to be prepared for any emergency such as the deciding against it of the mill-per-passenger suit, has bought $1,200,000 of government 2 per cent bonds. The mill-tax suit, which is pending in the courts, was instituted by the city to collect the tax provided in an ordinance which stipulates that the company shall pay the city 1 mill for each passenger carried.

Decision in Ohio Tax Case.—In the case of the State against the Cleveland & Pittsburgh Railway, Common Pleas Judge Lawrence of Cleveland rendered a decision on Feb. 1 to the effect that the Willis tax must be paid on underlying corporations. The defense contended that the operating companies pay an excise tax upon their gross receipts and that the underlying companies should not be taxed again on the part that is paid to them. This payment was made under the old code. The law was amended in 1911 and since then some of the companies have been paying the taxes.

Extension of Signal System on Indianapolis & Cincinnati Traction Company's System.—The Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., has completed and put in operation the Simmen signal system on the remaining 22-mile section of its Greensburg division. This makes a total of 40 miles protected in this manner. The work just completed included, in addition to the cab signals, open switch protection and safeguards for east and west bound train movements. Work will be started at once on the Connersville division which will add 55 miles more of Simmen signal protection to this road.

Municipal Line at Edmonton Unprofitable.—The municipal street railway at Edmonton, Alta., was operated at a loss of $26,495 during 1912, and W. T. Woodroofe, superintendent, has made a number of suggestions in regard to changes in operation to increase the revenue during the coming year. Tentative proposals have been made by him to charge a uniform rate of 5 cents, with transfer privileges, do away with the present yellow labor tickets, do away with the dollar blue book of tickets, do away with the transfer privileges, do away with the red and blue tickets and establish the price of children's tickets at ten for 25 cents.

Decision in Cincinnati Extension Case.—The Ohio Court of Appeals has handed down a decision which temporarily disposes of plans of the Cincinnati (Ohio) Traction Company for an extension of its lines to the Bond Hill residential section of that city. In the case of D. L. Carpenter and other residents of Reading Road against the city of Cincinnati seeking to restrain the municipality from calling the old Paddack Road an extension of the Reading Road and from permitting Reading Road residents to outvote them (the plaintiffs) in granting the right-of-way for the railway extension to Bond Hill, the Supreme Court upheld the petition of Mr. Carpenter and his co-plaintiffs.

Plan for Blanket Franchise in Shreveport.—The Retail Merchants' Association and the State Fair Association have indorsed a proposition for the City Council of Shreveport, La., to submit to the people, at a special election, an ordinance providing for several grants to the Shreveport Traction Company in exchange for a system of universal transfers and other considerations. The main grant to be made the company, if the proposition carries, is a franchise extension so that all the company's franchises will expire at the same time, about forty years hence. A similar proposition was defeated by the people about two years ago, but since then the company has added several lines, and transfers are more in demand.

Car Trust Certificates Advocated in Philadelphia.—Legal authority by consent of the city for the Philadelphia (Pa.) Rapid Transit Company to create a car trust, whereby additional equipment can be secured without increased bonded indebtedness, has been recommended by E. T. Stotesbury in a letter to Councils. The total issue is not to exceed $4,200,000. Consent is also asked to be given to the company to provide for additional equipment by further issues of car trust certificates and to guarantee the payment of the certificates. The issues are not to exceed 80 per cent of the equipment. In a letter to the Mayor T. E. Mitten said that the near-side car had been so successful that it would be wise to obtain enough of the cars to equip all the principal lines. Mr. Stotesbury said that the company desired to furnish the equipment, but that it could not do so out of the proceeds of the $10,000,000 loan recently authorized without cutting into other expenditures equally important in the development of the system.

Changes in New York Commission.—On Feb. 3, 1913, Governor Sulzer of New York nominated Justice Edward E. McCall of the Supreme Court of New York to succeed William R. Willcox as chairman of the Public Service Commission of the First District of New York and Devoe P. Hodson, former city judge of Buffalo, to succeed John B. Olmsted as a member of the Commission of the Second District. Two vacancies in the Commission for the Second District remain to be filled. The term of office of Chairman Frank W. Stevens expired on Jan. 31 and the term of office of Curtis N. Douglas came to an end automatically on Jan. 20 owing to the fact that Governor Dix appointed Mr. Douglas to succeed Winfield A. Huppuch during the recess and the Senate failed to confirm him during the first twenty days of the session. The term of office of Commissioner Olmsted expired last year, but Governor Dix permitted him to continue in office after the Senate had failed to confirm the nomination of Herbert P. Bissell as successor to Mr. Olmsted. The Senate has confirmed both nominations.

Decision in New York City Bond Limit Case.—The Appellate Division of the Supreme Court in the First District of New York has exempted about $70,000,000 of self-sustaining dock bonds from the city's computable debt, so that the debt limit is enlarged by that amount and the city, instead of being able to borrow but $85,000,000, may now borrow about $155,000,000. The decision was given under the constitutional amendment of Jan. 1, 1910. This amendment provided for the exemption from the computation of municipal indebtedness of all dock or transit bonds issued by the city for improvements from which a revenue was derived sufficient to pay interest on the bonds and to meet amortization charges. The courts were left the sole judge as to whether any bond issue for which exemption was claimed by the city met the requirements of the constitutional law. The Appellate Division, with but a single dissenting vote, has declared that the city's dock system is a profitable investment, and that bonds issued for its improvement are no longer to be chargeable against the debt limit. The decision will allow the city to carry out its obligations in connection with the financing of the new rapid transit lines.

Additional Rapid Transit Construction Contracts Opened.—During the week ended Feb. 1, 1913, the Public Service Commission for the First District of New York opened bids for the construction of Section No. 2 of the Astoria, Woodside and Corona rapid transit railroad in Queens Borough. Section No. 2 embraces the greater part of the proposed elevated railroad from the Queens end of the Queensboro Bridge to Astoria. The line runs through Second or Debevoise Avenue for the whole distance, and Section No. 2 lies between Beebe Avenue on the south and Ditmars Avenue on the north. The line will be about 2 miles long and contain about 7½ miles of single track. It will take about eighteen months to build, and when completed will be owned by the city of New York and operated jointly by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company under the dual system contracts. The commission received bids from twelve contractors, ranging in amounts from $860,000 to more than $1,200,000. The lowest bidders were Cooper & Evans, New York City. The commission has not yet awarded the contract. Bids for the construction of Section No. 3 of the same route, comprising the greater part of the line from the Queensboro Bridge to Corona, were opened on Feb. 7.

How Legislation in Massachusetts Has Stifled Development.—At the recent midyear meeting of the American

Electric Railway Association in New York Bentley W. Warren, general counsel of the Bay State Street Railway, explained how the Massachusetts anti-stock watering laws have hampered the investment of capital and have interfered with the development of transportation facilities in that State. That Mr. Warren described accurately the baneful effects of the Massachusetts legislation in regard to the issuance of new securities is attested in the statements made by Mayor John T. Fitzgerald of Boston in an interview which was published in the editorial section of the New York Sunday *World* of Feb. 2, 1913. Referring to the investment of Massachusetts capital elsewhere than in that State Mayor Fitzgerald said in part: "Take Stone & Webster. In the last fifteen years they have taken more than $179,000,000 of Boston money and invested it in the West. They have floated all their securities in Boston, and not a cent of all that Boston money has gone to improve the city, to build up her commerce, add to her industry or give employment, except to their office force, to a single one of her workers. There are a dozen other firms that have done the same thing, but not on such a scale. From 1901 to 1911 there were 42,000 miles of railroad main track extension built in the United States. The great State of Massachusetts increased her railroad mileage at the rate of just 653 yards a year, building the grand total of 3.71 miles in the ten years."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

A bill has been introduced in the Senate which provides for the regulation of public utilities by two commissions, one having supervision over Chicago and the other over the rest of the State. It is proposed that each commission shall be composed of five members, those for Chicago to be appointed by the Mayor and those for the rest of the State by the Governor. The commissions are to have jurisdiction in their respective districts over all public utilities, steam, surface and other railroads (elevated or underground), express, sleeping car, freight line companies, gas, electric, telephone and telegraph companies. Each commissioner will receive an annual salary of $10,000 and each commission will have a counsel at a salary of $10,000 and a secretary at a salary of $6,000. The bill, if acted upon favorably, will abolish the Railroad and Warehouse Commission.

INDIANA

The railroad trespass law providing that a fine be imposed on anyone convicted of trespassing on railroad tracks or crossings has been defeated by a vote of forty to four. A bill exempting cities and towns from the provision which requires crossing signs has been passed. A bill has been introduced in the Senate to prevent overloading of interurban, street and steam cars. The House bill providing that a motorman on an interurban car shall not perform any duties other than those which have to do with operation has been defeated. A House bill provides for the elimination from the railroad commission act of the provision which permits railroads to refuse to haul freight if revenue from freight is not in excess of 33 1-3 per cent of gross revenue. This bill, which has passed to third reading, will very likely be enacted. It will bring the freight service of the interurban roads under the jurisdiction of the Railroad Commission. A bill has been passed by the Senate which provides for the separation of railroad grade crossings under direction of the Indiana Railroad Commission.

PENNSYLVANIA

At a lengthy conference between members of the legislative committee of the democratic state committee and the joint committee of democratic members of the Senate and House in Harrisburg a few days ago, it was decided to present a third public utilities commission bill to the General Assembly, as representing the views of the democratic party better than the Tener-Bell bill and the republican state convention bill. The democratic measure was drafted by Roland S. Morris, Philadelphia, and differs in many respects from the other two measures that are now in committee of the House. It is much shorter and preserves the home rule of the municipalities of the State. It is claimed for it that it vests the commission with more discretionary powers, making unnecessary the enumeration of details of procedure. The principal feature of the bill lies in the centralization of the commission's responsibility, making the body responsible only to the Governor. It further leaves to the discretion of the commission the employment of counsel and other employees, and permits the commission to pay such salaries as may be deemed advisable, but fixes a maximum of $150,000 per annum for the payment of all expenses of the department. The other bills fix the number of employees. The democratic bill gives the commission absolute control and supervision over the securities, the issuing of stocks, bonds and notes.

The Tener-Bell administration measure is termed the "Public Service Company Law." The bill provides for a commission of five members instead of three, as the present State Railroad Commission is constituted, which shall be known as the "Public Service Commission of the Commonwealth of Pennsylvania." The commissioners are to be appointed by the Governor, with the approval of the Senate, one commissioner to be learned in the law, another in economics, a third in the business of common carrier. The original commissioners are to be appointed for terms of from one to five years. Their successors can each be appointed for five-year terms. The designation of the chairman of the commission is vested with the Governor. The chairman is to receive an annual salary of $10,500, and the other members $10,000 each. Other officers provided for in the bill are: Secretary at $5,000 annually; counsel and assistant counsel, to be named by the Attorney-General, at $7,500 and $5,000 respectively; marshal, $2,000; investigator of accidents, $4,000; other employees to be appointed by the commission, subject to the approval in writing of the Governor. The commission must meet at least twice monthly, and is empowered to enforce its decrees either by civil or criminal proceedings in the name of the Commonwealth against the offending corporation. Broad powers are vested with the commission in this bill, not only relating to the incorporation, construction and operation of steam and electric railways, telephone and telegraph companies, and all public service corporations, but also giving it authority to require all public service companies to account to the commission for the disposition and application of the proceeds of all sales of stocks, bonds, notes and other evidences of indebtedness, which shall be issued in such form and detail as the commission may deem advisable. The bill clothes the Dauphin County Court with exclusive jurisdiction throughout the State to hear and determine all actions brought by the commission. The commission is further clothed with authority to enforce the act of June 19, 1911, compelling railroads properly to man their trains, better known as the "Full Crew Bill." The act is to go into effect Jan. 1, 1914, but the commission is to have authority to organize and select its employees on or before Oct. 1, 1913. The bill repeals the act of May 31, 1907, creating the present State Railroad Commission.

Other bills now in committee affecting electric railways are the following: Prohibiting common drinking cups in cars under penalty of a $50 fine for each offense; a new third-class city bill under which an annual license fee of $100 per car may be collected from electric railways; regulating reports for purpose of taxation from railway companies; providing that on all paved highways in cities the car wheel tread of rails hereafter laid shall be of equal height, and the flange groove between said treads shall not be more than 1¼ in. in width; outer angles of each rail to be rectangles, and all paving on either side to be even with the tread, under penalty of a fine of not more than $500 for each offense, each day's continuance of the practice to constitute a separate offense. This latter act is to go into effect Jan. 1, 1914.

PROGRAM OF ASSOCIATION MEETING

Keystone Railway Club

The executive committee of the Keystone Railway Club is to call a meeting at an early date for the purpose of arranging the details of the next meeting of the club, which is to be held during March at the Hotel Walton, Philadelphia. Arrangements have been made to have the proceedings of the last meeting and the papers presented at that meeting printed and distributed among the members.

Financial and Corporate

Stock and Money Markets

February 5, 1913.

The volume of transactions on the New York Stock Exchange to-day was small. Most of the active industrials and the railroad issues sustained some amount of loss. The prospects of further delay in executing the rapid transit contracts because of the granting of an injunction caused a decline of 1¼ in the Interborough-Metropolitan preferred and of ¾ in the common stock of the company. Rates in the money market to-day were: Call, 2¾@3 per cent, with the last loan at 2⅞ per cent; sixty days, 3¾@4 per cent; ninety days, 4@4½ per cent.

In the Philadelphia market the trading was narrow but the tone was steady to-day.

In the Chicago market the trading in stocks to-day was dull, and changes were confined within a narrow range. The demand for bonds was good.

While the volume of transactions in Boston was not large, most of the issues were represented in the trading. Railroad stocks were in good demand.

The Baltimore market was active and firm to-day. The bulk of the transactions in the bond market was in the railway issues.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 29	Feb. 5
American Brake Shoe & Foundry (common)	93⅝	94½
American Brake Shoe & Foundry (preferred)	133⅞	134¼
American Cities Company (common)	47½	47½
American Cities Company (preferred)	a77	76⅜
American Light & Traction Company (common)	*405	405
American Light & Traction Company (preferred)	108	108
American Railways Company	40½	39¾
Aurora, Elgin & Chicago Railroad (common)	44	42½
Aurora, Elgin & Chicago Railroad (preferred)	86¼	86¾
Boston Elevated Railway	113¾	111½
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	65	65
Boston & Worcester Electric Companies (common)	7	7
Boston & Worcester Electric Companies (preferred)	40	40
Brooklyn Rapid Transit Company	91	90½
Capital Traction Company, Washington	121	123
Chicago City Railways	150	150
Chicago Elevated Railways (common)	35	35
Chicago Elevated Railways (preferred)	91	91
Chicago Railways, ptcptg., ctf. 1	96	90
Chicago Railways, ptcptg., ctf. 2	24	25
Chicago Railways, ptcptg., ctf. 3	7½	7¼
Chicago Railways, ptcptg., ctf. 4	3	3
Cincinnati Street Railway	118½	117½
Cleveland Southwestern & Columbus Ry. (common)	*5⅛	*5⅛
Cleveland Southwestern & Columbus Ry. (preferred)	*33	*33
Cleveland Railway	105	104¾
Columbus Railway & Light Company	59	19
Columbus Railway (common)	*81¾	68½
Columbus Railway (preferred)	84½	88½
Denver & Northwestern Railway	118	*118
Detroit United Railway	80	75
General Electric Company	142¼	142
Georgia Railway & Electric Company (common)	125	126¾
Georgia Railway & Electric Company (preferred)	83	82½
Interborough Metropolitan Company (common)	19	18½
Interborough Metropolitan Company (preferred)	63¾	62⅞
International Traction Company (common)	*38	*38
International Traction Company (preferred)	*99	*99
Kansas City Railway & Light Company (common)	18⅛	*18⅛
Kansas City Railway & Light Company (preferred)	*40	*40
Lake Shore Electric Railway (common)	*9	9
Lake Shore Electric Railway (1st preferred)	*91	91
Lake Shore Electric Railway (2nd preferred)	25½	25½
Manhattan Railway	131½	132
Massachusetts Electric Companies (common)	17½	18
Massachusetts Electric Companies (preferred)	76	78
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*25	*25
North American Company	80¼	80
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	100	100
Philadelphia Company, Pittsburgh (common)	49½	49
Philadelphia Company, Pittsburgh (preferred)	43	42½
Philadelphia Rapid Transit Company	26¼	27
Portland Railway, Light & Power Company	68½	68½
Public Service Corporation	116	116
Third Avenue Railway, New York	38⅞	38
Toledo Railway & Light Company	2	2¼
Twin City Rapid Transit Co., Minneapolis (common)	106¼	105⅞
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	23½	....
United Rys. Inv. Company (common)	32	32
United Rys. Inv. Company (preferred)	60	59
Virginia Railway & Power Company (common)	51¾	55½
Virginia Railway & Power Company (preferred)	92¼	92
Washington Ry. & Electric Company (common)	86	86
Washington Ry. & Electric Company (preferred)	90	90
West End Street Railway, Boston (common)	80	80
West End Street Railway, Boston (preferred)	96½	96½
Westinghouse Elec. & Mfg. Company	74½	73
Westinghouse Elec. & Mfg. Company (1st preferred)	116	117

*Last sale. a Asked.

ANNUAL REPORTS

Twin City Rapid Transit Company

The statement of receipts and expenditures of the Twin City Rapid Transit Company, Minneapolis, Minn., for the calendar year 1912 compared with 1911, as presented at the annual meeting of the stockholders of the company, held on Jan. 28, 1913, follows:

	1912.	1911.
Revenue from transportation	$8,147,199	$7,749,158
Revenue from operation other than transportation	61,768	62,035
	$8,208,967	$7,811,193
Maintenance of way and structure	$364,050	$358,606
Maintenance of equipment	370,251	380,270
Traffic expenses	39,943	42,804
Conducting transportation	2,680,496	2,470,401
General and miscellaneous	743,261	654,635
Total operating expense	$4,198,001	$3,906,716
Net revenue	$4,010,966	$3,904,477
Interest on debt and taxes	1,529,230	1,486,129
Surplus available for dividends and depreciation	$2,481,736	$2,418,347
Dividends preferred stock	$210,000	$210,000
Dividends common stock	1,206,000	1,206,000
Total dividends	$1,416,000	$1,416,000
Surplus from operation	$1,065,736	$1,002,347
Appropriated for renewals	775,000	750,000
Income account surplus	$290,735	$252,347
Per cent total operating (including taxes and renewal appropriations) to total revenue	67.14	65.96

In his statement to the stockholders of the company C. G. Goodrich, the president, says in part:

"By comparison with 1911 the following increases during 1912 are shown: Gross earnings increased $397,774, or 5.09 per cent; operating expenses increased $291,284, or 7.46 per cent; car miles operated increased $1,868,288, or 7.35 per cent; net earnings increased $106,489, or 2.73 per cent.

"Three main causes contributed to the fact that the operating cost increased more than the earnings. They are as follows:

"1. It was decided by your directors in June to increase by about 10 per cent the wages of your employees in the operating and mechanical departments. This increased rate of pay for the half year caused an actual additional expenditure of $84,781.

"2. Our taxes were increased $43,110.

"3. The mileage increase. This increase of 7.35 per cent is in direct proportion to the increased operating cost of 7.46 per cent, notwithstanding the increase in employees' wages. During the year 1912 we built and put into service 100 additional cars and 11.78 miles of new track and extensions, the operation of which caused the increased mileage.

"The directors have appropriated from surplus the sum of $775,000, which has been added to the renewal fund.

"The insurance fund has been increased during the year by the sum of $31,547.

"To provide funds for new construction and renewals $1,000,000 of the renewal fund bonds have been sold. The income from the sale of these bonds, with surplus earnings for the year, provided means for the following expenditures on new construction without any increase in the capital liability:

New power		$500,564
New shops and tools		64,987
Car equipment		522,724
Carhouses		49,274
Track and paving		236,721
Minneapolis track	$209,319	
St. Paul track	8,653	
Suburban track	18,748	
Real estate, buildings, miscellaneous		14,568
Total		$1,388,838

"The sum of $362,729 has been expended for renewals and there has been charged to the renewal fund the sum of $189,746 on account of discontinued and obsolete equipment.

"From the accumulated surplus the directors appropriated the sum of $120,922 to the injuries and damages reserve fund and also the sum of $50,000 to the special reserve fund.

"The regular quarterly dividends have been declared by your directors and paid, aggregating the sum of $1,416,000, being at the rate of 7 per cent on the preferred stock and 6 per cent on the common stock."

The statement of the revenue passengers carried and transfers redeemed for the years 1911 and 1912 as contained in the report follows:

	1912.	1911.
Revenue passengers carried	162,407,993	154,380,730
Transfers redeemed	57,584,451	51,844,378

Northern Ohio Traction & Light Company

The income account of the Northern Ohio Traction & Light Company, Akron, Ohio, for the year ended Dec. 31, 1912, as compared with the previous year follows:

Gross earnings	$2,996,036
Operating expenses and taxes	1,702,765
Net earnings	$1,293,271
Interest on bonds and collateral trust notes	523,068
Available for company's uses	$770,203
Preferred stock dividends	49,930
Net	$720,273
Common stock dividends	382,500
Balance surplus for year ended Dec. 31	$337,773
Surplus on Dec. 31, 1910 and 1911	1,157,912
Total surplus Dec. 31	$1,495,685
Charged for depreciation, reconstruction, and expenditures account of preferred stock issue, etc.	90,649
Balance surplus, Dec. 31	$1,405,036

Henry A. Everett, the president, says in part in the report:

"The mileage of the system has been increased 0.71 mile by the construction of double track on East Lake Street, Canton, from Belden Avenue to Superior Street and by the addition of new sidings on Garfield Avenue, Canton, and on Bowery street, Akron, making a total, at the close of 1912, of 216.47 miles.

"The total expenditure for additions and improvements was $1,535,522, subdivided as follows: Track and roadway, $304,533; power houses, carhouses, etc., $994,667; cars and equipment, $157,036; real estate and right-of-way, $12,542; light department, $66,640; general expenditures, $103.

"A total of 16,400 ft. of track has been renewed in most approved methods, all with 80-lb., 7-in. 'T' rail, laid on concrete foundations and repaved with brick.

"Extensive repairs and renewals have been continued on the various divisions of the company, and 50,700 ties and several miles of rail have been renewed.

"On the A. B. C. division, from the present terminus of the double track north to what is known as Fells Station, a double-track line for a distance of 7½ miles is being constructed on private right-of-way and will be placed in operation in the early spring.

"The Gorge Bridge, spanning the Cuyahoga River, 3 miles north of the city of Akron, has been converted into a steel structure throughout, 250 ft. of wooden trestle of original construction having been replaced by new deck girder section.

"Fifteen additional passenger cars, ten for city and five for interurban service, one 60-ft. baggage car and one wrecking car with 25-ton crane, including all of the electrical apparatus, have been added to the equipment during the year. In addition to these a contract was closed on July 13, 1912, for twenty-five city cars and ten interurban cars, including electrical equipment, which are now being received and placed in service.

"In the Beech Street power house in Akron a 600-hp B. & W. boiler and three 200-kw. three-phase transformers have been installed.

"The construction of the Gorge power station has been pressed forward as rapidly as possible considering labor conditions and the difficulty in securing materials. The 60-ft. dam was completed and the reservoir filled on Dec. 1. The first turbo-generator was placed in service on Dec. 5. All of the electrical machinery and one-half of the ultimate boiler capacity of the station are now ready for service. The rest of the boilers are being erected. The coal bunker and ash-handling machinery is in process of erection. The substation buildings at Kent, Northfield and Kenmore have been completed and the machinery is being installed. The portable substation, to be used at Bedford, is ready for service. All of the concrete piers for the hydroelectric plant and about two-thirds of the steel flume are complete and the work of installing the machinery is progressing as rapidly as possible.

"The company has under construction on its property located in South Akron new modern carhouse and shops which will be completed and ready for operation in the near future. A private right-of-way has been purchased from the center of the city of Akron, along what is known as the hydraulic race and Akron Heights, north for a distance of 3 miles to connect with our present line at the Gorge, this being a valuable acquisition to the property.

"The pension fund maintained for the benefit of the employees has a credit balance at the close of the year of $9,395. Since its establishment $9,439.45 has been distributed. Ten employees are now drawing regular monthly pensions.

"The injury and damage account has been monthly credited with 2 per cent of the gross receipts. The surplus at the close of the year's business amounts to $34,615.

"The board of directors at its regular meeting on Nov. 24, 1911, declared a dividend for the year 1912 at the rate of 4 per cent per annum, payable quarterly March 15, June 15, Sept. 15 and Dec. 15. At the regular meeting of said board held on Nov. 29, 1912, an extra dividend of one-quarter of 1 per cent was declared payable on Dec. 15, 1912, and at the same meeting the dividend for the year 1913 was declared on a basis of 5 per cent per annum, payable quarterly at the regular dividend periods.

"On account of the large expenditures necessary for the construction of the new steam and hydraulic stations, carhouses and shops, A. B. C. division double track and other improvements, the company applied to the Public Service Commission of Ohio for permission to issue an additional $2,000,000 of 6 per cent cumulative preferred stock. After several hearings the company obtained authority to issue $1,640,000 of said stock, the same to be disposed of at not less than par. Complying with this order, the company offered the stock to the shareholders pro rata at par, and about 50 per cent was subscribed, the balance being disposed of to Borton & Borton, Cleveland, Ohio.

"On July 1 the company redeemed $2,000 of Lake View Land & Improvement Company bonds, and on Nov. 1 $100,000 collateral trust serial bonds, thereby reducing the funded indebtedness.

"The company has 1435 stockholders of record, an increase of 292 over the previous year.

"Your president cannot let pass the opportunity to commend the loyal, conscientious and efficient effort of the entire staff of the company, on whom has fallen the added strain of pushing forward the successful completion of the large improvements commenced in 1912."

The following operating statistics are contained in the report:

	1910.	1911.	1912.
Average mileage in operation	215.20	215.76	216.47
Gross earnings per mile	$10,376.36	$11,244.06	$12,378.05
Net earnings per mile	$4,517.87	$4,888.07	$5,153.02
Ratio of expenses to earnings	55.34	55.40	56.83

East St. Louis & Suburban Company

The following statement shows the earnings, expenses and taxes of the operating companies composing the East St. Louis (Ill.) system and the fixed charges (interest and taxes of the East St. Louis & Suburban Company) for the calendar years 1911 to 1912, inclusive:

	1911	1912
Gross receipts	$2,279,146	$2,452,451
Operating expenses	1,204,900	1,275,118
Net earnings	$1,074,246	$1,177,333
Interest and taxes, all companies	612,976	656,920
Surplus	$461,270	$520,412
Preferred dividend	350,000	350,000
Surplus	$111,270	$170,411
Percentage of operating expense to gross receipts	52.8	52

C. M. Clark, the president, says in part:

"The increase in gross earnings in 1912 over 1911 was $173,304, or 7 per cent. The increase in net earnings was $103,086, or 10 per cent.

"The sum of $191,041 was expended for construction of tracks, cars, power, new installations in connection with new customers, etc., of which $163,309 was charged to capital accounts and $28,542.15 to renewals and replacements.

Measured on single-track basis there are 187.5 miles of track in the system, of which the operating companies own 182.7 miles, 4.8 miles being operated under trackage agreement.

"There were owned 153 passenger cars, 810 coal cars, two electric locomotives and two steam locomotives on Dec. 31, 1912. The generating capacity of the steam stations on Dec. 31, 1912, was 10,740 kw.

"The connected light and power load (not including railway system) on Dec. 31, 1912, was 11,692 kw, an increase of 2767 kw, or 31 per cent. The number of light and power customers was 5169, an increase of 840, or 19 per cent. The gross receipts from light and power business for the year increased $62,044, or 15.6 per cent.

"A conservative estimate of the population served by the lines of the East St. Louis & Suburban Company in 1912 is 155,000, compared with 85,000 in 1900, an increase of 82 per cent. In addition the lines of the company enter St. Louis over the Eads Bridge, thereby reaching a population of nearly 800,000 additional.

"Since Jan. 1 an agreement has been reached with the Mississippi River Power Company for the delivery to your company of hydroelectric power from Keokuk for street railway, light and power purposes. This water power will be supplemented by a new large modern steam plant which will be constructed at Alton. Contracts already made with large power consumers will require this additional steam capacity and the water-power can be used in large quantities in connection with our present and proposed steam stations. A very large amount of power business is available in the territory served by your company, and it is the belief of the management that this business offers the greatest field for the future growth of your company's earnings."

St. Joseph Railway, Light, Heat & Power Company

The following statement shows the earnings, expenses and fixed charges of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., for 1911 and 1912:

	1911	1912
Gross receipts	$1,099,284	$1,179,839
Operating expenses	629,150	613,494
Net earnings	$470,134	$566,345
Interest and taxes	283,784	291,589
Surplus	$186,350	$274,756
Percentage of operating expenses to gross receipts	57.23	52.00

J. H. Van Brunt, vice-president, says in part:

"The increase in gross earnings in 1912 over 1911 was $80,554.45, or 7.3 per cent. The net earnings increased $96,210.67, or 20.46 per cent.

"The following statement shows amounts charged to construction accounts during 1912: For railway extension and improvements, $51,344; for new cars (on account), $18,880; for power plants (on account), $32,794; for carhouses and miscellaneous, $1,779; for extension overhead lines, light and power department, $55,204; for extension of steam-heat lines, $11,981; total, $171,984.

"There were 47.06 miles of track on single-track basis in the system on Dec. 31, 1912, and the total equipment consisted of 145 motor cars and 41 trail cars. Five new cars were purchased and put in operation during the year.

"The total steam generating capacity on Dec. 31, 1912, was 4600 kw. This is being increased by the addition of a 3000-kw turbine and 440 hp of boilers and an extension of the power house. This work is progressing satisfactorily. During the year $55,204 was expended for transformers, meters, street and service installation necessary in order to serve new customers. The connected light and power load on Dec. 31 was 12,445.98 kw, an increase of 1052.48 kw, or 9.2 per cent. The number of light and power customers was 7812, an increase of 1482, or 23.4 per cent. The gross receipts from light and power business for the year increased $52,149.28, or 17.02 per cent.

"The gross earnings of the St. Joseph & Savannah Interurban Railway, the stock of which is owned by your company, were $56,202; net earnings, $19,296; surplus over fixed charges, $1,205.

"During the year a contract was made with the Kansas City, Clay County & St. Joseph Railway, under which the cars of that company from Kansas City will be operated over the tracks of your company."

Receiver for Bankers' Corporation Company

Despite the fact that the Bankers' Corporation Company, a Delaware corporation with offices in Philadelphia, has already confessed insolvency in the Eastern District United States Court, which has appointed Samuel A. Whitaker, Franklin Building, Philadelphia, receiver, a hearing on a rule to show cause why a receiver should not be appointed for this corporation was held in the Dauphin County Court on Jan. 29. The matter was brought before the Dauphin County Court by the Attorney-General, on behalf of the State Banking Department, which attacks the character of the company. The hearing on Jan. 29 was largely to determine the question of jurisdiction in the case.

It was brought out that the company had disposed of about $300,000 worth of collateral trust notes represented to be secured by bonds of various electric railways deposited with the Union Trust Company, of Pennsylvania, as trustee. Each collateral note was certified by the trust company as being one of an issue of notes secured by bonds in the hands of the trust company. It was stated that the bonds were issued by the Warren County Traction Company and the Wayne County Traction Company, of Pennsylvania, and an electric railway in St. Louis. The claim was advanced that these companies were without available assets. William S. Lambert, Philadelphia, is president of the Bankers' Corporation Company. While the hearing has been continued, it is believed the State will not press for a receiver in view of the fact that the federal court has already made such appointment.

Merger Proceedings in Chicago

The local transportation committee negotiating with the representatives of Chicago's surface and elevated railways for a general merger decided to dispense with the services of the committee of real estate experts appointed by the Chicago Real Estate Board when they set their compensation at $10,000. The transportation committee considered the amount named excessive and decided to abandon this method of reconciling the two values placed on the elevated railways real estate by the city's and the company's experts last spring.

Athol & Orange Street Railway, Athol, Mass.—The Athol & Orange Street Railway and the Gardiner, Westminster & Fitchburg Street Railway have petitioned the Railroad Commission for authority to consolidate. The Athol & Orange Street Railway has petitioned for the right to issue $185,000 of additional capital stock to effect the consolidation.

Bay State Street Railway, Boston, Mass.—James F. Jackson appeared before the Railroad Commission of Massachusetts on Jan. 29, 1913, on petition of the Bay State Street Railway for approval of an issue of $800,000 of first preferred stock to be offered stockholders at $115 per share and of an issue of $429,000 of refunding first mortgage 4 per cent bonds dated July 1, 1904, $266,000 by the Boston & Northern Street Railway and $163,000 by the Old Colony Street Railway. The stock will provide for expenditures already made and the bond issue will provide for the retirement of floating indebtedness.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—It is reported that Newburger, Henderson & Loeb, Philadelphia, Pa., have agreed to finance the proposed consolidation of the Corpus Christi Ice & Electric Company, the People's Light Company and the Corpus Christi Street & Interurban Railway.

Frederick (Md.) Railroad.—An application has been filed with the Public Service Commission of Maryland for permission to consolidate the Frederick Railroad, the Frederick Gas & Electric Company, the Frederick & Hagerstown Power Company and the Hagerstown Railway as the Hagerstown & Frederick Railway, with an authorized capital stock of $3,000,000, of which $1,000,000 is to be 7 per cent preferred stock and $2,000,000 common stock. The new company desires authority to execute a mortgage to secure an issue of $10,000,000 of thirty-year 5 per cent bonds, $3,300,000 of these bonds to be used to retire issues of the constituent companies which are now outstanding.

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Power Company has declared a dividend of $4.70 a share upon its first preferred stock, this being at the full rate of 6 per cent since the incorporation of the company last March. No dividends have as yet been declared upon the company's second preferred stock. It has been announced that the Georgia Railway & Power Company will take over the property of the East Tennessee Power Company.

Grafton (W. Va.) Traction Company.—The Kuhn interests of Pittsburgh, Pa., are reported unofficially to be negotiating with John T. McGraw, president of the Grafton Traction Company, for the purchase of the property of that company. The Kuhn interests control the Wheeling (W. Va.) Traction Company and have a pretentious water-power development under way on the Cheat River.

Illinois Traction System, Peoria, Ill.—The Illinois Traction System has purchased the property of the Abingdon (Ill.) Light & Power Company, which holds light and power franchises at St. Augustine and Prairie City. The consideration is said to have been $60,000.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has granted the application of the New York Municipal Railway Corporation for permission to issue $100,000 of its capital stock to acquire property and for improvements, extensions, etc. The company has a total capital of $1,000,000, but none of it has yet been issued. Later the commission adopted another order granting the New York Consolidated Railroad permission to purchase the stock of the New York Municipal Railway Corporation when issued. Both companies were organized by Brooklyn Rapid Transit interests to facilitate their participation in the proposed dual system of rapid transit. The New York Municipal Railway Corporation will make the contract with the city for the operation and a contribution to the construction of the new lines. The New York Consolidated Railroad is the owner of the existing Brooklyn elevated system and will take over the contract made by the New York Municipal Railway Corporation and operate the new lines.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—The Public Service Commission of the Second District of New York continued until Feb. 6, 1913, the hearing on the application of the Rochester, Syracuse & Eastern Railroad, the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Electric Railroad to consolidate as the Empire United Railways, Inc., in accordance with the terms published in the ELECTRIC RAILWAY JOURNAL of Feb. 1, 1913, page 228. At the hearing before the commission at Albany, on Jan. 30, 1913, C. D. Beebe, president, and William Nottingham, attorney, stated that consents to the consolidation had been obtained from holders of 87 per cent of the stock of the three corporations, and that eventually consents would be obtained from the holders of more than 90 per cent of the stock of the companies. Mr. Nottingham emphasized the fact that the total of the securities to be issued by the new company, amounting to $11,600,000, is $1,200,000 less than the present securities of the constituent companies. Mr. Beebe pointed out that the Syracuse, Lake Shore & Northern Railroad has a closed mortgage and is without means to finance any needed improvements. This year the company will have to meet an expenditure approximating $75,000 because of State highway improvements.

Toledo & Chicago Interurban Railway, Kendallville, Ind.—Evidence is being heard in the Superior Court at Fort Wayne, Ind., upon the petition of the receivers of the Toledo & Chicago Interurban Railway to sell the property of the company. This road has been in the hands of a receiver since February, 1908.

Toledo Railways & Light Company, Toledo, Ohio.—The Toledo Traction, Light & Power Company has been incorporated in Maine with a capital stock of $15,200,000, of which $6,000,000 is 6 per cent preferred stock and $9,200,000 is common stock, as the successor to the Toledo Railways & Light Company, the plans for the reorganization of which were referred to at length in the ELECTRIC RAILWAY JOURNAL of Oct. 19, 1912, page 984. The unofficial statements which have been published in this connection indicate a number of slight changes in the distribution of the securities from the plan as originally announced. It was at first proposed that the successor company should be incorporated as the Toledo Light & Railways Company.

United Light & Railways Company, Grand Rapids, Mich.—The United Light & Railways Company has sold to the stockholders $1,000,000 of 6 per cent first preferred stock at par with a bonus of 25 per cent in common stock. This issue of stock makes the present capitalization $6,000,940 of first preferred stock, $3,000,000 of second preferred stock, and $5,537,500 of common stock. The proceeds of the sale of the new stock will be used for additions to the properties of the company.

Wheeling (W. Va.) Traction Company.—The Wheeling Traction Company has elected new officers as follows: W. S. Kuhn, president; J. S. Kuhn, first vice-president; George O. Nagle, second vice-president and general manager; J. B. Van Wagener, treasurer; C. W. Schenk, assistant treasurer; W. A. Shirley, secretary; Byron Trimble, assistant secretary.

Dividends Declared

Binghamton (N. Y.) Railway, 2 per cent.

Boston (Mass.) Elevated Railway, 3 per cent.

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Harrisburg (Pa.) Traction Company, 3 per cent.

Massachusetts Northern Railways, Greenfield, Mass., quarterly, 1¼ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, preferred.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, 1½ per cent.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPPANY

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Nov.	'12	$12,494	*$7,328	$5,166	$1,730	$3,436
1 "	"	'11	10,707	*6,483	e4,224	1,730	2,494
12 "	"	'12	145,450	*86,315	59,135	20,763	38,372
12 "	"	'11	118,025	*75,955	42,071	20,654	21,417

BROCKTON & PLYMOUTH STREET RAILWAY CO., PLYMOUTH, MASS.

1m.,	Nov.,	'12	$8,051	*$7,282	$769	$1,033	$264
1 "	"	'11	8,116	*7,161	955	1,018	63
12 "	"	'12	120,200	*90,109	30,091	12,525	17,567
12 "	"	'11	118,833	*90,734	28,200	13,005	15,095

CAPE BRETON ELECTRIC COMPANY, LIMITED, SYDNEY, N. S.

1m.,	Nov.,	'12	$34,563	*$15,810	$18,753	$5,682	$13,071
1 "	"	'11	30,991	*15,204	15,787	5,653	10,134
12 "	"	'12	357,207	*194,555	162,652	68,076	94,576
12 "	"	'11	335,657	*180,622	155,034	67,899	87,135

DALLAS (TEX.) ELECTRIC CORPORATION

1m.,	Nov.,	'12	$163,751	*$91,217	$72,534	$24,635	$47,899
1 "	"	'11	146,013	*96,310	49,704	19,813	29,891
12 "	"	'12	1,800,248	*1,089,469	710,779	285,279	425,501
12 "	"	'11	1,618,655	*1,086,308	532,348	247,087	285,261

EL PASO (TEX.) ELECTRIC COMPANY

1m.,	Nov.,	'12	$75,011	*$38,691	$36,320	$4,808	$31,512
1 "	"	'11	62,684	*34,579	28,105	6,983	21,122
12 "	"	'12	785,585	*438,231	357,354	72,741	284,613
12 "	"	'11	683,282	*406,267	277,015	80,893	196,122

GALVESTON (TEX.) ELECTRIC COMPANY

1m.,	Nov.,	'12	$38,904	*$23,039	$15,866	$7,653	$8,213
1 "	"	'11	32,127	*21,544	10,583	7,324	3,258
12 "	"	'12	490,123	*268,421	221,702	94,363	127,339
12 "	"	'11	435,126	*251,363	183,763	83,794	99,969

GALVESTON-HOUSTON (TEX.) ELECTRIC COMPANY

1m.,	Nov.,	'12	$181,075	*$104,786	$76,288	$33,722	$42,566
1 "	"	'11	132,003	*85,094	46,910	18,918	27,992
12 "	"	'12	1,981,369	*1,159,651	821,719	392,011	429,707
12 "	"	'11	1,501,188	*949,367	551,821	231,449	320,372

HOUGHTON (MICH.) COUNTY TRACTION COMPANY

1m.,	Nov.,	'12	$24,110	*$14,366	$9,744	$5,677	$4,067
1 "	"	'11	22,000	*15,538	6,462	5,227	1,236
12 "	"	'12	305,898	*172,688	132,211	66,720	66,491
12 "	"	'11	301,181	*180,179	121,002	62,575	58,427

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*Includes taxes.

Traffic and Transportation

Honesty, Courtesy and Sobriety as Essentials to Success

Robert E. Lee, general superintendent of the Cincinnati (Ohio) Traction Company, has made it a practice for several years past to address the trainmen in the service of the company twice each year. At a recent meeting of the men at the club rooms in Brighton, Mr. Lee made a very forceful address, in part as follows, in regard to honesty, courtesy and sobriety, which he considers essential to success in street railway work:

"I am not here to lecture you or to find fault with you, but to help you. I will not indulge in any personalities. If I do and thereby hurt anybody's feelings, call me down hard and I will stand for it. What I most particularly want to say to you is that there are three cardinal principles which make for success in our work. First, honesty and truthfulness; second, courtesy, and third, sobriety. As to the first, the dishonest man and the liar are not wanted anywhere, and when I find one in the employ of this company out he goes without ceremony. A liar is bad for the company and bad for his fellow employees.

"The second cardinal principle, courtesy, is in some respects the most important of all. Politeness does not cost you a cent, and will bring in great returns in the long run. I know that sometimes you have to bite your tongue to keep still, especially on divers occasions when, owing to slippery rails, the car has slid maybe 10 ft. past an irate old gentleman and he hops aboard with the query: 'What is the matter with that farmer up in front?' But if you tell the old gentleman in an equally irate tone to go up and ask the motorman he will say that you are as big a roughneck as the man ahead is a farmer, and a fine argument is started. On almost all occasions the best thing to do is to smile, smile and keep on smiling. Now, I do not mean for an instant that if some rowdy calls you a vile name or attempts violence you are to smile. Far from it. Srtike out, and strike out with all your might, and this company and I will stand right behind you. Above all, do not get into arguments with our dear friends, the ladies. It is useless, foolish and a waste of time. It takes two to make an argument worth while. If I find that any man has been guilty of discourtesy to any man or woman passenger I shall discharge that man immediately, whether he has been in the service one day or twenty years.

"Street railroading has reached such a development that it is positively dangerous to life and limb to place any car in charge of a motorman or conductor who drinks on duty. I will not have this to the slightest extent. Sobriety, the third principle insisted upon, will be rigidly enforced. We owe this to the people who walk upon our streets, to the innocent men and women and children who ride upon our cars. The rule that at no time shall employees of the company enter a bar while in full uniform will also be enforced."

Free Insurance and Increase in Wages for Binghamton Employees

G. Tracy Rogers, president of the Binghamton (N. Y.) Railway, issued the following announcement on Jan. 30, 1913, in regard to the establishment by the company of a system of free life insurance for all of its employees:

"Upon the death of any employee of the Binghamton Railway who has been in good standing for twelve months prior to the sickness or casualty resulting in death, said company will pay to his estate 25 per cent of the amount earned by said employee during the twelve months prior to the sickness or casualty resulting in death.

"Upon the death of any employee of the Binghamton Railway who has been in good standing for twenty-four months or more prior to the sickness or casualty resulting in death, said company will pay to his estate 50 per cent of the amount earned by said employee during the twelve months prior to the sickness or casualty resulting in death. This refers only to men in the employ of the company a full twelve months or twenty-four months or more subsequent to Jan. 1, 1913, and does not apply to officers of the company.

"Disobedience of rules sufficient to warrant a lay-off or suspension, or accepting employment with others, would lose to the employee all right of benefit under this insurance provision up to that time, and in event of such lay-off or suspension or accepting employment with others the conditions of this insurance provision would start anew from the date of his reinstatement."

Mr. Rogers has also announced an increase of 10 per cent in the wages of all the motormen and conductors in the employ of the company.

Fare Recommendation of Wisconsin Commission

The State Railroad Commission of Wisconsin issued a recommendation on Feb. 1, 1913, extending the single street fare limit over the lines of The Milwaukee Electric Railway & Light Company to the city of Wauwatosa.

The recommendation of the commission follows:

"It is recommended that within twenty days of the date of this order the above-named companies so extend the present one-fare or single-fare limits that on the Walnut Street line they will apply to and from any portion within the city of Milwaukee and the terminal of this line in the city of Wauwatosa; and that on the Wells-Farwell Street line they will apply to and from any portion within the city of Milwaukee to a point across the Chicago, Milwaukee & St. Paul Railway tracks, about one block from the said Walnut Street line terminal in the city of Wauwatosa. These extensions in the one-fare or single-fare limits shall not carry with them any changes in the present transfer privileges that are provided in the above orders of this commission in the Hans A. Koenig case and in the other cases against the above respondents, which orders, as stated, were dated Aug. 23, 1912."

President Mortimer of The Milwaukee Electric Railway & Light Company announced that the company would comply with the recommendation. He said:

"While the commission recommends and does not order the change, we shall carry out the suggestion provided no complications occur. The extension of the single fare to the center of Wauwatosa will carry with it the transfer privileges of Milwaukee. No additional construction of tracks will be necessary to make the change."

Mr. McHenry on Railroad Electrification

In response to a recent request of the Boston banking house of Thompson, Towle & Company for a statement regarding electrification plans on the New York, New Haven & Hartford Railroad, Vice-president E. H. McHenry has issued a statement pointing out that the New Haven company is now committed to an expenditure of $20,000,000, covering work along this line completed, in progress or authorized. In addition to the work between Woodlawn and Stamford, completed several years ago, the company has substantially finished the work on the Harlem River and Westchester lines. Construction is actively in progress between Glenbrook and New Haven, and the electrification of the main line between Boston and Providence will begin in the spring. The latter is the first step toward the ultimate electrification of all the steam railroad lines within the suburban radius of Boston. Mr. McHenry states that in his opinion electricity will be installed upon a large scale within the next decade, particularly at the great railroad centers He believes that the initial electrification of congested traffic centers will be followed by an ever-extending zone of electrical operation until such centers are finally interconnected by electrically operated lines. In the larger cities the obligations to electrify will be forced upon the companies regardless of economy and considerations of uniformity, and disabilities attending a break in the kind of operation will make it economical and desirable to extend the electrifiaction to parts of the railroad system which would not be justified if independently considered. Mr. McHenry says that as yet little direct economy has resulted from the electrification already completed, but that "the indirect advantages are large, and with an extension of electric operation to include passenger, freight and switching service, it is probable that a direct and sufficient return upon the necessary investment will be secured under favorable conditions. . . . In general it may be stated that the principal and almost the entire economy to be effected by electric operation is comprised in the two items of fuel and engine repairs, which will be approximately reduced by 50 per cent."

Individual Drinking Cups on Cars.—The Union Traction Company of Indiana is preparing to place individual drinking cups in its cars for use, free, by its patrons.

Modification of Toledo Transfer System.—On Feb. 3, 1913, the Toledo Railways & Light Company, Toledo, Ohio, inaugurated a new north and south transfer system in that city which gives patrons of the company their choice of four lines north or south in either direction.

Campaign Against Trafficking in Transfers in Newark.—The Public Service Railway, Newark, N. J., has begun a vigorous campaign to prevent the abuse of the transfer privileges which it extends to its patrons in that city. On Jan. 29 and 30 the company caused the arrest of six men whom it charged with trafficking in transfers, and each of the offenders was fined $10 in the police court.

Petition for Reduced Fare in Racine.—The Council of Racine, Wis., has adopted a resolution to the effect that a petition be filed with the Railroad Commission of Wisconsin asking that body to require The Milwaukee Electric Railway & Light Company, which operates in Racine, to sell six tickets for 25 cents good over its lines in Racine any time of the day. The commission will also be asked to direct the company to extend its lines in Racine.

Abandonment of Route Proposed in Binghamton.—The Binghamton (N. Y.) Street Railway has applied to the Public Service Commission of the Second District of New York for permission to discontinue its route on Eldredge Street, between Chenango Street and State Street. In its application the company states that it deems this portion of its road no longer necessary for the successful operation of its system and not essential for the convenience of the public.

New Elevated Station in New York.—The Public Service Commission of the First District of New York has ordered the Interborough Rapid Transit Company to construct a new station on its Sixth Avenue elevated line at Thirty-eighth Street and to place the new station in operation before the end of the present year. The new station will be in the center of a newly developed business and retail dry-goods district and convenient to the Engineers' Club and the United Engineering Societies building.

Increased Service in Washington.—The Washington Railway & Electric Company, Washington, D. C., has increased the service on seven of its lines and the Capital Traction Company, Washington, D. C., has increased the service on one of its lines at the instance of the District Electric Railway Commission. The Washington Railway & Electric Company has received another consignment of side-entrance cars, and several of the new cars have been added to the cars operated regularly on the Mount Pleasant line.

Accident Prevention Campaign.—The Aurora, Elgin & Chicago Railroad, Chicago, Ill., will stop its Aurora cars on the near side of the street, equip all the city cars in Aurora with fenders, close the platforms of all cars while in motion and permit passengers to leave the cars only from the right side. E. C. Faber, vice-president and general manager of the company, has announced a safety-first campaign which will include lectures before the school children of Aurora and East Aurora and the distribution of accident-prevention maxims.

Service Over Lulu Island Line.—The British Columbia Electric Railway, Vancouver, B. C., has established service over its new track on the Lulu Island line between Vancouver and Eburne. This line is leased by the British Columbia Electric Railway from the Canadian Pacific Railway. As originally constructed the entire line was a single track, but owing to the rapid development of the Point Grey district a double-track was constructed last year from Vancouver to Eburne. A fifteen-minute service is in force during the rush hours between Vancouver and Eburne.

New Police Traffic Rules in Indianapolis.—The Board of Public Safety of Indianapolis, Ind., at a special meeting on Jan. 24, 1913, issued an order that the traffic squad for seven days stop every driver or pedestrian violating any traffic rule and inform him of his fault, and set Feb. 1 as the date on which arrests would be begun for violations of traffic regulations. Orders were issued to Superintendent of Police Hyland to give especial attention to the provision of the city ordinances requiring all vehicles to pass no less than 6 ft. distant from a street car receiving or discharging passengers, or to stop where this is impossible.

Ventilating Buffalo's Near-Side Cars.—E. G. Connette, president of the International Railway, Buffalo, N. Y., has explained for the benefit of the traveling public of that city in an extended newspaper article the method of ventilating the near-side cars which the company has in service. He said that air-velocity tests made recently in some of the Buffalo near-side cars show that between 300 and 600 cu. ft. of air per person per hour passes through the cars. He also explained in detail the features of the near-side cars. Referring to the development plans of the company, Mr. Connette said that it was proposed to spend $2,000,000 in improvements during 1913.

Increase in Wages by Philadelphia & Western Railway.—The Philadelphia & Western Railway, Upper Darby, Pa., has announced an advance in the wages of motormen and conductors, effective on March 1, 1913. Under the present scale men in the service less than six months are paid 21 cents; those employed between six months and a year, 22 cents. Under the new scale all first-year men will receive 22 cents. The old scale for second, third and fourth year men, who are paid respectively 23, 24 and 25 cents, remains unchanged, but a new rate of 26 cents is fixed for the fifth and subsequent years, the present advancing scale stopping with the fourth-year rate as a maximum.

Ordinance to Reduce Fare in Omaha.—An ordinance has been introduced in the Council of Omaha to reduce the fare of the Omaha & Council Bluffs Street Railway from 5 cents to seven tickets for 25 cents, or 3.57 cents each. G. W. Wattles, president of the company, in opposing the ordinance, said that at the present time the company, after meeting all operating expenses, making proper allowance for depreciation and paying taxes and fixed charges, used 4.46 cents of each fare collected, thus leaving but a small balance for dividends. A fare of 3.57 cents would not only wipe out all dividends but leave operation at a loss. He made comparisons with other cities where there is a fare of less than 5 cents.

Increase in Wages by Lehigh Valley Transit Company.—The Lehigh Valley Transit Company, Allentown, Pa., has announced an increase in the wages of motormen and conductors on all divisions effective on March 1, 1913. Men in the first year's service are to be advanced from 21 cents to 22 cents per hour, second-year men from 22 cents to 23 cents, third-year men from 23 cents to 24 cents, fourth-year men from 24 cents to 25 cents, while a new rate of 26 cents is established for the fifth and subsequent years of service. The posted notice of the increases is signed by R. P. Stevens, president, who states that the higher scale is a recognition of the co-operation of the men. Mr. Stevens refers to the excellent results of the past year in increased receipts, decreased accidents and the absence of labor trouble and extraordinary expense.

Suits to Force Transfer Privilege.—Arguments are being heard in the mandamus proceedings brought by the villages of Oak Park, Maywood and River Forest to compel the Chicago Railways to issue transfers good on the lines of the County Traction Company and vice versa. As the city of Chicago has an interest in the earnings of the Chicago Railways Company it also is made a defendant in the case. The villages named are suburbs of Chicago lying west and northwest of the Loop district. At the present time the rate of fare to villagers desiring to reach the Loop district is 10 cents. The surface railways made parties to the suit are independent of each other and are operated by entirely separate organizations. The petitioners in the proceedings allege that the two companies have a common ownership and that the Chicago Railways Company in particular is bound by franchises which were given to its predecessor, the Union Traction Company, to arrange for the payment of a 5-cent fare between Chicago and the villages in question.

Personal Mention

Mr. Devoe P. Hodson, a former city judge of Buffalo, has been nominated by Governor Sulzer to succeed Mr. John B. Olmsted as a member of the Public Service Commission of the Second District of New York.

Mr. John C. Thompson, the retiring superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J., had a reception tendered to him on Jan. 31, 1913, by the employees of the company. A purse of gold was presented to Mr. Thompson by the men as a token of their esteem.

Mr. W. M. Kavanaugh, president of the Little Rock Railway & Electric Company, Little Rock, Ark., was chosen United States Senator from Arkansas on Jan. 28, 1913, to serve until March 4. Mr. Kavanaugh is a Democrat and has many business and financial interests. He is president of the Southern Baseball League.

Mr. Clarence S. Pinkerton has been appointed street railway inspector of Cincinnati, Ohio. He will act under Service Director Price and City Solicitor Bettman of that city. The department of street railway inspection was maintained under former Mayor Schwab, but was abolished by Mayor Hunt, the present incumbent.

Mr. Thomas K. Bell has resigned as general manager of the St. Petersburg Light & Power Company and the St. Petersburg & Gulf Railway, St. Petersburg, Fla. Mr. Bell was for many years engineer of William Wharton, Jr., & Company, Inc., Philadelphia, Pa., and was also connected with the Interstate Railways, Philadelphia, and the Philadelphia Rapid Transit Company.

Mr. Miles Bronson has been appointed general superintendent of the electric zone of the New York Central & Hudson River Railroad and of the Grand Central Terminal, New York, to succeed Mr. A. R. Whaley, who was recently elected vice-president of the New York, New Haven & Hartford Railroad. Mr. Bronson is thirty-seven years old and has been in the employ of the New York Central & Hudson River Railroad fourteen years.

Mr. G. H. Caffrey, formerly superintendent of the Norwalk (Conn.) district of the United Electric Light & Water Company, has accepted the position of engineer of the Havana Railways & Light Company, Havana, Cuba. Mr. Caffrey is a graduate of the Stevens Institute of Technology and was connected with the engineering department of the New York Central & Hudson River Railroad before going to Norwalk.

Mr. W. E. Higgins has been appointed acting vice-president and general manager of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., to succeed Mr. Charles F. Conn, resigned, who, as previously noted in the ELECTRIC RAILWAY JOURNAL, has been elected president and general manager of the American Cement Company, Philadelphia, Pa. Mr. Higgins was formerly assistant to the general manager of the Lackawanna & Wyoming Valley Railroad.

Mr. Olaf A. Mann has been appointed auditor of the Ithaca (N. Y.) Street Railway and the New York, Auburn & Lansing Railroad, to succeed Mr. Allan Gordon Armstrong, whose appointment as general auditor of the General Gas & Electric Company, New York, N. Y., is referred to elsewhere in this column. Mr. Mann was formerly connected with the accounting department of the New York (N. Y.) Railways, the successor to the Metropolitan Street Railway. He will take up his duties at Ithaca on Feb. 15, 1913.

Mr. George O. Nagle, who has been general manager of the Wheeling (W. Va.) Traction Company since 1904, has been elected second vice-president of the company in addition to general manager. Before becoming connected with the Wheeling Traction Company, Mr. Nagle was with Stone & Webster, with headquarters at the main office of the company in Boston. Previous to that he was manager for several years of the Savannah (Ga.) Electric Company, which is controlled by Stone & Webster. Mr. Nagle was also connected with the surface railway systems of Chicago for a number of years.

Mr. Allan Gordon Armstrong has resigned as auditor of the New York, Auburn & Lansing Railroad and the Ithaca (N. Y.) Street Railway to become general auditor of the General Gas & Electric Company, New York, N. Y. Before accepting the position with the companies at Ithaca Mr. Armstrong was connected with the accounting and auditing departments of the New York Railways, the successor to the Metropolitan Street Railway, New York. He was previously for nine years with the Norfolk & Portsmouth Traction Company, formerly the Norfolk Railway & Light Company, which is now merged with the Virginia Railway & Power Company. His resignation from the companies at Ithaca becomes effective on Feb. 15, 1913.

H. W. Irwin

Mr. Howard W. Irwin has been appointed assistant superintendent of equipment for the Bay State Street Railway, Boston, Mass., which operates nearly 1000 miles of track in Massachusetts, Rhode Island and southern New Hampshire, extending from Boston to Newport and Nashua and comprising the trackage formerly operated by the Boston & Northern Street Railway and the Old Colony Street Railway. Mr. Irwin is a native of Brattleboro, Vt. His primary education was had in the public schools of Natick, Mass. Later he attended Amherst College and was graduated in the mechanical engineering course at Purdue University in 1903. His first connection with the street railway industry was as a conductor on the Northampton Street Railway during vacation and holiday periods. Following his course at Purdue, he entered the testing department of the General Electric Company at Schenectady, N. Y., and for about three years was at the head of the steam-turbine testing division. Later he served for a year as assistant superintendent of power for the Schenectady works. He then became general manager of the Northern Electric Company and affiliated central-station properties, Fargo, N. D. In 1909 he became superintendent of instruction of car service employees for the Boston & Northern Street Railway and the Old Colony Street Railway. In handling this work he was in charge of the design of the unusually complete instruction cars built for service on this system and fully described in this paper when they were placed in service. For the past year Mr. Irwin has been acting as assistant to Mr. E. W. Holst, superintendent of equipment of the Bay State Lines, and his appointment formally confirms his title and jurisdiction.

Mr. T. P. Artaud has been appointed assistant general manager of the Hudson & Manhattan Railroad, New York, N. Y., to succeed Mr. O. T. Boyd, resigned, and will report to Mr. Wilbur C. Fisk, the vice-president and general manager. Mr. Artaud was born in Jackson, Miss. He was graduated from Rock Hill College, at Ellicott, Md., and studied at Johns Hopkins, Harvard and Columbia. He is a mechanical and electrical engineer. His first work was in connection with the electrification of the Cary Street line in Baltimore, Md. Subsequently he served in the drafting office of the Maryland Steel Works. He became associated with the Hudson & Manhattan Railroad during the construction of the tunnel under the Hudson River between New York and New Jersey and has served in practically all of the various departments of the company. Previous to his appointment as assistant general manager, Mr. Artaud was purchasing agent of the company. As assistant general manager he will have direct supervision over the operation of the line, the power house and terminals and will also act as supervisor of purchases. He is an associate member of the American Society of Mechanical Engineers.

Mr. Thomas K. Glenn, who resigned as vice-president and general manager of the Georgia Railway & Electric Company, Atlanta, Ga., in January, 1908, to become president of the Atlanta Steel Hoop Company, has been elected third vice-president of the Georgia Railway & Power Company, the successor to the Georgia Railway & Electric

Company. Mr. Glenn has been a director of the company. Mr. Glenn began his street railway career in Atlanta in 1891 with the Atlanta Consolidated Street Railroad and was connected with that company and its successors continuously until 1908. The position of third vice-president of the Georgia Railway & Power Company is a new one with the company.

Mr. O. T. Boyd has resigned as assistant general manager of the Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey. He became connected with the Hudson & Manhattan Railroad in June, 1909, as general passenger agent, and in January, 1912, was appointed assistant general manager. Before Mr. Boyd entered the service of the Hudson & Manhattan Railroad he was city passenger agent of the Pennsylvania Railroad in Washington, D. C., for three years. He served the Pennsylvania Railroad for twelve years in various capacities.

Mr. Edward E. McCall, justice of the Supreme Court of New York, was nominated by Governor Sulzer of New York on Feb. 3, 1913, to succeed Mr. William R. Willcox as chairman of the Public Service Commission of the First District of New York. The nomination was subsequently confirmed by the Senate. Justice McCall was born in Albany on Jan. 6, 1863. He was educated in the public schools of that city and was graduated from the Albany High School. He entered the New York University Law School and was graduated in 1884 with honors and as valedictorian of his class. He formed a partnership with Mr. William C. Arnold, but this was dissolved after several years and Mr. McCall continued to practise alone. He acted as personal counsel to his brother, the late John A. McCall, when the latter was president of the New York Life Insurance Company. He was subsequently nominated for the position of justice of the Supreme Court of the State of New York.

Mr. E. T. Munger, who since Jan. 1, 1909, has been general superintendent of the Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey, has resigned that office as a result of the financial reorganization of the company which is now under way. As head of the transportation department of the company Mr. Munger's principal duty was to carry out the public-be-pleased policy of Mr. William G. McAdoo, the president of the company, and in hiring men he paid especial attention to securing such help as would be courteous and attentive to the public. Mr. Munger personally engaged every transportation employee on the system, altogether about 1500 men. Before becoming connected with the Hudson & Manhattan Railroad Mr. Munger was superintendent of motive power and equipment of the Metropolitan West Side Elevated Railway, Chicago. He was graduated from the University of Wisconsin in 1892 and became connected with the Hall Signal Company as draftsman and construction foreman. In 1894 he entered the employ of the National Switch & Signal Company, but resigned a year later to become foreman of construction of the Metropolitan West Side Elevated Railway, in charge of wiring cars, stations and power houses. In 1898 Mr. Munger was appointed engineer of the Englewood & Chicago Railway in charge of the construction and installation of that company's storage battery surface line between Englewood and Blue Island. On the completion of the road he became general manager of the Havana Telephone & Electric Light Company, Havana, Ill., but re-entered the service of the Metropolitan West Side Elevated Railway in 1903 as master mechanic, and continued in that position until March 14, 1908, when he was appointed superintendent of motive power of the Metropolitan West Side Elevated Railway.

E. T. Munger

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Indianapolis & Cincinnati Electric Railroad, Indianapolis, Ind.**—Incorporated in Indiana in the interests of the Indianapolis & Cincinnati Traction Company. In explaining the purpose of the new company C. L. Henry, president of the Indianapolis & Cincinnati Traction Company, said the new company had been formed to extend the lines of the Indianapolis & Cincinnati Traction Company from Rushville to Cincinnati by way of Brookville, Ind., and Harrison, Ohio. The Indianapolis & Cincinnati Electric Railroad is capitalized at $10,000, and may be merged with the Cincinnati, Harrison & Indianapolis Traction Company, which is now in existence.

***Iowa Southern Railway, Des Moines, Ia.**—Incorporated in Iowa to build a 25-mile electric or steam railway from Albia to Centerville. Capital stock, $900,000. Incorporators: William Gardner, Richard Aishton, John Caldwell and Jonah Cleveland.

***Orleans-Kenner Electric Railway, New Orleans, La.**—Incorporated in Louisiana to build an electric railway between New Orleans, Kenner and Hanson City. Right-of-way is being obtained. A. Smith Bowman, New Orleans, president of the Bellevue Farms Company, is interested.

***Toledo Traction, Light & Power Company, Toledo, Ohio.**—This company has been incorporated in Maine with a capital stock of $17,200,000 presumably as the successor to the Toledo Railways & Light Company, the plan for the reorganization of which company has been published in the ELECTRIC RAILWAY JOURNAL.

FRANCHISES

Little Rock, Ark.—The Little Rock Railway & Electric Company, Little Rock, has asked the Council for a franchise to extend its lines to Biddle, a suburb of Little Rock.

Los Angeles, Cal.—The Los Angeles Railway will ask the Council for a franchise for an extension of its line on Sixteenth Street to the western city limits of Los Angeles.

Santa Ana, Cal.—The Pacific Electric Railway has asked the Council for a franchise for a line in Santa Ana.

Martinsville, Ill.—The Decatur, Sullivan & Mattoon Transit Company has received a franchise from the Council in Martinsville. This company has asked the Board of Trustees of Moweaqua for a franchise in Moweaqua. [E. R. J., Jan. 25, '13.]

Dubuque, Ia.—The Union Electric Company, Dubuque, has received a twenty-five-year franchise from the Council to extend its line up West Locust Street in Dubuque to West Dubuque.

Ashland, Ky.—The Councils of Ashland and Russell, Ky., and the fiscal courts of Boyd and Russell Counties are expected to take action in the near future in granting a franchise to the Ohio Valley Electric Railway, Ashland, for an interurban line, which will connect Ashland with Russell and thence run to Huntington, W. Va., where there is already a connection. The right-of-way is now being secured

***Donaldsonville, La.**—S. Wexler, New Orleans, has submitted plans to the City Council in which he offers to build a 16-mile electric railway between Donaldsonville, White Castle and Napoleonville if the Council will grant him a franchise in Donaldsonville.

Cortland, N. Y.—The Cortland County Traction Company has asked the Council for a franchise to extend its line along Railway Avenue west to Oswego Street in Cortland.

Granville, N. Y.—Thomas F. Haley, Granville, has received a franchise from the Council for an electric railway from Granville through North Granville.

Islip, N. Y.—The Suffolk Traction Company, Patchogue, has asked the Islip Town Board for a franchise to extend its line from Patchogue to Sayville. If the franchise is granted the company will use the tracks laid by the South Shore Traction Company about four years ago.

Youngstown, Ohio.—The Lake Erie & Youngstown Railroad has received a twenty-year franchise from the Council over Covington, Federal and Front Streets in Youngstown.

***Medford, Ore.**—The F. P. Minney Company, Oakland, has received a franchise from the Council in Medford. This is part of a plan to build an electric line through the Rogue River Valley. W. E. Beveridge, chief engineer.

Portland, Ore.—The Portland, Eugene & Eastern Railway has received a franchise from the City Council to electrify its line on Fourth Street, Portland.

Charleston, S. C.—The Charleston & Summerville Interurban Railway has received a six months' extension of time in which to begin the construction of its 20-mile line between Charleston and Summerville. J. L. David, president. [E. R. J., Oct., 19, '12.]

Chattanooga, Tenn.—The Chattanooga Railway & Light Company has received a thirty-eight-year franchise from the Council to extend its lines over certain streets in Chattanooga.

St. Elmo, Tenn.—The Lookout Mountain Railway has asked the Council for a franchise to build a line in St. Elmo. Joseph E. Brown is interested. [E. R. J., Nov. 2, '12.]

***Dallas, Tex.**—L. A. Stemmons, representing the Dallas & Oak Cliff Electric Railway, has asked the County Commissioners for a twenty-year franchise for a line from a junction on the line of the Northern Texas Traction Company's loop in Oak Cliff along Marlborough Avenue and Brooklyn Street into Sunset Hill at Oak Cliff Boulevard.

New Braunfels, Tex.—The San Antonio & Austin Interurban Railway, San Antonio, will ask the Council for a franchise in New Braunfels. The line will connect San Antonio, Austin, New Braunfels and San Marcos. H. G. Henne, New Braunfels, is interested. [E. R. J., Jan. 25, '13.]

Port Townsend, Wash.—W. B. Webb and associates have received a fifty-year franchise from the Council for a line in Port Townsend. [E. R. J., Jan. 25, '13.]

Vancouver, Wash.—The Northwestern Electric Company has received a franchise to build a line across the government grounds at Vancouver. The company has asked for a franchise in Portland. It is reported that the company plans to construct a line up White Salmon River Valley.

Point Marion, W. Va.—The West Penn Railway, Pittsburgh, has asked the Council for a franchise in Point Marion.

Point Marion, W. Va.—The West Virginia Traction & Electric Company, Wheeling, has asked the Council for a franchise in Point Marion.

TRACK AND ROADWAY

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has applied to the Railroad Commission for authority to issue $1,250,000 of bonds. It is proposed to use the proceeds in the construction of a line extending from Fresno easterly to Centerville and southeasterly to Kingsburg, 40 miles. The company has procured practically all of the needed rights-of-way and has completed the roadbed over most of the route. It has constructed culverts over all waterways.

Pacific Electric Railways, Los Angeles, Cal.—Extension of this company's lines into the districts of East Long Beach, including Belmont Heights and the Temple district, is being considered by this company.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Grading has been completed by this company on the last stretch of its line between Bays Point and Sacramento. Rails have been ordered and the ferry slips at Chipps Island and Mallard Island are nearing completion. The Yolo Basin trestle will be 13,000 ft. long, and 6000 ft. of this is already finished.

Crescent City Railway, Riverside, Cal.—Work has been begun by this company on the grading of the roadbed for the extension of the Riverside-Bloomington line to Rialto. Oscar Ford, Rialto, has been awarded the contract for the construction of the line.

Sacramento Valley West Side Electric Railway, Willows, Cal.—This company will soon award contracts to build its line between Red Bluff, Davis and Dixon, connecting at Dixon with the Oakland, Antioch & Eastern Railway. C. L. Donohue, Willows, president. [E. R. J., Nov. 2, '12.]

***Miami, Fla.**—The Ocean Beach Realty Company, of which Joseph A. MacDonald is president, plans to build an electric railway from Homestead or Detroit to Palm Beach. At Miami a steel and concrete bridge is to span the bay at a point just north of First Street, landing on the peninsula at the north end of the holdings of the Ocean Beach Realty Company. The bridge will be 3 miles in length. The company will soon ask the Council for a franchise to build its line over certain streets in Miami.

Georgia Railway & Electric Company, Atlanta, Ga.—This company has been asked to consider plans to extend its Highland Avenue line in Atlanta for 1 mile beyond its present limits.

Rome Railway & Light Company, Rome, Ga.—This company plans to build two extensions, one 1½ miles and the other 3 to 4 miles, to East Rome in the spring.

Americus, Tifton & Atlantic Railway, Tifton, Ga.—Right-of-way has been obtained, surveys completed and construction will be begun soon by this company on its line from Americus to Milltown, via Oakfield, Doles, Ashburn, Tifton and Nashville, I. W. Myers, Tifton, president. [E. R. J., Jan. 4, '13.]

Waycross Street & Suburban Railway, Waycross, Ga.—Work has been begun by this company on its extension along Albany Avenue in Waycross.

Tri-City Railway, Davenport, Ill.—Double track will be laid by this company on Third Avenue between Fifteenth and Twentieth Streets in Rock Island.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—Elections will be held in Richland, Noble and Rushville Townships, Rush County, to vote on a proposition of a tax of 20 cents on $100 in aid of the extension of this company's line through Rush County.

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.—Extensive improvements, which are planned by this company, include addition of one-third to the present trackage, new and heavier rails on old tracks and laying of new tracks on two of the old lines. The improvements involve the construction of 6½ miles of new track, in addition to the reconstruction of some of the old lines, making a total of 8½ miles.

Kentucky Utilities Company, Lexington, Ky.—This company plans to construct a line through Bath and Montgomery Counties in Kentucky, leading out of Sharpsburg.

Louisville & Interurban Railway, Louisville, Ky.—This company has been asked to consider plans to extend its line east and northeast along the Brownsboro Road out of Louisville.

Louisville (Ky.) Railway.—Work has been begun by this company double-tracking a 2-mile stretch of its line south on Third Avenue to Iroquois Park between Meadow Brook station and the park, affording through double-tracking to the southern terminal.

Louisiana Traction & Power Company, Lafayette, La.—Preliminary surveys have been completed by this company from Lafayette to Jennings. This line will connect Lafayette, Morgan City, Alexandria and Abbeville. J. A. Landry, Lake Charles, president. [E. R. J., Feb. 1, '13.]

Twin City Rapid Transit Company, Minneapolis, Minn.—An extension along Xerxes Avenue in the Lake Harriet district, Minneapolis, will soon be built by this company.

Meridian Light & Railway Company, Meridian, Miss.—Work will be begun at once by this company on the extension of its Eighth Street line in Meridian to Oakland Heights from Fortieth Avenue and Paulding Street.

***Bonner Springs, Mo.**—Surveys are being made to build an electric railway from Kansas City to Bonner Springs, via Kaw Valley. J. D. Waters, Bonner Springs, is said to be interested.

Newbern-Ghent Street Railway, Newbern, N. C.—Plans are being considered by this company to extend its lines to Pollocksville or Trenton.

Cincinnati (Ohio) Traction Company.—Plans are being considered by this company for an extension to Bond Hill.

Nipissing Central Railway, Cobalt, Ont.—This company has been asked to consider plans for an extension from New Liskeard, the present terminal, to North Temiskaming.

Niagara Falls, Welland & Lake Erie Railway, Niagara Falls, Ont.—Work will be begun in the spring by this company on its line between Fort Erie and Fort Colborne. The plans call for the erection of a bridge at Fort Erie for a connection with the lines of the International Railway at Buffalo. Thomas R. Cummings, chief engineer.

Humber Valley Railway, Toronto, Ont.—This company has applied to the Ontario Legislature for approval of its plans to build a double-track electric railway through the Humber Valley from Lambton to the mouth of the Humber River and along the shore to Sunnyside. This line will be built by Home Smith and the Toronto Land Corporation.

Toronto & York Radial Railway, Toronto, Ont.—This company will apply to the Legislature for the right to enter into an agreement with the city of Toronto for the double tracking of Yonge Street from the southern terminus of the railway to York Mills. It is also proposed to apply for the right to construct lines west to connect with the Mimico division and east to connect with the Scarboro division. The company in addition wants its authorized bond issue increased from $20,000 to $30,000 a mile.

Erie (Pa.) Traction Company.—Plans are being considered by this company to build an extension to Corry.

Pottsville Union Traction Company, Pottsville, Pa.—This company, which is operated by the Eastern Pennsylvania Railways Company, plans to extend its line from Pottsville to Shenandoah over the summit of Broad Mountain.

Reading (Pa.) Transit Company.—Surveys are being made by this company to extend its line between Myerstown and Womelsdorf, a distance of 8 miles.

***Chambersburg & Shippensburg Railway, Shippensburg, Pa.**—This company has been organized in Pennsylvania to build an electric railway between Red Bridge Park and Shippensburg. It will be necessary to build only from Red Bridge Park. There it will join the Chambersburg, Greencastle & Waynesburg Railway tracks and use them to Memorial Square, Chambersburg, under a lease. The power plant of the company will be located at Red Bridge Farm. Capital stock, $250,000. Officers: T. M. Mahon, president; William H. Fisher, vice-president; C. P. Miller, treasurer; J. G. Schaff, secretary, and J. A. Strite, solicitor.

Warren (Pa.) Street Railway.—Announcement is made by this company that it will extend its lines 9 miles to Youngstown in the spring.

***Bristol, Tenn.**—James B. Cox, Knoxville, and associates are considering plans to build an electric railway between Bristol and Johnson City, via Austin Springs. Right-of-way is being secured.

Memphis (Tenn.) Street Railway.—This company is reported to have ordered 500 tons of rails from the Pennsylvania Steel Company. The company has announced that it will begin the construction of two extensions in the immediate future, one from the present Central Avenue terminus to Cooper Street and the other from Florida Street on Trigg Avenue to Riverside Park.

El Paso (Tex.) Electric Railway.—Grading on this company's line from El Paso to Fabens, 30 miles down the El Paso Valley, will be begun by the Stone & Webster Engineering Corporation at once. The grading contract has been awarded to the Dudley & Orr Company.

Northern Texas Traction Company, Fort Worth, Tex.—During the next month this company plans to begin work double-tracking the Fort Worth-Dallas line between Fort Worth and Handley. The company also expects to extend its double track from Boundary, Oak Cliff, to Westmoreland, a distance of 2 miles.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—Prelimnary surveys are being made by this company on its 80-mile interurban railway between Austin and San Antonio. The following officers have been elected: Vories P. Brown, president; W. B. Tuttle, San Antonio, vice-president; Jesse D. Oppenheimer, treasurer, and S. C. Bell, secretary. [E. R. J., Jan. 25, '13.]

San Antonio, Fredericksburg & Northern Railroad, San Antonio, Tex.—Preliminary arrangements are being made by this company to build its 25-mile line from Fredericksburg to a connection with the San Antonio & Aransas Pass Railway, 4 miles north of Waring, Tex. The headquarters of this company are at the Gunter Building, San Antonio. R. A. Love, president. [E. R. J., Jan. 11, '13.]

San Antono (Tex.) Traction Company.—Plans are being made by this company to double-track and extend some of its lines in San Antonio.

Texas City (Tex.) Street Railway.—Rails are being laid by this company at Tenth Street and Ninth Avenue in Texas City. At this point the line connects with the Texas City Terminal Company's tracks. The main line of this company will run from the waterfront at the docks west to Sixth Street to Eighteenth Avenue, Texas City. Thomas J. Davies, president. [E. R. J., Dec. 21, '12.]

SHOPS AND BUILDINGS.

British Columbia Electric Railway, Vancouver, B. C.—This company has purchased the Pythian Castle Hall on Douglass Street and Pandora Avenue in Victoria, and will reconstruct it to be used for an office building and suburban depot for the Saanich line. The company plans to build new carhouses between Bay Street and Haultain Street in Victoria. The cost is estimated to be about $50,000.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—This company has purchased property in Fairland on which it will soon build a new passenger station.

Des Moines (Ia.) City Railway.—During the summer this company plans to build new carhouses in Des Moines. The site has not yet been selected.

Interborough Rapid Transit Company, New York, N. Y.—This company has been ordered by the Public Service Commission to build a new elevated station at Thirty-eighth Street and Sixth Avenue in New York City.

Portland Railway, Light & Power Company, Portland, Ore.—With the completion of this company's new carhouses and repair shops at Rhone, Mall and East Seventeenth Streets, Portland, the company's old shops at Twenty-third, Milwaukee and Clay Streets have been abandoned and all the work is now being handled from the one central plant.

Greenville, Spartanburg & Anderson Railway, Anderson, S. C.—This company has awarded the contract to the Wilkeson-Moffett Construction Company, Durham, N. C., for the construction of its new machine shops and carhouses in Greenville. The carhouse will be 65 ft. x 200 ft. and the repair shops 65 ft. x 125 ft. Both structures are to be constructed of white brick, one story high, with steel roofs.

Texas City (Tex.) Street Railway.—This company will build its new carhouses at the corner of Ninth Street and Tenth Avenue in Texas City. R. M. Orth, general manager.

POWER HOUSES AND SUBSTATIONS

Bay State Street Railway, Boston, Mass.—An addition will be built by this company to its plant on Middlesex Street, Lowell. The structure will be 35 ft. x 95 ft. and one story high. The cost is estimated to be about $10,000.

Twin City Rapid Transit Company, Minneapolis, Minn.—Nearly $2,000,000 for improvements was included in the budget agreed upon by this company at a recent meeting of the directors. Among the improvements scheduled is a new 15,000-kw unit at the steam power station and a transformer station.

Morris County Traction Company, Morristown, N. J.—Plans are being considered by this company to build a new central station.

Montreal (Que.) Tramways.—This company plans to add to its equipment at its station on William Street a 2000-kva synchronous motor, with a 1500-kw, 600-volt direct-connected generator. The Canadian Westinghouse Company will supply the machines. The Montreal Tramways will also install a 15-ton monorail hoist, supplied by John Millen & Son, Ltd., Montreal, for handling the machinery.

Manufactures and Supplies

ROLLING STOCK

United Railroads, San Francisco, Cal., expects to purchase fifty cars of the California type during 1913.

Easton (Pa.) Transit Company has ordered three semi-convertible pay-within cars from The J. G. Brill Company.

Toledo Railways & Light Company, Toledo, Ohio, expects to purchase twenty prepayment cars and build an additional twenty cars of the same type in its own shops.

Spartanburg Railway, Gas & Electric Company, Spartanburg, S. C., has ordered from the American Car Company five 20-ft. 8-in. closed cars mounted on Brill 21-E trucks.

New England Investment & Securities Company, Springfield, Mass., is reported to have ordered ten 35-ft. cars from the Wason Manufacturing Company for operation between Springfield and Worcester.

Great Northern Railway, St. Paul, Minn., has ordered two 70-ft. gas-electric motor cars from the General Electric Company. They will be placed on branch line service between Rockport and Anacortes, Wash.

Minneapolis, St. Paul, Rochester & Dubuque Traction Company, Minneapolis, Minn., will place in service on its line between Minneapolis and Northfield two more gas-electric motor cars which were ordered from the General Electric Company. These new cars will be of the 70-ft. type and will make a total of ten similar self-propelled gas-electric units now in operation on this line. A gas-electric locomotive has also been ordered for light freight and passenger work, and an order has been received from the same company to equip a Strang gas-electric car with General Electric apparatus.

TRADE NOTES

Western Electric Company, New York, N. Y., has elected Gerard Swope, general sales manager, and Albert L. Salt, general purchasing agent, vice-presidents of the company.

Simplex Electric Company, Boston, Mass., has changed its name to the Simplex Wire & Cable Company. The change of name involves no change in the management or interests of the company.

Weir Frog Company, Cincinnati, Ohio, has appointed M. J. Madison superintendent of its plant at Cincinnati. Mr. Madison was formerly assistant superintendent of the Morden Frog & Crossing Company.

Sanderson & Porter, New York, N. Y., announce that Richard S. Buck has retired from the firm and has become chief engineer of the Dominion Bridge Company, Canada. Seton Porter has been admitted as a member of the firm of Sanderson & Porter.

Ohio Brass Company, Mansfield, Ohio, has recently secured the exclusive sales rights for the National railroad trolley guard, which is a patented device for preventing electric cars from becoming stalled on steam road crossings when the trolley wheel leaves the wire.

H. W. Johns-Manville Company, New York, N. Y., has appointed C. L. Wheeler its traveling representative in the Atlanta territory. Mr. Wheeler is an electrical engineer of practical experience and formerly covered the Southern States for various large electrical and jobbing concerns. He will devote his attention to the electrical products of the company.

Allis-Chalmers Company's properties at Milwaukee and West Allis were sold on Feb. 3 by Jerry W. Hazelton, special master, to J. H. McClement, of New York, chairman of the reorganization committee, for $2,500,000. Mr. McClement's bid was the only one made. Otto H. Falk and Daniel W. Call have been acting in the capacity of receivers of the company since May 28, 1912.

John Hoffhine, for nine years assistant chemist on the Union Pacific Railroad at Omaha, has become connected with the American Brake Shoe & Foundry Company, with headquarters at 30 Church Street, New York, N. Y., effective Feb. 1. Mr. Hoffhine entered the testing department of the Union Pacific Railroad at Omaha in 1904, where he soon advanced to the position of assistant chemist. He conducted exhaustive tests and analyses of the associated line steel rails, and under the direction of W. R. McKeen, Jr., former superintendent motive power and machinery, Mr. Hoffhine had charge of the material testing and research work in connection with the Harriman lines' standardization of passenger cars, freight cars and locomotives.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received the following orders for railway motors: St. Petersburg Investment Company, St. Petersburg, Fla., one double equipment of No. 306 motors and K-36-J control; Georgia Railway & Power Company, Atlanta, Ga., twenty-five double equipments of No. 306 motors and K-35-G control and seven double equipments of No. 306 motors and HL control; Oakland, Antioch & Eastern Railway, San Francisco, Cal., one 600-1200-volt, quadruple equipment of No. 322-E motor and HL control; Jewett Car Company, Newark, Ohio, two quadruple equipments of No. 101 B-2 motors and K-28-B control for use on the cars which this company is building for the Richmond & Rappahannock River Railway, Richmond, Va.

ADVERTISING LITERATURE

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has printed in booklet form a new carbon-titanium specification for rails.

Ohio Brass Company, Mansfield, Ohio, has issued a folder which discusses some of the advantages of the O-B electric car signal system.

Indianapolis Brass Company, Indianapolis, Ind., has issued a circular which briefly describes and illustrates several of its products, including I. B. C. trolley frog, motormen's glass, Samson splicers and the I. B. C. pole sleeve.

W. N. Matthews & Brother, St. Louis, Mo., have issued a folder which calls attention to the Matthews guy anchor. Other folders issued by the company describe Matthews easy lamp changers and Matthews Giant boltless guy clamps.

Sterling-Meaker Company, Newark, N. J., has issued a twenty-four-page catalog which fully describes and illustrates the Giant brake. This brake is made in two forms, equipment A and equipment B. Either of these equipments is furnished with 18-42 or 14-46 gear ratio. The same box houses either ratio, thus facilitating change from one to the other.

R. D. Wood & Company, Philadelphia, Pa., have issued a 160-page catalog on gas producers and producer gas power plants. Besides illustrating and describing the company's apparatus, the publication contains much valuable information regarding producer gas when used for power or furnace work. Some abstracts from W. J. Taylor's paper, "Energy of Fuel, Solid, Liquid or Gaseous," are also included in the catalog.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued a twenty-eight-page catalog on "Ball Bearings on Machine Tools." The publication describes the difference between Hess-Bright ball bearings and the early adjustable types and fully explains the reasons for the durability of H-B bearings. A folder issued by the company contains the results of power tests of Hess-Bright ball-bearing hangers made in two representative plants.

C. W. Hunt Company, West New Brighton, N. Y., has printed a sixty-four-page catalog which describes the various arrangements of Hunt conveyors that have been designed and installed by the company. It also contains a general description and illustrates the mechanical construction of Hunt conveying apparatus. More than half of the publication is devoted to illustrations of various installations, together with such brief notes as the peculiarities of the plant suggest.

Union Switch & Signal Company, Swissvale, Pa., has issued Bulletin No. 61, which fully describes and illustrates the interurban automatic block signaling system which is installed on the Washington, Baltimore & Annapolis Electric Railroad, between Naval Academy Junction and Annapolis, Md. The signal installation comprises 13.2 miles of protected track, eight standard single-track blocks and one special block, seventeen semaphore signals and sixteen light signals. The longest block is 11,610 ft. and the shortest 5430 ft., an average of 8680 ft.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, FEBRUARY 15, 1913 No. 7

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

JAMES H. MCGRAW, President. C. E. WHITTLESEY, Secretary and Treas.

239 West 39th Street, New York.

CHICAGO OFFICE..............................1570 Old Colony Building
PHILADELPHIA OFFICE........................Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8000 *copies are printed.*

OPERATION OF A UNION BENEFIT PLAN

In the current issue of the *Motorman and Conductor* is given a report of the operation in 1912 of the death and disability benefit plan inaugurated in 1911 by the Amalgamated Association of Street and Electric Railway Employees. This is, therefore, the first complete year's experience with a system which promises benefits based on the length of membership in the association and varying from a minimum of $100 to a maximum of $800. The total amount paid out during the year to 247 beneficiaries was $114,950, which is perilously close to the income depended upon to carry the benefit scheme. This income, at the rate of $3.12 per year (26 cents a month) from 37,000 members, amounted to $115,440, leaving a margin of less than $500 above the outgo. These figures hardly justify the confident statement made in presenting them that "they show an absolute assurance that the venture is secure from the remotest possibility of default." If the system has the effect its originators desire, namely, that of preventing members from dropping out of the union, this effect will just as surely show in larger benefits and fewer "non-beneficial deaths," which last year were 16.5 per cent of all the deaths that occurred among Amalgamated members.

PAY FOR RAILWAY MAIL SERVICE

A report of the hearing on railway mail pay before a committee of Congress, at which arguments for an increase in compensation were presented by a committee of the American Electric Railway Association, is published in this issue. It is of special importance because the request of the committee was presented directly to a committee on which members of both houses of Congress are represented, and because the arguments were supported by data showing the losses to individual companies under the prevailing rates. As the amounts appropriated for railway mail service are determined by Congress and the Post Office Department is not able, if it were willing to do so, to exceed the sums or rates allowed, the committee has done some educational work which is a real service to the industry. The value of such analyses of accounts as were submitted to the committee lies not only in the opportunity for educational work with public authorities but also in the lessons they give to railway managers concerning the actual results of operations. It is true that the mail service is in the nature of a by-product of urban railway operation, but it is not true that it is a by-product in the same sense in which that term is applied in industrial enterprises. It is said that the Chicago packers can afford to conduct the business of slaughtering animals and marketing meats for little or no margin of profit because the profits from by-products are compensation enough for the risk and investment, but the electric railway industry generally in its present state needs such profits as it gains from the regular business of carrying passengers as well as from all of the by-product sources of revenue that are developed. More than one railway manager is deluding himself with the theory that some service which is of the by-product type is furnishing a profit to the company when an analysis like the one made by Mr. Neal of Boston would show that he is actually providing it at a loss.

THE CO-OPERATIVE STORE MOVEMENT

The co-operative store form of welfare work, which is being taken up by the Interborough Rapid Transit Company of New York, the Philadelphia Rapid Transit Company and The Milwaukee Electric Railway & Light Company is a practical means of aiding employees which is well worth a thorough, conscientious trial. Owing to the large proportion of trainmen who leave the service voluntarily or are discharged within a few months from the time of their employment, and to the resultant small proportion of long-service men, some of the customary forms of welfare work do not help the great body of employees. The promise of a pension in old age, for instance, does not appear to a young man in the same advantageous light as a saving in the daily or weekly grocer's bill which a well-managed co-operative store ought to show. Any opposition to a co-operative store movement that might arise from representatives of the men is clearly not in the interest of the men if the store offers goods at prices below those obtainable by the employees elsewhere, and if the store does not quote such prices there is every reason why it should be abolished. If opposition developed from merchants who found their business reduced because trainmen transferred their trade it would be an unfortunate circumstance, but it is, after all, the duty of the railway company to improve and strengthen its own organization and, if a co-operative store is a means to that end, it is amply justified. In the report presented at the recent annual meeting of the National Civic Federation in New York the welfare department of that organization says that it "is not able to point to any co-operative plan in this country which has been a marked success," and adds that the plan does not seem to fit American customs as the great co-operative stores in England do in helping to meet the low-wage conditions there. The establishment of successful co-operative stores, therefore, will be an accomplishment of no small dimensions. If the electric railways are able to carry into effect what they are considering, they will reduce the cost of living for every employee and his family in such a way that the benefits will be plain from day to day.

PLANNING SHOP PRODUCTION

The pursuit of higher efficiency in the mechanical department of a modern street railway system depends for success upon many factors, but of these none is of greater importance than intelligent planning of work to be handled on a broad scale. In a typical instance 500 trucks were to be overhauled during one season of 120 working days. The magnitude of the task justified the careful preliminary study of methods of working, order of processes and disposition of men and materials, and the success of the program was unquestionably due in large manner to the systematic anticipation of every emergency. The capacity of the shops was limited, although no restriction was placed upon the number of necessary workmen who could be put upon the truck job. The general scheme adopted was to allow only two types of trucks to come into the shop during a given period. Two or three weeks in advance of the appearance of each type of truck, the shop notified the foremen of carhouses in various localities on the system as to the number and type of trucks required thus far ahead of the shopping date, so that the carhouse foremen had ample time to have the desired trucks ready for movement to the shop in due season.

The passing of trucks through the shop was also planned on the basis of a regular schedule. The general order was followed of running the truck into the building upon a single track, having it knocked down by two men who performed no other service and remained in a fixed position, and the subsequent movement to other departments of the trucks, which were handled by workmen in twos who specialized in every instance in one class of operations. Each truck passed six pairs of workmen on its way through the shop without doubling in its course, and in all cases the successive pairs remained in place, the work being passed from position to position in straightforward fashion. The success of the scheme depended, of course, upon trucks being in the shop yard in specified quantities and at stated times. Thus, a schedule of fifteen trucks per week of a certain type demanded an actual delivery of three trucks per day and not an average of three per day for the period. In this way not a moment was lost in securing a new truck to knock down, and the equipment moved uniformly through the shop from crew to crew. By putting the trucks through in this way it was found that they could be handled at less cost than on any other basis, for the reason that expenses are reduced when workmen have materials and tools on hand and work ahead to keep their full time occupied in specialized activity. Other advantages were a reduction in fatigue due to specialization and a continuous supply of work, since lost motion in starting and stopping jobs was practically eliminated. Of course, the treatment of this problem was along well-known lines of industrial production, but in some railway shops the irregularities of the demands upon the force and equipment have tended to obscure the possibilities of such careful planning.

POWER CONTRACT FOR A TRUNK-LINE ELECTRIFICATION

We publish this week a brief account of the very interesting contract entered into between the Great Falls Power Company and the Chicago, Milwaukee & Puget Sound Railway for the electrification of part of the latter system. This contract has been more or less in the public eye on account of the difficulties of making suitable arrangements with the federal government for crossing the public domain. This difficulty having been settled, the contracting parties were free to go ahead, as the agreement with the government has insured a fifty-year right-of-way. The contract goes to a final possible limit of no less than 25,000 kw, with various options for lesser amounts.

The interesting features of the contract have to do chiefly with the provision for suitable delivery of the power and the price therefor. The railway company will receive the energy purchased on the high-tension line at either 50,000 volts or 100,000 volts, three-phase, 60 cycles, and will make its own provision for the transformation of the energy into such form as it may desire. The supply company, therefore, merely has to deliver its high-tension current and consider nothing further regarding its distribution or further uses. The energy delivered will be measured by watt-hour meters and curve-drawing wattmeters, and it is specified in particular that the railway substations must contain sufficient synchronous machinery to give a power factor of at least 80 per cent leading or lagging. To insure the carrying out of this provision the power company has the right to install automatic regulators on such synchronous machinery so as to hold the power factor at any point it may desire between the limits of power factor just noted. In other words, although the power is purchased on the high-tension circuits and transformed and distributed wholly by the purchaser, the power company yet reserves the right to control the power factor within a range of 20 per cent either way from unity. This is a somewhat unusual but very wise provision, considering the purposes for which the energy is sold.

The rate at which this energy is purchased is on its face extraordinarily low, amounting to 5.36 mills per kw-hr. only. This is probably much the lowest figure at which a large block of power has ever been sold at the end of a high-tension transmission line. What few cases of lower figures there are have been for relatively small quantities and under extraordinary conditions. It is a most striking comment on the condition of electrical power transmission when it is possible to make presumably at reasonable profit so low a figure as this. A saving clause, from the standpoint of the supply company, is that the minimum bill is put at 60 per cent of the energy contracted for. This means that the railway company in order to secure its whole supply of power at the rate just quoted must take very good care of its operating conditions; else, owing to the minimum-bill provision, the cost per kilowatt-hour of power actually delivered might run materially above the basic price of the contract. It would not be at all surprising if it did thus run high in the actual working out of the scheme of electrification. It is absolutely certain that the railway company could not generate its own power at anywhere near the price quoted, which assuredly is a feature of much encouragement toward electrification projects in general aside from the fact that the steam railroad's investment for electrification is materially reduced in any event.

AN EXAMPLE OF GOOD PUBLICITY

At the midyear meeting of the American Electric Railway Association there was renewed discussion of publicity, without which no gathering of electric railway men would be complete. True, there was not a great deal of publicity in evidence, but there was much talk about it, just as there has been before and will continue to be until publicity becomes a fact instead of something that is merely approved of but not accomplished.

In the meantime we see here and there examples of sporadic publicity which are the best evidence of what can be done in the way of educating the public into the intricacies, difficulties, possibilities and accomplishments of electric railroading. In New York there has been of late considerable criticism of surface railway service. This service has been better than usual; the criticisms were merely a familiar symptom of the newspaper mania which is periodically manifested in a desire to "make it hot for the railway company." But this time the railway company has answered back.

In our issue of Dec. 7, 1912, there was printed one of the statements issued by the New York Railways Company, dealing with various subjects of public complaint. Another statement, over the signature of Frank Hedley, vice-president and general manager of the company, appears in the New York *Sun* of Feb. 9. It is admirable in tone and substance. Prefaced by the statement that "it is apparent that many factors in the situation which are so thoroughly well known to railroad men as to seem trite and commonplace are not altogether understood by the general public," Mr. Hedley proceeds to give some details of the difficulties of surface operation in New York streets that can hardly fail to make the reader wonder that the service is as good as it really is.

He shows, for example, that the five-minute delays caused by track obstruction amounted in six months to 37,295 minutes, or 621 hours. He explains how cars become bunched by hold-ups at heavily traveled crossings where the traffic policeman's word is a higher law than railway schedules. He gives a count that was made of the 130,000 pedestrians and the 7000 vehicles, besides the cars, that cross Thirty-fourth Street at Broadway and Sixth Avenue every twelve hours. The work of the street inspectors and emergency department in keeping cars moving and of the tally men in supplying data for readjustment of schedules is described in a way that must convince reasonable men that the railway is trying, and trying hard and intelligently, to give good service. Just as important is the proof this article affords that try as it may, there are certain inevitable inconveniences connected with operation on crowded city streets, and that it is foolish to blame the company for these unavoidable inconveniences.

This is good publicity. Kickers we shall always have with us, but they will grow fewer in the degree that railways make their problems, and what is being done to solve them, understood. This applies to larger problems as well as to those every-day annoyances that make so many enemies. And with the annoyances or inconveniences explained or accounted for there are always fewer enemies and less hostility to overcome when the larger problems of rates, financing and franchises come up before public bodies for their adjudication.

TRANSPORTATION AT THE PANAMA EXPOSITION

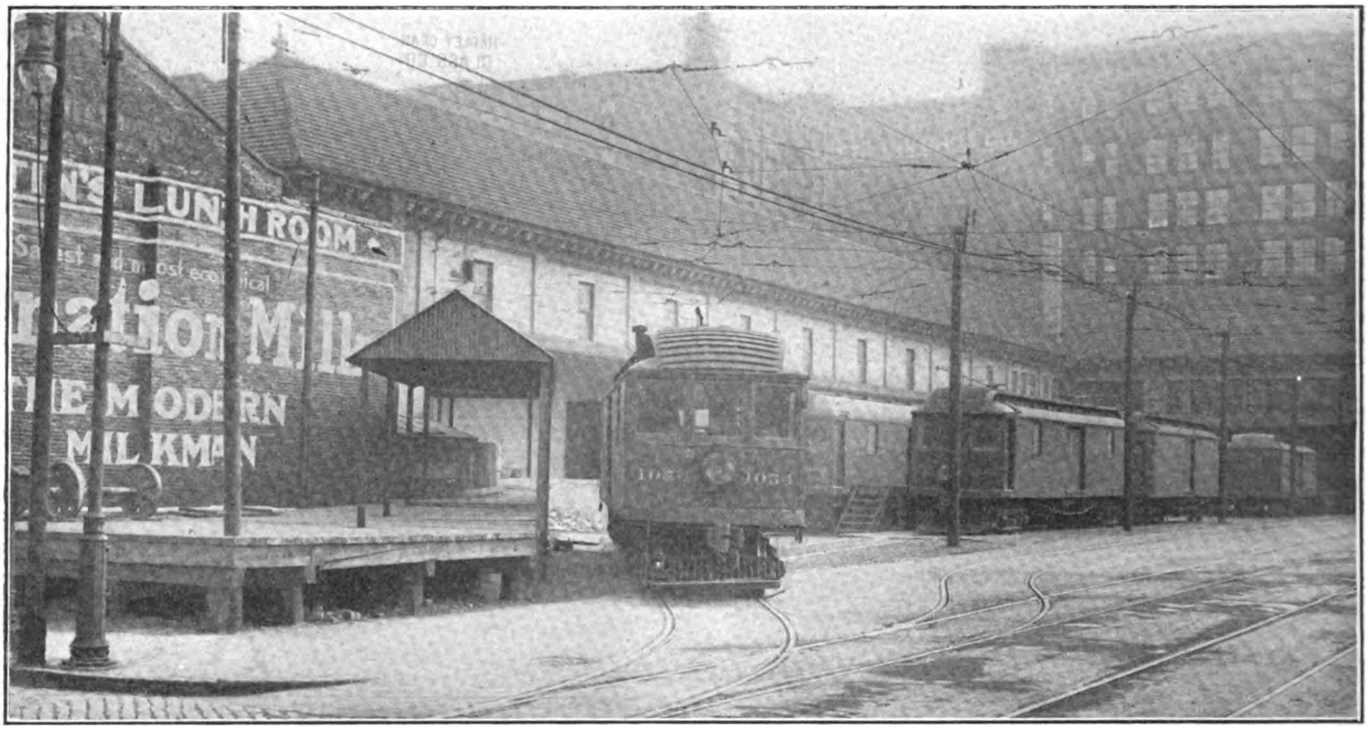
In discussing the New York subway muddle, in which politics seems to be as large a factor as ever, we took occasion to refer to the difficulties which a company or an individual is likely to encounter in carrying on any public work when business must be done with a municipality. A similar condition exists in San Francisco, and the causes seem largely the same, namely, the desire of some politicians to pose as the champions of the people by opposing any grant to build railway extensions except on prohibitive terms. But the conditions in the two cities are somewhat different because in San Francisco the need for definite action is accentuated by the near approach of the international exposition and the grounds selected for this event are almost without any transportation facilities from the city, certainly without any which would be at all adequate for the demands to be made upon them. Nevertheless, the city is unwilling to allow any extensions to be built by the local railway company except under a franchise revocable at any time. Upon such a permit the company has declared that it cannot borrow the money necessary to finance the enterprise.

It is possible to understand, now that the city has embarked upon a policy of municipal railway operation, why it might not like to grant a number of long-term franchises without some provision for their recapture at the end of a term of years. The company has recognized this condition and has offered to build under an indeterminate franchise by which the city could at any time obtain the property so built at its actual value. Some of the members of the Board of Supervisors approve this plan, while others think the city should force the company to build under the revocable-permit plan already mentioned. In the meantime the directors of the exposition are in despair over the likelihood that nothing will be done until it is too late to make adequate provision for transportation to and from the exposition grounds. The city took the proper step when it engaged an expert to report on the proposition. He recommended an arrangement with the company, but this advice was not palatable and was not adopted. Nevertheless, the time at which the fair is advertised to open will not wait while the municipal authorities back and fill, and unless some action is reached soon the exposition gates will have to be swung back for visitors before the connecting tracks can be properly built and placed in operation.

Illinois Traction System's St. Louis Express and Freight Traffic Methods

A Detailed Description of the Methods Employed in Stimulating and Handling a Large Express and Freight Business —The Article Also Describes Briefly the Terminal Facilities, Which Represent a Seven-Million-Dollar Investment

The acquisition and construction of terminal facilities involving an expenditure in excess of $7,000,000 by a steam railroad trunk line is not unusual, but for an electric railway system to undertake a project of this magnitude marks an epoch in the annals of this industry. Detailed descriptions of these different facilities—namely, the Venice power house, the McKinley Bridge, the St. Louis express terminal and others—were published from time to time in the Electric Railway Journal as the work progressed. The purpose of this article is to describe briefly these terminal facilities in relation one to the other, and to give a detailed account of the methods employed in stimulating and handling particularly the express and freight traffic wherein lies the financial success of a project of this size.



St. Louis Freight Terminal—View Showing Entrance to Freight House Tracks and Milk Platform

HISTORICAL FEATURES

The existing lines of the Illinois Traction System now total 460 miles. This system began in a modest way in 1901 with a 6-mile line built from Danville, Ill., to a mining suburb. Since that time extensions to the property have been made from year to year. These at the close of 1911 averaged 50 miles annually. In 1906, when the line between Springfield and St. Louis had been constructed as far south as Granite City, a suburban place on the Illinois side of the Mississippi River about 6 miles north of the St. Louis business district, considerable difficulty was experienced in obtaining an entrance into St. Louis. After negotiations were conducted for some time with the East St. Louis & Suburban Railway interests, a trackage agreement was reached whereby the Illinois Traction System could run its passenger trains to the east end of the Eads Bridge. At that time very little attention was paid to the general freight business, and it was confined almost wholly to less-than-carload traffic. After a short time, however, negotiations were entered into whereby a building was leased and remodeled in East St. Louis for freight traffic purposes.

This traffic developed very rapidly owing to energetic solicitation on the part of the traffic department until it was evident that maximum development lay only in a terminal station in St. Louis proper. At that time the East St. Louis merchants delivered their own shipments to the freight house, but St. Louis shippers had to depend upon a large transfer company with which the traction system had made a contract to reach the freight house. Team traffic across the Eads Bridge was extremely congested, and the grades in the approaches limited the truck tonnage. The additional expenses necessary to obtain business in this way as well as the serious delays experienced in team delivery did more than any other thing to bring about the present arrangement.

ACQUISITION OF ST. LOUIS TERMINALS

There were many obstacles in the way of obtaining desirable freight and passenger terminals in a strategic location in St. Louis. First, the cities of Granite City, Madison and Venice, which lay on the only available route to the proposed McKinley Bridge site, were large manufacturing districts, covered with a network of steam road industrial tracks. It was necessary to cross these, as well as a number of trunk lines leading to the approach of the Merchants' Bridge, which crosses the Mississippi River about three-quarters of a mile up the river from the site selected for the McKinley Bridge. The same difficulties had to be met on the St. Louis, or west, side of the Mississippi River as on the east. Here the approaches to the bridge cross several steam road main lines. Each of these roads raised every possible obstacle in the way of the traction company, as all believed it would infringe upon the prosperity of the St. Louis Terminal Association, of which they were members.

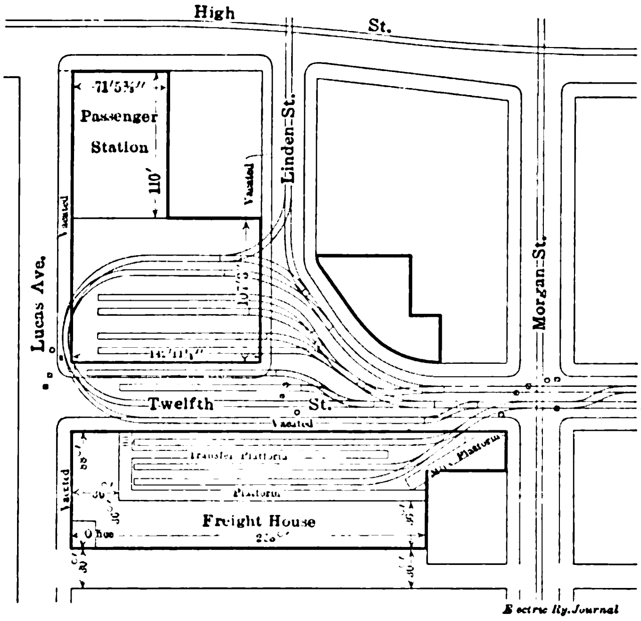
On the St. Louis side the objective point for terminal facilities was selected in a tentative way somewhere near Washington Avenue between Twelfth Street and the river. Very little difficulty was experienced with the St. Louis City Council in obtaining a street railway franchise, as the public was up in arms against the terminal association. This association had arbitrarily fixed rates across the river which made all commodities coming from the east higher in price in St. Louis than on the Illinois side of the river. These franchise rights were obtained over a portion of Ninth Street and Twelfth Street as far south as Lucas Avenue. As these streets were very narrow, it was necessary to purchase additional property at angles in the street in order to alllow clearance between cars on the double track, as well as between the buildings and the cars, and at the same time reduce the curvature. One and one-half city blocks, lying just north of Washington Avenue, the principal retail street of St. Louis, and between High Street and Eleventh Street, were purchased for a freight and express terminal as well as a passenger station. In addition to these, a portion of the property under the bridge approach near Broadway and Salisbury Street was utilized as an additional passenger station, and a strip of land, 600 ft. in width by 1400 ft. in length, extending back from the banks of the Mississippi River was purchased for the bridge approach as well as for a location for steam tracks and for freight-car storage purposes.

Under the franchise agreement with the city of St. Louis trains are restricted to a single trail car and motor car during the day and two trail cars and a motor car during the night time. This agreement prohibits ordinary steam road freight cars to use the streets, thus making it necessary to load and unload this class of equipment in the yard under the St. Louis bridge approach. Recent interchange contracts made with several steam roads have given the electric line access to receipts and deliveries of freight from twenty-eight steam road connections. It now has friendly relations with all steam roads entering St. Louis and has become a member of the American Railway Association. These friendly relations have also served to enable it to show an enormous growth in the gross tonnage handled annually in and out of St. Louis.

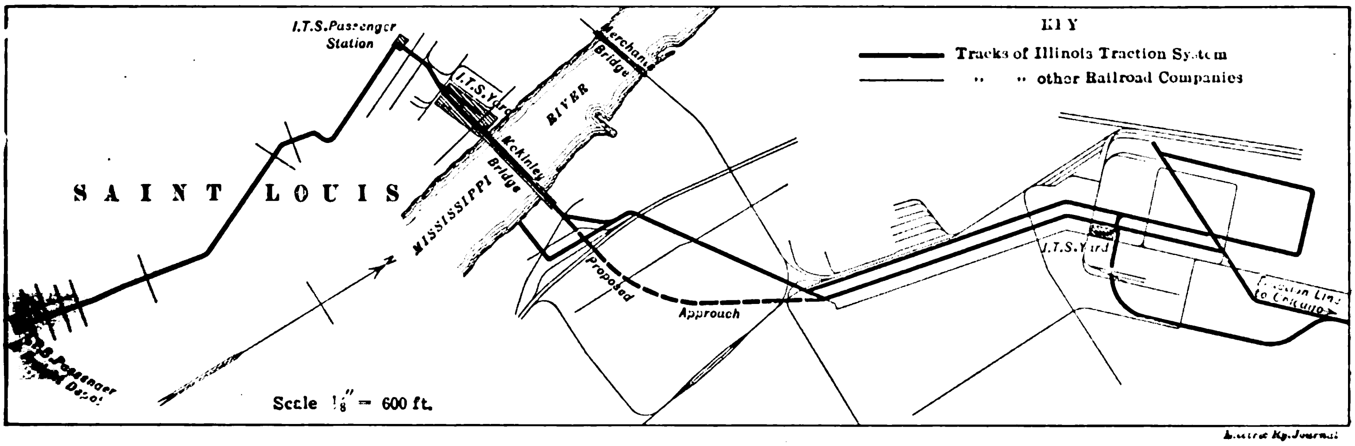
TERMINAL OPERATION

At the present time there are sixteen local and limited trains running into St. Louis and the same number out each day. A ten-minute headway also is maintained throughout the day on the street railway line operating between St. Louis and Granite City. In addition to these, sleeping-car and parlor-car service is operated between St. Louis, Springfield and Peoria. The arrival and departure of freight and express trains is such as to make it necessary to break up the trains and haul them over one or two cars at a time to the St. Louis express terminal between the regular passenger cars operating under this close headway.

Under the existing arrangement of operation the line crews do not cross the river but set out their train on a side track in Venice at the east end of the bridge. As these express trains arrive at a time when they are permitted to haul two trail cars into the St. Louis terminal, the express motor and two cars are detached and proceed into the city. Several passenger car motors are held over at all times at the St. Louis terminal and are employed with extra crews in charge to pull the remainder of the two express trains into St. Louis, one car at a time. At the present time these two express trains include fifteen cars, seven in one train and eight in the other. Although considerable time is consumed in setting the incoming train in the express terminal yard, all inbound freight is unloaded and ready for delivery by 12 o'clock noon.

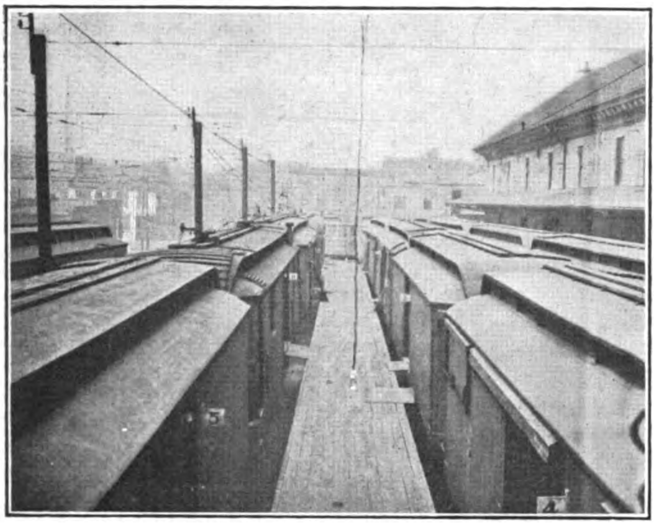


St. Louis Freight Terminal—General Plan of Main Terminal



St. Louis Freight Terminal—Map Showing Route of Illinois Traction Tracks Into St. Louis

The reverse movement of these express trains is in a similar way, except that the trains are made up by two electric switch engines on a third track on the St. Louis side of the McKinley Bridge approach. These two engines not only do this work but are used for switch service between Granite City and St. Louis. This switching includes setting back freight cars into the freight yard under the west bridge approach, setting coal cars to the retail coal-handling plant on the same side of the river and clearing the freight yard of bulk freight loads, either setting them to the steam road connections or making up freight trains in Granite City for the north. The average number of cars on each night's shipping list approximates 120, including a large number of interline cars to and from connections. All interurban train movements are under the general supervision of a terminal trainmaster. His jurisdiction not only extends over movements in St. Louis but on the east side of the river as far north as the Granite City belt line.



St. Louis Freight Terminal—Transfer Platform and Numbers on Cars

ST. LOUIS TRAFFIC DEPARTMENT ORGANIZATION

The general agent whose authority extends over the Illinois Traction System's lines south of Springfield has charge of all freight and express traffic matters at the St. Louis terminal. Reporting to him are the city passenger agent, the local agent and the commercial agent. The duties of the city passenger agent include the stimulating of the passenger traffic. He keeps in personal touch with the different clubs, societies and social organizations so that he will be advised in advance of unusual passenger traffic movements. By keeping informed as to movements of various theatrical troupes he is enabled to procure a large portion of this business along the Illinois Traction lines. A commutation fare book permits the passenger traffic agent to give attractive rates to large or small parties, firms, families or individuals. The book may be used individually or collectively at 1½ cents per mile, which has made it very popular.

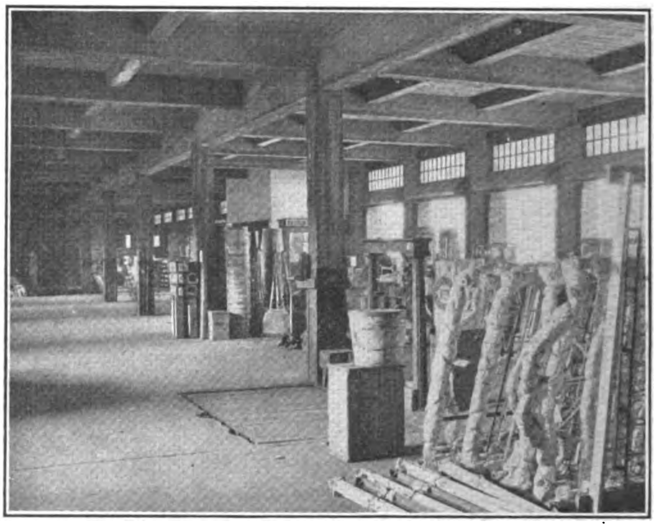
During the winter months, when there is very little excursion business to be had, the passenger traffic agent consumes a large portion of his time booking dates for summer excursion business. By having advance notice of this extraordinary passenger traffic movement he is able to co-operate with the various societies and organizations so that in setting the dates the best service may be given. By dating this excursion business consistently throughout the summer months he is able to regulate the total passenger traffic so as not to overtax the available rolling stock.

To the commercial agent is assigned the duty of stimulating freight traffic, and two contracting freight and express agents report to him as assistants in this work. The senior of these two contracting agents solicits freight along the line between St. Louis and Springfield. He watches the conduct of the business at the different stations and submits his criticisms to the commercial agent, who in turn passes them on to the general agent. As the traffic department does not have supervision over the way station agents, these criticisms are passed on to the division superintendent, who has direct charge.

The junior contract agent is assigned to St. Louis. From time to time he makes a house-to-house canvass for business, but the greatest results come from the personal friends he is able to make on these trips of solicitation. There was a time when these agents could bid for traffic against competing roads by reducing rates, but it is different now. The Illinois Traction System is under the supervision of the Interstate Commerce Commission and its rates are the same as those of steam roads. The agents' talking point nowadays is service, and the electric line is in a position to offer express deliveries at freight rates. The wide range of territory covered by this single line in the State of Illinois is of great assistance in getting business. If the electric line can establish its reliability with the shipper, he would rather deal with a single road than with several in order to reach a number of given points.

Another source of information which has resulted in a large volume of business gained by solicitation is through construction items appearing in the daily newspapers. All the papers published in the cities and villages touched by the traction line are watched very carefully for this kind of news. When advice is obtained that a large building is to be built at a certain point the contracting freight agent follows this lead until the contract for the building is let. Having previously gained a knowledge of the large builders' supply houses along the traction line, he is able to interest the contractor in his own shippers, or if material has been purchased at points from which the traction line could get a portion of the haul, the agent then has quick-delivery service to offer.

The receipts and deliveries of all St. Louis freight and express are under the supervision of a local agent. His office is located at one end of the express terminal building, where he may easily observe the conduct of the business. The office force includes a cashier, two bill clerks, a stenographer and a yard clerk. The force required to handle the freight through the warehouse includes a warehouse foreman, two checkers, two loading clerks and three gangs of truckers with three men in each gang. In addition to these a delivery clerk sees that shipments are properly receipted for by the consignee and stevedore, whose duties include stowing the freight in the cars. An outside collector also is provided to assist the cashier in keeping up his collections.



St. Louis Freight Terminal—Portion of Interior of Freight House

METHOD OF RECEIVING AND CHECKING INBOUND FREIGHT AND EXPRESS

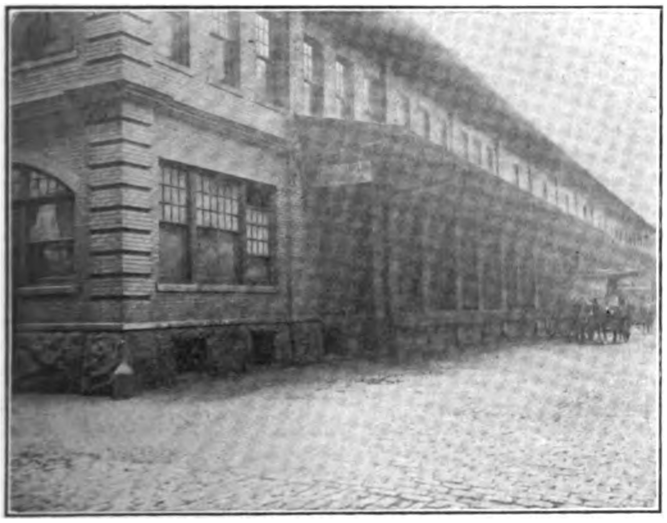
The freight house tracks are arranged so that twelve cars may be set for loading or unloading at one time. There are three tracks, each of which will hold four cars. Two of these tracks are on 11-ft. centers and the third is 18 ft. distant between track centers. This latter spacing allows what is known as a transfer platform to be built between them. The purpose of this platform is to allow truckers to reach cars on the outside track without passing through those set on the two inside tracks.

As noted earlier in the article, the inbound express train arrives early in the morning, and all cars are sent to the house before 12 o'clock noon. The warehouse doors are open from eight in the morning until five in the evening for the receipt and delivery of shipments. When the warehouse force arrives in the morning most of the inbound express and freight cars have been set. The unloading clerks with their gangs of three truckers each are assigned to certain cars. The method of checking inbound freight is by a blind tally of contents of each car. In making this check it becomes the duty of the clerk to inspect each box or package to obtain a description of the contents which he records on the tally sheet.

A certain portion of the warehouse floor is assigned to inbound freight, so that if the consignee does not call for his shipment promptly it will not interfere with the receipt of outbound freight. In order that the teaming on the driveway side of the building may be orderly, the local freight agent requires teams to approach the building from one end and leave at another. He bears this arrangement in mind in selecting a location for inbound freight, placing it at the end of the warehouse where the wagons leave.

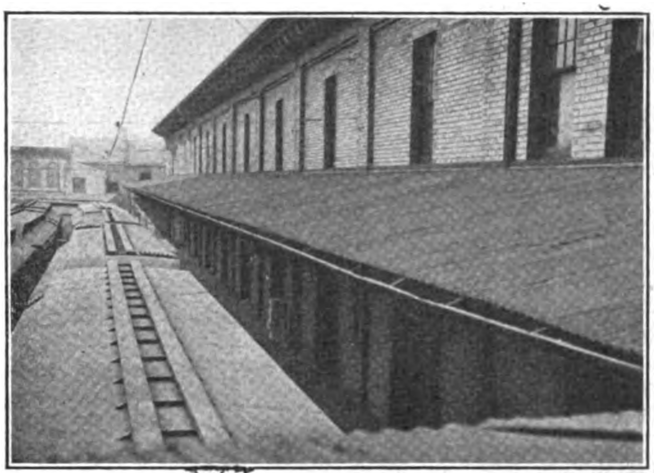
When all the freight has been unloaded from a car the blind tally sheet is turned over to the warehouse foreman, who checks it against the waybill. All items checking on both are circled, and in case they do not correspond the exception is noted on both the tally sheet and the waybill, being "over" on one and "short" on the other. After assuring himself that the over or short shipment has not been missed by the unloading clerk, the warehouse foreman attaches the tally sheet to the waybills and turns them in to the local freight agent's office.

Upon the waybill's receipt in the agent's office the rate clerk checks the rates shown on the waybill, making corrections as necessary, and passes it on to the expense bill clerk. It is the latter's duty to prepare an expense bill in triplicate for each shipment appearing on the waybill. In addition to preparing the expense bill the expense clerk addresses a postal card to each shipper advising him of the arrival and giving a description of the shipment.



St. Louis Freight Terminal—View of Team Side of Freight House

In case a shipment has been incorrectly expensed or the waybill shows an over or short shipment, a statement of expense corrections is issued in triplicate. Two copies of the statement are mailed to the billing agent, who corrects his record, accepts the correction and sends one copy to the auditor for his information. The auditor, in turn, adds to or deducts from the St. Louis agent's account by debit or credit letter. When all the statements required by the condition of the waybill have been properly filled out, the expense bill is given to the cashier.



St. Louis Freight Terminal—View Showing Cars and Protecting Awning

Where bills for certain shipments are lost in transit the agent receiving the stray freight issues a waybill for stray shipments. This waybill is used for less than carload shipments, and if the agent receiving the stray shipment cannot locate the waybill showing the weight and charges, he must ascertain the shipping point from the invoice or bill of lading and collect all charges due.

If a truck driver calls for a certain firm's shipments and they have been received, he is referred to the cashier's office. Here the driver receipts the warehouse receipt and the cashier's stub if he pays the freight or the firm is on the company's credit list. Upon receipt of the warehouse receipt from the driver the warehouse foreman permits him to remove the shipment.

When a waybill shows an over, short or damaged shipment it is forwarded to the traction company's claim department as soon as the expense bills and other statements have been completed. If a shipment remains unclaimed or is refused and the local agent is unable to make delivery within thirty days from the date of receipt, an O. S. & D. report is issued. This report is made in triplicate, one copy going to the billing agent and one to the freight claim agent, and the third copy is retained for the local agent's record. A copy of each statement pertaining to a certain waybill is attached to it so that in case further investigation is desired a complete record may be had when the waybill is found. In addition to this record, which goes to the freight claim agent, a tissue record is taken of all statements as well as the postal card notice of freight received for the local agent's office record.

In accounting for all waybill dispositions, the local agent fills out other forms once in each month, one of which is an abstract of the local waybills received, another for local waybills forwarded and a third and fourth for abstracts of interline waybills received and forwarded. Each of these forms contains a record of the transactions only between two stations.

OUTBOUND FREIGHT

The method of receiving and handling outbound freight is of particular interest because it makes up a large proportion of the tonnage handled at the St. Louis express terminal and, therefore, largely controls the cost of handling freight through the warehouse. One of the strict rules of the warehouse foreman is that all outbound freight must be deposited on the floor with the destination marking on each shipment in plain view. After unloading his freight in the warehouse in this manner, the teamster presents his shipping bill to the receiving clerk, who checks the shipments against it. If all items correspond, the dray ticket is stamped with the local agent's signature. If the shipment is billed to a prepay station and the shipper is not on the Traction Company's credit list, the teamster is referred to the cashier before the receiving clerk is permitted to accept the shipment.

In order to facilitate the loading of outbound freight, a box conveniently located and provided with seventeen pigeonholes, corresponding to the seventeen doors in the freight house, is employed as a point to deposit the receipted copy of the shipper's bill for shipments received at each door. This arrangement permits the loading clerk, who has supervision over three truckers, to take the bills, say, from pigeonhole No. 1, and he will find the freight corresponding to the bills on the warehouse floor at door No. 1. As he has been previously provided with a list showing the car number on which freight is to be loaded for certain destinations, he knows in what car each shipment is to be placed.

The cars are numbered arbitrarily by attaching a small rectangular piece of wood, which contains a number in large size printed on each side, beside the door of each car. In applying these numbers to the cars, however, it becomes the warehouse foreman's business to select the cars and apply the numbers in a way that will make switching unnecessary. Views showing the method of numbering cars as well as the transfer platform are shown in the illustrations.

Each loading clerk is provided with a small pad of blank paper, and each car has a pad of similar size, which is hung near the door and contains printed numbers corresponding to the arbitrary number placed on the car. After the trucker has loaded a shipment on his truck and the clerk has ascertained the destination of the shipment and is sure of its weight, he refers to his list of car numbers and obtains the number corresponding to the shipment's destination. He then marks this number on a blank slip of paper which he gives to the trucker. After the trucker has deposited the shipment in the car he pulls the slip of paper containing the car number from the pad at the door and returns with the two to the loading clerk. The introduction of these "very" tickets has served greatly to reduce the number of stray shipments and has assisted the traffic department in making prompt deliveries.

After all shipments which correspond to the tickets for a given door have been loaded the shipper's bills are placed in what is termed the office box. Bills found in this box indcate to the chief bill clerk that shipments have been received and loaded. He collects these bills from time to time and takes them to the local agent's office, where the shipments are classified, the rate is applied and the whole is recorded on the waybill going to the corresponding destination.

Each of the bill clerks has a list made by himself of all the local rates, and this list is mounted conveniently on his desk. When he bills shipments he glances at the rate sheet instead of consulting the printed tariff, a practice which greatly reduces the time necessary to do this work. Another apparently little thing which serves to shorten the time of making out waybills is that all are sorted in station order before he begins to classify them. After all waybills covering the day's outbound shipments have been completed a tissue press record is taken in duplicate, one copy going to the auditor's office. The dray tickets for the previous day's business are also filed for future reference. They are sorted in numerical order and filed in boxes containing 250 bills each. In case the receiving agent takes exception to a waybill, the St. Louis agent is able to locate the shipper's bill for verification in a short time.

The most valuable record to the traffic department in its efforts to reduce the cost of handling freight in less than carload lots is the station performance record. The record for each station is made out on a separate sheet. The record shows the date and number of each waybill, the initial and number of each car in which carloads of shipments are sent, a description of the freight, the weight of carload shipments and of L. C. L. shipments, the charges, advances, prepayments, claims, etc. This form is filled out at the first of each month covering the previous month's business and is a record of the efficiency of the organization at any given station. The average cost per ton for warehouse expense at the St. Louis express terminal has been between 25 and 30 cents. This cost depends largely upon the total volume of business handled each day, as it is necessary to maintain a warehouse force of sufficient size to handle the average daily shipments during any week. The office expense for this station averages about 15 cents per ton of freight handled during the month. The rapid increase in the total volume of business handled, however, has tended to reduce this fixed charge, and the amount shown is a fair average.

To give one a comprehensive idea of the large growth of freight and express business handled by the Illinois Traction System in and out of St. Louis since the establishment of the express terminal, it is necessary only to state that the less-than-carload lot business has increased more than 300 per cent since 1910. Until 1912 no carload-lot business was obtained from connecting steam lines. The following is a tabulated statement of the gross tonnage for a given month handled since 1910:

Year.	Month.	Total Tonnage.
1910	October	2,967,500 lb., L. C. L.
1911	October	3,800,000 lb., L. C. L.
1912	October	4,257,000 lb., L. C. L.
1912	October	5,311,000 lb., carload

During October, 1912, the carload freight received from and delivered to connecting steam roads at Venice, Ill., in which the traction company participated in the revenue, totaled 18,321,000 lb. This represents only that portion of the tonnage from foreign cars not delivered in St. Louis. The usual switching charge allowed by the Interstate Commerce Commission, when totaled for the month and added to the gross revenue, increases it materially.

Although this article is not intended to include the passenger traffic, some information relative to this class of traffic should be interesting. Agents are maintained at two points in St. Louis, one at the downtown station at Lucas Avenue and High Street and one in the sub-passenger station under the bridge approach at Broadway and Salisbury Street. The street railway service maintained across the McKinley Bridge has also shown a healthy increase since its inception, and a bridge toll is collected from vehicles and pedestrians. Although the toll for pedestrians is at a fixed rate, 5 cents each, that for vehicular traffic varies in proportion to the size of the vehicle.

TRAFFIC NOTES

The question of reducing claims for damaged freight and express has received considerable attention. The addition of a stevedore to the warehouse force has assisted materially in reaching this end. He is not only familiar with the method of loading cars which will reduce damage in transit to the minimum but is especially familiar with handling heavy glass shipments. Although the published tariff contains a rule for packing and crating, instructions have been issued to the receiving clerk to pay particular attention to the quality of the material used for this purpose. Crated furniture receives special attention as it has been the source of a large number of claims for damage in transit.

Another source of claims has been through the handling of perishable shipments. To eliminate this, the traffic department has made it a rule not to accept perishable commodities unless they are at the shipper's risk. As the company has abandoned the use of refrigerator cars, shipments of fresh meat are not accepted from July to September. Shipments of vegetables are not accepted during the winter months unless the freight charges are guaranteed by the shipper and then they are accepted at his risk.

Damage in transit as well as over and short shipments has been greatly reduced by keeping a close check on the train crews and laying much stress on care in handling freight at the way stations.

Shortly after the traffic department had taken up quarters in the new St. Louis express terminal a dairy traffic agent was appointed. During the past three years this agent has developed a volume of milk business which adds materially to the revenue from freight and express business. He is a man familiar with stock raising and breeding who has specialized in the development of dairy products. Through circular letters he calls the farmers of certain communities together and organizes them so that their interests may be pooled. He advises them in regard to the raising of stock and chickens, and agrees to furnish them a market and to protect their interests. As a direct result of this, the company now runs a milk train consisting of two cars between Hillsboro and St. Louis, and the average daily shipments amount to 2500 gal. Four cooling stations have been established along the line, and the service is so scheduled that within four hours after milking the milk is in the St. Louis market.

The dairy traffic agent has been especially successful in protecting the farmer against the market. His knowledge of the worth of milk, sweet or sour, has served him in obtaining the maximum price for all kinds of milk. Heretofore the farmer has had to accept whatever the milk dealers offered. Now the milk which is not fresh is turned over to cheese factories, where it is as valuable as though it were sweet.

All passenger, freight and express traffic is under the general supervision of George W. Quackenbush, traffic manager, who reports direct to H. E. Chubbuck, vice-president executive.

TRAFFIC STATISTICS FROM BOSTON.

C. S. Sergeant, vice-president of the Boston Elevated Railway, presented at the A. E. R. A. midyear convention some statistics upon the investment, length of ride and revenue passengers per trip on the Boston Elevated Railway. In the abstract of the report of the meeting published in the Feb. 1 issue of this paper a few of these figures appeared, but the statement is such an interesting one that it is printed in full below:

"Realizing that the history of the business of electric railways has probably been as long in Boston as anywhere, I have brought along a few data going over a considerable period of years, showing what the results have been in the matter of possible revenue passengers for the half trip. The point I particularly wish to emphasize is the effect of the demands from the public in the way of extensions of lines, increased transfers, etc. In our case these demands have eaten up the advantages which are supposed to come from doing business for a long time in a growing community, as may be seen from these data from Boston, to which I would especially call attention. In 1888 some five or six horse railways were put together, forming a consolidated system, which gave the railway company virtually the monopoly of the business of the city. The operations of this consolidated company began substantially on Jan. 1, 1888. At that time it had a nice little business, and it took about nine thousand horses to carry it on. In the first year there were gross earnings of $4,276,000 and the capital invested was about 2.72 times the amount of these gross earnings. The average number of revenue passengers for the half trip in that year was 22.5, the average length of the half trip was 3,62 miles and the average distance from the center of the city to the ends of the routes was 4.79 miles. Following along from that time there was a constant tendency to extend to the more sparsely settled territory, and the lines afterward were extended, not only as to the trips that were run, but as to the total length of the routes. The company began also immediately to electrify the lines, so that in 1892 about half of the system was electrified and the number of revenue passengers per half trip had gone up from 22.5 to 28. Four years later, in 1896, the road was 98 per cent electrified, and there were 29.5 revenue passengers to the half trip.

"Now, without going over these figures, coming on later, we introduced the rapid-transit system, so-called—that is, the subways and the elevated—with a view to providing more room for the congested district, and with these lines the demands that were made for service cut down the average revenue passengers per half trip, so that these figures in 1903 went down to 23 and in 1912 were only 25.5. In other words, in 1912, with gross earnings of $16,644,000, we had only three more revenue passengers to the half trip than we had with the horse cars in 1888.

"It seems to me, Mr. President, that these figures are rather significant; that what has happened to us is probably only typical of what will happen in many cities as business increases. Not only will there be more demands for transfers, more demands for extension in an unprofitable territory and more demands for new methods of carrying on the business, but in every way the public will take what would be the only increment of the capital invested, and it seems to me that that has some bearing on the question under discussion. The result in Boston has been that the permanent investment has increased to more than six times the gross revenue. Of that investment, which is now $101,000,000, about $16,500,000 has been contributed by the city, on which the railway company pays interest and sinking fund, so that a considerable part of the capital has been obtained at a fairly low rate. But even under these conditions it is extremely difficult to carry on the business and satisfactorily meet these increased public demands.

"I am heartily in sympathy with the report of our committee and the action of the executive committee in devising means to collect data on this question and to get it before the public, because we must inform the public on this subject if we are going to continue to do business."

REPORT OF BOSTON TRANSIT COMMISSION FOR 1912

The eighteenth annual report of the Boston Transit Commission covering the year ended June 30, 1912, has just been issued. The principal features are illustrated descriptions, including maps, of new and future subways and tunnels of the Boston Elevated Railway. These descriptions refer to the Cambridge tunnel, 2486 ft. long, under Beacon Hill opened March 23, 1912; the Dorchester tunnel and Boylston Street subway now under construction. Appendices are presented giving engineering and legal data, contracts, etc., on these and other works, and there is also a memorandum on the location of the proposed tunnel of the Boston & Eastern Electric Railroad. Another valuable feature of this report is the cumulative index to the commission's eighteen annual reports.

President Mellen of the New York, New Haven & Hartford Railroad has inaugurated a plan to demonstrate that the company is inclined to take care of its old and faithful employees who become incapacitated in its service. By President Mellen's direction E. O. Brown, for many years the commercial agent of the road with offices at the Grand Central Station, New York City, who retired on Feb. 1, has been placed on the pension list for the remainder of his life. President Mellen intends that all employees of long service and equal fidelity shall be similarly pensioned.

A French Single-Phase Locomotive

This 1500-hp Locomotive Is Now Being Tried by the Midi Railway—It Has a Novel Form of Drive, Recuperates Energy and Uses Induction Regulators Instead of Contactors

As noted in the Electric Railway Journal for Jan. 4, 1913, the Chemin de fer du Midi (French Southern Railway) is conducting trials with six types of single-phase locomotives on a 10-mile line at Villefranche. The following is a description of the principal features of the locomotive supplied by the Ateliers de Constructions Electriques de Jeumont, based upon an article by R. van Cauwenberghe in a recent issue of the *Elcktrotechnische Zeitschrift.*

GENERAL FEATURES

The Jeumont locomotive, as shown in Fig. 1, is of the 1-C-1 type; that is to say, the axle arrangement comprises two leading or trailing axles and three driving axles. The locomotive weighs 86 metric tons, the weight per driving axle being 18 tons and per leading axle 16 tons. Its principal dimensions are as follows: Length over body, 41 ft. 4 in.; over the buffers, 46 ft. 11 in.; height from top of the rails to the highest position of the pantograph, 19 ft. 8 in.; diameter of pony wheels, 3 ft. 3 in.; diameter of driving wheels, 4 ft. 7 in. The locomotive is furnished with three 230-volt series-connected self-cooled single-phase motors which are rated at 500 hp each when running at 450 r.p.m. Under these conditions the efficiency, after including gearing losses, is 87 per cent with 93 per cent power factor. With 400 hp per motor the efficiency is 88 per cent and the power factor is 95 per cent.

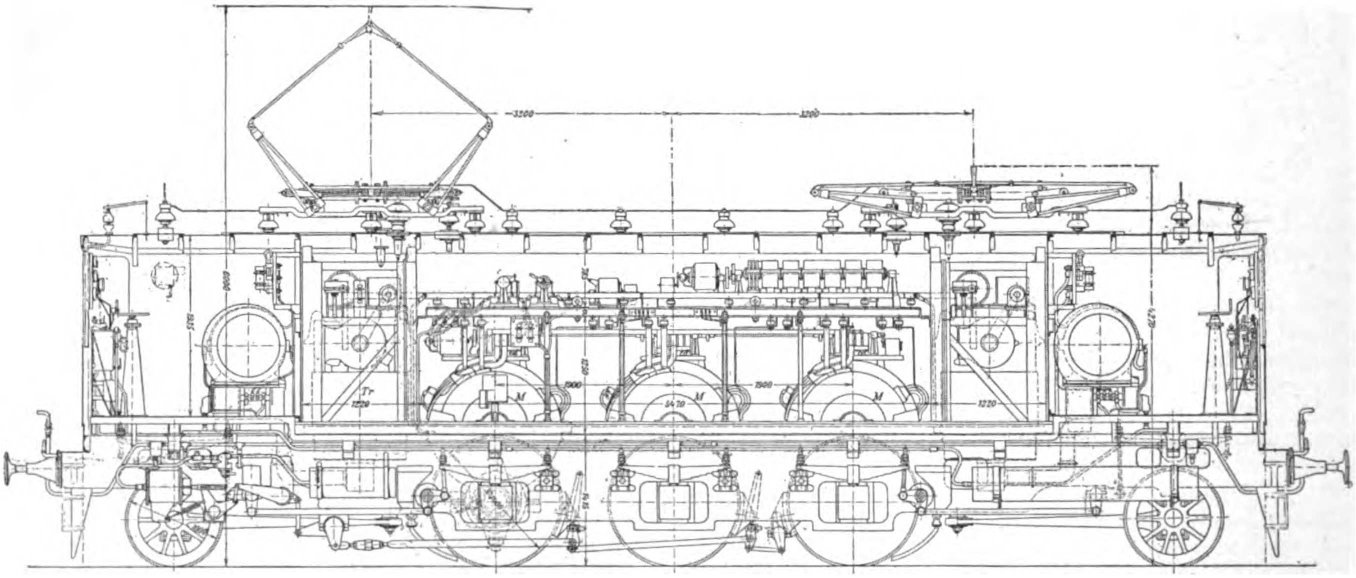


Fig. 1—Midi Locomotive—Side Elevation, Showing Arrangement of Electrical Equipment; Dimensions in Millimeters

The line current is conducted by means of a compressed-air switch to two 750-kw air-cooled transformers, which are connected in parallel on their high-tension side. The top yoke of each transformer carries an induction regulator. The transformers and regulators are connected in series on the low-tension side to permit the difference of potential to be varied continuously between 200 volts and 760 volts. The low-tension current then passes to the motors, which are rigidly mounted on the locomotive frame with their centers of gravity about 5 ft. 11 in. above the top of the rails. Instead of using connecting rods, each motor drives its own axle through a transmission system, which consists of gearing proportioned 1:2.72, a hollow quill concentric on the driving axle and elastic universal couplings. Uniform speed of the motors and their corresponding driving wheels is obtained electrically as hereinafter explained.

Although the motors are of the compensated series type, they can be connected as repulsion machines, when starting, without weakening the field. The induction regulators serve to vary the voltage without employing contactors. Recuperation is obtained by exciting the large motors by means of an auxiliary winding of the compressor motor. The control equipment at each end consists of a two-handle controller and a foot-operated switch. The four positions of handle *B* cover the forward or backward running of the motors and the corresponding positions of the reverser during recuperation. The other handle, *A*, is used to control the oil switch and the induction regulators. Also on point 1 of handle *A* the induction regulators turn to the position which corresponds to the lowest difference of potential. The contacts of the auxiliary motor for the induction regulators are thus short-circuited and the oil switch closes. On point 3 the induction regulators are operated in the opposite direction, and the voltage rises, excessive speed in rising being prevented by a current limit device. This insures the proper automatic acceleration as long as the motorman keeps his handle on point 3. Point 2 is used to stop the induction regulators, point *O* for cutting out the oil switch and point *OO* for cutting out all auxiliary motors.

During recuperation the action of the oil switch is dependent upon a relay after the first handle has been set. As handle *A* is successively brought to points 1 and 2, the potential gradually rises until it approximately equals the voltage of the externally excited motors, whereupon the action of the relay closes the oil switch. Handle *A* is also used for the automatic regulation of braking between speeds of 13.6 m.p.h. and 34.1 m.p.h.

The foot-operated switch effects the repulsion connection of the traction motors by means of a separate controller. This switch is used only during starting. Should it be held too long by the motorman, the series connection of the motors would be restored by a centrifugal switch upon reaching a speed of 13.6 m.p.h. The centrifugal switch also serves to cut out the recuperation connections automatically when the locomotive speed drops below 13.6 m.p.h.

DETAILS OF THE DRIVE

A detailed cross-section and sectional elevation of the drive are presented in Fig. 2. The coupling piece *C*, connected to its corresponding driving wheels, has four extensions; two of these, t_1t_1, are movable in the bronze shells c_1c_1, which are firmly seated in arms, *B*, of the hollow shaft; the other two extensions, t_2t_2, are set in the shells c_2c_2, which are secured on the inner face of the wheel but with a certain amount of play in order to permit a slight turning of the hollow shaft or sleeving around the axle. Furthermore, the shells c_2c_2 can move in their bearings parallel to the axle so that the coupling may adjust itself to axial side play. These bearings are not rigidly seated in the wheel but are held between springs, *R*. Therefore, the entire coupling piece, *C*, is carried elastically, partly through the springs, *R*, and partly through the locomotive springs. The former also serve to minimize shock when starting the locomotive and to damp the vibrations which may ensue from the pulsating torque of single-phase motors. This drive has offered no trouble even at speeds of 49.4 m.p.h.

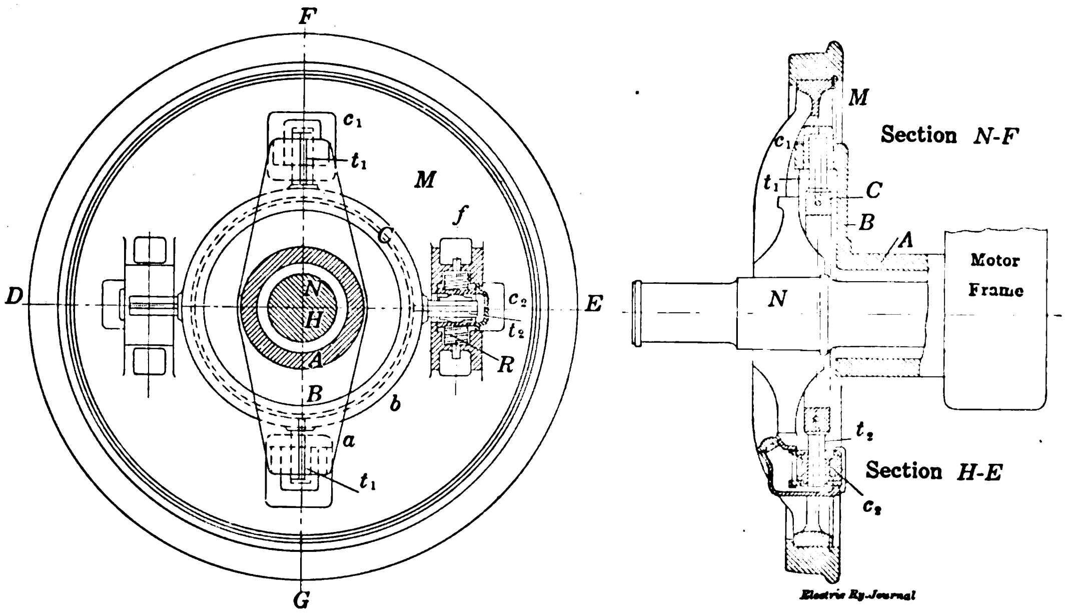
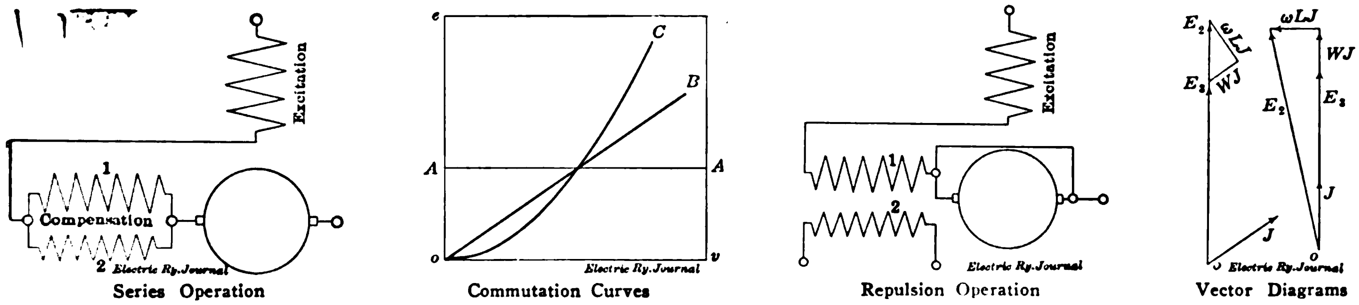


Fig. 2—Midi Locomotive—Sections of Power Transmission by Means of Universal Couplings, Quill and Gearing

ELECTRICAL FEATURES

The voltage regulation is distinguished by the use of induction regulators which are built into the transformers. By placing the regulator in the upper yoke of the corresponding transformer, the total iron weights and losses and the space occupied are made little greater than in an ordinary step transformer of like total capacity. The copper is 18 per cent greater, but, on the other hand, contactors and auxiliary choke coils are eliminated.

The complete compensation and good commutating characteristics of the motors are obtained by two windings of different numbers of turns and copper cross-section, which are connected in parallel and set in the same slots, as shown in Fig. 3. These windings convey a commutating current displaced 90 time deg. from the main line current. This commutating current is proportional to the main current and is independent of the speed. For constant main current—that is to say, when the excitation is constant—the voltage generated by the alternating field between the commutator bars is constant, as shown at *AA* in Fig. 4. The voltage generated between the commutator bars by the cutting of the commutating field is proportional to the speed and is represented by the line *OB*. The distance between lines *AA* and *OB*, as compared with a simple repulsion motor of like capacity, expressed by the difference between *AA* and the parabola *CO*, indicates the superior commutation of the Jeumont motor.



Series Operation — Commutation Curves — Repulsion Operation — Vector Diagrams

Figs. 3 to 7—Midi Locomotive—Wiring Combinations of Motors, Voltage Curves and Vector Diagrams

At full acceleration the commutator bar voltage, *OA*, is 3.5 volts. It is zero at three times synchronous speed (about 31 m.p.h.). During slow running the repulsion connection tends to improve the commutation somewhat. When operated as repulsion motors, the windings 2 (Fig. 5), which would otherwise be idle, are connected in parallel, thereby insuring equality of field strength and causing the motors to operate at the same speed. Hence coupling rods are not required. This parallel connection is also valuable when the locomotive has to start on slippery rails.

Recuperation between a relatively wide range of speeds is obtained by means of an auxiliary stator winding in the single-phase shunt-wound compressor motors. The main windings are supplied by the transformers with a constant voltage, E_1, in time-phase with the trolley voltage. The auxiliary windings, however, are displaced 90 space deg. with reference to the main windings, and they generate an alternating field which gives a total emf, E_2, almost exactly in time phase with E_1. By means of the induction regulator, the total secondary voltage, E_3, of the transformers and regulators can be made equal to E_2, thus enabling the closing of the oil switch. The difficulty begins here, because, as soon as an attempt is made to return energy to the line by lowering E_3, a large phase displacement, namely, $\tan \phi = \frac{\omega L}{R}$, occurs between current and voltage, as shown in Fig. 6. In the foregoing equation, *R* is the ohmic resistance and ωL the leakage reactance of the motors and induction regulators. In order to raise the power factor it is necessary to displace E_2 toward E_3, in proportion to current *J* as shown in Fig. 7. This is done automatically by having the current, *J*, flow through the primary of an air-gap transformer, so that the secondary influences the brush voltage of the compressor motors. Unfortunately the power component of the current required for this results in an undesirable phase displacement in the main transformers which must be cared for by compensation transformers. The compensation transformers and ohmic resistances serve to compound the compressor motors so that recuperation will occur at unity power factor both in regular operation and during the period of excitation of the main motors.

OTHER EQUIPMENT

The Jeumont Company, in addition to furnishing the Midi Railway with eight more locomotives of the type hereinbefore described, has received an order to supply the following equipment for a line in the eastern Pyrénées: three 6000-volt, 25-cycle, 300-hp hydroelectric sets, four motor cars carrying four 50-hp motors each, one 1000-kw motor-generator and transformers similar to those at the Villefranche substation and overhead material for 17.7 miles of line.

PURCHASED POWER FOR THE CHICAGO, MILWAUKEE & PUGET SOUND ELECTRIFICATION

In connection with the plans for the electrification of the Chicago, Milwaukee & Puget Sound Railway from Harlowton, Mont., to Avery, Idaho, the details of the contract between the railway company and the Great Falls Power Company, mentioned briefly in the ELECTRIC RAILWAY JOURNAL Jan. 11, are of some interest. This contract is made part of the articles of agreement between the power company and the federal government, by which a fifty-year grant of right-of-way for transmission lines across public lands was secured.

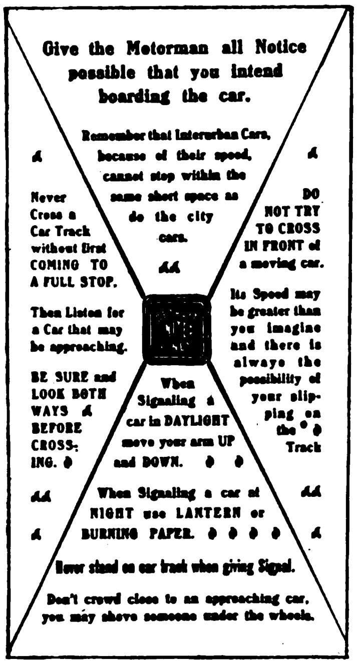
The railway company agrees to electrify its line between Harlowton and Deer Lodge, Mont., before Jan. 1, 1918, and also agrees to buy from the power company electric energy at the rate of 10,000 kw for the full period of the ninety-nine-year agreement, but two years' notice will be given the power company that delivery must commence. The railway company has several options for more power, up to a total rate of 25,000 kw, as follows: Not less than 4000 kw, nor more than 8000 kw, if called for prior to Jan. 1, 1923; not less than 3500 kw, nor more than 7000 kw, if called for between the last date and Jan. 1, 1928; or, failing to exercise the foregoing options, the full 25,000 kw may be called for at any time between Jan. 1, 1918, and Jan. 1, 1928, if at least 6300 kw additional has been called for prior to Jan. 1, 1923. Additional energy, when once called for, as above, will be supplied for the entire remaining term of the contract. The power company is not liable for interruption to supply, nor the railway company for interruptions to its consumption, owing to causes beyond their control such as strikes, fires or floods. The contract will be broken automatically in the event that the federal government permanently enjoins at any time from the enjoyment of its privileges. The railway company is made a preferential customer entitled to first service.

Delivery of energy will be made to not more than five stations between Deer Lodge and Harlowton, at 50,000 volts or 100,000 volts, three-phase, 60 cycles, alternating current. The voltage shall not be changed except by mutual agreement. The railway company will receive the energy at the terminals of air-break, high-tension line switches to be provided by the power company and will transform and distribute such energy to its line of railway in such manner as it sees fit. Watt-hour meters and curve-drawing wattmeters will be employed to measure the energy delivered. The railway substations are to contain sufficient synchronous machinery to secure a power factor, leading or lagging, of at least 80 per cent. Twelve months' notice will be given the power company of the location of the delivery points. The power company will also have the right to install Tirrill regulators in the substations for the operation of synchronous machinery in such manner as to receive any power factor between 80 per cent leading and 80 per cent lagging.

The rate for energy will be $0.00536 per kw-hr., subject to a minimum bill after the first year of service equivalent to 60 per cent of all the energy contracted for. The power company is also required to pay the federal government a tax of 5 mills per 1000 kw-hr. for all energy delivered over transmission lines crossing the public domain. The power company also has the conditional right to occupy the railroad right-of-way with its transmission lines, subject to sixty days' notice of removal, and such transmission lines shall not interfere with the operation of the railway or its telephone or telegraph lines. The railway company is forbidden to resell any of the energy purchased of the power company. Disputes of any nature between the two companies will be referred to and settled by a board of three arbitrators, chosen one by each company and the third by these two.

SPEED NOTICES ON DETROIT INTERURBAN LINES

The publicity department of the Detroit United Railway has recently prepared an advisory notice of the character reproduced in the accompanying illustration relative to the necessity for caution when using interurban cars. The company has found that residents of the larger towns when out in the country do not realize the higher speed of interurban cars, and hence they often fail to signal them in time. The notice not only calls attention to this fact, but also explains how the cars can be most effectively signaled. Furthermore, this notice will act as a warning against accidents, inasmuch as it impresses the passenger with the need for exercising caution when crossing the tracks or boarding a car. This notice has been printed in three sizes, namely, poster type for shelter stations and waiting rooms, medium size (8½ in. x 11 in.) for tacking on telephone poles, etc., at cross-roads, and pocket size (2¾ in. x 5¼ in.) for distribution on the cars.



Give the Motorman all Notice possible that you intend boarding the car.

Remember that Interurban Cars, because of their speed, cannot stop within the same short space as do the city cars.

Never Cross a Car Track without first COMING TO A FULL STOP.

Then Listen for a Car that may be approaching.

BE SURE and LOOK BOTH WAYS BEFORE CROSSING.

DO NOT TRY TO CROSS IN FRONT of a moving car.

Its Speed may be greater than you imagine and there is always the possibility of your slipping on the Track

When Signaling a car in DAYLIGHT move your arm UP and DOWN.

When Signaling a car at NIGHT use LANTERN or BURNING PAPER.

Never stand on car track when giving Signal.

Don't crowd close to an approaching car, you may shove someone under the wheels.

Warning Notice on Interurban Speeds

THE ASSOCIATION PROCEEDINGS

The bound proceedings of the American Electric Railway Association for the convention of 1912 are now being distributed to members from the office of Secretary H. C. Donecker. As customary, a separate volume is devoted to the American, the Engineering, the Accountants', the Transportation & Traffic and the Claim Agents' Association respectively. An excellent frontispiece portrait of the president of each association accompanies the individual volumes. The proceedings of the five associations as published make 2744 pages, the Engineering proceedings alone totaling 978 pages. A valuable feature of the volume for this year is the summary index of previous reports of the various associations, including the earliest proceedings of the American Street Railway Association.

Hearing on Electric Railway Mail Pay

A Report of a Meeting of a Joint Committee of Congress at Which Representatives of the Companies Showed that Their Costs of Operation Were Above the Compensation Received and Asked for Higher Terms of Payment—Detail Figures of Cost

A series of hearings on the subject of railway mail pay is being held in Washington before the Senate committee on post offices and post roads and before the joint House and Senate committee on postage on second-class mail matter and compensation for the transportation of mail. At the hearing on Feb. 7 representatives of the electric railways submitted statements showing the cost of operation of their mail cars and the government rate of payment for this service. The statements showed that the operations are conducted at a loss.

Those who attended the hearing were Henry S. Lyons, secretary Boston Elevated Railway; J. H. Neal, general auditor Boston Elevated Railway; Alexander R. Piper, general freight agent Brooklyn Rapid Transit Company; F. C. Hamilton, statistician Chicago Railways; W. F. Ham, vice-president Washington Railway & Electric Company; John Wilson Brown, president Maryland Electric Railways; Senator Jonathan Bourne, Jr., of Oregon, chairman of the committee; Representative Lloyd of Missouri, Representative Tuttle of New Jersey and Representative Weeks of Massachusetts.

The hearing of Mr. Neal covered almost all the points involved. Senator Bourne, as chairman, asked Mr. Neal if he was familiar with the bill prepared and suggested to Congress by the Post Office Department under which it was proposed to substitute space for weight as the measure of compensation for the service rendered in the readjustment of railway mail pay.

Mr. Neal said that he was chairman of the committee appointed by the American Electric Railway Association to take this matter up with this committee.

Thus far, Mr. Neal said, the Boston Elevated Railway had been paid 1 cent per linear foot for each car mile run. The company also had the pouch service, for which it was paid a certain rate per pouch. The company had been receiving for cars which were called 16-ft. box cars, but which measured a little less than 16 ft. on the inside, 15⅝ cents per car mile for the work that it had been doing for the government.

For years it had been well known to various committees and to various postmasters and certainly to all the railways, Mr. Neal said, that this rate of compensation was absolutely inadequate, and for years the railways had been pointing this out in various ways, but up to the present time they had not been able to do so in such a manner that they had received any increased compensation. It was a very easy matter to show that the present rates were causing a loss to the Boston Elevated Railway alone of $15,000 a year.

The Boston Elevated Railway received substantially $35,000 a year from the government for the mail that was carried at a loss.

In answer to a question of why, as the company was not obliged to carry this mail, it assumed a burden which necessitated a loss, Mr. Neal, speaking for the American Electric Railway Association, said that, in the first place, many roads undertook to carry United States mail at unremunerative rates with the idea that it would help them in cases of labor trouble to keep their cars running.

Second, operating expenses formerly were less than at present, but the carriers had continued from year to year in the hope that the government would recognize the value of the services rendered and increase the rates to an equitable basis. The electric carriers now realized that the business was unprofitable and undesirable at the present rates and asked that the government equalize the existing rates paid for the different classes of mail transportation so that the electric lines could consistently obtain a reasonable proportion of the business on a fairly remunerative basis.

As far as the Boston Elevated Railway was concerned, Mr. Neal said that the feeling had been that the company would be able eventually to get an increased appropriation. It had taken the matter up year after year, hoping that this would be granted. It was felt that perhaps some hardship would be caused by a withdrawal of the service, and it was hoped that whatever prevented a proper compensation would be overcome, but the matter had reached a point now where Mr. Neal thought the company should not be asked to carry any further a burden as great as this.

Continuing, Mr. Neal expressed the opinion that the practice of the past would show that if the space rate were increased to at least 1½ cents instead of 1 cent, the cost would be met at any rate.

Representative Lloyd asked whether some other system of accounting could not be adopted.

Mr. Neal answered that that question would require some further study on the part of the electric railways. He thought that it would be almost impossible to compare the carrying of mails in city service with the steam railroad practice. The difference between train operation and individual car operation was great, and he knew of no precedents on which he could base any statements to permit him to make a comparison that he would dare to stand on or to make a contract on.

On the other hand, this practice of paying according to the length of a car, which had been in use for years and years, gave a greater compensation for a long car and a lesser compensation for a short one and involved in that way payment according to space. As a matter of practice it was shown that if 50 per cent more compensation had been received, which would have been just to the companies, that would fix a basis for payment on the city service which would be satisfactory and was perhaps the best all around.

Senator Bourne said that as he understood it the company was perfectly satisfied to have space the determining factor as to compensation but was dissatisfied with the rate received for the space.

Mr. Neal answered that with one modification that was so; he would add, if the rate was 1½ cents per linear foot there should be an allowance of not less than 30,000 miles for a car.

Senator Bourne asked if this allowance was desired without regard to the mileage actually made.

Mr. Neal replied in the affirmative, adding that if the government said that a company must set aside a certain number of cars, the fixed charges, the arrangements for crews and other incidental expenses put the roads to a considerable expense. The Boston Elevated Railway last year averaged something like 25,000 miles per car.

Senator Bourne asked if, when the companies considered the advisability of extending any of their electric lines they took into consideration the returns they would receive from the government for the transportation of mail.

Mr. Neal said that this was considered only indirectly. He said it would be taken into consideration if an extension into one of the suburbs was contemplated. Mail would be one of the determining factors if there were post offices in that suburb and would not be if the line appeared to be away from any post office district.

In answer to a question Mr. Neal said that mail was merely a by-product of an electric railway and that electric railway operations to-day involved the carrying of mail, newspapers, trolley passengers and express.

Representative Weeks declared that that was not an especially practical question as applied to Massachusetts because in that State railroad extension had been hedged around with so many obligations that most people did not want to put money into extensions and were not making them.

STATEMENT GIVING ESTIMATED COST OF OPERATION OF PRESENT TYPE OF MAIL CARS ON SYSTEM OF THE BOSTON ELEVATED RAILWAY

	Cents per Car Mile
Type and number of cars now used	*9 16-ft. box
Mileage operated year ended June 30, 1912	225,695
(A)—Car investment—Taxes, interest, depreciation and insurance	1.338
(B)—Carhouse storage—Taxes, interest, depreciation and insurance	0.187
(C)—Power station—Taxes, interest, depreciation and insurance	1.229
(D)—Power transmission—Taxes, interest, depreciation and insurance	0.198
(E)—Track investment	2.441
(F)—Cost of power used	1.350
(G)—Wages of car crews	8.422
(H)—Maintenance of car bodies	0.482
(I)—Maintenance of car trucks	0.200
(J)—Cost of maintenance of track	1.500
(K)—Wages of other transportation and car service employees and other expenses	1.680
(L)—Maintenance of line equipment, buildings and electric equipment of cars	1.320
(M)—General expenses	2.790
Total	23.137
Pay for 16-ft. box car (15 ft. 11 in. inside)	15.58

*Not including one 25-ft. box car.

DETAILS OF ESTIMATES

		Cents per Car Mile
(A)—Car Investment:		
Original car body	$500.00	
Rebuilding car body	640.13	
Heaters, without wiring	23.00	
Harrison racks	25.00	
Wire guards	28.12	
Fire extinguishers	14.50	
Electric equipment and equipping	117.96	
K-2 controllers	168.00	
G-58 motors (two at $455)	910.00	
Peckham truck	220.00	
Vestibuling	167.75	
Investment per car	$2,814.46	
For nine cars	$25,330.14	
Taxes and insurance, $9.25 per $1,000 (assuming capital to be composed of one-half stock and one-half bonds)	$234.30	
Interest at 5 per cent (the average amount paid on West End and Boston Elevated capital is 5.09 per cent)	1,266.51	
Depreciation, 6 per cent	1,519.81	
	$3,020.62	
Investment charges per car mile (on mileage operated year ended June 30, 1912)		1.338
(B)—Carhouse Investment:		
Length of car from bumper to bumper, 25 ft., 300 sq. ft., required for housing, at $1.75 for land and buildings	$525.00	
For nine cars	4,725.00	
Taxes and insurance, at $9.25 per 1000 (as above)	$43.71	
Interest, 5 per cent	236.25	
Depreciation, 3 per cent	141.75	
	$421.71	
Per car mile (on mileage operated year ended June 30, 1912)		0.137
(C)—Power Investment:		
Power station investment, 16 kw per car, at $175 per kw	$2,800.00	
For nine cars	25,200 00	
Building (30 per cent), $7,560.00; interest, 5 per cent	$378.00	
Building (30 per cent); depreciation, 3 per cent	226 80	
Equipment (70 per cent), $17,640.00; interest, 5 per cent	882.00	
Equipment (70 per cent); depreciation, 6 per cent	1,058.40	
Taxes and insurance, $9.25 per 1000 (as above)	233.10	
	$2,778.30	
Per car mile (on mileage operated year ended June 30, 1912)		1.229
(D)—Power Transmission Lines:		
(16 kw per car at $45 per kw.)		
For one car	$720.00	
For nine cars	6,480.00	
Interest, 5 per cent	$324.00	
Depreciation, 1 per cent	64.80	
Taxes $8.98 per $1,000 (assuming capital to be one-half stock and one-half bonds)	58.19	
	$446.99	
Per car mile (on mileage year ended June 30, 1912)		0.198
(E)—Track Investment:		
Charges taken at the average cost per mile for the entire surface system:		
Investment	$9,300,000.00	
Car mileage	45,427,857.00	
Interest, 5 per cent	$465,000.00	
Depreciation, 6 per cent	558,000.00	
Taxes, $9.25	86,025.00	
	$1,109,025.00	
Per car mile (on mileage year ended June 30, 1912)		2.441
(F)—Cost of Power Used:		
Cost of power taken, at $0.0075 per kw-hr.		
Car uses 1.8 kw-hr. per mile.		
Cost per mile		1.350
(G)—Wages of Car Crews Year Ended June 30, 1912.	$18,032.29	
Add for effect of nine-hour law, figures for which are not yet obtainable	1,000.00	
	$19,032.29	
Mail car mileage	225,695	
Cost per car mile		8.422
(H)—Cost of Maintenance of Mail Car Bodies:		
Thirty-three months ended June 30, 1912	$2,244.35	
Add proportion of cost for painting to be done later.	750.00	
	$2,994.35	
Average cost for one year	1,088.88	
Cost car mile		0.482
(I)—Maintenance of Car Trucks, Including Wheels and Axles, Brakeshoes, etc.:		
Taken at the average cost for four years for the type of trucks used on mail cars per car mile		0.20
(J)—Cost of Maintenance of Tracks per Car Mile Estimated by Mr. Hile		1.500
(K)—Wages of Other Transportation and Car Service Employees and Expenses:		
Taken at the average cost per car mile for about 46,000,000 car miles on the entire surface system.		
Superintendence of transportation, including division clerks, starters, street inspectors, etc	0.55	
Switchmen	0.12	
Lamps, lubricants, waste, etc	0.15	
Carhouse employees and expenses	0.53	
Wrecking expenses	0.01	
Miscellaneous car service expenses	0.07	
Labor, cleaning and sanding track	0.15	
Oil, grease, sand, etc	0.01	
Snow expenses	0.09	
		1.68
(L)—Maintenance of Line Equipment, Building and Electrical Equipment of Cars:		
Taken at the average cost per car mile for about 46,000,000 car miles on the entire surface system.		
Maintenance of line equipment	0.34	
Maintenance of buildings	0.22	
Maintenance of electrical equipment of cars	0.60	
Superintendence of equipment	0.16	
		1.32
(M)—General Expenses:		
Taken at the average cost per car mile for about 46,000,000 miles on the entire surface system.		
Salaries, office and general expenses	0.53	
Law expenses	0.23	
Pensions and gratuities	0.04	
Miscellaneous expenses	0.39	
Injuries and damages	1.43	
Stationery and printing	0.16	
Rent of tracks, terminals	0.01	
		2.79

Senator Bourne said that the point he wanted to draw out was that no railway extensions were made on account of mail contracts, and that the mail-carrying contract was a by-product.

Statements and exhibits were submitted by representatives of the various companies in regard to their operations.

Mr. Neal, explaining the statement submitted on behalf of the Boston Elevated Railway, which is published herewith, said in answer to questions from Senator Bourne that he showed exactly what it costs for the investment in a car, maintenance of the car, wages of the men who operated the car, cost of power and various other elements that went to make up this cost and to demonstrate the loss indicated. In preparing the statement he took the actual power the mail cars were using. He had had a meter put on the cars.

Mr. Neal said further in regard to this statement that in trying to find out what the service cost he first looked to see how many cars were in use for this purpose and found there were ten, one of which was a 25-ft. box car. The other nine cars were 16-ft. cars, so in order to make the statement plain he eliminated the 25-ft. box car. For the nine 16-ft. box cars he found the investment to be $2,814.46 per car.

Mr. Neal went through the statement, explaining the various items, in answer to questions by the committee.

Similar explanations as to the statements were made by the other railway representatives who were present at the hearing.

F. C. Hamilton, Chicago Railways, made an oral statement of the results of operation of mail-car service on the lines of that company. He explained that he would file a statement with the committee but would not do so until such a statement had been authorized and approved by the Board of Supervising Engineers, Chicago Traction.

A. R. Piper, general freight agent Brooklyn Rapid Transit Company, submitted to the committee the rates of compensation recommended by the American Electric Railway Association's committee on compensation for carrying United States mail. These figures were printed on page 821 of the ELECTRIC RAILWAY JOURNAL for Oct. 11, 1912.

APPLYING THE CAR TRUST PLAN TO THE PURCHASE OF ELECTRIC RAILWAY EQUIPMENT

The Philadelphia banking interests of Drexel & Company, Brown Brothers & Company and Edward B. Smith & Company are back of the Philadelphia Equipment Securities Company, the incorporation of which was noted briefly in the ELECTRIC RAILWAY JOURNAL recently. As previously stated the purpose of the new company is to aid electric railways in the purchase of new equipment by acting as bankers and purchasing and marketing issues of car trust certificates.

The equipment trust plan was devised about forty years ago by steam railroads which wished to provide themselves with cars and locomotives and did not care to finance these purchases out of earnings or impair their surplus accounts. It is the plan followed by the steam railroads so successfully which the Philadelphia Equipment Securities Company proposes to bring to the electric railways. The method followed is simple: An electric railway which desires to increase its equipment orders cars from the car builders and pays down at the time of delivery, say, 25 per cent of the total cost of the new rolling stock. The balance of the debt is distributed over a period of ten years by means of a semiannual rental, which provides funds for the retirement of the car trust certificates, and distributes the debt so that it does not prove burdensome.

The plan also possesses another feature which is very attractive to operating companies. A steady income is provided from the operation of the cars during the time that they are being paid for. In the case of steam railroads many companies market their car-trust securities direct, the issues being large enough to attract investment bankers. On account of their smaller requirements electric railways have found it difficult to interest bankers in notes given for the purchase of new equipment, and car builders have been loath to accept paper when any other arrangement could be made.

The Philadelphia Equipment Securities Company proposes to bridge the gap between the railways and the car builders on the one hand and the investing public on the other hand by purchasing the car trust certificates of electric railways, placing them in the hands of a trustee and issuing against such deposit its own equipment trust bonds.

There are now outstanding approximately $320,000,000 of railroad equipment trust bonds. Orders for approximately $30,000,000 of electric railway cars were placed last year, and the applicability of this method of financing the rolling stock needs of the electric railways has been the subject of several articles in the ELECTRIC RAILWAY JOURNAL.

The officers of the Philadelphia Equipment Securities Company, Philadelphia, Pa., are as follows: Arthur E. Newbold, president; Thomas Newhall, vice-president; Gerald Holsman, treasurer; J. Clifford Rosengarten, secretary; Arthur E. Newbold, George H. Frazier, Edward B. Smith, Horatio G. Lloyd, Thomas Newhall, directors.

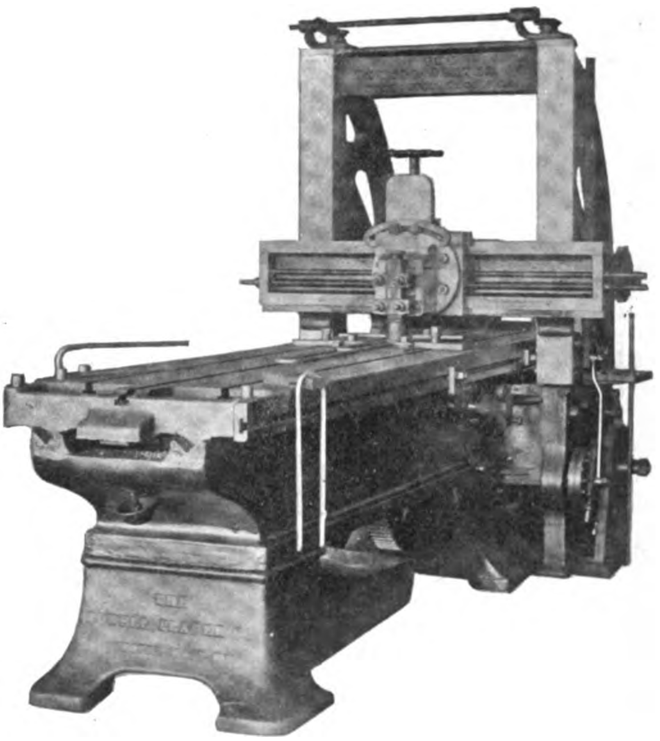
MAINTENANCE NOTES FROM BALTIMORE

Various shop practices of the United Railways & Electric Company, of Baltimore, have been described from time to time in these columns, but in view of the low maintenance costs which this company has attained, it may be of interest to present some additional data on this subject. For the year 1912, for example, the cost per 1000 car miles for the maintenance of motors, including lubrication, carbon, brushes, gears and pinions, was only $1.24, or, on the basis of 1000 motor miles, approximately 31 cents. The policy that has been instrumental in producing this result may be presented under two heads as follows:

First, careful inspection and attention to the small and seemingly trivial details to keep motor equipments in first-class condition.

Second, special arrangements for the proper lubrication of each type of motor whereby the armature bearing is oiled most effectively every thirty days and the axle bearings every 1800 miles.

No extensive attempt has been made to execute the overhauling of cars on the mileage basis, as under the present shop conditions the amount of extra clerical help required to follow the records would entail too much expense. The disadvantage of the straight time system is avoided, however, by having each carhouse adopt that car maintenance interval which is best adapted for its particular type, service and schedule. In accordance with this practice, each car is thoroughly gone over from the trolley pole to the truck at periods varying from eight to ten days.



Baltimore Shops—Bending Straight Stock into U's for Wheelguard Fingers

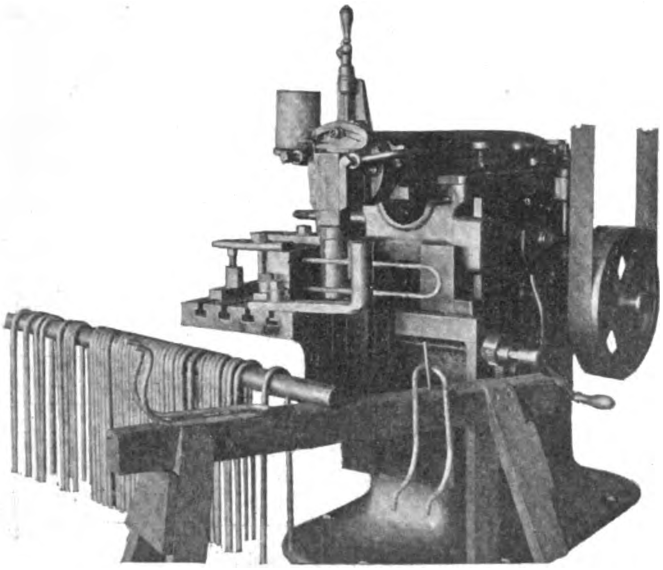
The thorough nature of this inspection will be apparent from the following statement concerning the motor equipment: Motors are fibered with strips 0.125 in., 0.075 in. or 0.050 in. thick for proper armature clearance and worn bearings; interior of the motor frame around the fields blown out and cleaned; all motor leads and wires carefully inspected so new material may be applied if any connection shows indications of burnt tape or brittleness; all wiring exposed to the elements or to oil cleaned and painted to preserve the insulation; brush holders and brush-holder shunts examined for indications of burning, and brushes for side wear; all motor fastening or supporting bolts examined for tightness. Furthermore, each carhouse is supplied with a water-barrel rheostat and an ammeter to test the circuit breakers every month at the amperage fixed as standard for the given service. It is clear from the foregoing that everything possible is done to maintain the motor equipment and other parts of the car in as good condition as when they first left the shops for service.

GEARS AND PINIONS

The company is gradually adopting solid gears which are installed on the 4½-in. and 5-in. axles at 45 tons to 60 tons pressure. Forged steel gears have been purchased recently for trial, and case-hardened pinions and gears are also on test. Gears are inspected every eight or ten days and lubricated when the inspection shows that they actually need lubricant. The grease used is heavy in consistency and cheap in cost.

MOTOR PRACTICES

Much of the success which the company has attained in keeping its maintenance costs low is doubtless due to the accurate handling of supply parts. Thus templates are used for brush-holder yokes and all brush holders must fit their respective jigs perfectly before they are placed in the motor.



Baltimore Shops—Bending Wheelguard Fingers on a Shaper

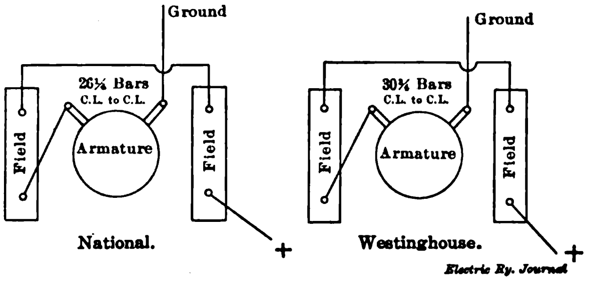
A brick oven, which is steam-heated in winter and electrically heated in summer, is used for making motor coils. New armature coils are first placed in the oven to dry, and then plunged into a compound of 0.865 specific gravity which has been heated by a steam coil to about 90 deg. Fahr. As the warm compound is thin, this treatment thoroughly impregnates the cotton. Gasoline or benzine was formerly used as a thinner, but it was found that these chemicals destroyed the body of the varnish. After impregnation the armature coil is returned to the oven for the final baking. The same compound is used in making field coils except that it is mixed with French chalk to form a mixture of the consistency of molasses. This mixture is then applied to every turn of the field form as the coil is being wound in order to obtain a compact solid mass. After this treatment the coil is thoroughly baked in the oven.

Standard instruction prints 5¾ in. x 4½ in. in size have long been used in these shops to aid the shopmen in making the proper connections of motors, setting of brushes, etc. The wiring and brush-setting diagrams for National and Westinghouse compressors reproduced herewith have recently been added to the album of instruction prints.

SHOP ECONOMIES

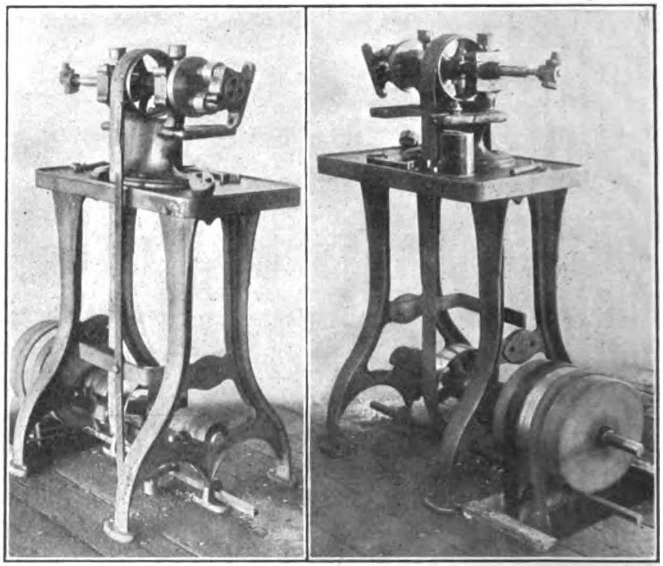
An interesting piece of axle welding has recently been carried out in the blacksmith shop, where two pony axles have been made out of three old motor axles by cutting off the journals and welding in a new piece which is long enough to extend the pony axle to the proper length. Such rewelded axles have been found of ample strength for use with pony wheels. Including overhead charges, they cost but $4 each against $12 for new axles.

One of the illustrations shows a reversible emery grinder which was reconstructed to grind valves at one end of the shaft and drain cocks at the other end. The principal changes required to adapt the grinder for this purpose were the installation of a new shaft and of a mandrel for holding the valves. The valves are principally of the rotary type, but slide valves can also be ground on these machines, although they require a little hand finishing.



Baltimore Shops—Connections for Compressor Motors

Two other illustrations show how a planer and shaper are used for making wheelguard fingers. The first step is to place the original stock, consisting of 35-in. bars of ½-in. diameter, between guide pieces or blocks upon the bed of the planer to bend them into long "U's," as illustrated. These pieces are then placed in the shaper for two additional bendings. The first bend is made along the sides of the "U" by means of an old car axle which has been indented for this purpose. The ends of the fingers are turned up through the same movement of the machine after they have been anchored in the two ¾-in. holes of the block shown alongside the indented axle. The ends have to be turned to this final curvature to permit their attachment to the woodwork of the wheelguard. The grooves of the shaping axle are constantly lubricated by gravity oil feed.



Baltimore Shops—Valve and Drain Cock Grinder

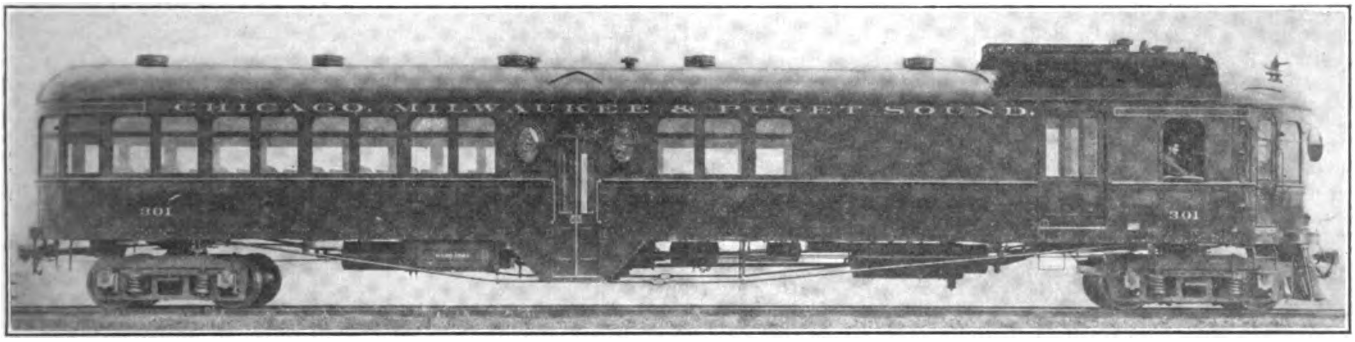
It has been found that the planer and shaper permit this work to be done six to ten times faster than is possible in the blacksmith shop because they eliminate the need of subjecting the stock to three different heats.

Acknowledgments are due to William A. House, president, and A. T. Clark, superintendent rolling stock and shops, for the information on maintenance practices and shop devices presented in this article.

GAS-ELECTRIC MOTOR CARS FOR THE CHICAGO, MILWAUKEE & PUGET SOUND RAILWAY

The Chicago, Milwaukee & Puget Sound Railway Company has recently placed two gas-electric motor cars in service on branch lines in the State of Washington. One of them is operating between Everett and Monroe, a distance of 14 miles, and makes five single trips per day, totaling 70 miles, while the other runs from Seattle via Cedar Falls to Enumclaw, a distance of 62 miles, and makes one round trip each day, covering 124 miles. Both cars were built by the General Electric Company.

The cars are of the combination passenger, smoking and baggage compartment type. They are 70 ft. 5 in. long, 10 ft. 5 in. wide, weigh approximately 50 tons and have a total seating capacity for seventy-seven people. The cab in front containing the power plant apparatus is 11 ft. 11 in. long; next is the baggage room, 15 ft. long; then the smoking section, 10 ft. 11 in. long, and the passenger compartment, 27 ft. 5 in. long. A center vestibule with side entrances runs crosswise between the passenger and smoking compartments. The smoking section provides twenty seats and the passenger compartment fifty-seven.



Gas-Electric Car for the Chicago, Milwaukee & Puget Sound Railway

The generating unit consists of an eight-cylinder, four-cycle gas engine of the "V" type, direct-connected to a 600 volt commutating-pole electric generator. An auxiliary hand-started equipment is also provided to start the main engine and run the lighting generator. Mounted on the axles of the forward truck are two GE-205 600-volt box-frame, oil-lubricated, commutating-pole 100-hp motors.

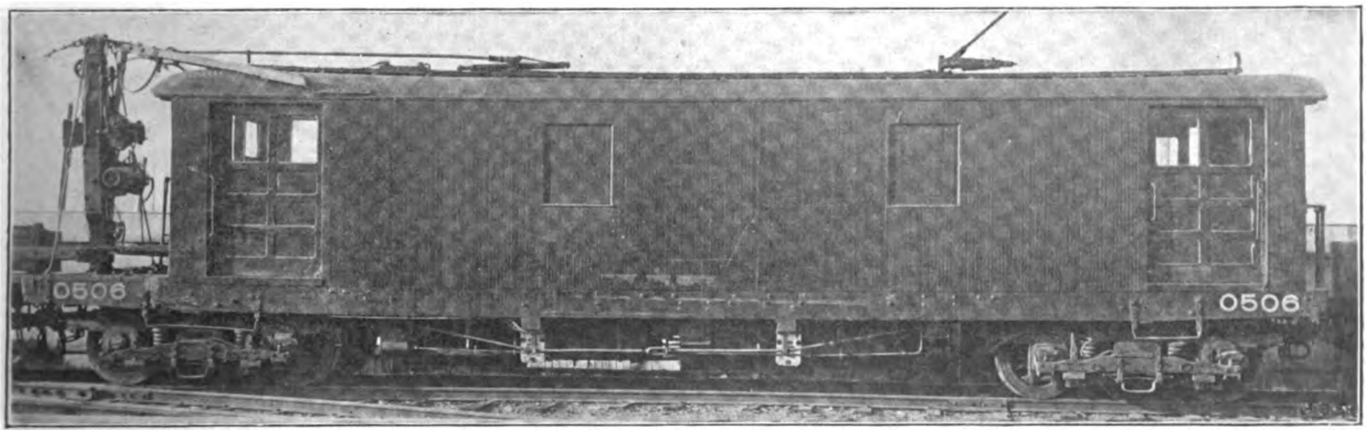
A hot-water heater, coal-fired, is installed for heating the car. To prevent freezing in cold weather when the car is lying idle the heater circulation may be connected to the engine-cooling system. A 150-gal. gasoline tank for the power supply is suspended under the car.

Both of these cars made the long trip across the western part of the continent under their own power. One of them left Chicago on the Chicago, Milwaukee & Puget Sound tracks and covered the distance to Tacoma, Wash., 2201 miles, in ten days, daylight running.

The car in question averaged 220 miles per day, and one day covered 315 miles. A run from Malden to Othello, Wash., 103 miles, was made in two hours and ten minutes, and in one case 20 miles of 2.2 per cent grade was negotiated in fifty-six minutes with one stop.

640-HP WORK-CAR LOCOMOTIVE FOR THE BOSTON ELEVATED RAILWAY

Among the several service cars included in the rolling stock of the Boston Elevated Railway is a high-powered work-car locomotive built by the company in its own shops. In general service this car hauls rails and construction material on the elevated division of the Boston Elevated Railway. Frequently it must haul four loaded cars of steel rials and at the same time keep clear of the regular service. The motors of this locomotive therefore are geared to the same speed as those operating on the passenger trains. The car is 46 ft. 4 in. over all and 32 ft. 3 in. between center pins and weighs completely equipped 81,350 lb. Four Westinghouse commutating-pole No. 301-D 160-hp, 600-volt box-frame motors are used to propel this locomotive. The control equipment consists of two sets of straight type HL unit-switch control double equipments, one set consisting of a line switch, switch group, reverser and control resister, controlling the motors on one truck, while one line switch, one switch group and control resistance operate the motors on the other truck. A Westinghouse air-operated hoist of 15 tons capacity is mounted on one end of this car. The interior of the car is supplied with tools and wrecking paraphernalia.

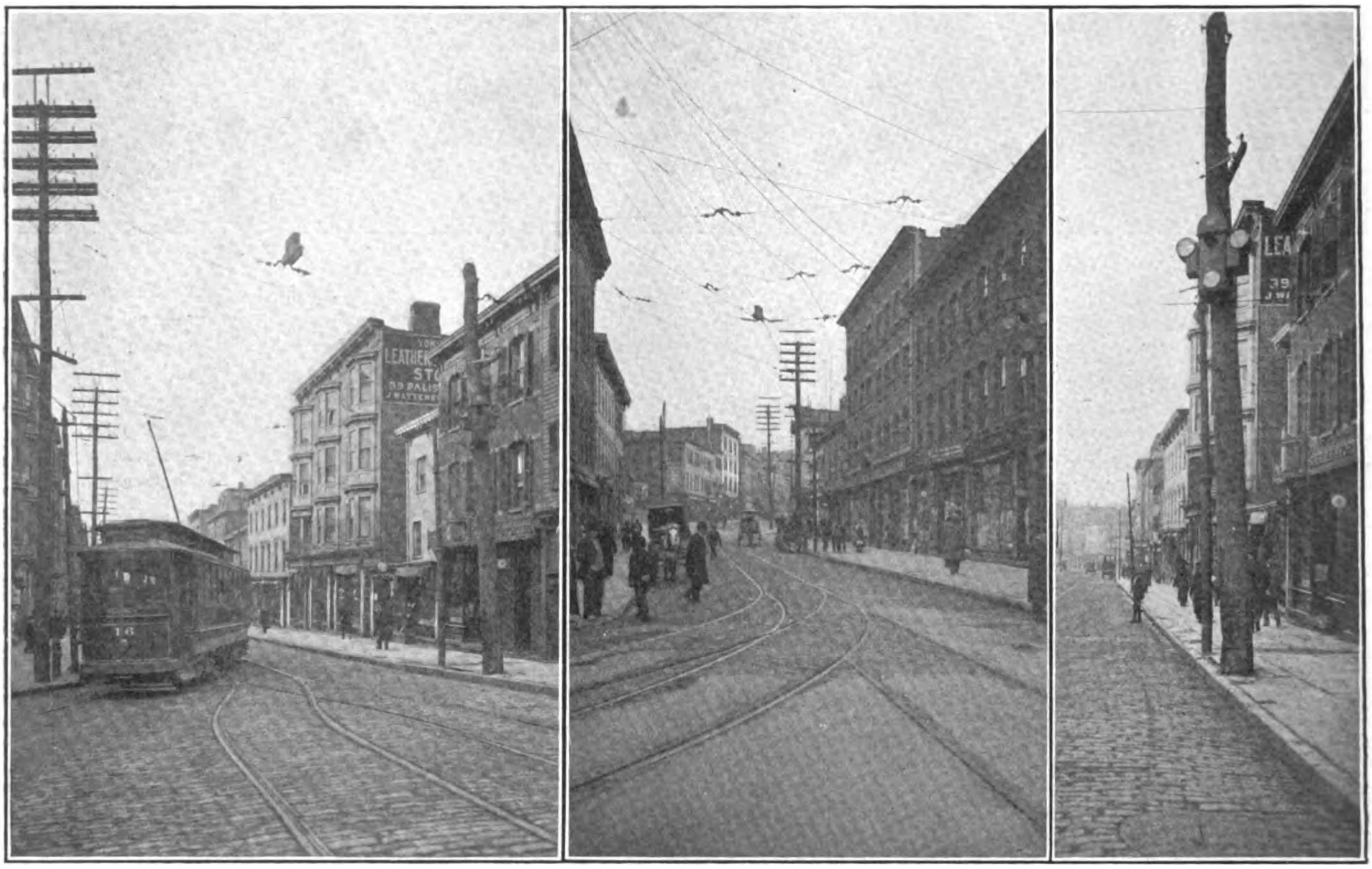


Boston Work Car with Pneumatic Hoist at One End

Mounted underneath the locomotive are the following pieces of apparatus: Two line switches, two switch groups, two reversers, two control resistors, eight frames of grid resistors, four reservoirs and four air compressors.

OVERHEAD SIGNAL INSTALLATION AT YONKERS

An interesting example of how a simple overhead signal system can be employed to improve car-operating conditions at a highly congested point is the installation made recently for the Yonkers (N. Y.) Railroad by the United States Electric Signal Company, West Newton, Mass. The traffic center of Yonkers is Getty Square, where seven of this railway's nine lines converge. Of these lines four come inbound and one goes outbound over an 800-ft. section of single track on Palisade Avenue between Getty Square and Elm Street. The difficulties of the situation are increased by the condition that all the converging thoroughfares enter Getty Square on steep grades. Furthermore, the square is also the passing point for a great deal of vehicle traffic owing to the fact that its Main Street outlet presents the easiest route between the eastern and western part of Yonkers. The layout of streets near the section which has been furnished with signals is shown in a diagram on page 297. The second diagram shows tht usual directions of car movement.



Yonkers Signal Installation—Overhead Switch and Pole Signal Outfits at Opposite Ends of the Palisade Avenue Single-Track Section

The signals at Elm Street, like those at Palisade Avenue and Gettty Square, are connected for two-way operation, which arrangement takes care of the possibility of rerouting and emergencies. Under the ordinary conditions of operation the Palisade Avenue section is used for one outbound and four inbound routes, as previously noted. The Palisade Avenue branch-off is operated in both directions, the Elm Street line is inbound only, while the New Main Street line is operated one way for the Mount Vernon, Tuckahoe and Nepera Park cars and both ways for McLean Avenue. The Main Street line, which connects with the station of the New York Central & Hudson River Railroad, is double-tracked for its entire run from Getty Square to the station.

The heavy operating conditions which the signal system has met satisfactorily on the Palisade Avenue section of single track are clear from the accompanying table, which shows the number of cars operated a day and also the rush-hour headways of the different lines.

Number and Headway of Cars on Yonkers Lines

	Trips Through Palisade Avenue	Rush-Hour Headway, Minutes
Inbound		
Mount Vernon	96	12
Tuckahoe	108	10 (double headers 5:30 p.m. to 7 p.m.)
Nepera Park	83	15
Park Avenue	159	5
Outbound		
Park Avenue	159	5 (a few double headers)
Cars per day	605, or cars per year, 220,825	

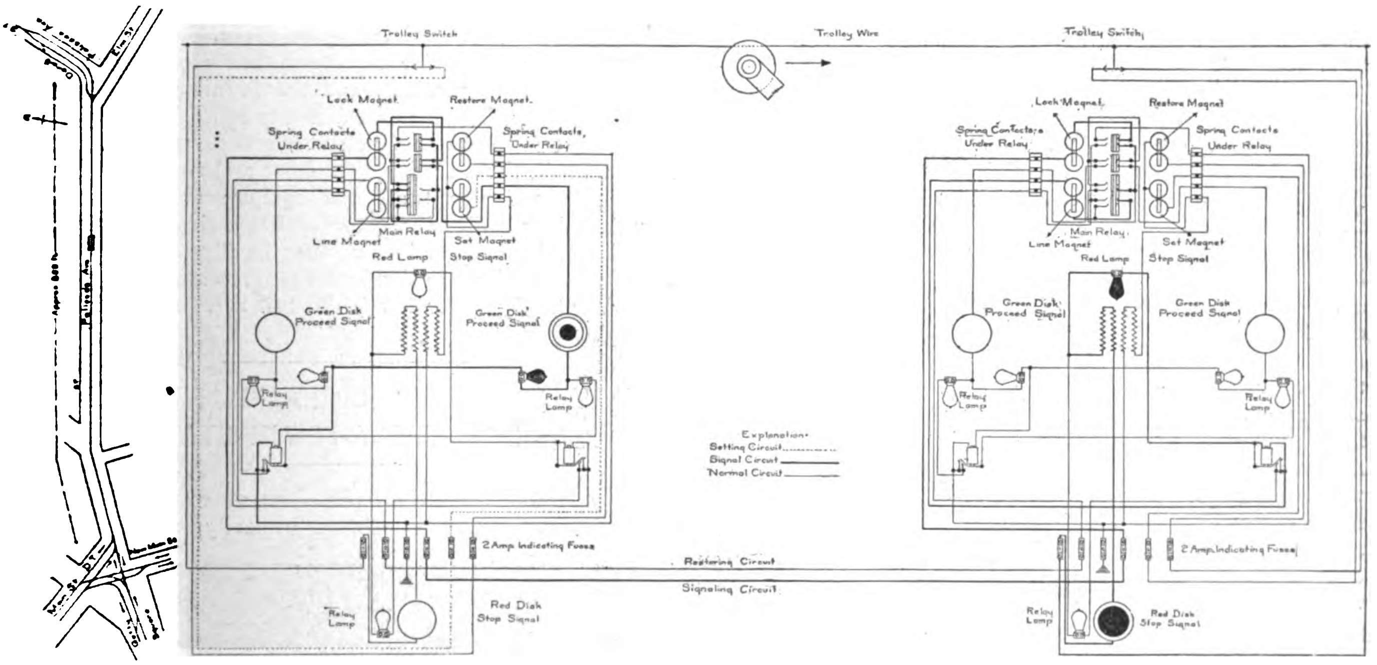
The schedule thus calls for the operation of 159 outbound cars and 446 inbound cars, the headways of the several lines ranging from twelve to five minutes. This condition, of course, made it necessary to install a counting mechanism in each signal. It is possible to have fifteen cars in a block, but in practice not more than six cars have ever been so operated and the usual time of passing this number through the block does not exceed five minutes. The equipment was installed during December, 1912, and has since operated with the greatest satisfaction. The apparatus consists of one United States K-2 lamp and disk signal outfit at Getty Square, a similar equipment at the junction of Palisade Avenue and Elm Street and six overhead switches. A detailed description of the working parts and wiring connections of the equipment follows:

A block of these signals consists of two signals, each equipped with two side semaphore attachments. Provision is made in each signal for the display of a red or danger aspect by light shining through a 5-in. lens and the display of a red signal disk through a circular glazed window in the lower part of the box at such time as is determined by the signal mechanism.

The semaphores are enameled white sheet-metal disks with green center inclosed in cases hung on each side of the main signal case. The semaphore case has round glazed windows through which the semaphore disks may be seen, and a lamp is placed within to illuminate them. These disks are pivoted on horizontal shafts which have a side-to-side direction and are held nominally in a horizontal position so that the edges only are presented to view.

When a car enters a block one of the white semaphores is turned into a vertical position, presenting its whole area to view, and is illuminated at the same time. This is the signal display at the entrance end of the block for the first car and indicates that the red light and red disk, which are danger signals, are displayed at the other, or exit, end of the block.

A following car operates to restore the semaphore set up by the entrance of the first car to its normal or horizontal position and to rotate the other disk to the vertical position, thereby presenting its broad side to view. This change of display from one semaphore to the other indicates that the second car has been properly counted in. Each following car will in turn drop the semaphore disk it finds set up and set up the other one, the operation taking place simultaneously. The danger signals will remain unchanged until all cars have left the block. The last car out restores the signal to normal condition.



Yonkers Signal Installation—Street Layout and Wiring Diagram

Operation is effected by charging wires from the trolley which operate a counting mechanism located in the top of the main signal case. When the trolley wheel of the car strikes a projection on the trolley switch connection is made between the trolley wire and the wire connecting the counting mechanism. If the car is entering a block, it runs under one of these switches, which charges a setting wire—that is, a wire connected with the counting mechanism—and rotates a wheel a short distance in a certain direction for each car entering the block. If a car leaves the block it runs under a switch which charges another wire, causing the wheel of the counting mechanism to rotate the same short distance but in the opposite direction. When as many cars leave the block as have entered, this wheel has been turned back to its normal position, and in so doing has restored the signals to their normal condition.

The first car which enters a block at either end determines that end as the entering end and the other end of the block as the exit end until the block is again restored to normal.

The signals are connected by two line wires, and each signal is connected to the setting end restoring switches at its end of the block. Each signal has also a feed wire from the trolley wire and a ground wire connecting it with the track. Thus there are six wires entering each signal. Each signal contains, besides the counting relay before mentioned, resistance tubes, two lamps behind the red lens, two lamp relays, a red signal disk and fuses protecting all circuits. Lamps are provided in pairs with relay connections so that if a regular lamp burns out its mate is automatically switched into active service.

Normally the two line wires are on feed at both ends of the block by connections through the counting relays placed in the domes of each of the main signal cases. One of these wires is for the circuit operating the signals. The other is for the restoring circuit which operates to step the counting mechanism back, step by step, as cars leave the block at the exit end.

When a car runs under the setting switch it charges a wire which operates the counting mechanism, disconnects the signal circuit from its feed at that end and connects it with the ground. The result of this operation is a flow of current from the signal at the other end of the block which lights one of the lamps behind the red lens, displays the red signal disk, energizes magnets to open the setting circuit at that end, continues over to the case at which the car operated the counting mechanism, through a lock magnet (which makes restoring impossible while this circuit is active), through a white light in one of the semaphore cases, energizing a magnet to display the semaphore disk, and thence to ground.

By opening the setting wire as above noted a car cannot derange the signal display by unavoidably running against a danger signal. When the cars run through a block and leave at the exit end they charge a wire leading from the restoring switch to the nearby signal, which, by energizing a magnet in the counting relay, opens the signal circuit and at the same time connects the other line wire with the ground.

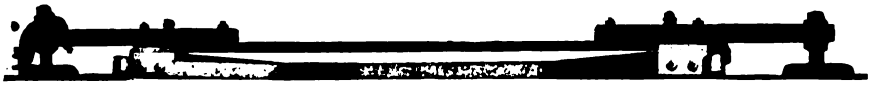
By opening the signal circuit the lock magnet at the entering end is de-energized and the restoring circuit is established as above noted by putting it on the ground. The restoring circuit operates a magnet which turns the step or counting wheel in the direction contrary to that caused by the setting operation. Restoration takes place in a similar way when a car backs out of the block at the end in which it entered.

Cars following one another into a block change the semaphore signal display from side to side alternately by operating to rotate the step wheel in the counting relay, which switches the signal circuit first into one semaphore mechanism for one car and then into the other for the following car.

The whole arrangement of circuits is such that outside influences, such as grounds, crosses, etc., affect the signal display in all cases only in such manner as insures safety in the car movements.

HIGHWAY CROSSING SIGNAL FOR ELECTRIC RAILWAY

Among the new apparatus brought out by the Nachod Signal Company, Philadelphia, Pa., is a highway crossing signal for electric railways, which is stated to embrace many of the meritorious features of that company's well-known line signals. With respect to the variety of car movements possible, the control is practically equivalent to that given by a track circuit, and very much more elaborate in that regard than the ordinary crossing signal operated by intermittent contacts.

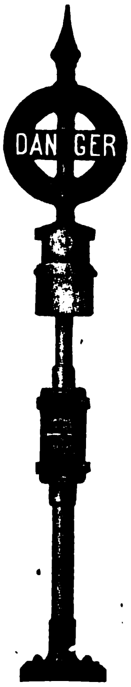


Trolley Contactor for Highway Crossing Signal

The signal is started by a car passing a contact device, located, say, 1000 ft. from the crossing, and is stopped by a similar contactor at the crossing. For a single-track crossing another contactor is located at an equal distance in the opposite direction to start the signal for cars going the other way. The indication is given simultaneously by a vibrating bell and by a flashing illuminated danger sign. If two or more cars pass the starting contactor the bell will continue to ring until both or all have made the crossing, or if a car should start the bell ringing and should back under the contactor without making the crossing it will stop it. Thus cars may run through the protected section in any manner, making all kinds of abnormal movements, but so long as one remains between the starting contactor and the highway crossing the bell will continue to ring. In fact, the control embodies the directional and car-counting features of Nachod signals.

The trolley contactors of the type illustrated are without moving parts and operate at high speeds. They are fixed to the wire by the usual trolley ears and are supported by a double curve pull-off at one end. The wheel bridges from the wire to the contact strips, which are inclined toward each other. Therefore the one adjustment of the strips will accommodate a variety of trolley wheels.

The standard, which is illustrated in the accompanying cut, consists of a pinnacle, sign, fuse box and base, with pipe connections, the base being secured with foundation bolts to a concrete pedestal. The fuse and control box affords a convenient means of testing the circuits of the bell and also for stopping it manually in emergencies. No batteries are required for the bell, as both the controlling and ringing circuits are supplied from the trolley.



Crossing Signal

The bell is an 11-in. cast bell-metal gong, attached to the door of the cast-iron case. The clapper strikes the gong through a small hole in the case, thus making a thoroughly weatherproof construction. The relay, which comprises a clapper magnet and a pair of counting magnets operating a revolving switch in the manner of a drum controller, is in the lower part and is immersed in a tank of transformer oil. This lubricates the moving parts, quenches the arc of the contacts, protects against lightning damage, in general increasing the reliability of the bell and reducing maintenance. The scheme of circuits is said to be remarkably simple for so universal a control.

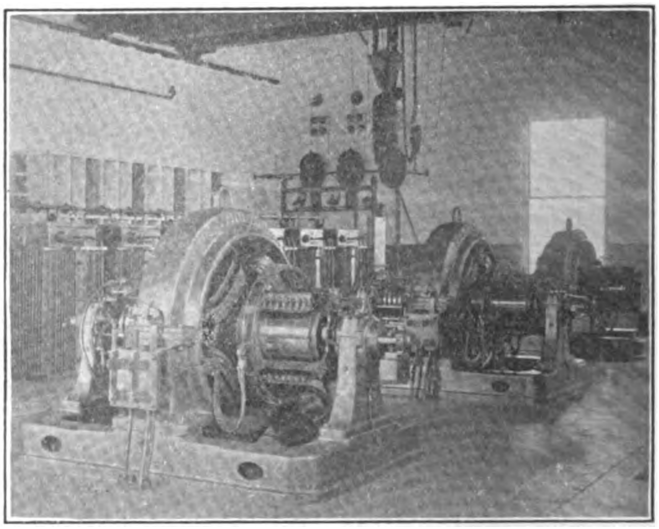
The danger sign is a cast-iron box having the word "Danger" in 6-in. letters deeply recessed, glazed with wire glass, in which are a series of lights flashing in unison with the bell. This is a new form of warning and is particularly arrestive at night. The ringing indicator furnished consists of a shaded light signal located immediately in advance of the starting contactor and illuminated by one of the series of flashing lamps which is run to it. Thus a motorman who passes the contactor will be assured by observing this that he has started the signal in operation. This improvement should be welcomed, as most crossing signals give no proof that the apparatus is in operative condition and that the signal has been given.

The light and bell signals are independent, and the burning out of lights will not affect the bell. The equipment for single track comprises one standard complete, including sign and bell, three trolley contactors and two ringing indicators. For double track the equipment comprises one standard, four trolley contactors and two ringing indicators.

In a residential district or other locality where the bell might be objectionable the flashing lights alone can be furnished. On the other hand, the bell can be used without the lights.

ROTARY CONVERTER OPERATION FROM SINGLE-PHASE RAILWAY POWER STATION

The operation of a three-phase rotary converter railway system from a power house used primarily to supply single-phase current for the operation of a trunk-line railroad is a problem which presents several unusual considerations.



Interior of Stamford Substation, Showing Converters, Transformers and Lightning Protective Apparatus

The Stamford substation of the Connecticut Company is one of three rotary converter substations now installed which are designed for operation from the three-phase, 11,000-volt, 25-cycle circuit fed from the Cos Cob power station of the New York, New Haven & Hartford Railroad. The other two are the Port Chester substation of the New York & Stamford Railway, with a capacity of 1500 kw, and the White Plains substation of the Westchester Street Railroad, with a capacity of 1200 kw. The Stamford substation contains three rotary converters rated at 300 kw each, and it is equipped with the usual transformers and a suitable three-phase reactance, all of Westinghouse construction.

In laying out this station a number of problems had to be considered. The resistance of the line between Stamford and Cos Cob was very low, the distance being only 3½ miles, and the unbalancing of voltage due to the single-phase railroad system was considerable as well as very fluctuating. For the same reason surges of voltage were often encountered, and it was necessary to consider the conditions which would exist when one leg of the transmission line was opened on account of line trouble on the leg supplying single-phase current to the trunk-line railroad.

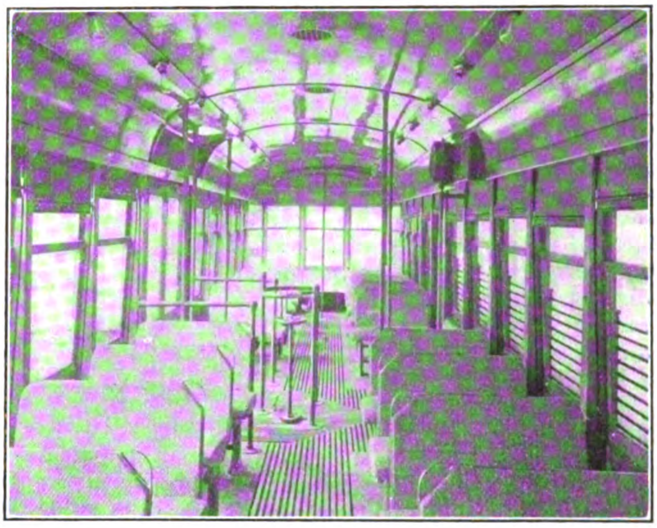
By providing sufficient taps on the 11,000-volt side of the transformers it was found possible to reduce the maximum unbalancing of the line, so far as the rotary converters themselves were concerned, to a value somewhere about one-half that on the primary circuit, and this arrangement, together with the reactance coils and the liberal design of the rotary converters, has given very good results. In order to take care of the single-phase condition resulting from the opening of one leg of the transmission system, the specifications called for an equipment which would disconnect one leg and for rotaries which would be capable of carrying full load for five minutes when supplied with single-phase energy. The ability of the machine to do this has been amply demonstrated, there being only a slight momentary, and by no means objectionable, sparking when one leg is opened under conditions of full direct-current load. The disconnection of any one leg is obtained by the use of three single-pole, electrically operated oil circuit-breakers on the incoming line, and by means of undervoltage relays controlling the breakers in the power and trolley circuits respectively.

The incoming three-phase 11,000-volt line is controlled by single-pole, outdoor-type electrically operated oil circuit-breakers similar to those used on the bridges of the electrified portions of the New York, New Haven & Hartford Railroad, but they are set at a rather high tripping point, so that under normal conditions the station is handled and overload protection afforded by electrically operated oil circuit-breakers mounted in the busbar structure in the building. These are operated and tripped from power supplied by a storage battery in the station. Lightning protection is afforded by a specially designed electrolytic arrester.

After being in service a period over a year, it does not appear that there is any difficulty in obtaining successful operation with a rotary converter substation feeding a railway load when supplied with three-phase power from a single-phase railway power station.

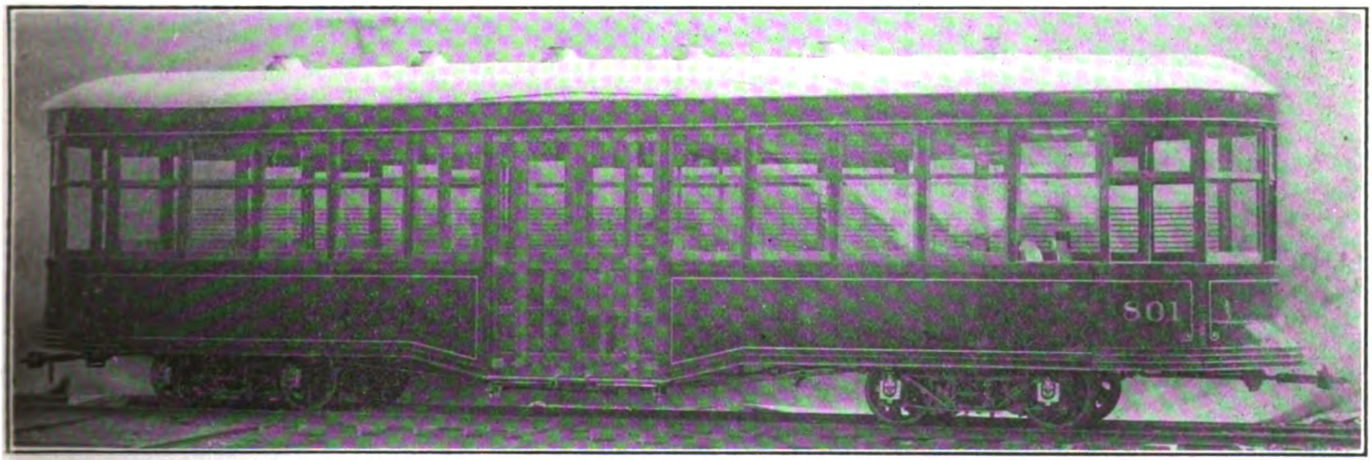
CENTER-ENTRANCE TRAIL CARS FOR MEMPHIS

The Memphis Street Railway has recently placed in service fifteen trail cars with low floors and center entrances. The cars are intended for single-end operation and for that reason entrance doors are provided only on one side of the car, the side opposite the door being equipped with a short longitudinal seat.



Memphis Trailer — Interior View, Showing Railings at Center

The bottom framing is of steel with side sills of 7-in. T-beams. The end sills and four cross-beams are 4-in. T-beams, two 1½-in. truss rods being placed under the side sills. The sides are straight and are sheathed with white ash and an exterior sheathing of No. 12 gage steel is installed below the window sills. Both the upper and the lower window rails are made in one piece and they are screwed and dovetailed into the side and corner posts.

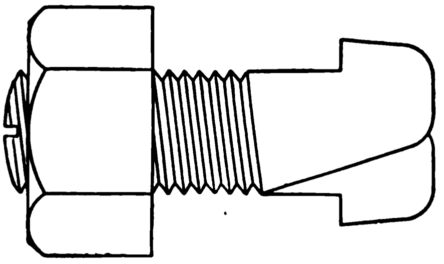


Memphis Trailer—View Showing Center Door and Drop Siding to Provide for Interior Step

The wheels are only 24 in. in diameter, thus permitting a floor 28½ in. above the top of the rail. This floor is reached in two steps, the first with a 14½-in. and the second with a 14-in. riser. The latter step is of the interior type and, as shown in the accompanying illustration, the side sheathing is dropped at the doorway to support it. The center entrance is 5 ft. 3 in. wide. The length of the car over the vestibules is 38 ft. 3¼ in. and the seating capacity is fifty-four. Cross-seats are used throughout, except at the semi-circular ends and at a point opposite the entrance. The lower window sashes can be raised up to the level of the stationary upper ones, thus making the car suitable for both winter and summer use. A plain arched roof is installed in connection with Brill ventilators, which are located along the center line.

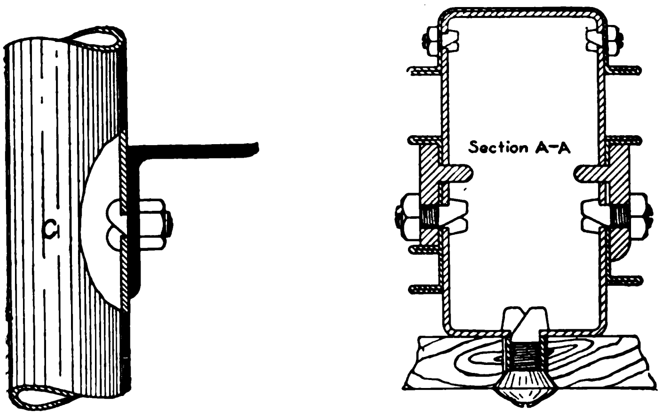
SPLIT BOLT FOR USE IN INACCESSIBLE PLACES

A new device called the Kling bolt has been designed for attaching brackets to tubes or drums or in places where insufficient space exists for inserting bolts of the standard type. It permits the head to pass through a hole of the same diameter as the stem of the bolt and yet gives a firm anchorage for the head on the opposite side of the material through which it passes. In consequence it is well adapted to all hollow construction work.


Split Bolt—Side View Showing Shape of Half Heads

The device is a split bolt, each half having a head of special shape, the split being made in order that the bolt head may be passed through the hole. This splitting does not reduce the area of the metal nor affect the tensile strength of the bolt, as the area of the metal at the head is greater than the area of the metal where the thread is cut. The heading of the bolt does not injure the fiber of the metal in any way.

The new bolts are made both with plain heads and with braced heads, the braced head bolts being designed for use where heavy strains occur. The accompanying illustration indicates how readily brackets may be attached to tubing with these bolts, and this is also the case with swivels, loops, attachments for guy wires, etc. In addition the bolt offers many advantages where connecting or bracing is necessary in the construction of railings. Where gates are required their hinges may be securely attached to the railing by means of this device, and it is possible to attach fittings of various design to both round and square columns. In all cases the bolts will save the cutting or threading of pipe or tube.



Split Bolt—Bracket Attached to Tube—Sash and Curtain Guide Attached to Side Post

A broad field for the use of this bolt is that of steel and semi-steel passenger car construction, as it permits the use of tubular posts. The illustration shows sash and curtain guides attached to a tubular post with the Kling bolt. Where space is limited, a single curtain guide can be used as shown on this section. Composition wood or steel lining can also be readily attached to posts and carlines. The new bolt is the invention of Peter M. Kling, of the Brooklyn Rapid Transit Company, and it is being placed on the market by the United States Metal & Manufacturing Company, New York.

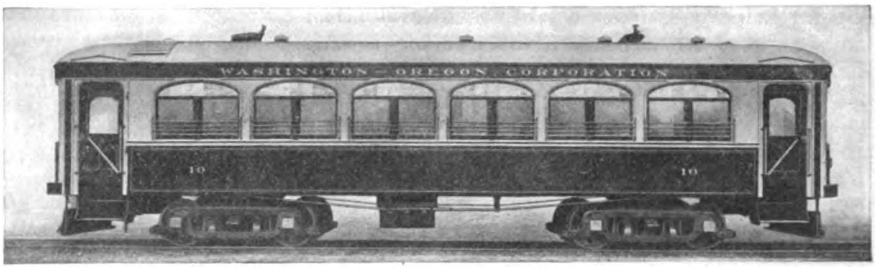
CAR FOR COMBINED CITY AND LIGHT INTERURBAN SERVICE

The accompanying halftone shows the exterior of a car of unusually handsome lines which was recently built by the Niles Car & Manufacturing Company for the Washington-Oregon Corporation of Portland, Ore., and Vancouver, Wash. The car is of standard construction in all details, with single arch roof, single side walls, with steel outside sheathing and an extremely wide aisle. It is designed for double-end service and has passenger and smoking compartments. It is intended for city, suburban and light interurban traffic in Oregon and Washington, as it can be operated at speeds up to 45 m.p.h. as a maximum.

The general dimensions are as follows:

Length over buffers	47 ft. 0 in.
Length of car body	35 ft. 0 in.
Width over outside sheathing	8 ft. 9½ in.
Width of aisle	29¼ in.
Length of seats over aisle arm rests	37 in.

Each end of the car body and each side of each platform is fitted with a 30-in. single door. The side walls below the windows are of 1-in. tongued and grooved oak, sheathed on outside with No. 12 gage patent bevel steel plates.



Car of Washington-Oregon Corporation for Combined City and Light Interurban Service

WATER-POWER FOR THE TWIN CITIES

Active construction work has been commenced on the Coon Creek Rapids development in the Mississippi River, 11 miles northeast of Minneapolis, where a 12,000-hp plant is to be erected by H. M. Byllesby & Company, to furnish additional power to their Minneapolis and St. Paul properties. The dam is being built under a fifty-year permit granted by the United States government, which requires that the army engineers supervise the design, construction and operation of the development. The dam will consist of an earth embankment with core walls 600 ft. long, a power house and a retaining section 470 ft. long.

The first installation in the power house will aggregate 12,000 hp, transmitting to Minneapolis at 13,300 volts, thus tying in directly without transformers with the general distribution system of the Minneapolis General Electric Company at its Riverside steam plant. The transmission line to Minneapolis will be erected for part of the distance on private right-of-way and partly alongside the new tracks of the Minneapolis & Northern Railroad.

News of Electric Railways

Report of the District Electric Railway Commission, Washington

The fifth annual report of the District Electric Railway Commission, Washington, D. C., for the year ended Dec. 31, 1912, as submitted to the Interstate Commerce Commission, was made public on Feb. 10, 1913. During the year the District Electric Railway Commission held thirty-seven executive sessions and eight public sessions. One hundred and six complaints were received during the year. Of these complaints ninety-four were disposed of by the direct informal action of the commission or by the Interstate Commerce Commission after recommendation by the District Electric Railway Commission. A considerable part of the report is necessarily taken up with matters of purely local interest, such as service over particular lines, the operation of "owl" cars, etc. An abstract follows of the parts of the report which deal with the subjects of crowding, trailers, new and improved equipment, transfers, all-night service, ventilation, etc.:

"The largest question which the commission has had to deal with has been that of providing a sufficient number of cars to handle the traffic properly during the rush hours of the day. A study of the situation has been made by taking records of the number of passengers carried and the number and capacity of cars furnished on the various lines. On the basis of these records orders have been issued from time to time requiring the operation of an increased number of cars so as to relieve the conditions somewhat. The Washington Railway & Electric Company was seriously handicapped during the year by the destruction of forty-five passenger cars by fire. The company finally placed orders for sixty-five new cars. Delays in the arrival of these new cars made it impossible for the company to place enough cars in service to handle the passenger traffic without overcrowding. In this connection investigation by this commission has shown the necessity of action whereby the street railways will be required to have on hand a sufficient number of surplus cars properly to meet the increasing demands of traffic.

"Previous reports have emphasized the fact that the maximum number of cars which can be efficiently operated on certain lines in the District had been nearly—if not quite—reached during the daily periods of heaviest traffic. The commission repeats its suggestion that there should be legislation requiring the construction of additional tracks in order that a sufficient number of cars may be operated to accommodate the continually increasing traffic.

"Owing to the loss by fire of a large number of cars of the Washington Railway & Electric Company, as heretofore mentioned, and the subsequent delay in the delivery of new cars to replace those destroyed, the order of the commission prohibiting the operation of single-truck trailers was amended and will finally become effective Feb. 1, 1913. The Washington Railway & Electric Company is now operating about twenty single-truck trailers, which constitute the entire amount of equipment of this character now in service in the District. The Capital Traction Company ceased operating trailers on May 15, 1912.

"The Capital Traction Company has received its full complement of 150 new city cars of the pay-within type, all of which are now in service, and in addition has remodeled a number of its old cars to conform to this type. Five additional suburban pay-within cars have also been placed in service on the Chevy Chase line operated by this company. These pay-within cars are suitable for both summer and winter use, and experience shows that when these cars are properly heated and ventilated they are excellent equipment for winter use.

"The Capital Traction Company decided during the past year to equip all of its cars with air brakes and will have the work completed not later than Jan. 1, 1914.

"During the year the Washington Railway & Electric Company has placed in service fifty new fourteen-bench cars, has practically rebuilt twelve suburban cars operated on the Tenleytown line, equipping them with new trucks, four motors in place of two, new seats, etc., and has converted several cars from the pay-as-you-enter to the pay-within type, installing air brakes and cross-seats in the place of longitudinal seats in the latter. This company has also placed in service about thirty new cars of the center-entrance type, these being a part of an order of sixty-five new cars of the same design, all of which are expected to be in service in the course of a few weeks. These cars are all equipped with air brakes, are adapted to both summer and winter service and have several additional features which are conducive to increased comfort and convenience. The Washington & Old Dominion Railway has placed in service a number of new cars of the interurban type in connection with its extended service to Bluemont, Va. The Washington, Spa Spring & Gretta Railroad has in service two cars operated by storage batteries.

"This commission favors legislation giving to the Interstate Commerce Commission or to the public utilities commission, if such is to be provided, power to determine the points at which and the conditions on which transfers shall be issued within the District of Columbia. It is believed that this situation can be better handled administratively than by the incorporation of transfer arrangements in a statute.

"After extended investigation and hearing in regard to the operation of all-night cars through certain sections of the city not provided with such service, it was decided that an all-night service was reasonable and should be required. Orders were accordingly entered requiring a minimum service over certain lines with very satisfactory results to the patrons of these lines. The Washington Railway & Electric Company has protested to the commission against being required to furnish this all-night service, claiming that it does not pay the operating expense, but the Interstate Commerce Commission has declined to withdraw its order.

"The establishment of express service on several lines extending into the suburban sections of the District has resulted in a more proper distribution of passengers between city and suburban cars running over a portion of the same route, and the inauguration of similar service on other lines is now under consideration.

"The investigation into the question of the impure air in cars has been continued through the year. The modern car with both platforms inclosed by doors which are closed while the car is moving, while it presents many advantages which have led to its almost universal adoption, is unquestionably deficient in the matter of pure air. There are not more than six or seven cars in service within the District of Columbia which are equipped with automatic ventilators. The sixty-five new cars now being placed in service by the Washington Railway & Electric Company are equipped with a mechanically operated ventilating device. The necessity for proper ventilating devices is plainly shown by the investigation made by the health officer of the District of Columbia at the instance of this commission, the details of which will be embodied in a separate report on car ventilation which will be submitted at a future date. In the meantime it is believed that every closed car should be automatically ventilated in order that passengers may be relieved from the dangers of vitiated and poisonous air."

Bigelow Bill Discussed at Cincinnati

Mayor Henry T. Hunt of Cincinnati, City Solicitor Bettman, representatives of civic and labor organizations of Cincinnati and other interests appeared before the judiciary committee of the House of Representatives on Feb. 4 to discuss the Bigelow bill, which seeks to repeal all franchises which were made for a period of more than twenty-five years. This bill can be applied only to the Cincinnati Traction Company and underlying corporations, since no other city took advantage of the Rodgers law during its short life. Mayor Hunt opposed the Bigelow bill because it interferes with the plans of the administration for settling the street railway differences in Cincinnati. He has proposed that the Cincinnati Traction Company shall give up its fifty-year franchise and accept one for an indefinite term or one that can be terminated at the option of the city. The company should rent the loop when constructed at a sum equal to the interest and sinking fund on the cost of construction, plus taxes. Interurban roads should be permitted to use the loop at not more than 25 cents per car mile. A commission should be selected to determine the propriety of stock issues, extensions and fares, the company to be permitted to earn enough to pay a fair return on the capital invested. Any additional profits should be divided equally between the city and the company. Mayor Hunt then asked the enactment of legislation as follows:

Authority for a bond issue for a terminal loop to be submitted to the voters, two-thirds of the votes cast being required to carry it.

Grant of an additional stretch of the canal about three-quarters of a mile in length to Ross Avenue in St. Bernard to enable the city to develop the loop project.

Relief from the word "beneath" in the original canal act, apparently requiring subway construction to a point beyond the necessity of public convenience.

A law converting term franchises into indeterminate franchises with proper provision for valuations and appraisals.

A law permitting a city and a company in possession of a term franchise to agree upon terms of surrender of franchises when approved by popular vote.

City Solicitor Bettman outlined the objectionable features of the Bigelow bill. He said its greatest fault was that improvements and extensions could not be financed under it. No provisions had been made for the reconstruction of the work that would be torn down. Mr. Bettman offered a bill which follows the Wisconsin plan. He believes that it cares for all the exigencies that may arise and provides for financing upon a fair basis.

Miller Outcalt, attorney for the Cincinnati Street Railway, operated under lease by the Cincinnati Traction Company, said that the enactment of the Bigelow bill into a law would be followed by a long legal struggle. The company which he represented wanted to see the contract with the lessee enforced. but it would oppose any measure that threatened to disturb its financial status or its contracts with the Cincinnati Traction Company.

Representative Bigelow said that he did not mean that the bill should be devoid of constructive features, but that the inclusion of some of the points named by speakers would make it weak and perhaps unconstitutional. The constructive ideas could be taken up later, when the city would have more power to enforce its demands.

A public meeting was held at the Music Hall, Cincinnati, on the evening of Feb. 5, at which Mayor Hunt, City Solicitor Bettman and Representative Bigelow discussed the bill. Theodore Horstman, who presided, condemned the fifty-year franchise and criticised the company on the ground that it had furnished inadequate service. He also stated that the amount of stock which is outstanding is excessive. Mr. Horstman said that the proposed loop around the city would benefit the company.

New York Rapid Transit Operating Contract Injunction

Edward E. McCall, formerly Justice of the Supreme Court of the State of New York, who was appointed a member of the Public Service Commission for the First District by Governor Sulzer on Feb. 3, 1913, took possession of his new office on the afternoon of Feb. 7, 1913, when he succeeded William R. Willcox as chairman of that commission. Mr. Willcox has served as chairman from the date of the organization of the commission in 1907, when he was appointed and designated as chairman by Governor Hughes. His colleagues at that time were William McCarroll, Edward M. Bassett, Milo R. Maltbie and John E. Eustis. Governor Hughes reappointed Commissioners Maltbie and Eustis when their terms expired, and they are still members of the commission. Commissioners McCarroll and Bassett retired during the administration of Governor Dix, who appointed as their successors respectively J. Sergeant Cram and George V. S. Williams. Chairman Willcox's term expired on Feb. 1, 1913, and Governor Sulzer appointed Judge McCall as his successor and also designated him to act as chairman. The commission as it now stands, therefore, consists of Edward E. McCall, chairman; Milo R. Maltbie, John E. Eustis, J. Sergeant Cram and George V. S. Williams.

The operating contracts with the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company were not signed before Chairman Willcox went out of office. Action probably would have been taken on these contracts if it had not been for an injunction obtained by John J. Hopper restraining the commission from executing them. The injunction was vacated on Feb. 11, 1913, Presiding Justice Ingraham declaring that the points raised were without merit. The injunction was applied for on the ground that the carrying out of the terms of the proposed contracts would involve a waste of public funds.

Notwithstanding the delay as to the operating contracts, the commission has gone ahead with actual construction work. During the week two contracts were awarded for the construction of the Astoria and Corona branches of the proposed rapid transit system in Queens Borough. These branches run from the Queens end of the Queensboro Bridge, one north to Astoria and the other eastwardly to Corona and Flushing. The contracts awarded cover the greater part of these two routes, although the section covering the junction and embracing the joint station near the Queens end of the Queensboro Bridge has not yet been advertised for bids. Both contracts were awarded to the lowest bidders, the Astoria line going to Cooper & Evans for $860,743 and the Corona line to the E. E. Smith Contracting Company for $2,063,588. Both will be elevated railroads, and under the proposed dual system are to be operated jointly by the Interborough Rapid Transit Company and the New York Municipal Railway Corporation.

The commission has approved a contract made by the Brooklyn Heights Railroad and the New York Municipal Railway Corporation for the construction and operation by the latter of an elevated connection between the Myrtle Avenue elevated line in Brooklyn and the Lutheran Cemetery line, so that under the new rapid transit system trains on the Myrtle Avenue line may be operated continuously over the Lutheran Cemetery line from Wyckoff Avenue to Metropolitan Avenue and return.

The commission has transmitted to the Board of Estimate and Apportionment resolutions laying out two new rapid transit routes needed for the dual system. One is known as the Park Avenue-Lexington Avenue connection at Forty-second Street, Manhattan, and provides for the connection of the existing subway with the new Lexington Avenue subway. The other is known as the Flushing route and provides for the extension of the Woodside, Astoria and Corona route in Queens from its present terminus at Prime Street, Flushing, through Roosevelt Avenue, Amity Street, Marston Avenue, Lucerne Place, Station Road and Warburton Avenue to Bay Side Boulevard. This route will bring the district in and around Flushing and Bayside into all-rail communication with Manhattan.

The Question of Deficits in the Operating and Maintenance Funds in Cleveland

A meeting of the officers of the Cleveland (Ohio) Railway and city officials was held in the office of J. J. Stanley, president of the company, on Feb. 5, 1913, for the purpose of formulating a plan to wipe out the deficits in the operating and maintenance funds. Mayor Newton D. Baker, Street Railway Commissioner Peter Witt, Engineer Joseph Alexander and Thomas Sidlo, secretary to Mr. Witt, represented the city, while Mr. Stanley, Secretary Henry J. Davies, General Manager George Radcliffe, Auditor Thomas Kilfoyle and Attorney Harry Crawford were present for the company.

The representatives of the city asked that the surplus in the accident fund be transferred to the other funds in order to balance them and argued that if this was done there would be no need to increase the fare. Mr. Stanley feels that the funds should be administered just as intended in the Tayler franchise. An increase in the fare would be necessary to prevent further deficits in the funds and pay off those already made. Mayor Baker said he believed that the Tayler franchise did not contemplate a deficit of any kind and intimated that so long as there are funds in the treasury there will be no deficit. Mr. Witt and Mr. Davies will submit their views in writing for the consideration of the city officials. The franchise provides for arbitration in case of disagreement.

Mayor Baker, Mr. Witt and Councilman Haserodt, chairman of the Council committee on street railways, inspected the property of the company recently and as a result decided to approve the request of the company to expend $500,000 for track repair this year.

At a meeting of the street railway committee of the Cleveland Chamber of Commerce recently, the subject of service was discussed. Mr. Stanley and Commissioner Witt said the service is not what it should be, but that it will be improved as soon as the trailers and motor cars ordered some time ago are received and placed in operation. Mr. Witt's request that mercantile houses and factories dismiss their employees at different times between 4.30 p. m. and 5.30 p. m. was discussed, and it is said that the committee later decided to advise employers to do this if possible.

Subsidy Urged for Toronto, Uxbridge & Port Perry Railway

A deputation from Toronto, Ont., and surrounding municipalities asked the Premier and Minister of Railways on Feb. 6 for a subsidy of $455,000, or $6,500 a mile, toward the construction of the proposed Toronto, Uxbridge & Port Perry Railway. The total cost of construction is estimated at $1,500,000 for the 70 miles of line, or between $20,000 and $25,000 a mile. Mayor Hocken of Toronto urged the necessity for proper radial facilities between the city and surrounding municipalities. He explained that the line would be constructed by the municipalities interested on a private right-of-way. Adam Beck, explaining that he was not appearing as the representative of the Ontario government, outlined the steps leading up to the recent conference in Toronto on radial railways. The opinion seemed to be that the Hydro-Electric Commission should finance the power end. Mr. Beck said:

"It is admitted that the steam railroads do not serve the agricultural communities. We want facilities to bring the mixed farm products to leading centers. A continuous service from rural districts to the city can be operated economically only by electricity."

Premier Borden said:

"We will give our most attentive consideration to the representations put before us. So far as the purpose you have in mind is concerned, we recognize its importance. We also recognize the importance of giving the tiller of the soil adequate transportation facilities. You will recognize, however, that subjects of very potent consideration are involved. This is not the first application for a charter of this kind that we have had, and you will realize that if we embark on a policy of federal aid to local undertakings we shall be opening up a pretty wide question. Our resources are limited, but we shall be very glad to receive your representations in written form and to give them careful consideration."

Compulsory Adoption of Block Signals Recommended

The Block Signal and Train Control Board, which was created by Congress in 1907, made its final report to the Interstate Commerce Commission on Feb. 8, 1913. The most important recommendation of the board is for the compulsory adoption of the block signal system by all interstate railroads. Special attention was paid to the devices which have been developed to stop trains automatically. In this connection the Block Signal and Train Control Board says in part:

"The development of the automatic train stop has proceeded far enough to warrant the expectation that by its use greater safety can be secured in the operation of trains. Railroads should be given to understand that the automatic train stop must be developed by them as rapidly as possible."

The board also recommends that railroad tracks be properly inclosed and laws against trespassing be enforced. It also says there should be more complete co-operation of the state and federal governments on the one hand and the railroads on the other to bring about more stable conditions throughout the country. Piecemeal legislation should be brought together and harmonized into general enactments, comprehensive in character and based on the best practice, and the enforcement of this general legislation should be intrusted to a body having powers similar in character to those possessed by the railway departments of the British Board of Trade.

The members of the Block Signal and Train Control Board are M. E. Cooley, dean of the engineering department of the University of Michigan, chairman; Azel Ames, F. G. Ewald, B. B. Adams and W. P. Borland, secretary.

Western Massachusetts Electric Railway Situation

During a recent visit to Springfield, Mass., L. S. Storrs, vice-president in charge of the Connecticut electric railway properties of the New York, New Haven & Hartford Railroad, stated in an interview that the company's interest in electric railway development in western Massachusetts continues unabated, and that the New York, New Haven & Hartford Railroad organization stands ready to expend $5,000,000 in extensions if the Legislature now in session passes the bill authorizing ownership of the electric railway system centering in Worcester and Springfield and known as the New England Investment & Security Company's lines. Mr. Storrs said that he agreed with President Charles S. Mellen of the New York, New Haven & Hartford Railroad that the State, through properly delegated authority, should say where the extensions shall be built. The company desires so to operate the systems that they shall be mutually beneficial. Mr. Storrs said that the proposed legislation was needed not only on account of the demand for rural extensions in hill towns at present suffering for lack of transportation facilities, but to facilitate the raising of funds for improvements at Springfield and Worcester. A repair shop to cost between $300,000 and $400,000 is needed at Springfield for adequate rolling stock maintenance, and without the help of the New York, New Haven & Hartford Railroad, which cannot at present legally be given, it is difficult for the Springfield lines to raise the money.

Governor Dunne of Illinois on Public Utilities

In discussing the subject of public utilities Governor Edward F. Dunne of Illinois in his inaugural address to the Forty-eighth General Assembly of that State said in part:

"Only one utility-producing concern should be allowed that privilege for each utility in each city. That concern must be either the municipal corporation itself or a private corporation. The sole aim of a public corporation is to operate to the satisfaction of the community, which is always assured by giving the best service at the lowest rate. The sole aim of all private corporations, unregulated by law, is to make money for their stockholders, and the most money can be made by poor service at a high rate to the consumer. The only question, then, is whether the public shall own and operate through state or local agencies, or whether it shall allow these utilities to remain in the ownership and control of private corporations and regulate them by law.

"After a careful investigation, the committee on municipal versus private operation of public utilities appointed in 1906 by the National Civic Federation held the right of municipal ownership to be more important than any form of regulation.

"While most cities of Illinois may not be ready as yet to undertake municipal operation of other than waterworks, legislation should be enacted immediately giving all cities the right to build or buy and to operate their utilities. For this purpose, cities should be empowered to issue bonds, subject to a referendum and such other reasonable safeguards as may be necessary. If such rights are given, it will force private corporations now furnishing these utilities to give decent service at decent rates or face the alternative of public ownership.

"Important as it is to give cities the right to manage their own public utilities, it is also important to give to state and local bodies large powers of regulation of the public utilities that remain in private hands. The interurban utilities can only be regulated by the State. For that purpose, a well-equipped public utilities commission should be created with large powers. It should control the issue of securities, the character of service, the rate of charge, etc. It should be appointed by the executive with the approval of the Senate. With respect to intraurban, or strictly city utilities, it might be well, at the start, to give to the proposed

State commission control of the city utilities when requested by any of the several cities of the State. The commission, however, should be empowered to secure uniformity of accounting and full publicity with respect even to the city utilities, and should be prepared to furnish this information in tabulated form in its annual reports, and in further detail to public officials. It would also be well to give the State commission full control of all new issues of stocks, bonds and notes and other evidences of indebtedness of all the public utilities of the State, including those within the cities.

"To Chicago and all cities over 100,000 population might be given the right, enjoyed by the city of St. Louis, of creating its own commission, which would report directly to the City Council and have such powers and resources as may be conferred upon it by the city itself."

Pittsburgh Subway Ordinances.—The subway ordinance was passed finally by the City Council of Pittsburgh on Feb. 4, 1913.

Double-Deck Car for Washington.—The Washington Railway & Electric Company, Washington, D. C., has ordered a double-deck car from the Southern Car Company, High Point, N. C.

Earnings of the Geary Street Municipal Railway.—The gross receipts of the Geary Street Municipal Railway, San Francisco, Cal., for January, 1913, the first full month of operation, are reported unofficially to have been $17,465, and the surplus after the payment of all operating expenses and interest on the bonds is said to have been $415.

Appraisal of Seattle, Renton & Southern Railway Ordered.—Scott Calhoun and Joseph Parkin, receivers of the Seattle, Renton & Southern Railway, Seattle, Wash., have been authorized by the court to employ experts to appraise the property of the company. The city of Seattle has commenced condemnation proceedings for the acquisition of 10 miles of the 14 miles of railroad operated by the company, the intention of the city being to use the condemned property as part of a municipal line if the condemnation proceedings are successful.

Key Route Pier Contract Awarded.—The San Francisco, Oakland & San José Terminal Railway, Oakland, Cal., the Key Route, has awarded a contract to Twohy Brothers for the filling in of the Key Route pier at a cost approximating $2,000,000. Work is to be started immediately, and while the contractors fill in the pier they will increase the number of tracks from two to eight. While the Key Route's plans for the enlargement of its terminal facilities at Oakland provide for an immediate expenditure of $2,000,000, the improvement work will ultimately cost in the neighborhood of $7,000,000, the latter sum covering the cost of erecting new and more extensive train sheds.

Conference on Block Signals in Indiana.—The Railroad Commission of Indiana has announced that a hearing will be held before the commission at Indianapolis on Feb. 20, 1913, at which means will be discussed for expediting the work of equipping the electric railways in Indiana with block signals in accordance with the recommendations of the commission. It is said that the companies furnishing the equipment will be unable to supply sufficient material for the railways to comply with the order of the commission within the time specified except at prices which will include compensation for the changes which will be necessary in their organizations in order to anticipate the time limit.

New Pennsylvania Line Placed in Operation.—The Lebanon & Campbellstown Street Railway has been placed in operation between Lebanon and Campbellstown. It is intended to operate this railway and the Hummelstown & Hershey Electric Railway, both owned by M. S. Hershey and his associates, under the name of the Hershey Transit Company. The completion of the new line gives electric railway communication between Newville, Cumberland County, and Myerstown, Lebanon County, via Harrisburg and Lebanon, a distance of about 70 miles. It is more than likely that in a short time it will be possible to travel by electric railway from Chambersburg to Philadelphia, via Harrisburg, Lebanon and Reading. The distance over this route would be about 170 miles.

Jurisdiction of Quebec Commission Questioned.—The Montreal (Que.) Tramways has questioned the jurisdiction of the Quebec Public Utilities Commission in relation to an inquiry proposed to be made into the affairs of the company. At a hearing before the commission the company objected that the orders were *ultra vires*. Counsel for the company said that at one time the company was willing to help the work of investigation as a means to improving its relations with the city, but that the attitude of the commission and the newspapers had influenced the company not to tolerate impositions. In brief, it was contended that the contracts between the company and the municipalities cover all points which might arise and that the commission was without jurisdiction. Judgment was reserved.

Increase in Fare on Hull Suburban Lines.—In the recent award by a board of conciliation which considered the differences between the Hull (Que.) Electric Railway and its employees in regard to wages, the board made the following recommendation: "The members of the board are of the opinion that in view of the proposed increase of wages and considering the financial condition of the company, as shown by its annual statement and the evidence given before the board, the company would be justified in increasing its charges for fares." The company has since announced a number of changes. The fare to a section having an average distance of 5 miles from Ottawa has been increased from 5 cents to 6¼ cents, four tickets for 25 cents. The fare to a section having an average distance of 8 miles from Ottawa has been increased from 6¼ cents to 8 1/3 cents, three tickets for 25 cents. The city fares remain unchanged.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CONNECTICUT

Representative O'Keefe, of Orange, has introduced in the House a bill providing for a tax of 1 per cent on the valuation of all franchises of all the railroads in the State. It provides for the creation of a commission by the General Assembly for the valuation of all such franchises.

INDIANA

The following bills have been introduced in the Legislature recently: a bill providing that all interurban railroads operating in Indiana should place signal devices at small stations whereby would-be passengers can flag cars; a bill providing for an appeal within twenty days by a railroad from any final decision of the Indiana Railroad Commission; a bill authorizing the Indiana Railroad Commission to require flagmen on electric or motor cars in certain cases; a bill prohibiting the use of public drinking cups on the train of any common carrier which operates over a line more than 10 miles long, the companies to be required to supply sanitary drinking cups and city railroads to be exempt from the provision of the bill; a bill requiring separate compartments for motormen in interurban cars.

The Spencer "administration" public utilities measure was to be voted upon during the week ended Feb. 15, 1913. The representatives of the interurban railways have attended several meetings and have recommended amendments to the bill. They point out that the bill provides that interurban railways shall be valued by the State but that the steam railroads are not to be valued by the new commission. They charge that the bill, if it becomes a law, would seriously cripple the interurban railways of the State.

MASSACHUSETTS

The committee on railroads gave a hearing on Feb. 6 upon several bills now before the House providing for the electrification of the steam railroads within the Boston district during the next few years. Nathan Matthews, ex-Mayor of Boston, the principal speaker on behalf of the abolition of the steam locomotive, contended that the total cost of electrifying 420 miles of single track on the New York, New Haven & Hartford Railroad, the Boston & Maine Railroad and the Boston & Albany Railroad within the suburban area would be only $15,060,000. William H. Coolidge, attorney for the New York, New Haven & Hartford Railroad, stated that the official estimate of the railroads for this work was

$30,000,000. Mr. Coolidge said that the New York, New Haven & Hartford Railroad is not opposed to electrification and that it is proceeding steadily in the matter.

The committee on street railways has reported leave to withdraw the following bills: To require third-rails to be sectionalized at elevated railway stations, with disconnecting switches at platforms; to prohibit the use of prepayment cars; to require the Boston Elevated Railway to equip all its cars with folding platforms; to require the installation of escalators at elevated railway stations. Among bills introduced recently are the following: To require the granting of limited franchises for electric express and freight transportation; to investigate the affairs of the Boston Elevated Railway; to require all street railways in the same town to interchange transfers; to prevent overcrowding of cars; to lower street railway fares between Boston and Chelsea; to compel the running of cars on routes previously granted and to provide for state ownership of street railways.

OHIO

The Kilpatrick bill, requiring interurban cars operated more than 5 miles to be provided with toilet facilities and drinking water, has been passed by the House. A similar bill was enacted by the House two years ago but was killed in the Senate committee.

PENNSYLVANIA

Senator Beidleman has introduced a bill providing for the taxation for county, city and borough purposes of the real estate of all public service corporations, including steam and electric railways. Such property is now exempt from taxation. He has also introduced a bill providing that all cars of electric railways shall be equipped with inclosed platforms at both ends to protect the operators in cold weather. A bill has also been introduced to remedy faults in the present law forbidding the placing of obstructions on railway tracks and making the law applicable to railroads of every description.

WEST VIRGINIA

In his special message sent to the Legislature on Feb. 3, 1913, Governor William E. Glasscock recommends the creation of a public service commission to have authority over all the public service corporations which operate in the State. He also asks for a special report on the water power resources of the State. In this connection he says: "The possible water power of the rivers and streams of West Virginia is not less than 2,000,000 hp, and if the potential water power of the State is estimated to be 2,000,000 hp and it was converted into electric current, it would mean practically 1,500,000 kw, which, used 300 days in the year at 1 cent as an average rate per kilowatt-hour, would have a total annual value of $130,000,000."

WISCONSIN

A bill has been introduced in the Wisconsin Legislature prohibiting the Railroad Commission from raising the fares on street and interurban railways above the fare stipulated in the franchise contract without the consent of the party granting such franchise, as expressed by the people of the municipality affected. The selling of tickets on street cars and interurban cars is also made compulsory.

PROGRAMS OF ASSOCIATION MEETINGS

Society for Electrical Development, Inc.

The board of directors of the Society for Electrical Development, Inc., has announced a meeting for March 4 and 5, 1913, in the Engineering Societies Building, New York, N. Y., to which the entire electrical fraternity, as well as the general magazine men, advertising agencies, etc., are invited. The object of the meeting is to obtain from as many angles as possible the ideas of the many branches of the industry on the tentative plans that will be proposed in a program that will include papers and suggestions invited from or promised by such men as Henry L. Doherty, Joseph B. McCall, Dr. Talcott Williams, T. Commerford Martin, F. H. Gale, Reginald Pelham Bolton, George Harvey, William D. McJunkin, J. M. Wakeman, Hugh Chalmers, W. E. Robertson, A. W. Burchard, L. A. Osborne, J. C. McQuiston and others. A broad educational general magazine and class paper advertising campaign will be suggested, together with plans for a comprehensive press bureau for the dissemination of news matter pertaining to things electrical and also a field department for co-operative and general educational work throughout the electrical and allied industries. A complete program of the conference will be announced later.

The board of directors of the society, as an organization committee, has discussed and formulated divers concrete plans, but as the active work of the society will affect practically every individual interest in the electrical business, it was thought that only by a broad discussion of the definite policy of the many lines of effort which the society will endeavor to pursue could a plan be arrived at that would coincide with the thoughts of the many diverse but allied interests involved.

Arkansas Association of Public Utility Operators

The annual convention of the Arkansas Association of Public Utility Operators will be held at the Marion Hotel, Little Rock, Ark., on May 13, 14, 15, 1913. The following preliminary program of the papers has been arranged:

Paper, "Relation of Public Utility Companies to the Public," by J. Walter Gillette, general manager of the Fort Smith Light & Traction Company.

Paper, "Effect of Tungsten Lighting on Revenue," by A. E. Main, superintendent of the electrical department of the Hot Springs Street Railway.

Paper, "Operation of Small Water Plants," by W. C. McQuire, manager of the Arkadelphia Electric Lighting Company, and E. T. Reynolds, superintendent of the Camden Power Company.

Paper, "Operation of Small Central Stations," by W. H. Walkup, superintendent and chief engineer of the Batesville Electric Light & Power Company, and J. F. Christy, manager of the Jonesboro Water & Light Plant.

Paper, "Legislation Affecting Public Utilities," by C. J. Griffith, general manager of the Little Rock Railway & Electric Company.

Paper, "Benefits to Be Derived from the Association," by Mrs. LaSalle Stoopts, manager of the Stuttgart Water & Electric Light Company.

B. C. Fowles, Pine Bluff: J. F. Christy, Jonesboro, and C. J. Griffith, Little Rock, are the members of the arrangement committee.

Central Electric Railway Association

The following program has been announced for the annual meeting of the Central Electric Railway Association which is to be held at the Washington Hotel, Indianapolis, Ind., on Feb. 27 and 28, 1913:

FEBRUARY 27, 1913

Paper, "Economy in Motor Maintenance," by J. C. Thirwall, of the railway and engineering department of the General Electric Company.

Discussion.

Paper, "The Human Factor in Fare Collection Service," by John F. Ohmer, president of the Ohmer Fare Register Company.

Discussion.

Paper, "Interline Freight," by Charles O. Sullivan, traffic manager of the Western Ohio Railway, Lima, Ohio.

Discussion.

FEBRUARY 28, 1913

Business session and reports of committees.

Paper, "Mounting of Radial Couplers," by A. L. Price, sales agent of the Ohio Brass Company, Mansfield, Ohio.

Discussion.

Annual reports of standing committees.

Annual report of the secretary-treasurer.

Annual address of the president.

Election of officers.

The present executive committee of the association will meet at the Washington Hotel on the evening of Wednesday, Feb. 26, 1913, and the new executive committee will meet immediately after the adjournment of the regular meeting of the association.

Financial and Corporate

Stock and Money Markets

February 11, 1913.

There was considerable selling pressure on the New York Stock Exchange to-day, and new low records for 1913 were made in many of the prominent issues. The railroads all sold down, New York Central selling ½ point below its lowest figure for 1912, and thereby established a new low point for two years. Westinghouse Electric sold down to 71¼. Rates in the money market to-day were: Call, 2½@4½ per cent; sixty days, 4@4¼ per cent; ninety days, 4¼@4½ per cent.

The Philadelphia market to-day was broad and active. Lehigh Valley Transit was very active. The sales of stock of the Philadelphia Electric Company totaled 12,885 shares to-day.

The Chicago market was broad to-day, but the volume of sales was small. The bulk of the bond transactions was in Chicago Railways 5's, City Railway 5's and Commonwealth Edison 5's.

There was very little trading in the railway issues in Boston to-day and the bond market was dull.

The Baltimore market was narrow but active to-day. The demand for bonds continues good.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 5	Feb. 11
American Brake Shoe & Foundry (common)	94½	95
American Brake Shoe & Foundry (preferred)	134¾	135
American Cities Company (common)	47½	47½
American Cities Company (preferred)	76⅛	76½
American Light & Traction Company (common)	405	400
American Light & Traction Company (preferred)	108	108½
American Railways Company	39¾	40⅜
Aurora, Elgin & Chicago Railroad (common)	42½	43½
Aurora, Elgin & Chicago Railroad (preferred)	86¼	87
Boston Elevated Railway	111½	111
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	65	65
Boston & Worcester Electric Companies (common)	7	7
Boston & Worcester Electric Companies (preferred)	40	44
Brooklyn Rapid Transit Company	90½	89⅝
Capital Traction Company, Washington	123	123
Chicago City Railways	150	150
Chicago Elevated Railways (common)	35	a35
Chicago Elevated Railways (preferred)	91	91
Chicago Railways, ptcptg., ctf. 1	90	93
Chicago Railways, ptcptg., ctf. 2	25	25
Chicago Railways, ptcptg., ctf. 3	7¼	7
Chicago Railways, ptcptg., ctf. 4	3	3
Cincinnati Street Railway	117½	a119
Cleveland Southwestern & Columbus Ry. (common)	*5⅛	a6
Cleveland Southwestern & Columbus Ry. (preferred)	*33	a30
Cleveland Railway	104¾	104½
Columbus Railway & Light Company	19	19
Columbus Railway (common)	68½	69
Columbus Railway (preferred)	88½	a105
Denver & Northwestern Railway	*118	a117
Detroit United Railway	75	a80
General Electric Company	142	140¼
Georgia Railway & Electric Company (common)	126¾	123
Georgia Railway & Electric Company (preferred)	82½	82½
Interborough Metropolitan Company (common)	18½	18½
Interborough Metropolitan Company (preferred)	62⅞	62½
International Traction Company (common)	*38	a42
International Traction Company (preferred)	*99	a95
Kansas City Railway & Light Company (common)	*18⅜	a20
Kansas City Railway & Light Company (preferred)	*40	a41
Lake Shore Electric Railway (common)	9	6½
Lake Shore Electric Railway (1st preferred)	91	a91
Lake Shore Electric Railway (2d preferred)	25½	a25½
Manhattan Railway	132	132⅛
Massachusetts Electric Companies (common)	18	17½
Massachusetts Electric Companies (preferred)	78	77⅜
Milwaukee Electric Railway & Light Co. (preferred)	*100	a102
Norfolk Railway & Light Company	*25	26
North American Company	80	79⅝
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	100	105
Philadelphia Company, Pittsburgh (common)	49	49
Philadelphia Company, Pittsburgh (preferred)	42½	41½
Philadelphia Rapid Transit Company	27	27½
Portland Railway, Light & Power Company	68½	67
Public Service Corporation	116	116
Third Avenue Railway, New York	38	37
Toledo Railway & Light Company	2¼	a6
Twin City Rapid Transit Co., Minneapolis (common)	105⅞	105½
Union Traction Company of Indiana (common)	*4½	4½
Union Traction Company of Indiana (1st preferred)	*81	81
Union Traction Company of Indiana (2d preferred)	*34	34
United Rys. & Electric Company (Baltimore)	..	24
United Rys. Inv. Company (common)	32	27⅞
United Rys. Inv. Company (preferred)	59	54⅞
Virginia Railway & Power Company (common)	55½	57
Virginia Railway & Power Company (preferred)	92	93¼
Washington Ry. & Electric Company (common)	86	86
Washington Ry. & Electric Company (preferred)	90	90
West End Street Railway, Boston (common)	80	81
West End Street Railway, Boston (preferred)	96½	98
Westinghouse Elec. & Mfg. Company	73	71⅜
Westinghouse Elec. & Mfg. Company (1st preferred)	117	116

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*Last sale. a Asked.

ANNUAL REPORTS

Capital Traction Company

The statement of earnings of the Capital Traction Company, Washington, D. C., for the year 1912, as presented to the stockholders, follows:

Total revenue from transportation			$2,252,748
Revenue from operation other than transportation			12,465
Total operating revenue			$2,265,213
Operating expenses (48.942 per cent of operating revenue)			1,098,656
Net operating revenue			$1,166,557
Miscellaneous income			13,317
Gross income less operating expenses			$1,179,874
Deductions from income:			
Taxes		$130,967	
Interest		281,781	
			412,748
Net income			$767,126
Disposition of net income:			
Dividends			720,000
Surplus for year			$47,126
Surplus at beginning of year			80,446
			$127,572
Profit and loss adjustments during year:			
Debits:			
Set aside for depreciation	$55,000		
Uncollectible accounts charged off	18		
		$55,018	
Credits:			
Materials and supplies adjustments	$415		
Adjustment between road and equipment and operating account of charges in previous years	5,929		
		6,346	
			48,674
Surplus at close of year			$78,898

George E. Hamilton, the president, in presenting the report, said in part:

"Car earnings show an increase over 1911 of $9,967, miscellaneous income an increase of $1,750 and operating expense a decrease of $28,828, making a net increase from operation of $40,546. There was an increase in fixed charges of $63,699, due principally to interest on bonds issued in December, 1911, under mortgage of June 1, 1907.

"The funded debt of the company is $6,000,000 of bonds, authorized and secured under mortgage of June 1, 1907, of which $5,639,500 is issued and outstanding, the remaining $360,500 being held in the treasury to meet future extensions and betterments.

"The fire insurance reserve fund on Dec. 31, 1912, was $166,694, an increase of $10,219 over the preceding year.

"The reconstruction of the Navy Yard, Georgetown and Seventh Street carhouses, made necessary, as set forth in the last annual report, to care for and accommodate the double-truck single cars now operated by the company, has been fully completed.

"The 150 pay-within cars ordered in 1910 have been all received and put in operation. Five pay-within cars were ordered for the Chevy Chase division of a type similar to those in use on that division, and these were received and put in service in October. Thirty semi-convertible cars, in use on the Fourteenth Street line, are being converted to the pay-within type, the work being done in our own shops.

"During the year the small single-truck motor and trailer cars have all been retired, and the company is now operating only double-truck single cars on all of its divisions.

"To secure safer operation it was concluded to equip all cars in service on city lines with air brakes, and accordingly, under authority of the board of directors, a contract was made with the Westinghouse Traction Brake Company for 233 air-brake equipments. Two of these equipments were delivered in August and immediately installed for the purpose of instruction. Different shipments, making a total of fifty-two equipments, have been received up to the present time, and forty-one cars have been equipped with air brakes and are now in service on city lines.

"The adoption of fare boxes by the company has been under consideration for some time, and on Dec. 1, 1912, for the purposes of test and better information, the Union Station and Pennsylvania Avenue lines were completely equipped with the Cleveland fare box.

"During the year 1912, in addition to the ordinary track repairs and maintenance, considerable new track work has been completed. The new track work has consisted of additions to the loop at the Seventh Street carhouse in connection with the reconstruction of that carhouse and the installation of an automatic switch at the Decatur Street carhouse.

"The new power plant at the corner of Thirty-second and K Streets has been completed and equipped, and additional duct lines have been built and the necessary cable installed, thus giving to the company proper service amply to care for its present needs. One 525-kw direct-connected engine-driven unit and two 300-hp boilers were moved from the Grace Street plant, now abandoned, to the Chevy Chase power station and put in service in June. This installation gives a satisfactory plant at Chevy Chase for handling the increased load on that division.

"The claim department shows a decrease over the preceding year in the amount paid out in unlitigated claims of $3,378. The number of claims brought during the year against the company was less by sixty-eight than in the preceding year. The bulk of claims against the company during the year have grown out of collisions between cars, with vehicles and pedestrians. It is expected that this condition will be materially mitigated by the installation of air brakes. This department shows a decrease in payments on account of boarding and alighting accidents. A still further reduction in the number of such accidents is, by reason of our uniform equipment of pay-within cars, expected in the future.

"The sum of $55,000 has been charged off the surplus and credited to depreciation reserve fund. The sums of $50,804 expended for the rebuilding of tracks on Pennsylvania Avenue between Second and Seventh Streets, Northwest, and $149,364 of the amount expended for new double-truck cars, purchased to replace single-truck cars abandoned under order of the Interstate Commerce Commission, were charged to this fund."

The report contains the following statistics of passengers carried:

Number of passengers carried at 4⅛ cents	41,746,329
Number of passengers carried at 5 cents	9,906,805
Number of passengers carried on commutation tickets	955,734
Total number of revenue passengers	52,608,868
Transfer passengers	18,472,325
Total number of passengers	71,081,193

The J. G. Brill Company

The report of Samuel M. Curwen, president of The J. G. Brill Company, Philadelphia, Pa., for the year ended Dec. 31, 1912, was presented to the stockholders on Feb. 12, 1913. Some of the main features of the report are printed below:

"The total sales value of the combined output of all the five plants owned and operated by The J. G. Brill Company for the twelve months ended Dec. 31, 1912, was $7,842,090. The amounts of the combined sales of the five plants for the six years prior to 1912 are here given for purposes of comparison: 1907, $9,211,825; 1908, $3,845,173; 1909, $4,261,204; 1910, $5,960,778; 1911, $5,870,907; 1912, $7,842,090.

"The combined profit resulting from the operation of the plants owned and operated by your company during the year 1912 amounted to $1,054,851. The regular quarterly dividend on the preferred stock of your company, at the rate of 7 per cent per annum, amounting to $80,150, was declared by the directors at a meeting held Jan. 20, 1913, and was paid on Feb. 1.

"Your properties were all maintained during the year in excellent physical condition, and the entire expense of all maintenance and upkeep, amounting to $217,273, was taken from current earnings. During the year there was set aside out of earnings, as an addition to the depreciation reserve, the sum of $135,826, in pursuance of the regular conservative policy of your management.

"The general business conditions throughout the country during the year 1912 were reflected in the increased activities of your companies. In addition to the increase in domestic orders, your management is able to report a substantial increase during the year in your companies' foreign business. The amount of work obtained and executed during the year represented, in total, more nearly a normal output for your combined plants than any year's business since 1907. The ability of your companies to absorb, in the normal cost of so large an output, substantially all of their general expenses, manufacturing and administration, is indicated by the net profit resulting from the year's operations.

"On Feb. 1 the amount of orders of your combined companies in process of execution amounted to $4,140,689."

The combined balance sheet as of Dec. 31, 1912, and the condensed statement of combined sales and expenses for the year 1912 follow:

COMBINED BALANCE SHEET, DEC. 31, 1912

Assets:	
Value of properties	$8,003,102
Materials, raw and in process	1,850,549
Bills and accounts receivable	1,812,199
Investments	288,272
Cash	399,356
	$12,353,478
Liabilities:	
Preferred stock	$4,580,000
Common stock	5,000,000
Bonds (John Stephenson Company)	400,000
Bills and accounts payable	995,559
Portion of surplus of G. C. Kuhlman Car Company set aside as working capital of that company	144,361
Surplus	1,233,558
	$12,353,478

SALES AND EXPENDITURES FOR YEAR 1912

Total sales and other income	$7,842,090
Less material used, operating and all general and administration expenses and depreciation for the year	6,787,239
Net profit undistributed, added to surplus	$1,054,851
Surplus account, from previous year	$744,521
Less adjustments	100,853
	$643,668
Profit as above	1,054,851
	$1,698,519
Less dividends paid during year	320,600
Total combined surplus	$1,377,919
Less part of this combined surplus represented by the portion of surplus of G. C. Kuhlman Car Company now set aside for permanent surplus of that company, as an addition to its working capital	144,361
Net surplus	$1,233,558

Detroit United Railway

The following is a summary of the business of the Detroit United Railway, the Rapid Railway System, the Sandwich, Windsor & Amherstburg Railway, the Detroit, Monroe & Toledo Short Line Railway and the Detroit, Jackson & Chicago Railway, for the years 1912 and 1911:

	1912	1911
Passenger earnings	$10,932,686	$9,615,118
Express earnings	704,068	586,995
Mail earnings	11,939	11,907
Special car earnings	46,837	39,113
Gross earnings from operation	$11,695,530	$10,253,133
Operating expenses	7,730,409	6,580,041
Net earnings from operation	$3,965,121	$3,673,092
Income from other sources	208,857	178,812
Gross income less operating expenses	$4,173,978	$3,851,904
DEDUCTIONS		
Interest on funded and floating debt, and taxes:		
Detroit United Railway	$1,539,974	$1,544,570
Rapid Railway System	166,792	163,167
Sandwich, Windsor & Amherstburg Railway	35,414	35,261
Detroit, Monroe & Toledo Short Line Railway	160,167	158,171
Detroit, Jackson & Chicago Railway	221,166	222,228
	$2,123,513	$2,123,397
Credited to depreciation reserve	500,000	400,000
Credited to contingent liability reserve	100,000	......
Dividends	625,000	625,000
Total deductions	$3,348,513	$3,148,397
Net income to surplus	$825,464	$703,506

PASSENGER STATISTICS, YEAR 1912

	Total
Revenue passegners	208,538,594
Transfer passengers	61,393,877
Employee passengers	7,646,593
Total passengers	277,579,064
Receipts from revenue passenger	.0525
Receipts per passenger	.0394

MILEAGE STATISTICS, YEAR 1912

Car mileage	42,351,690
Earnings, car mile	.2761
Expenses, car mile	.1825
Net earnings, car mile	.0936

There has been expended on capital account during the year, and charged out under the head of "additions and betterments," in accordance with the classification of expenditures for road and equipment prescribed by the State and Interstate Commerce Commissions, as follows: road, $726,-

037; equipment, $482,260; general expenditures, $5,578; total, $1,213,876.

Of this company's collateral trust notes, $1,500,000, maturing on Jan. 1, 1912, were paid and retired out of the proceeds of the sale, to stockholders, of Detroit United Railway 4½ per cent bonds.

On Dec. 1, 1912, bonds of the Detroit Railway aggregating $50,000 became due and were paid.

During the year the company made liberal expenditures for the maintenance of its tracks, rolling stock and other properties. On Jan. 1, 1912, the depreciation reserve stood credited with $1,529,627. There was expended during the year for replacement of cars $96,263, of which $36,263 was charged into maintenance of equipment and $60,000 to the depreciation reserve. This reserve was credited with $500,000 out of the income for 1912, and $54,000 from scrap sales, leaving the balance at Dec. 31, 1912, $2,023,627.

Chicago Elevated and Surface Railways Requested to Present Their Plan of General Merger

Following an appeal by W. G. Beale, counsel for the elevated railroads for immediate action to bring about the general merger of the surface and elevated railways in Chicago, the local transportation committee of the Chicago City Council requested the representatives of the companies interested to submit to the committee their plan for a merger which will form a basis of the general merger ordinance. A special meeting of the committee will be called as soon as the companies are ready with their plans.

No further action has been taken to reconcile the real estate valuations since the committee refused to accept the offer of the Cook County Real Estate Board, the remuneration for which was considered excessive. It has been decided that each member of the sub-committee with the general merger proceedings in hand submit the names of three real estate men who would be willing to act as a reconciliation board at a more reasonable compensation.

A new aspect in the general merger proceedings developed at this meeting when a copy of resolutions adopted by the Northwest Side Commercial Association was read. These resolutions were directed to the Mayor and all the Aldermen and protest against any merger or subway proposition being submitted to the voters at the April election.

West Penn Traction & Water Power Company

The annual statement of the West Penn Traction & Water Power Company, Pittsburgh, Pa., for the year ended Dec. 31, 1912, showed the largest earnings ever reported. Gross earnings were $3,408,586, an increase of $1,148,299; expenses and taxes, $1,829,459, an increase of $717,178; net earnings, $1,579,127, an increase of $431,121; fixed charges, $794,748, an increase of $266,472. The surplus remaining was $549,379, an increase of $164,649. A comparative statement for three years follows:

	1910	1911	1912
Gross earnings	$2,042,002	$2,260,287	$3,408,586
Operating expenses and taxes	987,642	1,112,281	1,829,459
Net earnings	$1,054,360	$1,148,006	$1,579,127
Fixed charges	470,504	528,276	794,748
Balance	$583,856	$619,730	$784,379
Guaranteed dividends	235,000	235,000	235,000
Surplus earnings	$348,856	$384,730	$549,379

Atlantic Shore Line Railway, Sanford, Me.—The Atlantic Shore Line Railway has applied to the Railroad Commission of Maine for authority to increase its stock from $1,000,000 to not more than $2,500,000.

Chicago City & Connecting Railways, Chicago, Ill.—The income account of the Chicago City & Connecting Railways for 1912 compared with 1911 is as follows: Gross income for 1912, $2,437,250, as against $2,612,673 for 1911; total disbursements for 1912, $1,151,007, as against $1,148,763 for 1911; net income for 1912, $1,286,243, as against $1,463,910 for 1911; dividends on participation shares for 1912, $1,275,000, as against $1,425,000 for 1911; surplus income for 1912, $11,243, as against $38,910 for 1911. During the year only 1 per cent was paid on common participation certificates, against 2 per cent the previous year.

Detroit (Mich.) United Railway.—A quarterly dividend of 1½ per cent has been declared on the $12,500,000 of stock of the Detroit United Railway, payable on March 3, 1913, to holders of record of Feb. 14. This payment compares with 1¼ per cent paid quarterly from March, 1911, to December, 1912. The Railroad Commission of the State of Michigan has authorized the Detroit & Port Huron Short Line Railway, operated by the Detroit United Railway under the name of the Rapid Railway System, to increase the amount of its outstanding capital stock from $2,000,000 to $2,075,000 to reimburse the Detroit United Railway for expenditures made for extensions and improvements.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has applied to the Railroad Commission of California for authority to issue $1,250,000 of bonds.

Galveston-Houston Electric Company, Galveston, Tex.—A semi-annual dividend of 2½ per cent has been declared on the $3,000,000 of common stock of the Galveston-Houston Electric Company, payable on March 15, 1913, to holders of record of Feb. 20. This compares with 2 per cent paid in September, 1912, and 1½ per cent paid from September, 1909, to March, 1912, inclusive.

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Electric Company, the property of which is operated under lease by the Georgia Railway & Power Company, has applied to the Railroad Commissioners of Georgia for permission to issue $828,000 of bonds to cover 75 per cent of the cost of improvements made to the property of the company in 1912.

Louisville (Ky.) Railway.—The Louisville Railway has authorized the issuance of $1,000,000 of bonds under the general mortgage of 1910 given to secure $20,000,000 of bonds. Of the $20,000,00 issue a total of $4,000,000 has been issued to date by the company. The proceeds from the sale are to defray the expense of erecting the new power house of the company at Twenty-first and High Streets, which cost about $750,000, complete, to provide funds to extend the Orell line of the Louisville & Interurban Railroad a distance of 8 miles to Kosmosdale, Ky.; construct the Main Street extension, and for other improvements.

National Properties Company, Pittsburgh, Pa.—H. B. Hollins & Company and Newberger, Henderson & Loeb, New York, N. Y., are offering for subscription the unsold balance of $1,649,000 of 6 per cent cumulative preferred stock of the National Properties Company on the basis of $1,000 par value of preferred stock and $400 par value of common stock for $970. The par value of the shares is $100 each and the dividends are payable on Jan. 15 and July 15. As previously stated in the ELECTRIC RAILWAY JOURNAL the National Properties Company has recently taken over the property of the Wilmington & Philadelphia Traction Company and controls by stock ownership the Pittsburgh City Light & Power Company and the water company of Tonopah, Nev. The company has an authorized capital stock of $20,000,000, of which $10,000,000 is preferred stock and $10,000,000 common stock. Of this capitalization $1,649,000 of preferred stock and $1,992,000 of common stock is outstanding.

Philadelphia (Pa.) Rapid Transit Company.—A special meeting of the Union Traction Company has been called for Feb. 26, 1913, to obtain formal consent to the recently announced plans of the Philadelphia Rapid Transit Company for the creation of an equipment trust.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—The property of the Pittsburgh, McKeesport & Westmoreland Railway will be sold under foreclosure on Feb. 25, 1913, in the rotunda of the Allegheny County Court House, Pittsburgh. No bid for less than $60,000 will be accepted, and the purchaser will take the property subject to the lien of two mortgages aggregating $437,000, with accrued interest. The $50,500, issue of receivers' certificates, the interest accrued thereon and the costs and expenses of the receivership will be paid out of the proceeds of the sale.

Syracuse, Lake Shore & Northern Railway, Syracuse, N. Y.—The Public Service Commission of the Second District of New York has authorized the Syracuse, Lake Shore & Northern Railway to issue $350,000 of short-term notes, to bear not more than 5 per cent interest, and to be sold to net 97.65 per cent. The proceeds of the issue are to be used to pay outstanding notes.

Toledo Railways & Light Company, Toledo, Ohio.—It is believed that officers will not be elected by the directors of the Toledo Railways & Light Company until the next regular meeting on Feb. 27. An adjourned meeting of the board has been fixed for Saturday, Feb. 15, 1913, but it will probably be continued until the date for the regular meeting. The action of the reorganization committee in arranging with the Doherty interests to operate the property has been approved by the directors. L. E. Beilstein and R. C. Pugh, Toledo; Dr. W. H. Netherlands, Louisville, and W. E. Hutton, Cincinnati, have resigned as members of the board in order to make room for representatives of H. L. Doherty & Company. P. E. Schilling, W. J. Marshall, William R. Hodge and H. S. Swift have been elected as their successors.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad.—Justice McCall in the Supreme Court has dismissed the complaint in the suit brought by Joseph B. Mayer, receiver of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad against the directors of the Metropolitan Street Railway at the time of its dissolution, to compel them to account for the proceeds of $1,100,000 of 5 per cent bonds of the company which it is alleged were not used for the company's benefit. The court held that the bonds were legally issued and the proceeds put to proper use.

United Light & Railways Company, Grand Rapids, Mich.—The United Light & Railways Company has purchased the properties of the People's Gas & Electric Company, Mason City, Ia., and the Mason City & Clear Lake Interurban Railway. The United Light & Railways Company has also made a contract to operate the Iowa & Illinois Electric Railway between Davenport and Clinton, a distance of 40 miles, for four years, with an option to purchase the railway at the end of that time.

Dividends Declared.

Brockton & Plymouth Street Railway, Brockton, Mass., 3 per cent. preferred.

Detroit (Mich.) United Railway, quarterly, 1½ per cent.

Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent. preferred.

Galveston-Houston Electric Company, Galveston, Tex., 3 per cent, preferred; 2½ per cent, common.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., three-quarters of 1 per cent, common.

Northern Texas Electric Company, Fort Worth, Tex., 3 per cent, preferred; quarterly, 1¼ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, CHICAGO, ILL.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1mo., Dec., '12	$155,454	$97,348	$58,105	$32,071	$26,034
1 " " '11	143,178	95,141	48,037	31,940	16,097
16 " " '12	1,050,486	594,646	455,840	192,466	263,373
6 " " '11	982,945	551,931	431,014	189,156	241,858

ATLANTIC SHORE RAILWAY, SANFORD, MAINE

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1mo., Dec., '12	$23,407	$17,756	$5,651	$465	$5,186
1 " " '11	22,840	21,111	1,729	582	1,148

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1mo., Dec., '12	$97,271	$59,564	$37,707	$32,066	$5,641
1 " " '11	94,020	53,808	40,213	33,661	6,552
12 " " '12	1,030,315	693,529	489,803	373,113	116,690
12 " " '11	991,048	641,181	495,181	363,523	131,658

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1mo., Dec., '12	$173,866	$100,685	$73,180	......	......
1 " " '11	151,556	84,671	66,885	......	......
12 " " '12	1,722,648	1,008,036	714,612	......	......
12 " " '11	1,496.177	887,095	609,083	......	......

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1mo., Dec., '12	$259,881	$150,778	$109,103	$52,330	$56,773
1 " " '11	239,373	132,964	106,409	43,912	62,497
12 " " '12	2,996,037	1,702,766	1,293,271	572,998	720,273
12 " " '11	2,694,024	1,492,527	1,201,498	531,032	670,466

Traffic and Transportation

Reduction in New York Suburban Fares Ordered

Reductions in the fares charged to commuters between Westchester County points and New York City by the New York Central & Hudson River Railroad have been ordered by the Public Service Commission, Second District. The reduced rates will result in the re-establishment of the rates which were in effect on June 30, 1910. The territory affected is: on the New York Central, Hudson division, from Ludlow to Peekskill, inclusive, and Harlem division, from Williamsbridge to White Plains, inclusive; on the New York, New Haven & Hartford Railroad, from the Grand Central Terminal, New York, and stations from Mount Vernon to Port Chester, inclusive.

The reductions effected on the New York Central & Hudson River Railroad are as follows: on the Hudson division, on sixty-trip monthly commutation tickets, from a minimum of 60 cents per ticket per month to a maximum of $1.15 per ticket per month and on fifty-trip family tickets from a minimum per ticket of 25 cents to a maximum per ticket of $3.30. On the Harlem division, round-trip tickets are: between New York and Mount Vernon, 15 cents; Wakefield, Bronxville and Tuckahoe, 10 cents; Crestwood, Scarsdale, Hartsdale, and White Plains, 5 cents; on sixty-trip monthly commutation tickets, varying amounts from a minimum of 75 cents per ticket per month to a maximum of $1.05 per ticket per month; on fifty-trip family tickets, from a minimum of 95 cents to a maximum of $2 per ticket.

On the New York, New Haven and Hartford Railroad the reductions are: on one-way tickets, 5 cents in each instance; on sixty-trip monthly commutation tickets, 20 per cent; on fifty-trip family commutation tickets the reductions vary from a minimum of 13 per cent to a maximum of 25 per cent.

The new rates are ordered to be put into effect on March 1, 1913, and to continue for a period of at least three years. It is provided also that all tickets sold prior to March 1, for use on or after that date, are to be sold at not to exceed the rates as reduced.

The orders were made upon complaints filed in the New York Central & Hudson River Railroad case by the mayors of Mount Vernon and Yonkers and residents of Peekskill and White Plains, and in the New York, New Haven & Hartford Railroad case upon the complaints of the mayors of Mount Vernon, New Rochelle, the village of Port Chester, the towns of Rye and Harrison, and residents of the city of New Rochelle and village of Port Chester.

The commission concluded its decision in the case in part as follows:

"An attentive study of the evidence submitted satisfies us that the increased rates have operated unfavorably to the communities affected, that they have discouraged travel, that they have not permitted the growth and development of the communities within the commutation zone, and that they have added materially and unjustifiably to the burden of those who are required to travel back and forth daily in order to carry on their business in the city.

"The commission is also satisfied from the evidence that the revenues derived from the increased rates have not increased above those received formerly in anything like the proportion of increase of rate. The ostensible reason of the companies for increasing these rates was the increased expense of operation and the necessity for more revenue to meet this increase. This expectation has in a large measure, according to the evidence, been disappointed. The operating costs have not been decreased, but the gross earnings from the commutation rates have not afforded the relief to the companies which they expected from the increase in rates. This is another proof that the effect of the increase has been to diminish travel and not to better the net financial result to the companies. We are convinced that the fares of the companies complained of tend to restrict rather than to promote travel and to such an extent as to defeat materially the purpose for which commuters' fares are primarily established.

"These cases have not been free from embarrassing questions. The commission is not disposed to overlook or minimize the contention of the respondents that the increase in costs of operation arising from increased wages and greater cost of material should be reflected in rates. It should not be forgotten that the increased costs claimed by the respondents arise largely from the alleged increased cost of moving trains by electric energy. The commission feels that, assuming some such increased cost to have been shown, there should be taken into consideration in connection therewith that the change from steam to electricity as a motive power has made possible the utilization of the site of the Grand Central Terminal for other purposes and to an extent that may well pay an adequate return upon the cost of the station itself. It is a serious question to be determined only by future developments whether the use of electric energy is not the only possible method of economical operation in a city like New York, and whether it will not, all things considered, justify the continuance of the former rates rather than an increase in rates.

"There is another matter of large importance in the case of the New York, New Haven & Hartford Railroad. It has at very great expense built and put in operation the New York, Westchester & Boston Railroad as far as New Rochelle. It contemplates a completion of that line to Port Chester as soon as the work can reasonably be performed. When that road is completed to Port Chester, if it makes such connections and arrangements in New York City as to enable it to furnish a service as convenient and adequate as that which the New York, New Haven & Hartford Railroad now furnishes into the Grand Central Terminal, a question will at once arise whether the New York, New Haven & Hartford Railroad may not justly seek by all reasonable means to divert traffic from its main line to its subsidiary, the New York, Westchester & Boston Railway, and thereby reduce its terminal expenses and increase its returns upon its subsidiary investment. If it were assumed that the company might justly do so, always keeping in mind that the service must be in every respect convenient and adequate, still until that road is completed to Port Chester, and proper subway connections are made, the question cannot arise for determination."

Puget Sound Electric Railway Fare Case Carried to Courts

The Puget Sound Electric Railway, operating between Seattle and Tacoma and other points, has appealed to the federal court for an order declaring void and of no effect the order of the Public Service Commission of Washington made in 1911, directing the company to reduce its fares. The company declared in its petition that its net earnings during the twelve months ended Nov. 20, 1912, had equaled a rate of return on the original money invested of 1.382 per cent. Interest at the rate of 5 per cent was charged on the outstanding bonds secured by the mortgage lien, and the company asserted that it would be necessary for it to increase its rates between Seattle and Tacoma and other points above the rates ordered and allowed by the Public Service Commission to prevent the default and foreclosure of the mortgage.

The petition further sets forth that the Public Service Commission had estimated the company's receipts during 1910 to be $372,950, this estimate being made before the order decreasing the rates was handed down early in the same year. The receipts actually were, the company asserts, $218,253. The gross receipts from all sources in the six months ended June 1, 1912, were set forth as $288,250 and the expenses as $272,516, leaving a net revenue of $15,733. The rate of return on the original investment of approximately $4,000,000 was 0.773 per cent, it is alleged. Between June 1 and Nov. 30, 1912, the gross earnings were $308,418 and the expenses $267,911, leaving $40,506 of net earnings, and making the total rate of return on the original investment for the year 1.382 per cent. It is claimed that at least 7 per cent should be allowed the company.

The matter of interurban rates in the valley between Seattle and Tacoma, Renton and other points has been in the courts since 1909, when the Puget Sound Electric Railway put into effect its new tariff, charging 2 cents a mile or allowing commutation tickets good for a period of one month at 1.4 cents. Hearing was ordered by the Public Service Commission on complaints made by residents of the valley and early in 1910 the tariff was declared excessive. Ten days were allowed for a new tariff to be prepared. After the ten days had expired and no new rates had been made, the commission itself ordered the fares reduced. Appeal was taken by the company to the Superior Court in Thurston County, which affirmed the commission. In September, 1911, the State Supreme Court affirmed the lower court, and the company began to comply with the commission's ruling.

The plan of the company to appeal to the courts for relief from the order of the commission was referred to in the Electric Railway Journal of Jan. 25, 1913, page 173.

Proposed Terminal Station for Illinois Traction System at Peoria, Ill.

The general plans for the proposed terminal station of the Illinois Traction System at Peoria, Ill., have been approved and an appropriation made to cover the improvements. A Peoria firm of architects, Hotchkiss & Harris, are preparing the construction details. The general plans call for a building seven stories high and faced with white glazed terra cotta. The terminal building proper will be 100 ft. long by 58 ft. wide with a train-shed adjoining which will provide storage capacity for twenty cars. Provision was made for the erection of this terminal last year by the purchase of a site of the old National Hotel at Hamilton and Jefferson Streets following the destruction of the hotel by fire. Construction work will be started as soon as the weather permits.

Some of the details already worked out in the terminal station building and track layout include five tracks on the north of the terminal building proper for the accommodation of regular trains and sub-tracks on the west of the building for storage space for special and sleeping cars. The train shed will be built of steel and concrete and a running repair pit will be provided under one of the outside tracks. The waiting room will occupy practically the whole first floor of the terminal building, being 40 ft. x 80 ft. in plan and two stories high. Entrances to the waiting room will be provided on Hamilton and Jefferson Streets. Space has been provided for a restaurant, baggage room, check room and ticket office adjoining the waiting room. A portion of the first floor will also be reserved for four small stores. The third and fourth floors of the building will be occupied by the general offices of the Illinois Traction System and the Peoria Railway.

One of the features of the new terminal station will be an elaborate scheme of night illumination. According to present plans about 10,000 incandescent lamps will be arranged to mark the outlines of the building as well as the windows, panels and ornamental features on all four sides. The plan of illumination has been modeled to a certain extent after the Denver Gas & Electric Company's building, Denver, Col. It is estimated that the new terminal station and track layout will cost $350,000.

Illinois Road to Check Baggage.—The Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., has announced that it will check baggage up to 150 lb. with each ticket.

Park for Chicago, Ottawa & Peoria Railway.—The Chicago, Ottawa & Peoria Railway, Ottawa, Ill., has leased a 5-acre tract of land 2½ miles north of Grand Lodge, Ill., which will be operated as a place of amusement under the name of McKinley Park. The company will use the equipment from Majestic Park, west of Ottawa.

Owl Car Service in Birmingham.—The owl line of the Birmingham Railway, Light & Power Company, Birmingham, Ala., on which cars are operated between 1 a. m. and 4 a. m. is the Baylies line. The company now proposes to establish an experimental service between these hours on seven lines and to make the service permanent if the patronage justifies it.

Y. M. C. A. Membership as Reward for Efficiency.—The Kentucky Traction & Terminal Company, Lexington, Ky., has arranged for full membership in the Lexington branch of the Young Men's Christian Association for each of its employees in recognition of efficient service, thus giving the holder the privileges of the gymnasium, baths, libraries and other conveniences. Practically every employee will avail himself of the gift.

New Parcel Express Service on Pennsylvania Line.—The Northwestern Railway, Meadville, Pa., expects to put into operation about Feb. 15 a parcel express system on its lines in Meadville and on the interurban lines from Meadville to Linesville, Cambridge Springs and Erie. The territory covered has been divided into three zones and a schedule of rates fixed for each zone. Special adhesive tickets will be provided which patrons may use in prepaying transportation charge on a package by sticking them on the wrapper. The limit of weight under the new system will be 100 lb.

Increase in Fare in Effect Between Trenton and Princeton.—The increase in fare from 10 cents to 15 cents over the line of the Trenton & Mercer County Traction Corporation between Trenton and Princeton, N. J., was put into effect on Feb. 15, 1913, with the approval of the Board of Public Utility Commissioners of New Jersey. The company has divided the territory between Trenton and Princeton into three fare zones. The first zone extends from State and Broad Streets, Trenton, to the foot of Darrah's Hill, about 1½ miles south of Lawrenceville. The second zone extends from this point to the northerly line of Lawrence Township, about 2 miles south of Princeton. The last zone extends from this point to the terminus of the line in Princeton.

Suit to Force Extension of Transfer Privileges.—In their efforts to force an extension of the transfer privileges between the County Traction Company and the Chicago Railways, the attorneys for the villages of Oak Park and Riverside have examined many witnesses. Among the officers of the Chicago Railways who have appeared on the witness stand are H. A. Blair, chairman of the board of directors, and J. M. Roach, president of the company. The history of the reorganization of the two companies has been covered and canceled checks and vouchers have been submitted in evidence to establish the ownership of the County Traction Company. The attorneys for the village completed their case on Feb. 11 and the defendant companies began to present their side by introducing documentary evidence.

Explosion of Air Tank on Car at Allentown.—The end of an air tank on a car of the Lehigh Valley Transit Company, Allentown, Pa., in the yard of that company in that city blew out on the night of Oct. 8, 1913, giving rise to a rumor that a series of explosions had occurred. R. P. Stevens, president of the company, says that the total damage does not amount to more than $25. An enterprising newspaper correspondent at Allentown, too busy at the hour at which the accident happened to investigate the matter, put a greatly exaggerated story on the wires, which was accepted elsewhere as authoritative and received considerable publicity. The writer of this story, in a wild flight of fancy, had "Mayor Rinn and thirty officers on the scene in a jiffy by automobiles; but diligent search failed to reveal any culprit."

Plan to Prevent Smoking on Cars in Springfield, Mass.—City Solicitor Scott Adams, of Springfield, Mass., has addressed a letter to the Board of Health of Springfield in which he discusses the plan of that body to regulate smoking on street cars in that city. Mr. Adams in giving his opinion reviewed at length the statutes and ordinances on which the authority of the board in regard to nuisances was based, and also discussed the question of public and private nuisances. He thinks that probably smoking in street cars might be considered a public nuisance, but is uncertain whether it could be shown to have damaging effect on health or property. In his conclusions he draws attention to the fact that such matters as expectoration in public places, smoke nuisances and the matter of sanitary precautions in regard to mutoscopes have all been regulated by boards of health under special statute rather than with the authority of the general law, and suggests that the board could probably secure the enactment of such a statute at the present term of the Legislature.

Why the Street Car Service Isn't Better.—Frank Hedley, vice-president and general manager of the New York (N. Y.) Railways, contributd a full-page article to the New York *Sunday Sun* of Feb. 9, 1912, headed "Why the Street Car Service Isn't Better." The *Sun* prefaced the article by saying that the other side was entitled to its inning and that "Mr. Hedley is one of the most expert public transportation managers in the world, hence his statements will be received with interest." Mr. Hedley, first referred to the geographical formation of Manhattan Island and to the limitations on service which this formation sets. He then referred to the magnitude of the passenger movement and to the tendency to continue to increase the height of buildings, with the result that certain thoroughfares are choked with pedestrian traffic. He next discussed the necessity for running by passengers so as to prevent bunching of cars and to the theory of the "turn back." He told at considerable length about the power of inspectors to deal with emergencies and referred particularly to the limitations of the underground conduit system under the peculiar climatic and commercial conditions which obtain in New York.

Joint Operation of Interurban Lines.—Arrangements have been made whereby the Tri-City Companies will furnish the current for the operation of the Iowa & Illinois Railway and for light and power service along the route of the railway. At the same time joint operation has been provided for between the Iowa & Illinois Railway and the Davenport & Muscatine Railway, that economies may be effected and through service secured between Clinton and Muscatine, via Davenport. This arrangement is to be effective until Jan. 1, 1917. The freight service in connection with the Chicago & Northwestern Railway will be continued and extended and it is expected that the new source of power will enable the Iowa & Illinois Railway to extend its already effective service. The following directors have been elected: Garret E. Lamb, F. W. Ellis and R. B. McCoy, Clinton, Ia.; Joe R. Lane, J. G. Huntoon, P. P. Crafts, J. F. Porter, H. E. Weeks and George G. Kuhn, Davenport, Ill. The officers will be Joseph F. Porter, president; F. W. Ellis and P. P. Crafts, vice-presidents; H. E. Weeks, secretary and treasurer. Mr. Crafts will have the direct charge of the management of the interurban properties as general manager.

Service Question in Atlanta.—In connection with the order of the Railroad Commission of Georgia to the Georgia Railway & Power Company, Atlanta, Ga., in regard to service on the Ponce de Leon Avenue line of the company, Vice-president Glenn of the company wrote to the commission that the company would be glad to have the commission define what it thinks are the rush hours on the line, as the company had found from experience that the rush hours vary on different lines. In its reply the commission stated as follows its reason for not being more specific when the original order was made: "The commission was aware of the fact that the rush hours varied on your different lines, and presuming that you knew approximately the hours on each particular line, intended to leave it to your good judgment and experience to operate this increased service during the hours which in good faith you concluded from your records were rush hours. The hours this commission had in mind from the data before it were from 6.30 a. m. to 9.30 a. m., from 12 m. to 3 p. m., and from 4.30 p. m. to 7 p. m., and in view of your uncertainty in the premises you may take the above as the rush hours contemplated by the commission."

Modification of Ventilating System of Chicago Near-Side Cars Proposed.—The only objection which has been made to the operation of the near-side cars in Chicago was brought before the local transportation committee of the City Council on Feb. 10, 1913. It was complained that the dust which enters the cars through the ventilators located near the car floor is offensive. Leonard A. Busby, president of the company, explained to the committee that the company was testing several methods to remedy this defect. As an experiment a fine mesh screen has been installed to act as a baffle to the dust, care being taken to see that the screen does not decrease appreciably the amount of fresh air admitted to the car. The company has also considered the advisability of closing the intakes at the rear of the car and taking air from the front only. In case none of the plans which have been suggested to overcome the trouble prove effective the company will resort to the old method of taking in all of the fresh air at the roof of the car and exhausting it at the roof. When interviewed later, Mr. Busby added that in all other respects the cars are giving greater satisfaction than was anticipated when they were first placed in service. They have eliminated boarding and alighting accidents and have proved otherwise efficient.

Personal Mention

Mr. Lawrence A. McVeigh, formerly of the New York (N. Y.) Railways, has been appointed assistant auditor for the receivers of the New York, Auburn & Lansing Railroad and assistant auditor for the receivers of the Ithaca (N. Y.) Street Railway.

Mr. James P. Barnes, who has been chief engineer of the Syracuse (N. Y.) Rapid Transit Railway, has been appointed general manager of the Syracuse & Suburban Railroad to succeed Mr. Milford Badgero, who will devote himself very largely to Allen & Peck, Inc., of which he is secretary and assistant treasurer.

Mr. T. P. Alston has been appointed general manager of the St. John's Electric Company, St. Augustine, Fla. Mr. Alston was previously for ten years general manager of the Florida Railway and before that was purchasing agent of another steam railroad for three years. Previous to that he was for eight years chief clerk in the engineering department of the Florida & East Coast Railway.

Mr. R. H. Rice, formerly division engineer of Division E, having charge of electric power distribution for the Board of Supervising Engineers, Chicago Traction, has been appointed assistant to Mr. George Weston, engineer for the board, in charge of all engineering work. He became associated with the board as assistant division engineer of the electric power distribution division in 1907. At the resignaton of Mr. E. N. Lake, division engineer of this division, Mr. Rice was appointed as his successor. The new appointment became effective on Feb. 1.

Mr. James Harmon has assumed new duties with the Louisville & Northern Railway & Lighting Company, New Albany, Ind., a vacancy having been caused by the recent promotion of Mr. Charles B. Scott, who was formerly assistant general manager of the company. Mr. Harmon has become the assistant general manager of the Louisville & Northern Railway & Lighting Company nominally, having especial jurisdiction over the claim department of the company. He has been connected with the claim department since last March, and for several years previous was a motorman in the employ of the company.

Mr. R. F. Kelker, Jr., principal assistant engineer to Mr. George Weston, engineer for the Board of Supervising Engineers, Chicago Traction, has resigned. He has been associated with the board as division engineer track and roadway division since its inception in 1907. At the close of the rehabilitation period he was made principal assistant engineer to Mr. Weston and has held that position up to the present time. In this latter position he had charge of all engineering work handled by the different divisions in the chief engineer's organization. For the present at least Mr. Kelker will discontinue his engineering work and spend several months developing land in Texas in which he is interested.

Mr. A. W. Cournyer has been appointed superintendent of the Sterling, Dixon & Eastern Railway, Dixon, Ill., to succeed Mr. Dean Treat, whose appointment as superintendent of the railway department of the Wisconsin Public Service Company at Green Bay, Wis., was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 4, 1913. Previous to his appointment as superintendent of the Sterling, Dixon & Eastern Railway, Mr. Cournyer was employed as chief dispatcher and operating superintendent of the Milwaukee Northern Railway. Previous to that he was employed as dispatcher by the Grand Rapids, Grand Haven & Muskegon Railway, having worked up to that position with the company from the post of conductor.

Mr. Charles B. Scott, formerly assistant to Mr. M. J. Insull, general manager of the Louisville Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company, has resigned that position to become manager of the Bureau of Safety organized in connection with the Middle West Utilities Company, Chicago, Ill. The bureau is a separate organization from the utilities company and acts in an advisory capacity relative to the different subsidiaries. Mr. Scott has been associated with Mr. M. J. Insull for the last seven years and in addition to acting as his assistant he was claim agent for the companies named having charge of accident prevention work. The safety bureau has just been organized and Mr. Scott took charge on Jan. 1.

Mr. Charles J. Laney, traffic manager of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, has been appointed traffic manager of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, effective on March 1, 1913. Mr. Laney has been connected with the Toledo, Bowling Green & Southern Traction Company and its predecessor, the Toledo Urban & Interurban Railway, since 1907. He was for two and one-half years assistant general freight agent of the company, and in November, 1909, was appointed traffic manager of the company to succeed Mr. H. H. Stephenson. At that time the duties of assistant general freight agent were combined with those of traffic manager. Before becoming connected with the Toledo Urban & Interurban Railway Mr. Laney served in the freight department of the Toledo & Ohio Central Railway and the Wabash Railroad.

Mr. N. H. Brown has resigned as superintendent of the Albany Southern Railway, Rensselaer, N. Y., to accept the position of assistant superintendent of the International Railway, Buffalo, N. Y. Mr. Brown entered railway work with the Syracuse (N. Y.) Rapid Transit Railway in March, 1894, and continued with the company until February, 1907, holding the positions of conductor, motorman, cashier and inspector. He next became general inspector with the Worcester (Mass.) Consolidated Street Railway, and on Sept. 1, 1907, he was promoted to the position of superintendent of the Southbridge division of the company. He continued in the last-named position until Sept. 15, 1912, when he accepted the position of superintendent of the Albany Southern Railway. Mr. Brown was induced to become connected with the International Railway on account of the broader field of opportunities which the position with that company opened to him.

Mr. P. P. Crafts, who has been general manager of the Iowa & Illinois Railway, Clinton, Ia., has also been elected vice-president of that company and general manager of the Davenport & Muscatine Railway in addition, and as general manager of both of these properties he will have direct charge of the management of the companies, which are to establish joint operation between Clinton and Muscatine, via Davenport, as noted elsewhere in this issue of the ELECTRIC RAILWAY JOURNAL. Mr. Crafts entered electric railway work sixteen years ago with Stone & Webster in their Boston office. His first four years with this company were devoted to engineering and construction work, but in 1901 he went to Minneapolis as manager of an electric light property there controlled by Stone & Webster. This company was afterward absorbed by the Minneapolis General Electric Company. In 1902 Mr. Crafts became manager of the Saginaw Valley Traction Company, which operates between Saginaw and Bay City, Mich. After the consolidation of this property with the Saginaw-Bay City Railway & Light Company in 1904 he became connected with the Iowa & Illinois Railway as general manager just before the line was completed. He also acted for a time as general manager of the Joplin & Pittsburgh Railway. This position he relinquished on April 1, 1908, in order to devote his whole time to the Iowa & Illinois Railway. Mr. Crafts was president of the Iowa Street & Interurban Railway Association in 1908.

OBITUARY

Daniel F. Lynch, who was connected with the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., died recently at the home of his mother in Indianapolis. Before becoming connected with the Chicago, South Bend & Indiana Railway Mr. Lynch was for eleven years in the employ of the Indianapolis Traction & Terminal Company.

John Patterson, who was one of those instrumental in the formation of the Hamilton (Ont.) Cataract Power Company, which later became the Dominion Power & Transmission Company, died at his home in Hamilton on Jan. 26. Mr. Patterson also assisted in promoting the Hamilton Radial Electric Railway and the Brantford & Hamilton Electric Railway.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Tri-State Traction Company, Warsaw, Ill.**—Incorporated in Illinois to build an interurban railway from Quincy to Hamilton. Capital stock, $200,000. Headquarters, Warsaw. Incorporators: J. Henry Bastert and Henry F. Dayton, Quincy; John M. Hungate and Richard O. Marsh, Warsaw, and Cornelius T. Daugherty and Earl W. Wood, Hamilton.

***Gary & Interurban Railway, Gary, Ind.**—Incorporated in Indiana to consolidate the Gary & Interurban Railway, the Gary Connecting Railways, the Valparaiso & Northern Railway and the Goshen, South Bend & Chicago Railway. Capital stock, $5,000,000, of which $1,000,000 is preferred and $4,000,000 is common stock. Officers: Frank M. Gavit, Whiting, president, and Alexander Miller, Chicago, vice-president and general manager.

***Quebec Extension Railway, Presque Isle, Maine.**—Application for a charter has been made by this company in Maine to take over the Aroostook Valley Railroad, which operates a 25-mile line between Presque Isle and Washburn. Capital stock, $4,000,000.

***York & Oxford Railroad, Sanford, Maine.**—Application for a charter has been made by this company in Maine to build an interurban railway from Sanford to a connection with the Boston & Maine Railroad and the Atlantic Shore Line Railway and through the towns of Alford, Waterloo, Limerick, Cornish, Baldwin and Hiram to connect with the Maine Central Railroad and the Bridgeton & Saco River Railroad. Capital stock, $500,000.

Boston & Eastern Railway, Boston, Mass.—Incorporated in Massachusetts to build a high-speed electric line between Post Office Square and Beverly, with branch lines to Peabody, East Boston, Chelsea, Revere, Saugus, Lynn, Salem, Beverly and Peabody. The plans include a tunnel under Boston Harbor. Capital stock, $250,000. Directors: John H. Bickford, Charles Dayton, William H. Young, William S. Nichols and William H. Gove. [E. R. J., Oct. 2, '11.]

***Hamilton (Ont.) Mountain Electric Railway.**—Application for a charter has been made by this company to the Ontario Legislature to build an electric or steam railway on the mountain top from the point where the Horning Road, near Ancaster, intersects the Brantford & Hamilton Electric Railway to Mount Albion. Crerar & Awrey, Hamilton, Ont., are acting for local financiers.

***Huron Lake Shore Railway, Sarnia, Ont.**—Application for a charter has been made by this company to build an electric or steam railway from Sarnia to Meaford. Capital stock, $1,000,000. Incorporators: W. B. Converse, Arthur Terroux, R. B. Dillon and Edward Parker, Montreal, and J. H. Parks, Ottawa.

FRANCHISES

***Little Rock, Ala.**—The T. H. Bunch Coal Company has asked the council for a franchise to build an electric railway over twenty streets and avenues in Little Rock.

***Los Angeles, Cal.**—Frank E. Green, Los Angeles, has asked the Council for a franchise for a double-track line from Thirtieth Street and San Pedro Street extending south on San Pedro Street to South Park Avenue and on South Park and Manchester Avenue in Los Angeles.

Los Angeles, Cal.—The Los Angeles Railway has received a twenty-one-year franchise from the Council in Los Angeles on West Vernon Avenue from Dalton Avenue to the westerly city limits of Los Angeles.

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the Council to operate over the San Pedro Street line between Aliso Street and Ninth Street in Los Angeles. The line will be built by the city. Permission was also granted to the company to build a line in Los Angeles Street between First and Seventh Streets.

Richmond, Cal.—The San Francisco-Oakland Terminal Railways, Oakland, has asked for a certificate of public convenience and necessity to operate an electric railway on Standard Avenue in Richmond.

Sacramento, Cal.—The Oakland, Antioch & Eastern Railroad has asked the City Commissioners for a franchise to build a spur track at Third and M Streets to connect the main line of the railway with a proposed freight depot in Sacramento.

San Francisco, Cal.—The Supervisors of San Francisco have passed to print the ordinance authorizing the extension of the Geary Street Municipal Railway down Market Street to the corner of Sansome Street, where it will connect with the outer tracks in lower Market Street. The clerk of the board has been directed to advertise the sale of $120,000 municipal bonds to cover the cost of the extension, bids to be opened Feb. 17.

***Willows, Cal.**—George R. Freeman, Frank Freeman and Leon Speier, Willows, have asked the City Council for a franchise to build an electric railway over Syracuse Street and Walnut Street in Willows.

St. Augustine, Fla.—The Jacksonville & St. Augustine Public Service Corporation, St. Augustine, has received a franchise from the City Council in St. Augustine on Ribera Street from Orange to King's Ferry Way. This is part of a plan to build an electric line from South Jacksonville to Beach Junction and St. Augustine. A. W. Corbett, president. [E. R. J., Jan. 11, '13.]

Lerna, Ill.—The Springfield & Central Illinois Traction Company has received a franchise from the Council in Lerna.

Taylorville, Ill.—The Decatur, Sullivan & Mattoon Transit Company has received a franchise from the Christian County Supervisors to cross the highways of Taylorville with its lines. The company has received a franchise in Moweaqua. [E. R. J., Feb. 8, '13.]

Lexington, N. C.—The North Carolina Public Service Company, Salisbury, has received a sixty-year franchise from the Council for an electric line and a gas plant in Lexington.

Troy, N. Y.—The City Council will be asked to authorize the sale of a franchise for an electric railway in Troy on Fourth Street from Congress Street to a point north of Fulton Street, connecting with the present double track of the United Traction Company.

Utica, N. Y.—The New York State Railways has received a franchise from the Common Council to double-track its line over the overhead railroad crossing at Genesee Street in Utica to connect with the Deerfield line, and to construct a double-track line on Genesee Street from Whitesboro Street to North Genesee Street.

Stratford, Ont.—The ratepayers have passed a by-law granting the Stratford Street Railway a 25-year franchise for an electric railway in Stratford. Confirmation of the by-law is being asked from the Ontario Legislature. Work is to be started on the line in July, provided the by-law is ratified.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has asked permission to double-track its Meridian Avenue line in Seattle from North Forty-sixth to North Fifty-eighth Street, a distance of 1 mile.

TRACK AND ROADWAY

***Lacombe & Blindman Valley Electric Railway, Lacombe, Alta.**—This company plans to build a line from Lacombe to Gull Lake, Alta, 10 miles, and thence to Rimbey, a total distance of 30 miles. It is reported that some capital has been subscribed locally and that it is expected to start construction early in the spring. E. R. Strathy, Winnipeg, Man., and J. C. Gibson, Toronto, Ont., are interested in this company, which also owns the charter of the Lacombe, Bullocksville & Alix Electric Railway.

Phoenix (Ariz.) Railway.—Work has been begun by this company on the reconstruction of its entire line in Phoenix. New and heavier rails will be laid.

Pine Bluff (Ark.) Company.—This company is replacing its old single track on Main Street in Pine Bluff with heavy double track and making other improvements.

***Victoria, B. C.**—The British Columbia Legislature is being asked to incorporate a company to build a standard or narrow-gage railway, to be operated by steam, electricity or any other motive power, from the international boundary about 9 miles west of the Kootenay River westerly along the river valley to the international boundary where it is crossed by Blue Joe Creek, B. C. F. A. McDiarmid, Victoria, B. C., is solicitor for applicant.

Sacramento Valley West Side Electric Railway, Willows, Cal.—Grading for the first 8 miles of this railway have been completed. It is expected to have the line from Sacramento down the westerly side of the Sacramento River to tidewater at Rio Vista completed as far as the southwestern boundary of the West Sacramento reclamation district by June 1. [E. R. J., Dec. 21, '12.]

Jacksonville (Fla.) Traction Company.—Plans are being made by this company to extend its Lemon Street line in Jacksonville.

St. John's Electric Company, St. Augustine, Fla.—Plans are being made by this company to construct an extension from the present South Beach terminal 1 mile south to the site of the Methodist Assembly.

Georgia Railway & Power Company, Atlanta, Ga.—This company has completed one-third of the grading and has begun the track laying for a 17-mile extension from Atlanta to Stone Mountain. A contract will soon be signed whereby the Fairburn Interurban line, which extends from Atlanta to Fairburn, a distance of 20 miles, will be operated by electric power instead of by gasoline. Power will be supplied by the Georgia Railway & Electric Company.

Alton & Eastern Railway, Alton, Ill.—This company, which is controlled by the East St. Louis & Suburban Company, will begin construction in the spring on its line from Alton to the new hospital east of Alton. Officers: L. C. Haynes, East St. Louis, president; A. J. Purinton, East St. Louis, vice-president, and T. W. Gregory, East St. Louis, secretary. [E. R. J., Jan. 25, '13.]

Northern Illinois Electric Railway, Amboy, Ill.—During the year this company plans to build 20 miles of new track.

Peoria (Ill.) Railway.—Among the improvements planned by this company in the near future will be the extension of its South Adams Street line to the asylum.

Evansville & Southern Indiana Traction Company, Princeton, Ind.—This company has announced through its holding company, the Evansville Public Utilities Company, that it will build a new division from a point several miles south of Princeton to Owensville in the spring. The extension will be 8 miles in length and ultimately is to reach Mount Vernon or New Harmony, Ind.

Kentucky Southwestern Railway, Light & Power Company, Paducah, Ky.—A new steel bridge will be constructed by this company across Mayfield Creek.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—This company will award contracts in April for the construction of its 12-mile line between Moberly, Huntsville and Randolph Springs; also for three steel bridges. C. H. Dameron, Huntsville, president. [E. R. J., Jan. 18, '13.]

***St. Louis, Mo.**—Plans are being considered to build an electric railway along Hall's Ferry Road to a point opposite Florissant, then west over private right-of-way through Florissant to Bonfils and St. Charles. The right-of-way is being negotiated by J. E. Greffet.

Moncton Tramways, Electricity & Gas Company, Moncton, N. B.—This company has under consideration the building of an extension of 1 mile along Church Street to Sunny Brae and another of nearly 1 mile from the overhead bridge to Main Street, Moncton, N. B. H. N. Price, Moncton, N. B., superintendent.

International Railway, Buffalo, N. Y.—This company has been asked to consider plans to double-track its line through Lockport.

Piedmont & Northern Railway, Charlotte, N. C.—Plans are being considered by this company to build a line between Atlanta and Anderson.

Cape Breton Electric Company, Sydney, N. S.—This company plans to build the following additional lines: From Sydney to New Waterford, N. S., via Grand Lake, 8 miles; from Sydney to New Waterford, via Cow Point, 14 miles; from Dominion to New Waterford, 5 miles.

Cleveland, Alliance & Mahoning Valley Railroad, Cleveland, Ohio.—Work will be begun by this company on its 21-mile line between Ravenna and Leavittsburg as soon as the weather permits. It will connect Cleveland, Alliance, Ravenna and Leavittsburg. [E. R. J., July 27, '12.]

***Jackson, Ohio.**—Plans are being made to build a 40-mile electric railway between Jackson and Portsmouth, via Stockdale and Harrisonville, connecting at this end of the proposed line with the Jackson, Wellston and Hamden Belt Line. The following committee from the three counties through which the road will pass have been appointed: R. W. Allard, S. J. Nickolet and William Bennett, Scioto; Ira Keller, E. E. Balsinger and James Jenkins, Pike, and Dennis Keller, Jackson.

Tri-State Railway & Electric Company, Liverpool, Ohio.—This company has completed its extension from Steubenville, Ohio, to Weirton, W. Va.

Lake Erie & Youngstown Railway, Youngstown, Ohio.—Work will be begun at once by this company on the construction of a 65-mile line from Youngstown to Conneaut.

Niagara, Welland & Lake Erie Railway, Niagara Falls, Ont.—This company has in contemplation the immediate construction of the following lines: From the Grand Trunk Railway, Welland, to Rosedale, 1 mile, and from the Michigan Central Railway, Welland, to Dainville, about 2 miles. T. F. Swayze, Welland, superintendent.

Montreal & Southern Counties Railway, Montreal, Que.—The Board of Railway Commissioners has approved of location plans for the company's line in St. Antoine de Longueuil, Que., to a junction with the Central Vermont Railway, 2.25 miles.

***Oaklawn, R. I.**—Charles B. Westcott and associates plan to build a 3½-mile electric railway from Oaklawn to Apponaug.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—This company announces that it will spend $50,000 for improvements to its lines in Spartanburg during the year. This will include extension of tracks as well as additions to equipment.

Nashville Railway & Light Company, Nashville, Tenn.—An application for a charter amendment has been filed by this company in pursuance of a resolution passed by the stockholders on Dec. 16, 1912, for the purpose of extending the lines on several streets in Nashville.

Bay Shore Rapid Transit Company, La Porte, Tex.—Plans are being made by this company to begin soon the construction of its line between Houston, La Porte, Velasco and Freeport. Samuel F. George, Dayton, Ohio, is interested. [E. R. J., Oct. 12, '12.]

Orange & Northeastern Railway, Orange, Tex.—Grading will be begun at once by this company north out of Vinton, La. The northern terminus of this 133-mile railway will be Natchitoches, La., and the southern terminus will be East Orange, La., which is across the Sabine River opposite Orange, Tex. Edward Kennedy, Orange, president. [E. R. J., Nov. 23, '12.]

Virginia Railway & Power Company, Richmond, Va.—Construction on the extension of this company's Hull Street line in Richmond will be begun shortly. It will extend from the present terminus along the New Road to the Broad Rock Road.

Charleston (W. Va.) Interurban Railway.—It is reported that this company plans to build a 25-mile extension from Charleston to Montgomery, via Dana, Malden, Levi, Dickinson, Cedar Grove and Hugheston.

Princeton (W. Va.) Power Company.—Plans are in progress for the construction of a 7-mile line between Princeton and Bluefield by this company.

West Virginia Traction & Electric Company, Wheeling, W. Va.—It is reported that this company plans to reconstruct its entire line from Wheeling to West Alexander. New track will be built on Bow Street and the National Road at Fulton, and it will also build a reinforced concrete bridge near Langmeyer's Station in Wheeling.

SHOPS AND BUILDINGS

Pensacola (Fla.) Electric Company.—This company has awarded the contract to build its new carhouse in Pensacola. The structure will be 120 ft. x 63 ft.

Illinois Traction System, Peoria, Ill.—It is stated that this company will begin work next month on the construction of its new passenger terminal station in Peoria. The structure will be seven stories high, the first four to be used as waiting rooms and offices and the others as office suites. The cost is estimated to be about $350,000.

Lewiston, Augusta & Waterville Railway, Lewiston, Maine.—It is reported that this company, the Brunswick & Yarmouth Street Railway and the Portland Railroad are to consolidate several of their carhouses and will build a new plant in Brunswick, consisting of a large carhouse with a rotary converter and possibly an auxiliary power station.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—This company plans to build a terminal at Moberly.

Lake Erie & Youngstown Railway, Youngstown, Ohio.—This company plans to build a waiting station, office and freight buildings at Youngstown in the near future. It will also build a carhouse at Conneaut. The structure is to be 140 ft. x 160 ft. and of brick construction.

Ohio Valley Electric Railway, Huntington, W. Va.—This company has begun the reconstruction of its carhouses in West Huntington which were recently destroyed by fire. The new buildings will be built of structural steel with reinforced concrete roofs.

Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.—Plans are being made by this company to build a new public service building in the business section of Fond du Lac. The structure will be used for a general office building and an interurban depot for passengers and freight.

POWER HOUSES AND SUBSTATIONS

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—This company has purchased from the General Electric Company new substation apparatus comprising 120-kw and 180-kw synchronous motor-generator sets, a 20-kva feeder regulator and three 75-kw transformers and switchboard panel.

Gary & Interurban Railway, Gary, Ind.—This company will install new apparatus in its substations consisting of four 300-kw rotary converters, twelve 100-kw transformers and two switchboards. All the apparatus has been ordered from the General Electric Company.

Toledo & Chicago Interurban Railway, Kendallville, Ind.—This company has placed an order with the General Electric Company for two 300-kw, 600-volt rotary converters, six 100-kw, 2300-370-volt transformers and switchboard apparatus for its power plant.

Iowa Railway & Light Company, Cedar Rapids, Ia.—This company has placed an order with the General Electric Company for one 500-kw, three-bearing motor-generator set and one 500-kw, six-phase rotary converter for its power plant.

Brandon, Man.—A contract has been closed with the Brandon Electric Light Company whereby the company agrees to supply power for the operation of the new municipal electric railway, which is practically completed, at Brandon, at a rate of 2 cents per kw-hr. This contract is to hold good for two years at least, and at the end of four years the city has the option of purchasing the company's plant at its actual value as arrived at by arbitration. [E. R. J., May 4, '12.]

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—This company plans to build its new power plant in Moberly. J. J. Munindger, Huntsville, chief engineer.

Newbern & Ghent Railway, Newbern, N. C.—This company has placed an order with the General Electric Company for a 60-kw generator and a 50-kw two-unit motor-generator set, with 7-kw exciter and switchboard, for its power plant.

Monongahela Valley Traction Company, Fairmont, W. Va.—This company will install in its substations three 300-kw rotary converters, nine 110-kw transformers and three switchboards. The apparatus has been ordered from the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Tri-City Railway, Davenport, Ia., is said to be preparing specifications for twenty prepayment cars.

Meridian Light & Railway Company, Meridian, Miss., has ordered three cars from the Southern Car Company.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., expects to have built one one-man single-truck near-side car.

Washington Railway & Electric Company, Washington, D. C., has ordered one double-deck car from the Southern Car Company.

North Carolina Public Service Company, Greensboro, N. C., has ordered five double-truck open cars from the Southern Car Company.

Charlotte (N. C.) Electric Railway has ordered material from the Southern Car Company to convert sixteen open cars into center-aisle cars.

Toronto (Ont.) Civic Line is said to be negotiating for the purchase of twenty cars for the municipal lines on St. Clair and Danforth Avenues.

Montreal (Que.) Tramways has placed an order with the Canadian Car & Foundry Company, Ltd., for 100 of its standard car bodies and trucks.

Lake Erie & Youngstown Railroad, Youngstown, Ohio, has ordered from the McKeen Motor Car Company one 70-ft., 200-hp motor car and one 200-hp switching locomotive.

Minneapolis & Northern Railway, Minneapolis, Minn., has ordered a 200-hp switching locomotive from the McKeen Motor Car Company. The company recently ordered two 55-ft. motor cars from the McKeen Motor Car Company.

Western New York & Pennsylvania Traction Company, Olean, N. Y., has ordered from the Wason Manufacturing Company one single-truck semi-convertible car, one express car mounted on Brill 27-MCB trucks and one extra pair of trucks.

Louisville & Northern Railway & Lighting Company, New Albany, Ind., has had two trail cars rebuilt by the Jeffersonville Car & Foundry Company. They have been equipped with steel sides and steel underframes, and the steps have been lowered.

Chattanooga Railway & Light Company, Chattanooga, Tenn., has ordered from The J. G. Brill Company four 45-ft. 1-in. semi-convertible center-entrance Jim Crow car bodies mounted on Brill 27-MCB-1 trucks, one 40-ft. baggage-express car mounted on Brill 27-MCB-1 trucks, also two extra Brill 27-MCB-1 trucks.

Stone & Webster, Boston, Mass., have placed an order with the St. Louis Car Company, through Wendell & MacDuffie, New York, Eastern representatives, for forty-four cars. The order is distributed as follows: Dallas (Tex.) Consolidated Electric Street Railway, ten double-truck city cars; Houston (Tex.) Electric Company, ten double-truck city cars; Northern Texas Traction Company, Fort Worth, Tex., ten double-truck city cars and four interurban cars; Jacksonville (Fla.) Traction Company, ten double-truck city cars. The city cars are all of Stone & Webster standard steel T-post construction.

TRADE NOTES

H. W. Johns-Manville Company, New York, N. Y., has opened a branch office in the Dooly Block, in Salt Lake City, Utah. The company has recently removed its Newark office to 239 Halsey Street, Newark, N. J.

W. N. Matthews & Brother, St. Louis, Mo., announces that its New York office is now located at 50 Church Street. Warren M. Heim, sales engineer of the company, is in charge of the New York office and has charge of all the territory from Maine to North Carolina.

McKeen Motor Car Company, Omaha, Neb., has received an order from the Sunset Central Lines for five 70-ft. motor cars, which are assigned to the following lines: Morgan's Louisiana & Texas Railroad & Steamship Company, Galveston, Harrisburg & San Antonio Railway, Houston & Texas Central Railroad.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received the following orders for railway motors: Cumberland Electric Railway, Cumberland, Md., fourteen No. 92-A motors; Pensacola Electric Company, Pensacola, Fla., eight No. 92-A motors; Lynchburg Traction & Light Company, Lynchburg, Va., four No. 101-B2 motors and K-28-B control.

Stewart Hartshorn Company, Newark, N. J., has passed the half-century mark in the manufacture of curtain rollers. For more than fifty years this company has maintained the highest possible standard of quality in curtain roller construction, and has been constantly on the alert after exhaustive tests to adopt improvements. This policy has made the name Hartshorn an assurance of satisfactory operation, either in a spring roller or a sash balance.

Western Electric Company, New York, N. Y., has placed upon the market a new dry battery to be known as the red label blue bell battery. It is incased in a red carton and is designed for intermittent service requiring high efficiency and rapid recuperation. The battery is of the high initial amperage and low internal resistance type, having an initial amperage of 25 amp on short-circuit. These characteristics, together with its powers of rapid recovery after use, insure its long life and usefulness wherever this general type of battery is required. The battery may be used for the operation of call bells and annunciators, for operating telephone pole changers, for railway telephones in furnishing transmitter current or train dispatching circuits, as selective signaling battery or in operating No. 62 type interrupters. It is also specially fitted for ignition service in general, in conjunction with all types of industrial gas engines.

ADVERTISING LITERATURE

Chicago Pneumatic Tool Company, Chicago, Ill., has printed Bulletin No. 124 on pneumatic riveting, chipping, calking and stone hammers.

MacGovern & Company, New York, N. Y., have issued their February list of second-hand electrical and steam machinery, cars, car equipments, etc.

Nazel Engineering Works, Philadelphia, Pa., have issued a twenty-page catalog which fully describes and illustrates Béché patent forge hammers.

Trigger-Lock Reversible Controller Finger, Niagara Falls, N. Y., has issued a circular which calls attention to the merits of trigger-lock controller fingers.

Trolley Supply Company, Canton, Ohio, is mailing a folder which calls attention to the merits of the Peerless No. 10 trolley base for high-speed interurban cars and the Star trolley base for city cars.

G. L. Simonds & Company, Chicago, Ill., have issued a sixteen-page catalog which briefly describes and illustrates Simonds fuel economy specialties, including Hays flue-gas analysis instruments, Hays differential draft gages, Vulcan soot cleaners, Dean boiler tube cleaner, Robertson check and pump valves, Eclipse smoke indicator and Little Giant tube extractor.

Philadelphia Equipment Securities Company, Philadelphia, Pa., has issued a booklet "Equipment Trust Certificates as Applied to Financing Purchases of Cars by Electric Railways," in which it describes briefly the methods to be followed by the company in financing the purchase of electric railway cars by equipment trusts which have been used so extensively by steam railroads for many years.

The J. G. Brill Company, Philadelphia, Pa., has just issued *Brill Magazine* in bound form for 1912. It is the intention of the company to send out such volumes each year. This magazine is now in its seventh year, having started in January, 1907, with a circulation of 2000 copies, which has grown to over 7000. This circulation is made up entirely of the chief officials of electric railways throughout the world, the heads of engineering departments of universities and technical schools, technical libraries, editors of railway publications and the railway editors of the principal newspapers.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 48,500, which fully describes and illustrates G. E. Edison Mazda lamps for standard lighting service. The company has also issued Bulletin No. A4080, which is devoted to the use of electricity in excavation and construction work. The bulletin deals with both the generating of the current and its use through motors. It touches on the advantages to be derived from the use of electric power and refers briefly to its application to the work in connection with the Panama Canal, Catskill Aqueduct, New York Barge Canal and in general construction.

NEW PUBLICATIONS

Handbook on Incandescent Lamp Illumination, 1913. Published by the General Electric Company, Harrison, N. J. Price, 50 cents.

This is the first handbook of the kind to be published by the General Electric Company. In preparing the book the object has been to provide a reference book for those interested in incandescent lamps and in problems dealing with incandescent lamp illumination. With this in view there have been included tables and formulas covering the various problems that may present themselves to the central station man, to the lamp solicitor, to the student and to the user of incandescent lamps. The handbook is pocket size, contains 148 pages and is bound in leather.

Proceedings of the Keystone Railway Club. Published from the office of the secretary, J. G. Baukat, Allentown, Pa.

The proceedings of the Keystone Railway Club covering the meetings held at Harrisburg June 25, 1912, and Scranton, Pa., Sept. 10, 1912, have just been issued in convenient pamphlet form. The text is printed on rough stock, but the halftone illustrations are effectively displayed by the use of coated paper. The publication contains the following papers: "Relation of the Equipment Department to the Traffic Department," by C. M. Paxton; "Shop Management and the Handling of Repairs to the Best Advantage," by Henry Branson; "Preparation of Equipment for Summer Business," by William H. Wheaton; "Car Ventilation," by William J. Fleming, and "Development of Control Apparatus," by J. J. Sinclair. The minutes of the various meetings and a complete list of the officers, committees and members are also included.

Proceedings of Southwestern Electrical & Gas Association. Published from the office of the secretary, H. S. Cooper, Galveston, Tex.

The Southwestern Electrical & Gas Association has issued a handsome cloth-bound volume of about 250 pages covering the proceedings of the seventh annual convention held at Houston, Tex., April 27 to 29, 1911, inclusive. The proceedings for 1912 are now in the hands of the printer and will be sent to members within a short time. Among others, the 1911 proceedings contain the following papers of electric railway interest: "Boiler Economy and the Application of Flue Gas Analysis," by M. L. Hibbard; "Investigation and Care of Return Railway Circuits," by E. E. Nelson; "Cause and Prevention of Accidents," by C. W. Kellogg, Jr.; "Development of Power Business," by P. A. Rogers; "Light Weight Cars, Their Construction and Operation," by R. T. Sullivan. The question box also includes much matter of value to electric railway operators.

Electric Railway Diary. Published by *Light Railway & Tramway Journal*, London, England.

An annual feature of the *Light Railway & Tramway Journal*, London, England, is the distribution among its subscribers of a cloth-bound diary 18½ in. x 13 in. in size. The diary is always accompanied by a calendar, miscellaneous useful information on such matters as postage rates, telegraphic service, tables of measurements, etc., and a selection of the most interesting electric railway papers of the year. Among the latter in this issue of the diary are articles on the corrugation of rails, track maintenance, steel car wheels of M. C. B. standard, steel-tired wheels and axles, the use of meters on cars, depreciation and sinking fund, advantages of prepayment of fares to tramways and the traveling public and the authorization of trail-car operation in London. A directory of the personnel of British electric tramways, of the London offices of foreign tramways, of Belgian interests in such tramways and of colonial, Indian and foreign railways with business connections in London is also included.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, FEBRUARY 22, 1913 No. 8

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office..............................1570 Old Colony Building
Philadelphia Office........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

INEXPENSIVE WELFARE WORK

A long-established custom abroad is to serve tea, chocolate or some other beverage free of charge to the employees, either at some stated time or throughout the day when desired. The cost of this practice is a small item but it has been found to bring an ample return in the better physical and mental tone of the operating force. Less attention has been given in the United States to this form of welfare work, although some of the more progressive companies make it a point to serve hot meals en route to crews engaged in the removal of snow. The possibilities for extension along this line are indicated by the recent announcement of the Portland (Ore.) Railway, Light & Power Company that every noon it will serve free a cup of hot coffee to those who bring their lunch to work. This innovation indicates how a railway by doing things of like character on a large scale can give its employees much more than if it offered them the equivalent amount in money. For instance, the actual cost of a cup of really good coffee is not more than one or two cents. This practice, however, has a more significant feature than the saving of a few cents, inasmuch as it is a sign of kindly thoughtfulness which is sure to be appreciated by most of the men.

THE USE OF THE FRONT EXIT

It is generally conceded that the use of the front platform as an exit ameliorates crowded car conditions in proportion to its application. To this end many companies post signs and other tokens which direct the passengers to leave via the motorman's platform. Nevertheless, it is a fact that some of the railways which are most desirous of seeing the front exit in extensive use actually make it inconvenient for the passenger to comply with their wishes. Thus it is not unusual to find that the front exit doors are held closed by the small thumb latches which are in common use for locking blind side doors. At best these doors are difficult to unlatch and the primitive arrangement compels the motorman to leave his position in order to close the door. The latter procedure not only involves a certain amount of delay, but as the motorman generally feels that extra work is being imposed upon him he naturally will treat the departing passenger with scant courtesy. This condition in itself is enough to discourage many passengers from leaving at the front of the car, and as a result they join the crowd which always tends to collect near the rear exit, blocking the passageway for incoming passengers and so preventing the car from carrying its full load. It is idle to expect a passenger to comply with a printed request once he has discovered that the mechanical arrangements of the car are inconsistent with the railway's expressed policy and that his very willingness to comply leaves him open to the disagreeable experience of an implied rebuff from the motorman.

CO-OPERATION OF ELECTRIC LIGHT AND RAILWAY MEN

The meeting of the public policy committees of the American Electric Railway Association and the National Electric Light Association, together with several prominent guests, at Tuesday evening's get-together dinner, which is reported elsewhere in this issue, is significant of even more than a highly desirable spirit of co-operation. It is, we believe, indicative of a conviction that there is so much more to do in the way of improving public relations that it is impossible to have too many oars in the boat or too many hands at each oar. The men who participated in the meeting referred to are not merely the heads of great industries; they are men of public spirit and high ideals; they are working under the burden of public misunderstanding, which it is one of the first and most important duties of the electric light and railway associations to remove. In a footnote in one of the school histories of our childhood we were told that at the moment when there was some hesitation about signing the Declaration of Independence a Massachusetts patriot exclaimed: "Let us all hang together, for if we do not we are likely to hang separately." This, and the even more weighty reasons affecting the good of the industry and the duty that is owing to the stockholders of utility companies together with the public which they serve, should be the highest incentive toward activity on the part of the co-operative committee of the two associations in the effort to bring about an era of better understanding of the corporations by the public, for upon a good understanding mainly depends the future welfare of the public and its servants, the corporations.

RESPONSIBILITY FOR THE COMFORT OF PASSENGERS

In recent issues note has been made regarding the campaign of the Philadelphia Rapid Transit Company against the use of tobacco on its cars. This in itself is by no means unusual, although one feature of the rules covering the matter is, notwithstanding its importance, almost invariably overlooked. This is the inclusion of the carrying of partly consumed but unlighted cigars or cigarettes among the list of proscribed acts. It is a rule which in general will be welcomed by smokers and non-smokers alike, for the reason that the half-smoked, unlighted cigar which is preserved by its owner for reasons of economy is usually the most malodorous article in existence. There is, however, another feature which is of interest to electric railways. The Philadelphia Rapid Transit Company has not contented itself with the mere statement that the smoking and spitting nuisance is a violation of the company's rules or that spitting in the cars is contrary to the orders of the Board of Health of the city. It has struck out independently for itself and has included in its notice the statement that passengers who offend against the rules dealing with smokers will be ejected. Too much praise can hardly be given to the company for its courageous stand in safeguarding the comfort of its patrons. Nevertheless, it must be borne in mind that ejectments, even of the most proper kind, always leave an opening for a "spite" damage suit, inaugurated by a complainant whose code of ethics does not prevent him from exaggerating, to say the least, the injuries sustained to mind and body. Rules looking toward the comfort of passengers can and should be backed up by city ordinances, but, even when a community grants this protection, it is always well where possible to let actual ejectments be made by a public officer, who thus relieves the railway company of any charge that undue or unnecessary force was used.

INCREASE IN FARE IN NEW JERSEY

The increase in fare approved by the New Jersey commission in the case of the New Jersey & Pennsylvania Traction Company was possible, according to the decision published in abstract elsewhere in this issue, only because provisions of local franchise ordinances were rescinded or litigated. Apparently the local authorities recognized the inadequacy of the fares fixed by the ordinances, because they agreed to submit the establishment of "just and reasonable rates" to the commission. A willingness to rescind onerous rates is an unusual attitude, and the case is notable for the additional reason that in deferring to the judgment of the board the local authorities paid the organization and methods of the state supervising body a high compliment. The ordinary local official is jealous of interference from state authorities. The report upon which the commission based its findings contains one or two points of special interest. The commission appears to regard the valuation made for the receivers as careful and conservative and to approve an appreciation allowed for right-of-way. Although the amount of appreciation determined is small, if the increase in value exists it is in physical property that is an asset of the company, and credit for it should be allowed. Even the higher rates of fare which are to be established by order of the commission for an experimental period of one year are low. Passengers who travel the maximum distance in all of the three proposed 5-cent zones will pay an average rate per mile about as follows: first zone, 1.22 cents; second zone, 1.11 cents; third zone, 1.27 cents. For the full trip the fare of 15 cents averages 1.19 cents per mile. As the commission provides for special traffic situations by overlapping two of the zones and by directing the sale of tickets between certain points, the rates named will not apply to all classes of the business, but they affect a large part of the traffic and are enough above the old rates to lead to an improvement in the returns without much likelihood of a reduction in the number of actual revenue passengers.

NEEDED AMENDMENT OF THE ERDMAN LAW

In the course of the negotiations that have been going on for several months between the Eastern railroads and their firemen regarding readjustment of wages and conditions of employment the fact has been very sharply brought out that the Erdman act is in need of amendment in at least one particular. This is in respect to the number of arbitrators, which is now limited to three, one appointed by each of the parties to a dispute and a third designated by the other two or by some independent authority. The railroads object to an arbitration under this law on the ground that too much power is given to the third arbitrator, who in practice is the sole judge, his two associates exercising no judicial functions but being in fact advocates of their respective sides of a controversy.

Past experience with the law has justified these objections. It is, furthermore, known by everyone who has had experience with labor arbitrations under conditions similar to those imposed by the Erdman law that what happens is that the arbitrator having the deciding vote rarely delivers a decision on the merits of the case; he simply arrives at a compromise between the extreme positions taken by the employers and the employees. Perhaps substantial justice is done by such awards, but it is rather farcical to call the process by which they are attained "arbitration." And it is easy to understand why in a case so important as the firemen's demands there should be unwillingness to place the fate of fifty-five railroads in the hands of one man. It is doubtful if the Erdman act was ever intended to be applied to a matter of such magnitude. This seems to have been in the mind of Mr. Morrissey, the former president of the Brotherhood of Railway Trainmen, who some time ago suggested that the act might be amended so as to provide for three, five, seven or nine members, "depending upon the magnitude and importance of the issue, with neutral representatives holding the balance of power."

On the part of the firemen it was objected that if they were to consent to a variation of the terms of the Erdman law so far as the number of arbitrators is concerned the arbitration would be conducted wholly without the law and there would be no check upon perjury by witnesses for the railways or upon the submission of improper testimony. The recent engineers' arbitration is pointed to as an example of unfair arbitration, the principal grounds for this charge being that evidence was put in by the railways and independent investigation carried on by the arbitrators after the case was supposed to be "in the hands of the jury." The fact seems to be overlooked that it is the duty of arbitrators in any case to discover the truth wherever it may be and by whatever means are available. It is furthermore rather ridiculous to find labor men insisting upon the trial of their case by strict rules of evidence, for they have always been foremost in demanding that the widest latitude should be allowed in the presentation of testimony in labor disputes.

But whether the railways or the firemen were right, the one in objecting to and the other in advocating the application of the Erdman law to this particular dispute, it is evident from the viewpoint of the public that the law does not provide the measure of insurance against railway strikes that is needed. The objection to placing in the hands of one man the deciding vote in matters that involve millions of dollars and the rights of thousands of men is probably as strongly felt by the men as by the railroads, only in the firemen's case it was to their immediate advantage to hold out for the letter of the Erdman law. If this is a fair statement of the attitude toward the law by all the parties in interest, including the public, effective steps cannot too soon be taken to secure amendment of the law in such a way as to provide for a larger number of what Mr. Morrissey calls "neutral representatives" on labor arbitration boards.

Throughout the communications of the firemen to the railways and in the firemen's statements in the press there is a strong undercurrent of objection to any proposition that tends in the direction of making arbitration of railway labor disputes compulsory. But the steam railways and the public have, we believe, made up their minds that fair arbitration is better than strikes which paralyze industry, and labor must also eventually submit to this decree.

COMMUTATION-RATE REDUCTION IN NEW YORK

Restoration of the commutation rates of fare which existed on the New York Central and the New Haven systems prior to the general advances made in 1910 will have a direct effect on the New York suburban traffic as well as on the revenues of those properties. It will have an indirect but more serious effect on the business of the New York, Westchester & Boston Railway, the new subsidiary of the New Haven system which was built to serve Westchester County.

The effect upon the two systems directly involved, if the commission is accurate in its judgment that the increased rates operated unfavorably to the communities affected, should be a restoration of the conditions of residential and traffic development that prevailed several years ago in Westchester County, although a development of this character is likely to acquire momentum slowly. We think, however, that the failure of the suburban traffic to increase at a normal rate during the past two years is due in part to other considerations than the higher commutation rates. One of these is the unfortunate shortage of water from which some of the Westchester County communities have suffered and another is the fact that in many sections of that suburban district real estate was over-boomed, the last two or three years having seen a natural reaction from the artificial values reached when the advance was in progress.

The problem which the decision of the commission raises for the New York, Westchester & Boston Railway lies in the fact that the line of this company is located largely in undeveloped districts, that its rates were made a little lower than the advanced schedules of rates on the established roads, and that the declared purpose of the New Haven management was to divert some of the suburban business from the main line to the new road, which is not handicapped by a heavy terminal charge. The new line does not have as good terminal facilities as the old properties, and if it loses all or part of the advantage at competitive points that it has held by reason of lower rates of fare, it will have a longer time to wait for the upbuilding of the unsettled land through which it largely operates before obtaining the needed volume of business.

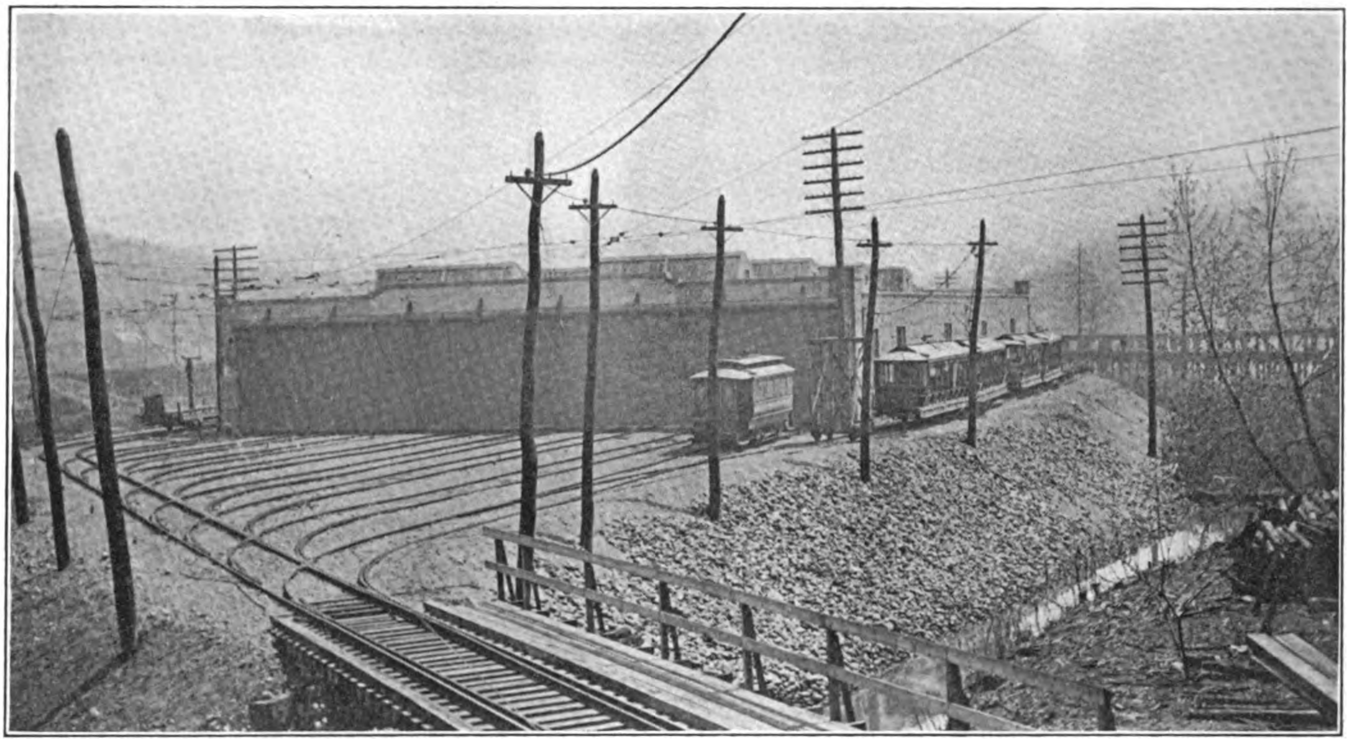
The decision of the commission, which was abstracted on page 309 of last week's issue, appears to be based largely on considerations that are primarily of a public-policy character. While the commission did not deny the increased costs of operation claimed by the companies, it made no allocation of expenses or capital costs and evidently was not greatly impressed with the argument of the New Haven management that the heavy Grand Central Terminal expense per passenger should be recognized as a factor in rate making in the commutation zone. The problem before the commission, as stated so clearly in its abstract of the decision, relates to the point at which the rate "should be placed in order to enlarge the commutating business, increase the suburban population and thereby increase the general prosperity. Of course this point must be fixed with proper reference to the fair and reasonable returns to which the corporation is entitled over and above the actual out-of-pocket expense involved in performing the service." It seems, therefore, that the commission is satisfied that the lower rates of fare furnish a return above the "out-of-pocket" cost of performing the service. This definition of cost is manifestly different from cost as it was defined by the railway companies in the proceeding, including all of the elements of expense that could be charged against service of this class. The decision of the commission, however, expresses the definite opinion that the allocation of the terminal cost to the particular traffic handled cannot be sustained. It regards the payment by the New Haven company to the New York Central company on account of the use of terminal facilities as in the nature of a rent and the method of accounting therefor as a detail. In other words, outside of the question of public policy which it raises, the commission is disposed to regard the business and revenues of the railroads in their entirety as a factor to which much weight should be given, if not more weight than the results shown by a segregation of revenues and expenses pertaining to one class of the many classes of traffic handled.

The question of public policy raised by the commission—that is to say, the duty and necessity imposed upon the companies of doing what will best serve the needs of workers in New York for convenient and reasonable means of transportation to places outside of the city where homes may be found—is one that may be applied to railways of large mileage and diversified traffic where it could not reasonably be applied to a short railway which served one community or group of adjoining communities or was dependent upon one class of traffic. If the railways carry the commuter business at a loss, they do so only because they are able to make up the deficit by a profit from other traffic or operations which is larger than the average profit on all business handled.

The Derby Carhouse of the Connecticut Company

Description of a Structure for Storing Cars Which Is Built Upon the Bed of a Diverted Stream and Designed to Exert the Minimum Weight Upon Its Foundations Consistent with Permanent Construction

A carhouse of unusual construction, intended solely for the storage of spare equipment, has recently been completed by the Connecticut Company. The operating conditions which necessitated its erection involved a location in the vicinity of the twin towns of Derby and Ansonia, both of which are well-known manufacturing centers of Connecticut. Under such circumstances the matter of securing land for the building was complicated by the fact that real estate in the desired location was of considerable value with every indication of a continued increase in future years. The company possessed some land adjoining the existing carhouses of the division in the town of Derby, but it was located on a low flat which at certain seasons was partly inundated by a stream running through it. It was decided, however, that the utilization of this property would be preferable to the purchase of new land upon which the building might be more easily built, and in consequence a structure was erected upon it after diverting the stream which ran through it and filling to the desired grade.



Derby Carhouse—View Showing Entrance Tracks Laid Upon Filled Ground

GENERAL ARRANGEMENT

The carhouse is 182 ft. long x 104 ft. wide and will hold thirty-two of the large cars of the type now practically standard on the Derby division, or forty cars of the small type. Eight tracks are located longitudinally with the center line of the building, and these are spaced alternately on 12-ft. and 13-ft. centers. All lead directly from a single straight ladder track. At the east side of the building an additional space of approximately 2 ft. between the track and the wall is provided, this aisle being available for inspection or repair of such minor parts of the car equipment as may be removed from the cars in the course of very light repairs.

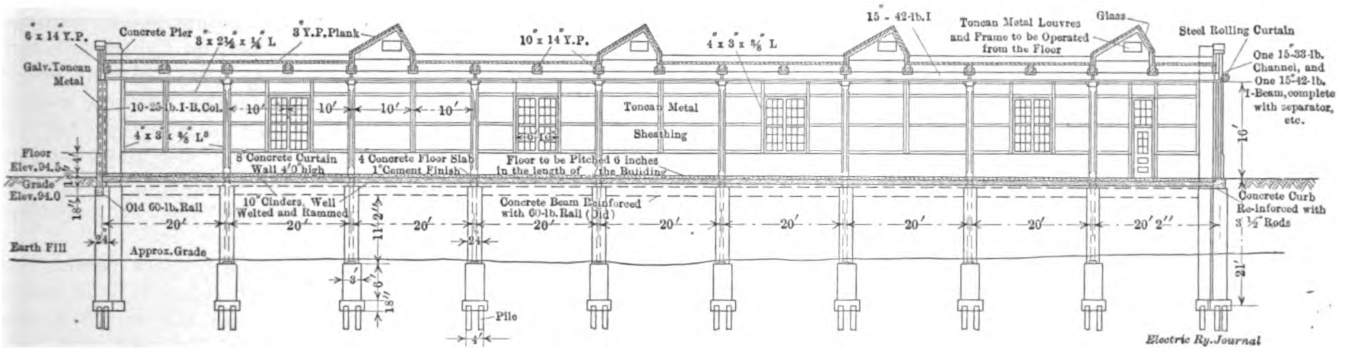
The carhouse is not intended, however, as a repair shop in any sense of the word, but instead is to be used only for housing spare equipment. For this reason the height has been limited, the roof framing beginning at a point 16 ft. above the rail. This limited height naturally prevents jacking up cars. Since the building is to be used for storage purposes only, no pits are provided, the floor being laid flush between the T-rails which are used inside of the building, the flange groove being molded in the concrete on the inside of each rail.

The house itself is constructed with a concrete curtain wall rising some 4 ft. above the surface of the adjoining ground, with corrugated galvanized Toncan metal siding between this and the mill construction roof.

FOUNDATIONS

Since the building is located on the bed of a diverted stream, the question of the weight of the structure was of serious importance in the design, owing to the twofold necessity for very deep foundations and for piling whatever foundations were installed because of the low bearing value of the original soil. The foundations take the form of a series of concrete piers under each of which three piles were driven with two extra piles installed at each corner of the building. The center piers have bases 4 ft. square and 18 in. high, the piles extending up into the concrete for about 9 in. Along the building walls the width of the pier bases is decreased to 3 ft. and the longitudinal dimension is increased to 4 ft. 6 in. The piers are set in rows spaced on 20-ft. centers longitudinally, and to conform with the framing of the building they are spaced transversely on centers varying from 25 ft. for the two center spans to 28 ft. for the span at the aisle side of the building. For approximately 7 ft. above the bases of the piers the dimensions are reduced to 3 ft. square, the wall piers being reduced to dimensions of 2 ft. x 3 ft. At this point, or about elevation 80, which was the level of the original ground, the piers are again reduced to the dimensions of about 2 ft. square and are extended approximately 12 ft. to elevation 92.5.

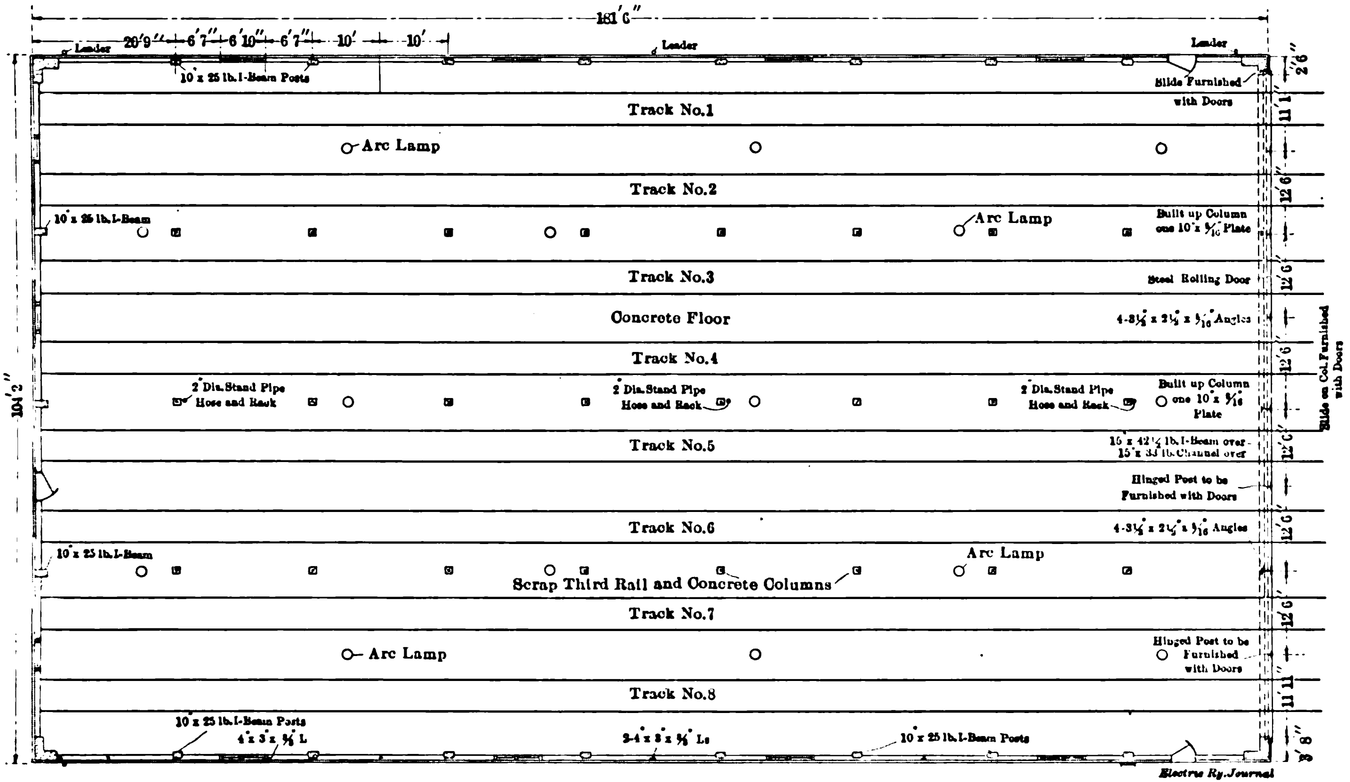
The fill which was made around the piers to bring the finished ground level up to that required by the track levels for the older structures near by was made with gravel containing a large percentage of boulders. This material, which has proved very satisfactory, exists in large quantities in the vicinity, as the valley of the Naugatuck River, in which the carhouse is located, is of glacial character. The fill brought the final grade up to elevation 94, and at this height a concrete beam 18 in. deep and 12 in. wide, reinforced with a single piece of 60-lb. rail, was extended between the piers around three sides of the building. This beam carries the curtain wall, which rises 4 ft. above the surface of this ground. At the other end of the building, where the entrance doors for the cars are located, the concrete beam is omitted and is replaced by a reinforced concrete door sill 22 in. wide and 17 in. high reinforced with three ½-in. round rods.


6" x 14" Y.P.
Concrete Pier
3" x 2½" x ¼" L
3" Y.P. Plank
10" x 14" Y.P.
4" x 3" x 5/8" L
15" - 42-lb. I
Toncan Metal Louvres and Frame to be Operated from the Floor
Glass
Steel Rolling Curtain
One 15"-33-lb. Channel, and One 15"-42-lb. I-Beam, complete with separator, etc.
Galv. Toncan Metal
10-25-lb. I-B. Col.
10'
10'
10'
10'
4" x 3" x 5/8" L^s
6'-10"
Toncan Metal
Sheathing
10'
Floor Elev. 94.5
Grade Elev. 94.0
4"
18"
8" Concrete Curtain Wall 4'0" high
4" Concrete Floor Slab 1" Cement Finish
Floor to be Pitched 6 inches In the length of the Building
Old 60-lb. Rail
10" Cinders, Well Welted and Rammed
11'-2"
Concrete Beam Reinforced with 60-lb. Rail (Old)
Concrete Curb Re-inforced with 3 ½" Rods
20'
20'
20'
20'
20'
20'
20'
20'
20' 2"
24"
24"
Earth Fill
Approx. Grade
3'
6'
18"
Pile
4'
21'
Electric Ry. Journal

Derby Carhouse—Longitudinal Cross Section on Line A A

WALL AND ROOF FRAMINGS

The low roof of the building is supported throughout on concrete columns resting upon the foundation piers. Except along the walls all of these columns are composed of two rolled shapes originally used as the central third-rail on the old Hartford-Bristol line of the New York, New Haven & Hartford Railroad, the pioneer steam railroad electrification. These scrap third-rails are utilized as cores for the columns by bolting them back to back. The metal center thus formed is wrapped with No. 10 gage expanded metal and the whole is then cast in concrete to make a column 12 in. square with the corners beveled. Along the walls of the building the columns are made up of standard 10-in., 25-lb. I-beams wired with expanded metal and cast in concrete to make posts 8¾ in. x 14 in. in cross-section. The roof load is transmitted to the rail columns by longitudinal 15-in. I-beams which serve as girders, to the side and rear end columns by 12-in. I-beams, and to the front column by the 15-in. I-beam and channel lintel. The girders are carried on cast-iron saddles which cap the columns and are extended up to inclose the rafters above the girders, holding them rigidly against overturning.

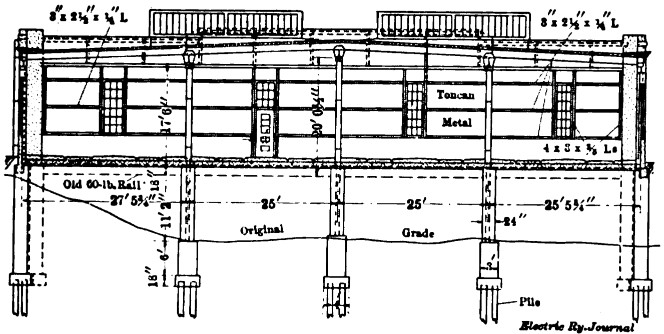

181' 6"
20' 9"
6' 7"
6' 10"
6' 7"
10'
10'
Leader
Leader
Leader
10" x 25 lb. I-Beam Posts
Slide Furnished with Doors
Track No. 1
Arc Lamp
Track No. 2
10" x 25 lb. I-Beam
Arc Lamp
Built up Column one 10" x 5/16" Plate
Track No. 3
Steel Rolling Door
Concrete Floor
4-3½" x 2½" x 5/16" Angles
Track No. 4
2" Dia. Stand Pipe Hose and Rack
2" Dia. Stand Pipe Hose and Rack
2" Dia. Stand Pipe Hose and Rack
Built up Column one 10" x 5/16" Plate
Slide on Col. Furnished with Doors
Track No. 5
15" x 42¼ lb. I-Beam over 15" x 33 lb. Channel over
Hinged Post to be Furnished with Doors
Track No. 6
4-3½" x 2½" x 5/16" Angles
10" x 25 lb. I-Beam
Arc Lamp
Scrap Third Rail and Concrete Columns
Track No. 7
Arc Lamp
Hinged Post to be Furnished with Doors
Track No. 8
10" x 25 lb. I-Beam Posts
4" x 3" x 5/8" L
3-4" x 3" x 5/8" Ls
10" x 25 lb. I-Beam Posts
104' 2"
2' 6"
11' 1"
12' 6"
12' 6"
12' 6"
12' 6"
12' 6"
12' 6"
11' 11"
3' 8"
Electric Ry. Journal

Derby Carhouse—Floor Plan Showing General Arrangement

All columns are spaced longitudinally on 20-ft. centers and the rafters or roof beams are spaced on 10-ft. centers so that every second rafter rests upon the middle points of the girders. The rafters are carried in cast-iron shoes at the points intermediate between columns, and those which pass over the tops of the columns are supported in extensions of the cast-iron saddles for the girders.

The spacing of the rafters on 10-ft. centers, together with the long span of over 25 ft., necessitates the use of 10-in. x 14-in. timbers, although this construction was found to be in the end lighter than the more customary arrangement of lighter rafters spaced on considerably shorter centers. The roof sheathing is composed of 3-in. yellow pine planks splined together and spiked to the rafters.

The side wall framing consists of 4-in. x 3-in. x ⅜-in. angles set back to back and located on a 10-ft. spacing except at windows, where additional vertical angles are added to form supports for the window frames. These vertical angles are riveted to the 12-in. I-beams which extend around the top of the walls and are set into the concrete of the curtain wall at the bottom. Three horizontal angles are run between the vertical angles on the closed sides of the building. One of these rests upon the top of the curtain wall and the other two are spaced above so that one comes at the top line of the window frame and the other at the center point of the window frame. To this wall framing a metal siding of Toncan metal is attached.


8" x 2½" x ¼" L
8" x 2½" x ¼" L
Toncan
Metal
4 x 3 x ⅜ Ls
17'6"
20'0¼"
Old 60-lb. Rail
18"
27'5¾"
25'
25'
25'5¾"
24"
11'2"
Original
Grade
6'
18"
Pile
Electric Ry. Journal

Derby Carhouse—Cross Section on Line B B

At the entrance of the building on the same level as the 12-in. I-beam extending around the top of the walls are one 15-in., 42-lb. I-beam and one 15-in., 33-lb. channel, coupled together with separators and carrying the rolling steel doors. These pairs of beams are supported by built-up columns each composed of one 10-in. x 5/16-in. plate riveted between four 3½-in. x 2½-in x 15/16-in. angles. The columns are located between alternate pairs of tracks. Each pair of beams is able to carry the weight of the doors and its share of the roof on a clear span of 25 ft. Additional posts are placed at the center of each beam so that there is a guide for the door on each side of each track. The latter post is, however, not intended to carry any of the load as it is hinged at the top and can be swung out to give additional entrance space between those tracks which are located on 12-ft. centers. This arrangement is for the purpose of permitting the ingress and egress of specially wide equipment.

Aside from the cast-iron saddles at the tops of the columns, which have a 2-ft. side bearing on the rafters and are in addition bolted to them, the only sway bracing which is employed in the building consists of 2½-in. x 2-in. x ¾-in. angles extending diagonally between the wall posts on each side of the building and each purlin. These reach out about 3 ft. from the center line of each wall post.

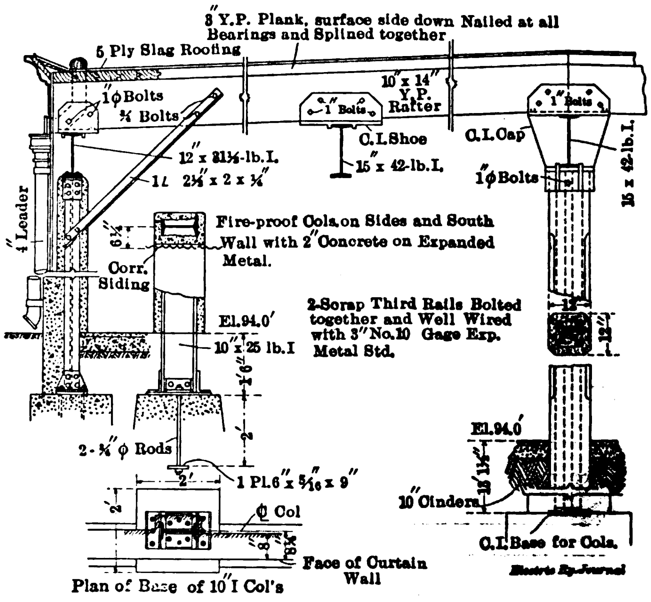
BUILDING DETAILS

The concrete floor of the building is entirely separate from the curtain wall and from the posts on account of the necessity for provision for settlement of the fill. It is pitched 6 in. from the rear of the building to the front, a distance of about 180 ft. In addition the floor has a pitch toward each track from the center line between each pair. This should prove ample to keep the floor clear of water even when the washing of cars is being carried on. The floor is made up of 1 in. of wearing surface on top of a 4-in. concrete slab, the latter being poured on a 10-in. layer of cinders carefully rammed.

The most unusual detail of the building construction is the use of the corrugated galvanized Toncan metal for the building wall. Its installation in place of the customary brick or concrete was made with the object of reducing the weight of the building to the greatest degree. The method of attachment is to clip the metal by means of galvanized wire of about No. 10 gage to the angles which form the wall framing of the building. These clips are hooked around the framing angles, being passed through holes punched in the metal and headed on the outside end. They are spaced approximately 1 ft. apart. At the points where the metal is in contact with the concrete corner posts of the building or with the curtain wall a groove has been cut in the concrete and the edge of the metal set into it, the groove being afterward filled with neat cement, this holding the sheet firmly in place and making a perfect rainstop.

The roof is peaked along the approximate center line and slopes ½ in. to 1 ft. toward each side. It is sheathed with 3-in. yellow pine planks set with the surfaced side down and nailed at all bearings and is covered with five-ply tar and slag roofing. Eight saw-tooth skylights, each 25 ft. long, 10 ft. wide and exposing 4 ft. 6 in. of glass to the north, provide light for the interior. The sills, 4 in. x 8 in. at the lower end and sized to the pitch of the roof, rest over main girders and carry end frames and a center frame on 12-ft. centers. The frames consist of a 4-in. x 10-in. rafter and a 4-in. x 6-in. supporting strut. The top and sides are 3-in. splined plank with five-ply slag roofing, and the ends, which are sheathed with ⅞-in. siding, have galvanized Toncan metal louvers, adjustable from the floor for ventilation.

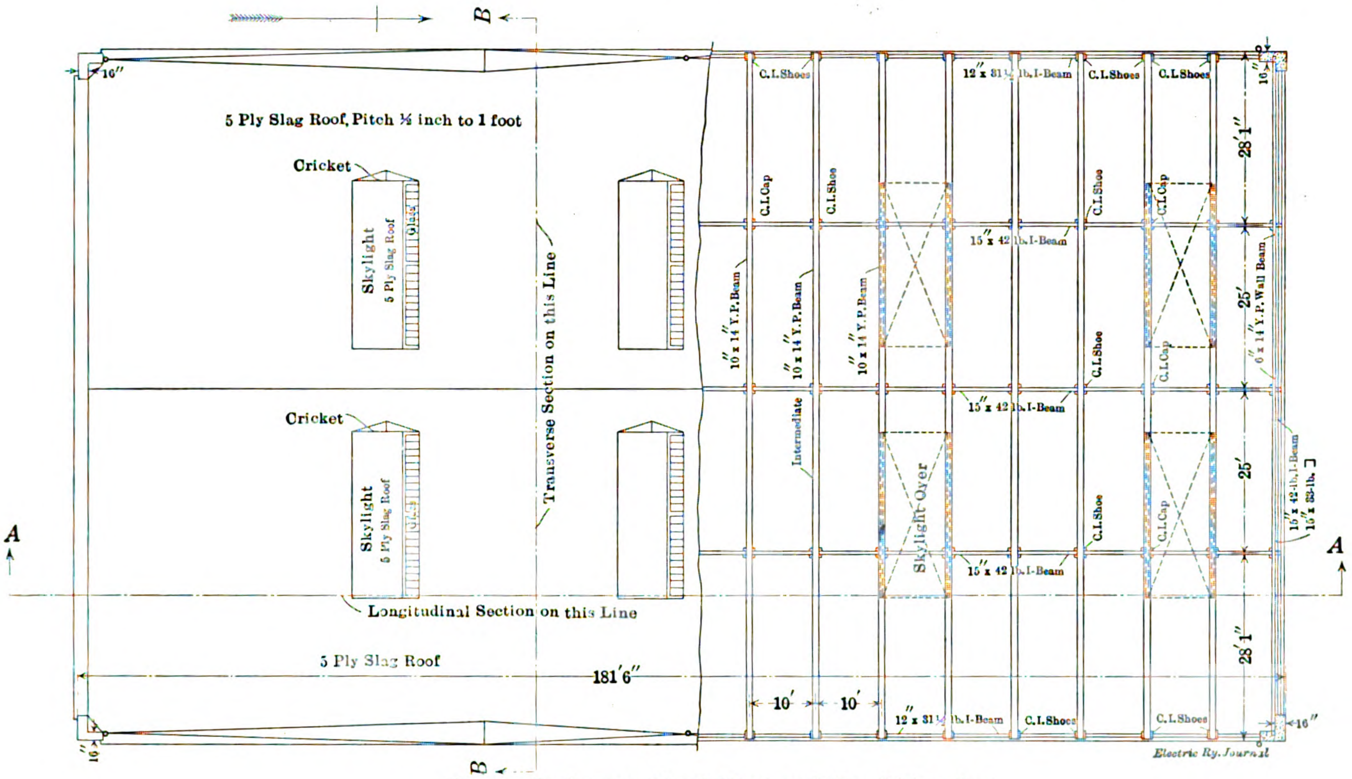
The window and small door frames are made of wood, the side windows being 6 ft. 3 in. wide and 8 ft. 3 in. high; the end windows are the same height and 3 ft. wide. The main entrance doors are of steel of the Kinnear rolling type with outside housings. Each door is 12 ft. 6 in. wide and slides between one of the permanent built-up columns previously described and the adjacent hinged columns, which may be swung out of the way to admit extra wide equipment. Operation is by hand from the floor level, a spring practically balancing the weight.


3" Y.P. Plank, surface side down Nailed at all Bearings and Splined together
5 Ply Slag Roofing
10" x 14" Y.P. Rafter
1" φ Bolts
¾ Bolts
1" Bolts
1" Bolts
C.I. Shoe
C.I. Cap
12" x 31½-lb. I.
15" x 42-lb. I.
15 x 42-lb. I.
1 L 2½" x 2 x ¼"
1" φ Bolts
4" Leader
6¼"
Fire-proof Cols. on Sides and South Wall with 2" Concrete on Expanded Metal.
Corr. Siding
2-Scrap Third Rails Bolted together and Well Wired with 3" No. 10 Gage Exp. Metal Std.
12"
12"
El. 94.0'
10" x 25 lb. I
1'6"
2'
2-¾" φ Rods
1 Pl. 6" x 5/16" x 9"
2'
2'
℄ Col
8"
8"
Face of Curtain Wall
Plan of Base of 10" I Col's
El. 94.0'
15'1½"
10" Cinders
C.I. Base for Cols.
Electric Ry. Journal

Derby Carhouse—Details of Columns and Roof

Outside leaders are installed, the connection through the eaves being broken just outside of the wall so that the drip from the roof is dischargd into a bowl-shaped top on the vertical portion of the main leader. Three of these are on each side of the building and they discharge onto the ground at the bottom of the wall.

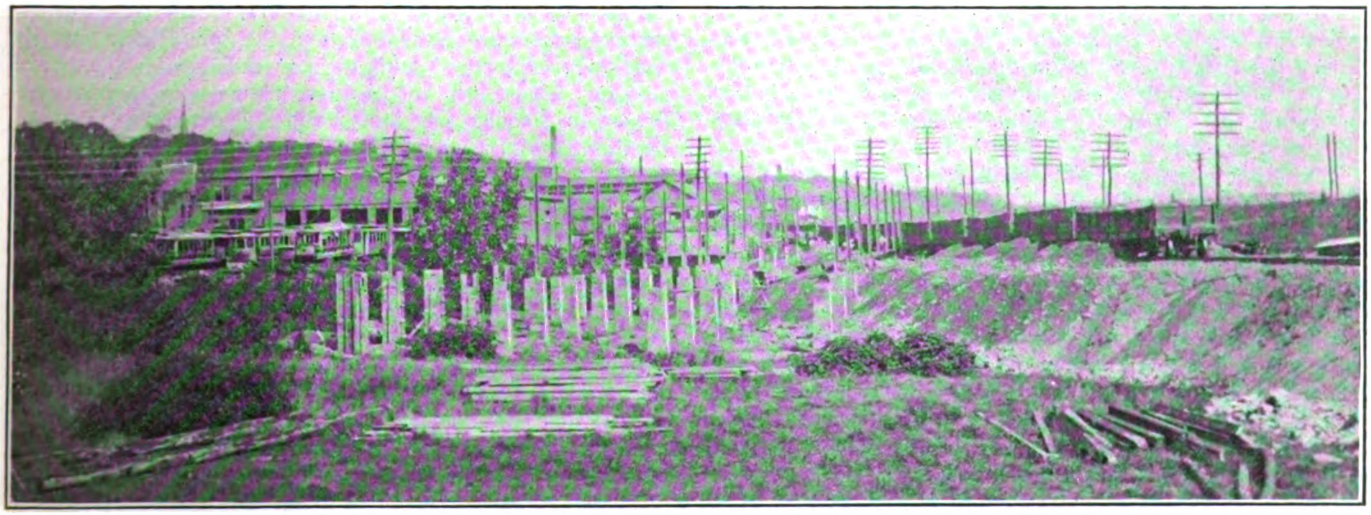
An ornamental effect to the building has been introduced by installing a molded cornice around all of its four sides. This is made of galvanized Toncan metal and takes the place of the metal gutter usual with outside leaders. In addition, the ends have been provided with low parapet walls with a raised portion in the center, and at the corners of the building concrete columns have been extended up slightly above the level of the parapet walls. These concrete columns are L-shaped in cross-section and measure 3 ft. 8 in. in both of the outside dimensions.


B
16"
5 Ply Slag Roof, Pitch ½ inch to 1 foot
Cricket
Skylight
5 Ply Slag Roof
Glass
Cricket
Skylight
5 Ply Slag Roof
Glass
Transverse Section on this Line
Longitudinal Section on this Line
5 Ply Slag Roof
181'6"
A
A
B
C.I.Shoes
12" x 31½ lb.I-Beam
C.I.Shoes
C.I.Shoes
C.I.Cap
C.I.Shoe
C.I.Shoe
C.I.Cap
15" x 42 lb.I-Beam
10" x 14" Y.P.Beam
10" x 14" Y.P.Beam
10" x 14" Y.P.Beam
Intermediate
C.I.Shoe
C.I.Cap
15" x 42 lb.I-Beam
Skylight Over
C.I.Shoe
C.I.Cap
15" x 42 lb.I-Beam
28'1"
25'
6" x 14" Y.P.Wall Beam
25'
15" x 42 lb.I-Beam
15" x 33 lb.
28'1"
16"
10'
10'
12" x 31½ lb.I-Beam
C.I.Shoes
C.I.Shoes
16"
Electric Ry. Journal

Derby Carhouse—Roof Plan and Roof Framing

EQUIPMENT

Lighting is provided by both arc and incandescent lamps, the latter being used only along the walls. All of the lighting equipment was installed in conduit by the building department of the New York, New Haven & Hartford Railroad Company. No heating equipment has been installed in view of the fact that no repair work is to be done in the building.



Derby Carhouse—Foundation Piers in Process of Construction Prior to Completion of Fill

A complete ceiling sprinkling system operated on the dry-air principle has been installed, the low roof of slow-burning construction permitting the omission of aisle sprinklers without increasing insurance rates. This eliminates the serious and unavoidable interference which such aisle heads cause with the work of the car cleaners. Sprinkler heads have been installed 9 ft. 6 in. apart in the center of each bay of the roof and in each of the skylights, pipes extending longitudinally with the skylight and close under its roof boards. The dry-air valve which keeps the water supply shut off from the system while the air pressure remains on it is located in a small concrete house at one side of the building, and inside of the main building next to the valve house is a small air pump operated by an electric motor for the purpose of maintaining an air pressure of from 50 lb. to 60 lb. on the system, thus keeping the dry-air valve shut unless an open sprinkler head should happen to reduce the air pressure.

Service water for washing cars is furnished at three points along the center line of the building from taps on risers beside the columns. At each of these points a 2-in. standpipe terminates in a valve and a fire hose mounted on a rack and connected to the city water system is furnished as an additional protection against fire. There is also a hydrant with 50 ft. of 1½-in. hose in an underwriters' hydrant house in front of the carhouse which controls the yard.

The overhead construction is the Connecticut Company's standard. Outside the building No. 00 round wire is used, while inside the structure there is a steel angle 2 in. x 2½ in. x ¼ in. with the long leg down, bolted along the center of a backing board 1¾ in. x 12 in., this width preventing contact between angle and trolley pole if the latter slips from its hook. The outside and inside systems end in composition pans at either side of the rolling doors, and the doors have fiber runners on the bottom to guide the trolley wheel between the pans, a series of fiber breaks insuring that no arc is drawn across.

The carhouse was designed by and erected under the supervision of the construction department of the Connecticut Company.

INCREASE IN FARE ORDERED BY NEW JERSEY COMMISSION

Brief mention was made in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 25, 1913, of the increase in the rate of fare authorized by the Board of Public Utility Commissioners of New Jersey on the line of the New Jersey & Pennsylvania Traction Company between Trenton and Princeton, N. J. The order of the commission increases the rate of fare from 10 cents to 15 cents for one year. In part the report upon which the order is based stated that the New Jersey & Pennsylvania Traction Company, acting for itself and the three companies it controlled, a consolidation known as the Johnson trolley, accepted an ordinance passed by the borough of Princeton on Dec. 3, 1901, and a similar ordinance passed by Princeton Township on Jan. 6, 1902. These ordinances provided that the fare for a through trip between Trenton and Princeton should be 10 cents. Up to the present time this fare has prevailed between the points named.

Largely by reason of the rising cost of operation, the operating company had not been able properly to maintain the property and the service had frequently been inadequate. Until recently even the safety of travel had been imperiled, and the board, upon report of its engineers, had repeatedly required expenditure to be made upon the company's plant so as to secure safe, adequate and proper service. On Feb. 29, 1912, the traction company was adjudged insolvent, and Alfred Reed and Sydney L. Wright were appointed receivers.

The board's power by statute to fix just and reasonable rates had not been interpreted as superseding an extant contract fixing rates where such contract was operative prior to the statutory vesting of power to fix rates in the board. Accordingly, in order that the proceeding might be brought, the ordinances, which were essentially contracts establishing rates of fare, had first to be rescinded. The borough of Princeton on Oct. 1, 1912, and the township of Princeton on Dec. 2, 1912, rescinded their ordinances so far as rates of fare were concerned and agreed to submit to the board the establishment of just and reasonable rates of fare. An ordinance passed by the city of Trenton involving rates of fare to be charged by the traction company had also been litigated, and the case was decided by the Court of Errors and Appeals in the June term of 1912. The effect of this decision, taken together with the rescinding of the two ordinances first referred to, removed all legal obstacles to the board's determination whether the existing rates, tolls or charges were or were not sufficient and permitted the board to set just and reasonable rates for service over the trackage of the Princeton division.

VALUATION OF THE PROPERTY

Upon the appointment of the receivers, a careful inventory and valuation was made of the traction company's properties, including the so-called "Johnson trolley line" between Trenton and Princeton. The original costs of large parts of the company's property were reduced by the appraiser in many instances by reason of the accrued and existing depreciation. In some instances items were depreciated by as much as 90 per cent, and in all instances the percentage of original cost written off for depreciation appeared to be extremely liberal, thus affording a very conservative estimate of the value of the property. The cars on the so-called "Johnson trolley line," which cost originally $42,000, were valued at only $5,500.

The final estimate put upon the entire property of the division between Princeton and Trenton was $373,378. The receivers had expended upon the division for rehabilitation and re-equipment up to Dec. 26, 1912, the total sum of $54,968 and estimated the additional expenses required for the complete restoration of the Princeton division at $20,000. This made the eventual value of this division $448,346. To this sum had to be added an estimate for a part of the power plant at Yardley, Pa. This plant generates current for the entire system, including the branches operated in Pennsylvania, which have a trackage about double that of the Princeton division. The original cost of the power plant was $183,750 and of the remaining property accessory to the power plant $51,250, making the total cost of power house and associated items $235,000. The appraiser put upon it a value of $192,000.

The board assumed one-third of this amount as representing the part of the power plant installed for operating the cars on the Princeton division, or approximately $64,000. Roughly speaking, therefore, the entire property of this division represented an investment of about $500,000. The report stated that a return at the rate of 6 per cent on this base would not be excessive or unreasonable and that a net profit of $30,000 over and above all expenses for operation, repairs and maintenance was amply warranted.

The gross receipts of the Princeton division of the company for the past twelve months (December being estimated) amounted to $43,789 for passengers and $10,026 for freight, a total of $53,815. The operating expenses for passenger service were $35,863, and for freight service were $5,438, making a total of $41,301. The gross receipts were the actual receipts upon the Princeton division; the operating expenses were estimated upon the car mileage on this division as compared with the car mileage on the entire system. The excess of receipts above expenses on the Princeton division was in consequence only $12,514. The car-mile results were as shown in the table published herewith.

The operating expenses during the last year did not include a large part of what would be ordinary outlay for maintenance of road, apparatus and equipment, as these expenses were largely covered by the money the receivers expended upon the rehabilitation of the property.

LOW RATES PER MILE

A comparison of the rate per mile charged by this company with the rates per mile charged by other companies showed that while on this division the company charged 8.1 mills per car mile, the rate charged per mile upon a number of other roads in the adjacent sections of this State and Pennsylvania ranged from 14 to 25 mills per car mile.

It appeared therefore that the present rates of fare on this division were lower, generally speaking, than similar charges for comparable service elsewhere, and that they failed to accord a just and reasonable return upon the value of the property of the Princeton division.

The receivers, by petition filed on Dec. 17, 1912, requested that the board would declare the present rates of fare to be inadequate and insufficient, and that the board would fix just and reasonable joint rates for passenger travel on the Princeton division.

On the ground recited above, the board found that the present rates of fare upon the Princeton division operated by the traction company were insufficient and did not afford fair or reasonable return. In place of the present fare of 10 cents between Trenton and Princeton, the board fixed for an experimental period of twelve months beginning Feb. 5, 1913, a rate of fare for a continuous through trip between Trenton and Princeton, in either direction, of 15 cents.

CAR-MILE RESULTS OF OPERATION DURING 1912

	Cents
Receipts, passenger	19.1
Operating expenses, passenger	15.6
Receipts, freight	68.3
Operating expenses, freight	37.0
Combined receipts	22.0
Combined operating expenses	16.9
Apparent excess of receipts over operating expenses	5.1

The board was also of opinion that to set reasonable and just rates of fare for passengers traversing only a part of the line between Trenton and Princeton it was proper and necessary that there should be three zones between these two termini, instead of two zones, as at present. The rate of fare for traversing any one of these three zones, or a part thereof, should be 5 cents. By reason of the considerable volume of daily passenger traffic between Eldridge Park and Lawrenceville, the board was of the opinion that but one fare of 5 cents per passenger should be charged between these two stations, and to this extent would establish an overlap which would provide for this. The board was also of the opinion that the company should sell bunches of tickets, or block tickets, not less than twelve tickets in a bunch or on a block, at an aggregate price of $1 for the twelve. These tickets should be good for passage between Lawrenceville and either Trenton or Princeton. The reason for this last provision was that with an inflexible three-zone system, and with a 5-cent fare in each zone or part thereof, rates of fare between Lawrenceville and either terminus would be exactly doubled, whereas the rate of fare for the through trip between Trenton and Princeton was increased only 50 per cent. Regular commuters between Lawrenceville and either terminus should not be required to bear a disproportionate increase in fare. Selling blocks of tickets, twelve for $1, would relieve the company from the necessity of collecting single cash fares of less than 5 cents, and inasmuch as the great bulk of travel on this division, estimated roughly to be 80 per cent or more, was through travel from one terminus to the other, this provision for block tickets good between Lawrenceville and either terminus would not very materially lessen the gross revenues of the company below what they would have been with three nickel zones and no overlaps or block tickets.

The board emphasized the fact that the increased fares were largely experimental. It was, however, in the interest both of the traction company and the traveling public that the advance in fare should not be so heavy as to tend to drive passengers to other avenues of travel.

NEW YORK ELECTRIC RAILWAY ASSOCIATION

The executive committee meeting of the New York Electric Railway Association was held in New York at the office of the American Electric Railway Association, 29 West Thirty-ninth Street, on Tuesday, Feb. 18, at 2 o'clock p. m.

Those present were W. H. Collins, president; H. M. Beardsley, treasurer; Charles C. Dietz, secretary, and Charles H. Smith, James F. Hamilton and Joseph K. Choate. Various matters were taken up, and it was decided to hold the next quarterly meeting at the Fort William Henry Hotel, Lake George, on March 11 and 12. The program will be announced later.

PUBLIC POLICY COMMITTEES IN CONFERENCE

Upon the initiative of the public policy committee of the National Electric Light Association and the invitation of its chairman, Arthur Williams, the members of the public policy committee of the American Electric Railway Association met the other committee at dinner at the Union League Club on the evening of Feb. 18. The event must be recorded as historical in many ways and cannot but be of value in shaping the future of the two industries for which these national bodies speak authoritatively.

The dinner was attended by President George H. Harries of the American Electric Railway Association and President F. H. Tait of the National Electric Light Association. The two public policy committees were very fully represented. From the National Electric Light Association the following members were present: Chairman Arthur Williams, E. W. Burdett, H. L. Doherty, C. L. Edgar, W. W. Freeman, T. E. Murray, S. Scovil and C. A. Stone, and from the American Electric Railway Association Chairman T. N. McCarter, Patrick Calhoun, O. T. Crosby, James H. McGraw and W. H. Heulings. In addition to these highly representative men there were present as representing important public utility systems or groups Frank Hedley, J. H. Pardee, H. G. Bradlee, E. A. Maher, C. C. Peirce, John W. Lieb, Jr., and C. Loomis Allen. Judge E. P. Matthews was also present, and the societies were represented by their respective secretaries, T. C. Martin and H. C. Donecker, while the dinner and other arrangements of the conference were in the hands of Walter Neumuller.

While for several years with increasing intimacy and relationship the two national bodies have been working together on matters of common technical interest, this was the first attempt to bring under joint consideration what may be termed the larger questions which affect the service of the public, the condition of employees and the attitude toward the new regulating element which has come into such active play in recent years in the shape of public service commissions. From time to time during the past six or seven years there have been tentative efforts toward co-operative consideration of these highly important matters, but this dinner is the first occasion upon which anything really definite has been accomplished, as before its close it was unanimously voted to form a joint committee of five, each association to select two from the sister body and these four members to elect the fifth. It was felt in this way that a harmonious, cohesive and useful joint committee could act and speak for both bodies whenever necessary, with unquestioned influence and at short notice.

The meeting was addressed during the evening by Presidents Harries and Tait and by Messrs. McCarter, Williams, Edgar, Hedley, Scovil, Maher and Burdett with an evident realization of the significance of the occasion. Toward the close of the evening attention concentrated upon the action of the National Civic Federation in framing a model form of public service commission and regulation bill which when complete is to be commended to states which have not yet placed their utilities under such a governing body. The feeling was generally voiced and unanimously approved that, while such efforts should necessarily have the cordial support of the two great associations, it was the duty of their public policy committees, and indeed of every member, to assist in the shaping of such measures that the greatest good should be secured alike for the public, the employee and the investor.

The dinner, which began at 8 o'clock, lasted until 1:30 a. m., and even then the interest in the general subjects of discussion was so great that it was with reluctance the party broke up. It is understoood that the joint committee will take form immediately and will at once assume the vital duties intrusted to it.

Direct-Current Turbo-Generators with Reduction Gears for Railway Service

A Description of the Two Types of Reduction Gears Which Have Recently Made the Use of the Turbine for Driving Direct-Current Railway Generators a Commercial Possibility—Examples of Existing Installations on Street Railways Are Cited

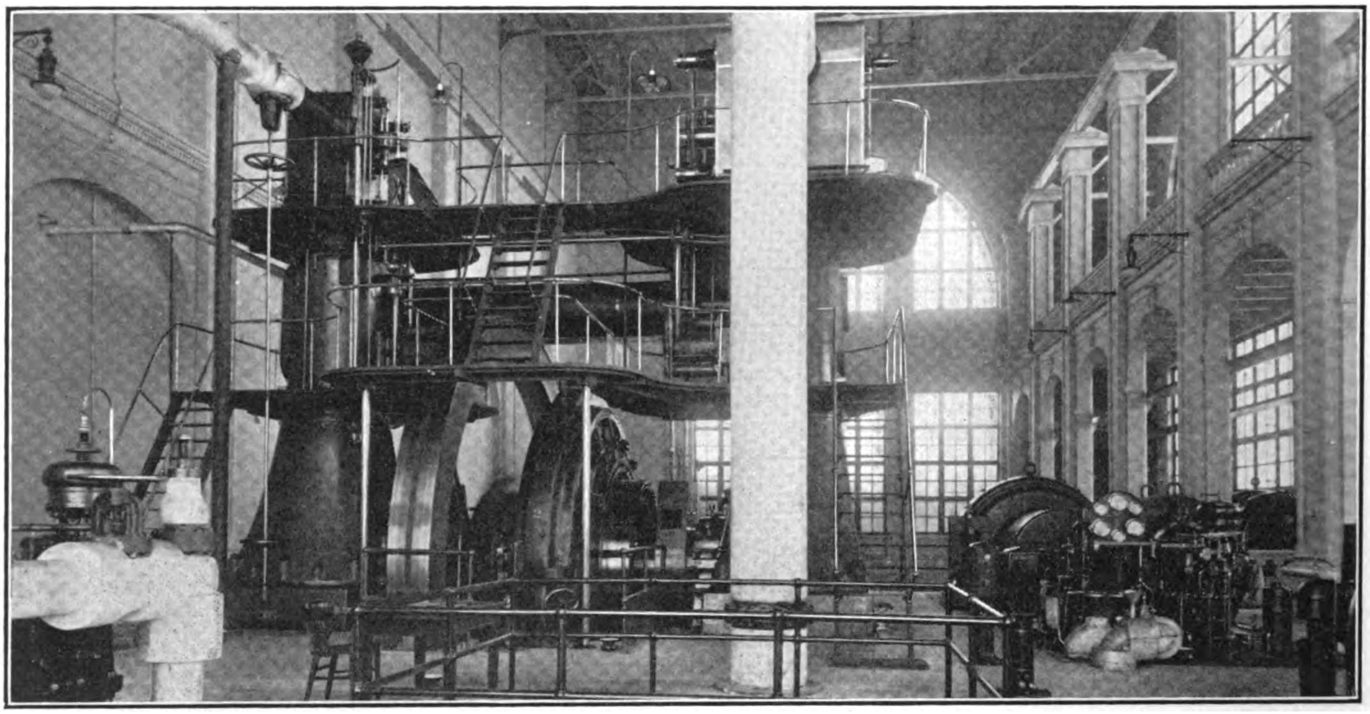
During the last decade the introduction of the steam turbine in this country has effected a practical revolution in methods of generating power. The high efficiency, low cost, compact form and practical freedom from repair charges of the turbine have met with prompt recognition in all quarters, and to-day it is exceptional to find any other type of prime mover installed, at least for the production of electrical energy in large amounts. The turbine is of course essentially a high-speed machine. Its design for low speed involves massive construction and a sacrifice of two of the most important advantages—low cost and small bulk.

Naturally a turbine coupled to an alternating-current generator makes a practically ideal combination, as both machines are at their best when operated at high speeds, but with a d.c. generator the turbine has been at a disadvantage. In the smaller capacities, and especially at low voltages, direct-connected d.c. turbo-generators have been in successful operation for some time, but limitations in speed have been imposed upon large units by the difficulties in designing commutators to withstand the centrifugal force set up at high peripheral velocities. This, together with the fact that the problem is complicated in 500-600-volt service by the excessive commutator diameters involved by the large number of bars, has practically kept the d.c turbo-generator out of the electric railway field. The advantages of the turbine are, however, so marked that persistent efforts have been made to develop a reduction gear which would be suitable for transmitting large amounts of power at the necessary high rotative speeds, and in this way make the turbine available for driving slow-speed apparatus.

THE FLOATING-FRAME REDUCTION GEAR

Up to the present time the commercial development of high-speed gears for turbines has resulted in the construction of two radically different types, both of which are successful. These are the rigidly aligned helical gears, as developed with the original De Laval turbine, and the more recent Westinghouse "floating-frame" helical gear.

The latter consists of a pair of pinions cut with right-hand and left-hand spiral teeth in the shaft which is supported in bearings, the bearings being integral in a single continuous block called the pinion-bearing frame. In the underside of this pinion-bearing frame three cylinders are cored out and accurately bored, one of them being located under each bearing. Into each cylinder extends a short stationary piston, resting upon a supporting pad which is part of the gear box or housing, and all three cylinders are equipped with interconnecting oil passages.



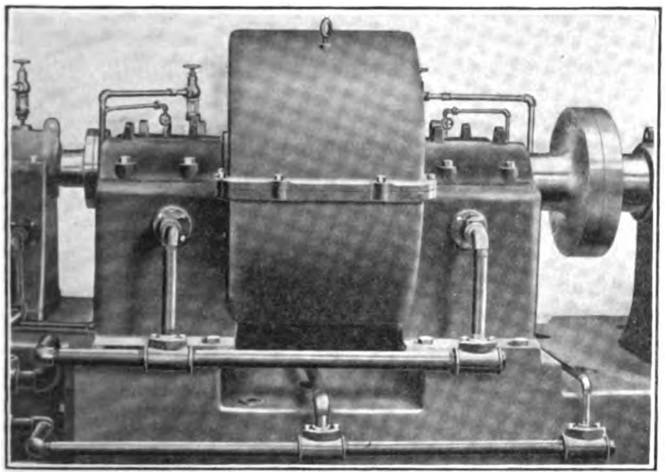
Geared D. C. Generators—View in Engine Room of San Diego Electric Company Showing Relative Sizes of 1000-kw Geared Turbine and 1250-kw Engine, Both Driving D. C. Generators

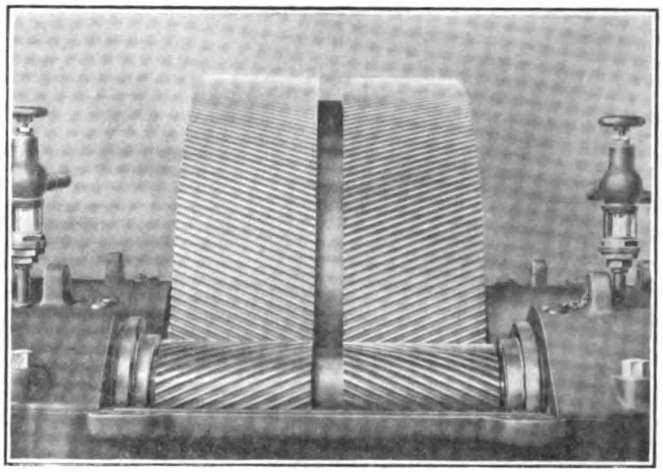
In service the cylinders are supplied with oil and the pinion-bearing frame is supported on these oil-filled cylinders, but the pinion frame can oscillate freely in a vertical plane, since the pressing down of one end of the frame simply causes the piston at that end to displace enough oil to raise the cylinder an equal amount at the opposite end. In effect, the pinion with its bearing frame and cylinders "floats" on the oil.

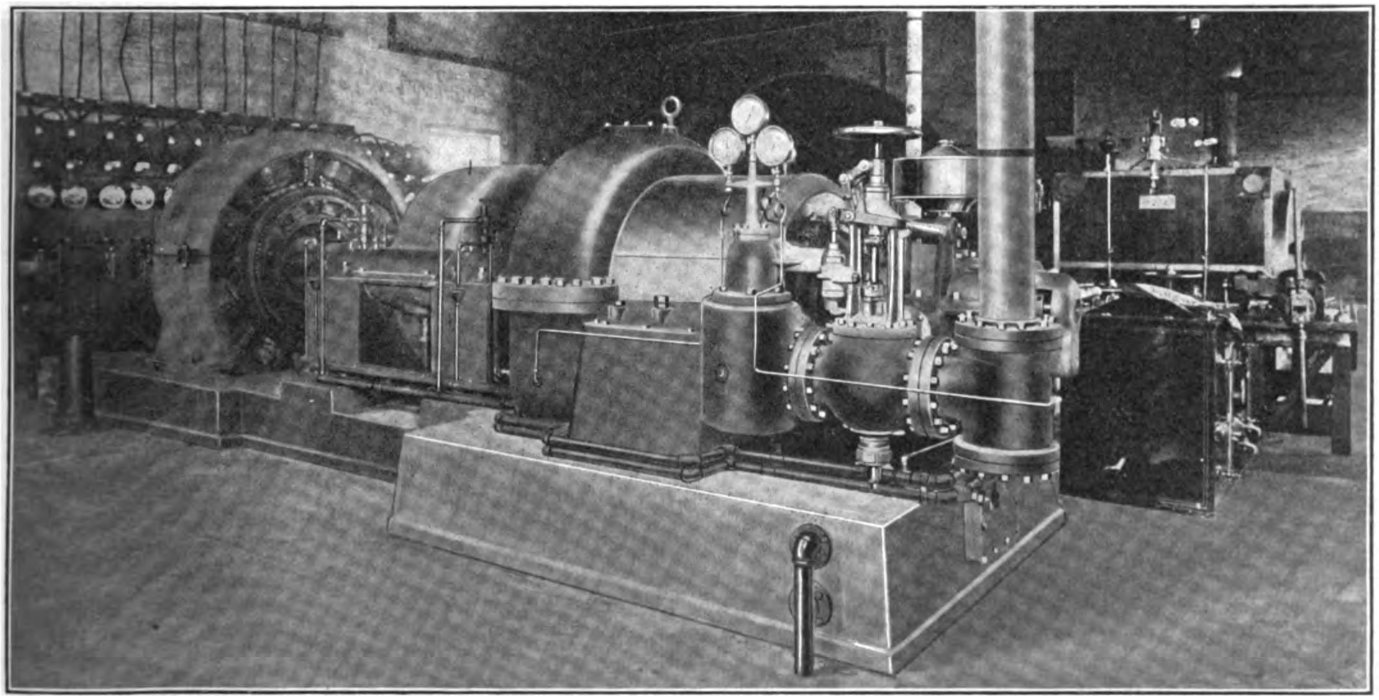
The opportunity for oscillation allows the pinions to shift their positions with respect to the gears in a vertical plane, and this permits the effects of microscopic irregularities in the spacing of the teeth in either one of the gears to be neutralized by the raising or lowering of the pinion in mesh with it.

The oil cylinders can be readily piped to a pressure gage and the oil pressure so indicated. This pressure gage when multiplied by suitable constants forms a convenient and reliable dynamometer, showing at all times the power transmitted.

Flexibility for the connection between turbine and pinion is obtained by the use of a flexible coupling, and in addition to this a slender turbine shaft extension is carried through the hollow pinion shaft, driving it through a connection at the end opposite to the turbine, and through its flexibility permitting wide variations in alignment. Vertical adjustment of gear and pinion is effected through variations in the quantity of oil contained in the cylinders over the pistons. Horizontal adjustment of the pinion shaft to bring the two pitch lines of gear and pinion in exact coincidence is effected by two horizontal screws, one at each end of the pinion-bearing frame, which may be run in or out by hand, thus moving the gears and pinions closer together or further apart. The toothed retaining wheels on the ends of these adjusting screws can be seen in the illustration on the following page showing the floating-frame gear with cover removed.


Geared D. C. Turbo-Generators—General View of Rigidly Aligned Type of Gear, Showing Casing and Oil Piping

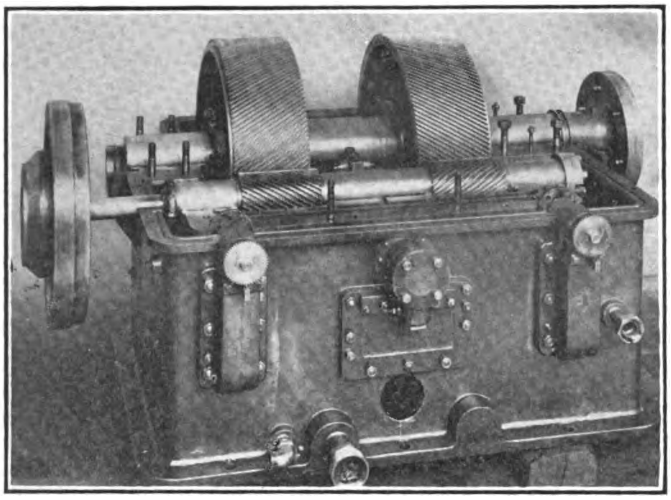

Geared D. C. Turbo-Generators—Rigidly Aligned Gear with Cover Removed to Show Ends of Split Pinion Shaft Bearings


Geared D. C. Turbo-Generators—750-kw Unit Installed in Trenton Power Station of Trenton & Mercer County Traction Corporation

This type of reduction gear has been under process of development during a considerable period by the Westinghouse Machine Company. The first installations were made for the propulsion of ships, but later the possibilities of application to electric generation became apparent and about two years ago the first turbine driving a direct-current generator through reduction gearing was built. Since that time a considerable number of such units have been sold, and several have seen fifteen to eighteen months' service, affording a good opportunity for observation of their serviceability and operating characteristics.

The distinctive feature of the new gear is the maintenance of correct tooth contact whatever the exigencies of operation. Torsional strains, settling of foundations, misalignment and the like are automatically corrected in the gears themselves by the use of the flexibly supported frame which carries the pinion shaft, the latter being flexibly coupled to the turbine. The results of maintaining this correct contact will, of course, be high initial and sustained efficiency, quiet operation and minimum of wear and adjustment.

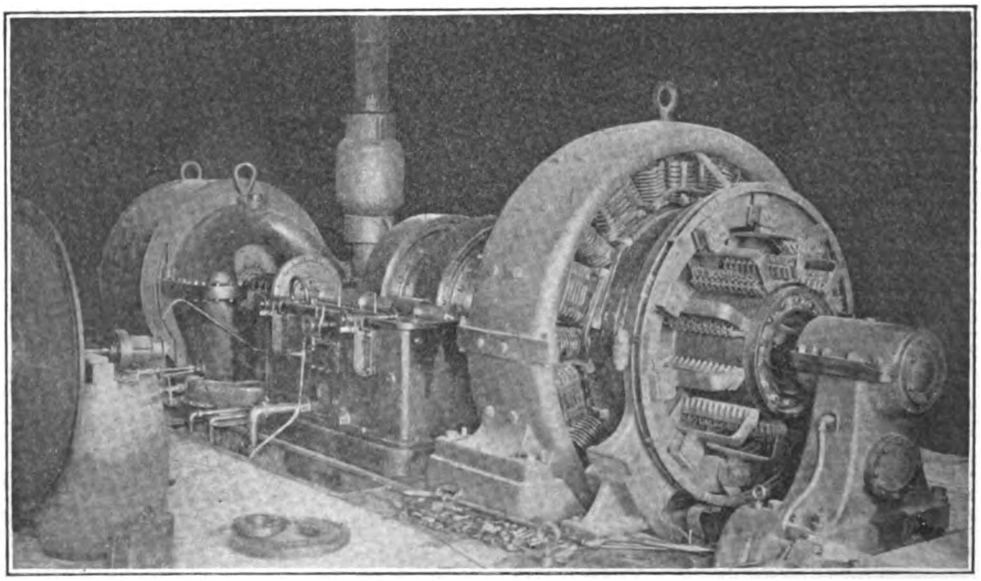
Of the first gears installed, eight are driving direct-current generators. Two of these units, of 1000 kw capacity, are at the plant of the San Diego Electric Railway Company. One of the turbines operates on high-pressure steam. The other uses the exhaust from a 1250-kw reciprocating-engine unit. The relative size of the engine and turbine, which are of equal maximum capacity, is shown by the illustration on page 326. The high-pressure unit is held as a reserve against extraordinary overloads and has, therefore, seen comparatively little continuous service. The low-pressure unit, however, has been in constant service since Sept. 1, 1911, carrying an average of about 600 kw and a maximum of 1250 kw with the usual violent fluctuations of railway service, swings of 700 kw having been observed.



Geared D. C. Turbo-Generators—Floating Frame Gear and Casing with Flexible Shaft Couplings

At the Bridgeport power plant of the Connecticut Company there is another 1000-kw low-pressure unit using steam from a cross-compound Corliss engine previously operated condensing. This machine carries an average of 500 kw of street railway load eighteen to twenty hours per day.

An inspection of all the gears of this type in service has recently been made. The significant facts developed are that they may be depended upon for continuous twenty-four-hour service, that they sustain their original efficiency and that adjustments are unnecessary except at infrequent intervals. On the oldest gear in point of service no appreciable wear has taken place, indicating that the function of the floating pinion frame, the equalization of pressure along the line of tooth contact, is being properly performed, and at the same time that the teeth are meshing with correct rolling action. Similar observations were made at each of the other installations, justifying the acceptance of this device as thoroughly standardized and reliable for even the largest sized units. Thus far the largest gear-driven d. c. generator in any service is one which has been installed by the Cleveland Illuminating Company and is rated at 3750 kw. This machine is driven through gears giving a speed reduction of 10 to 1, the peripheral speed at the pitch line being 4700 ft. per minute.



Geared D. C. Turbo-Generators—1000-kw Installation of Connecticut Company at Bridgeport, with Gear Cover Removed

THE RIGIDLY ALIGNED GEAR

The use of geared turbo-generators in extremely small sizes is, as mentioned before, by no means new. In fact the gear drive was forced upon the builders of the original De Laval single-stage turbine on account of the abnormally high rotative speed, in some cases reaching 30,000 r.p.m., which was required to give sufficient speed to the buckets on the single wheel. While this type of turbine was limited to an absolute maximum capacity of about 700 hp, on account of the enormous centrifugal forces set up by the high peripheral velocities, its development afforded to its manufacturers many years of experience with high-speed gearing of the rigidly aligned helical type, and since the De Laval multi-stage turbine was developed for large powers the use of similar reduction gears with it has been a natural sequence.

This type of gear has helical teeth cut at such an angle that several of the teeth on both gear and pinion are always in contact and the transition of pressure from one tooth to the next is, in consequence, gradual. The tooth form is a true involute, and the teeth are cut by specially constructed hobbing machines to give an extreme degree of accuracy of pitch and uniformity for all teeth, the only finishing process being a polishing which merely removes the tool marks.

The gears are of the twin type, with spiral teeth inclined in opposite directions to neutralize end thrust, and the shafts upon which they are carried are held rigidly in the same plane and at the proper distance between centers by a heavy cast-iron gear case the bearing seats of which are finished only by a light scraping to preserve the alignment. A great deal of attention has been devoted by the designers to the matter of establishing and maintaining the gear and pinion in such positions that their pitch lines exactly coincide. This is accomplished by supporting the shafts of both gear and pinion in cast-iron shell bearings the exteriors of which are ground to limit gages and which in consequence fit exactly into recesses in the solid frame of the gear case. The interiors of the shell bearings are reamed to the size of the shaft, and they are scraped only enough to secure a full bearing area, thus providing opportunity to secure by mechanical means exact alignment and location of the pinion and gear shafts when they are resting in their bearings.

The bearings are babbitt-lined, the shell being tinned before the babbitt is applied. The areas of the bearings are made unusually large to reduce the unit bearing loads to an exceedingly low figure, and the wear upon the bearings is in consequence reported to be negligible. However, when the inevitable wear does take place or in case the bearing is damaged, the makers do not countenance having it rebabbitted but furnish, instead, a duplicate shell bearing finished complete, which, on account of the interchangeability provided by the process of finishing to limit gages, can be slipped into place without necessity for hand work in the field.

The oiling system for the reduction gear provides a spray of oil projected on the gear teeth at the line of contact on the entering side, the pinion shaft bearings being oiled through gravity sight-feed oil cups and the gear shaft bearings by a ring oiling system. Circulation is assured through the oil pump, driven by a worm from the main shaft, which supplies the main turbine bearings.

These precautions to maintain alignment of gear and pinion were believed by the designers to be a necessity for the best economy with high-speed gearing, and a normal efficiency between 98 and 99 per cent is claimed for this arrangement by the makers. The method used to establish this figure is to measure the heat generated by the friction of the gears under load through observation of the temperatures and quantity of oil supplied and the temperatures of the gear case, which radiates a certain amount of heat depending on the difference in temperature between it and the surrounding air. The gears are reported to run invariably at temperatures only slightly higher than those in the turbine room and an oil-cooling device is not found to be necessary, thus indicating that the heat generated by friction is inconsiderable.

The gear case is made of a single heavy casting to hold the gear and pinion absolutely rigid in place and is supported on a heavy bedplate so that the opportunity for distortion is minimized. On both sides of the reduction gears, however, flexible couplings are installed to prevent strains on the shafts in case they should get out of line.

The life of the new type of bearing, as differentiated from that which used to be furnished with the original De Laval helical gear, is expected to be about ten years. None has as yet become sufficiently worn in service to call for replacement, the first one installed having been in operation for about three years.

The illustration on page 327 shows a 750-kw, 575-volt geared generating set installed in the Trenton power station of the Trenton & Mercer County Traction Corporation. A similar machine but of double the capacity, or 1500 kw, is now being installed in the same power station.

NOTES ALONG THE LINE

BY E. W. GOSS, SUPERINTENDENT MONTGOMERY TRANSIT COMPANY, NORRISTOWN, PA.

It is interesting to see the different ways in which different companies and their employees carry on construction and maintenance work. For example, a practice which seems to be quite general, in the fitting out of work cars, is to consider any old car or discarded equipment good enough, when in reality the cars and equipments should be the equal of any on the line. To have a gang of from fifty to a hundred men, more or less, depending on the old style of equipments and being held up for material frequently would easily pay a large return on the cost of modern cars and motors. Usually the passenger cars are fitted with whistles for blowing warning at crossings, and these cars run regularly, so that they are looked out for by the people using the crossings, while work cars come along with nothing but a discarded foot gong that can scarcely be heard the length of the car.

On many of the smaller and medium-sized roads, and on some good-sized roads too, the shop facilities are not suitable to take proper care of the cars. Such special wrenches and other tools as are necessary will always be found a profitable investment. The writer has in mind a carhouse where the entire track gang of about a half-dozen men were brought in from the roadway to assist the shopmen in changing a set of wheels under a car. Every time that a commutator had to be turned up, which was frequent, the armatures were rolled out on a plank and along the floor, and the shopmen then lifted them on to a car or wagon, and they were taken to a machine shop, where they suffered the same treatment. This operation took the best part of a day. The addition later of a few tools enabled the regular shop force to change a set of wheels in about half the time formerly required and also at a saving of the extra men. The armatures also are now handled without being rolled on the floor and are swung directly from the pit jack into the lathe, and the commutators can be turned up and the armatures quickly returned to their place with little manual labor.

The chipping of car wheels, when cast-iron wheels are used, is a serious problem to many roads. The steel wheel overcomes this trouble, but to the small road which does not have the facilities to do its own wheel turning the steel wheel means extra expense and work outside of the additional first cost of the wheels. A "one-wear" wheel for the small road is much to be preferred, and there is now an alloy for use in cast iron that will lessen chipping.

The trolley wheel also comes in for attention. The wheel placed in the harp on the top of a car hardly ever has the contacts and copper washers in place to help carry the current. In consequence the current has to go through the bushing, with the result that in a short time the bushing is burned and worn out of round, and a new one is required before the wheel is half gone. Trolley wheels should be replaced at the workbench where the repair man has the tools and the time to put them in properly. A large wheel with a wide groove has been found to be the most satisfactory and economical. A narrow-grooved wheel of large diameter is apt to come off the trolley wire at curves unless the curve has been carefully erected with a large number of pull-offs, although a wheel of small diameter will take the same curve on account of its lesser angle at the point of contact. When a change is made from a trolley wheel of small diameter to one of large diameter care should be taken to increase the tension in the springs in the trolley base sufficiently to overcome the extra weight of the wheel and harp. The springs in some of the older types of trolley stands will not allow enough tension to be put in them to provide for this increased weight, and in that case new stands must be installed. Trolley bases which are not fitted with a ball bearing or roller bearing must be oiled frequently, especially after a rain, because if the stand does not swing easily, the wheel will rub the wire so hard on the sides that it will come off, even on comparatively straight track.

For interurban and suburban lines the retriever for holding the trolley rope is much to be preferred to the catcher. The catcher requires the trolley pole to strike an arm or span wire to throw it down, and many times the wire is pulled down or the stand is pulled off the car, or both. Retrievers, when working properly, will pull the pole down at once, but sometimes they are condemned by crews and other operatives who do not understand them, and in some cases the devices are not properly installed.

Every road should provide itself with a good telephone system of its own, with telephones placed in boxes or booths at every switch. A competent man should be placed in charge at the central office to see after the running of the cars. He should be held responsible for this work and he should not have a lot of extra work to do unless he can drop it at any time.

Report on Cincinnati Terminal Possibilities

Bion J. Arnold Recommends Alternative Plans for the Erection of Individual Joint Terminals for Freight and Passenger Service Respectively, a Subway Line Using the Bed of the Miami & Erie Canal and Several Connections to Steam and Electric Lines

Bion J. Arnold has made a report to the Cincinnati Rapid Transit Commission on a proposed interurban railway terminal system for the city of Cincinnati. The commission was composed of William Cooper Proctor, chairman; W. A. Julian and Herman Schneider. It was appointed by Henry T. Hunt, Mayor of Cincinnati, in accordance with a resolution passed by the City Council. The letter of the commission to the Mayor, transmitting the report of Mr. Arnold, says in part:

"The problem presented to your commission and its expert was to devise a terminal system which would afford feasible connections for the interurban lines and insure rapid transit for these lines within the city limits. It was assumed, of course, that any plan presented would have to be financially possible. It was also a part of our problem to show the practicability of connections from the present termini of the various interurban systems to the terminal system, together with the cost of such connections; but we have not assumed these connections to be essential parts of the terminal system immediately to be built; they are really extensions of the interurban roads to the terminal, and whether they should be built by the city or by the interurban roads is a matter for future consideration.

"The canal right-of-way already acquired by the city offers a direct and almost level entrance to the business district through thickly settled portions of the old city and the newer manufacturing and suburban districts, north and northwest. The topographic conditions which seem, upon superficial observation, to present unusual difficulties in reality simplify the solution, for the right-of-way to be acquired is cheap, the streets to be crossed are few, there are few sewer and water pipes to be replaced, there are no streets to be torn up and resurfaced, and a private right-of-way insuring speedy and direct entrance for interurban and suburban cars is easily obtainable.

"The terminal system proposed is a two-track belt line (with four tracks on Canal Street) entering the heart of the business district, providing interurban entrance from any direction, except the southwest, and furnishing rapid transit from one suburb to another and from the suburbs to the business district, the cars moving in both directions around the belt line.

"We recommend the adoption of plan No. 4 or plan No. 5 submitted by Mr. Arnold, both of which possess the following basic essentials:

"1. A belt line from Canal Street through Mount Adams to Torrence Road, to Norwood, to Bond Hill, to St. Bernard, and thence through the canal to Canal Street. The estimated cost of this line, including right-of-way, tracks, stations, power plant and overhead expenses, ready for operation, but not including rolling stock, is $7,000,000.

"2. Two tracks throughout the system with a third track at stations for express service and four tracks from Twelfth Street south to Canal Street and west to Sycamore Street. Two tracks, with an automatic block system and a third track at local stations to permit the passage of express cars, will carry the traffic for many years. Four tracks in the Canal Street terminal will give ample station, storage and switching facilities.

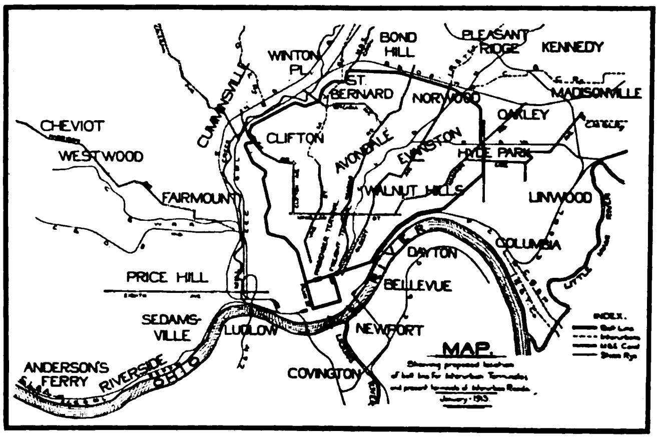
"3. An interurban subway passenger station on Canal Street between Sycamore and Plum Streets. Our recommendation is merely for a subway waiting room and ticket office at a point on Canal Street to be determined later. We see no necessity for an expensive surface station.

"4. An interurban surface freight station at Cheapside Street. The property upon which the freight station would stand is a part of the city's canal property. A surface station for freight has much lower operating expenses than a subway station.

"5. A covered subway on Canal Street from Broadway to Plum Street and on Plum Street from Canal Street to Liberty Street; the remainder of the two-track system on the canal right-of-way we recommend be in an open cut with a boulevard on each side. For reasons of comfort and economy, we recommend that the open cut be used as much as possible. Should the future growth of the city make a covered subway necessary north of Liberty Street, provision can be made by sinking fund to cover an additional mile, say, every ten years. A two-track open cut would still permit a 30-ft. boulevard on each side of it.

"Your attention is directed to an obvious extension of the system above described by means of a 'downtown subway loop.' This is not recommended as an immediate and essential part of the system.

"Your commission has given much thought to the franchise features of this project, but is not prepared at this time to present any recommendations; nor is it evident that the resolution of City Council contemplated such recommendations. However, if your honor desires to continue the commission in being, the commission will submit a supplemental report at a later date."



Cincinnati Report—Map of Cincinnati and Environs, Showing Proposed Belt Line for Interurban Terminals

SUMMARY OF MR. ARNOLD

The letter of Mr. Arnold, transmitting the report, says in part:

"Owing to the rugged topography of the country surrounding the city of Cincinnati, the avenues of easy entrance are limited in number, and these have been already pre-empted by steam railroads and by city street car lines.

"There are at present nine interurban railway lines operating into and out of the city. The cars from five of these lines come into the center of the city over the local street car tracks, running from 3 to 8 miles over them at an average speed of about 6 m.p.h. In addition to receiving and distributing their regular interurban passengers within the city limits, these cars also operate as city cars. The cars of four of the lines stop at or near the city limits, and the passengers to complete their trip transfer to city street cars.

"The service to the suburbs is entirely 'local,' requiring from forty-five minutes to one hour and fifteen minutes for a trip from 4 to 8 miles long from the city limits to the center of the city.

"On the lines of the city system the gage is 5 ft. 2½ in., and the five interurban lines operating over these tracks have the same gage, while the other four interurban lines have a standard gage of 4 ft. 8½ in.

"The interurban lines coming into the city have no common or other adequate terminal.

"At present several of the interurban lines are not paying a fair return upon the capital invested in them.

PRESENT NEEDS

"1. Adequate terminal located in the heart of the city.

"2. Rapid transit radial lines from this terminal to or near the city limits, thus forming a comprehensive terminal system which should be large enough to take care of present needs and be susceptible of enlargement to provide for future requirements.

"3. High-speed limited 'express service' to all suburbs, at least during the morning and evening rush hours. This means that all lines, both city and suburban, should have a uniform gage, or certain portions of the terminal system be provided with a double gage by using three rails, so that all lines could use the terminal system for 'express service,' in order that the capacity of the terminal system may be fully utilized and the investment in it justified.

"Rapid transit is one of Cincinnati's greatest needs, and its interurban lines must be financially successful if they are to fulfil their proper purpose, viz., the development of the territory in which they operate and the consequent growth and upbuilding of the city.

"I wish to emphasize the fact that the interests of the people of Cincinnati, the operators of the city system and the interurban companies are mutual, and that co-operation is necessary if the best results are to be obtained. Furthermore, the people have a right to demand the best possible service, but when the revenue from such service will not justify the expense necessary to secure it they should either be willing to pay more for the service or assist in providing it.

RECOMMENDATION

"If a comprehensive interurban and suburban terminal system for Cincinnati is built and the boulevard feature of the canal embodied, I recommend that it finally conform to plan No. 1, discussed in the report, consisting of the following elements:

"1. A subway terminal on Canal Street between Plum and Sycamore Streets, with a freight and passenger station located between Race and Walnut Streets. In this terminal provision is made for a terminal yard which, when completed, can if necessary embrace six tracks for a distance of nearly 2700 ft., thus providing ample storage capacity during the day for such interurban and city cars as may be needed to handle the morning and evening rush hour traffic.

"2. A double-track subway loop for receiving and distributing passengers in the downtown district extending on Plum Street from Canal to Fourth Street; on Fourth from Plum to Sycamore Street, and on Sycamore from Fourth to the terminal in Canal Street, with passenger stations located about midway of each side of the loop. This loop is to be provided with a suitable connection to the new steam railway passenger station when its location is definitely determined, and a connection for bringing in the interurban cars from Kentucky when required.

"3. A radial trunk line extending from the subway terminal on Canal and Sycamore Streets east to Carrel Street, where it connects with the Cincinnati, Georgetown & Portsmouth Railway, the Cincinnati & Eastern and the suburban divisions of the Interurban & Terminal Company.

"4. Branches extending northeast from Torrence Road to East Norwood, connecting there with the Cincinnati & Columbus Traction Company's line near where it crosses the Pennsylvania Railroad's Chicago line, and where the Rapid division of the Interurban Railway & Terminal Company and the Cincinnati, Milford & Loveland Traction Company will also make a connection.

"5. A four-track subway trunk line, occupying the site of the Miami & Erie Canal, extending from the terminals at Canal and Plum Streets as far as Queen City Avenue. At this point the subway construction will end and the trunk line will branch into two double-track roads, one continuing as an open-cut subway along the site of the Miami & Erie Canal to Carthage Pike, where it will connect with the Mill Creek Valley division of the Ohio Traction Company. About midway between Queen City Avenue and Carthage Pike the Cincinnati, Dayton & Toledo division of the Ohio Electric company will connect with this branch. The other double-track branch from Queen City Avenue will extend westward on a viaduct across the Mill Creek Valley and connect with the Cincinnati & Westwood Road at Fairmount, thence following the latter road to the city limits at Westwood, where the Cincinnati, Lawrenceburg & Aurora line can best be connected by the construction of a new line between Westwood and Cleves.

"6. If during the development of the interurban terminal system it should be deemed advisable to provide a belt line upon which could be operated high-speed cars for the purpose of connecting certain outlying districts of the city between which there are now no direct transit facilities, this can be accomplished by extending tracks along the canal bed from Carthage Pike, northeasterly, easterly and southeasterly, to a connection with the lines 'east of terminal' in the vicinity of Norwood.

"If it is found impracticable at the present time to finance the entire cost of the system as outlined in plan No. 1, to which might be added a belt line now or in the future, the belt line alone, together with the extension from Beech Avenue, Norwood, to East Norwood, as shown in plan No. 6, could be constructed at a greatly reduced cost, and if constructed would form the nucleus of the comprehensive interurban system of plan No. 1 and retain about 75 per cent of the revenue to be immediately expected from the latter. Branches to Westwood and Carrel Street and the loop in the downtown district could then be built when more urgently needed and when they could be more easily financed.

"The comprehensive plan when completed will provide ample terminal facilities and afford an entrance into the heart of the city for all existing interurban lines as well as for any other interurban lines that are likely to be built in the future.

"If this project is executed along conservative financial lines, the new life infused into the interurban systems will in all probability not only increase their earning capacity sufficiently to place them upon a paying basis but also remove one of the principal causes for the city's retarded commercial and corporate growth."

GENERAL CONSIDERATIONS

In his general discussion of the subject Mr. Arnold says in part:

"There are nine lines of interurban electric railways with an aggregate length of 342.85 miles of road operating out of Cincinnati.

"Five lines, having a total of 141.71 miles (including tracks of the city system over which they operate under a traffic agreement), come into the heart of the city—four lines having freight and passenger terminals on Sycamore Street, while the fifth line operates within the city as a part of the city street car system, being owned by the same company.

"Four lines, with a total of 201.14 miles, stop at or near the city limits, passengers transferring to city cars in order to reach the city. This transfer is made necessary on account of the difference in gage, and not because of inability to make a satisfactory arrangement to operate over the city tracks.

"The city line and the five interurban lines operating over the city tracks have a gage of 5 ft. 2½ in., while the other four interurban lines have the standard gage of 4 ft. 8½ in. Taking the city lines into account, there are 362 miles of the broad-gage and 201 miles of standard-gage track.

"The cost of standardizing the gage will be considerable, but it seems to be ultimately inevitable, since any satisfactory solution of the rapid transit problem for Cincinnati must include suburban as well as interurban service. To accomplish this, the gage of all lines should be the same, and naturally the standard gage will be preferable, since this would allow through service over connecting lines to other cities when desirable.

"The interurban situation at Cincinnati shows a rather unsatisfactory condition. A comparison of the earnings of the various interurban lines does not indicate that the lines which reach the heart of the city over the city tracks have any great advantage over the lines which terminate at the city boundary and transfer business to the city cars. It is probable, however, that without an entrance to the city the lines which now have this advantage would show decreased earnings.

"In order to compare interurban business in Cincinnati territory with that in other cities, statistics have been compiled for Cincinnati, Columbus, Cleveland, Toledo, Fort Wayne and Indianapolis, showing density of population within a radius of 50 miles of each of these cities. [A summary of these statistics is given in Table I, published herewith.—Eds.]

Table I.—Density of Population Within 50-Mile Radii of the Cities Named

City	City Population	Radial Area, Square Miles	Population Outside of Municipal District	Population of Outside Area per Square Mile
[1]Cincinnati	363,591	7854	653,281	83
[2]Columbus	181,511	7871	542,653	69
[3]Cleveland	560,663	5069	567,958	112
[4]Toledo	168,497	6646	488,585	74
[5]Fort Wayne, Ind..	63,933	7866	499,502	64
[6]Indianapolis	233,650	7865	524,659	67

[1] Including Hamilton County outside city of Cincinnati, Kenton County outside of Covington, Ky., and Campbell County outside of cities of Belleville, Dayton and Newport, Ky.

[2] Including Franklin County outside of city of Columbus.

[3] Including Cuyahoga County outside of city of Cleveland.

[4] Including Lucas County outside of city of Toledo, and Wayne County, Michigan, outside of city of Detroit.

[5] Including Allen County outside of city of Fort Wayne.

[6] Including Marion County outside of city of Indianapolis.

"Statements showing earnings per mile of road for the various interurban lines and the average earning of all lines in each territory have also been compiled, based on reports to the Railroad Commission for year ended June 30, 1911, and covering earnings from all sources.

"In density of population the Cincinnati territory is second, with an average of 96 per square mile, while in average earnings Cincinnati is sixth, or the lowest, with $4,626 per mile of road.

"On a per capita basis, taking Cincinnati's earnings per mile of road as 100, the earnings in the various territories rank relatively as follows: Cincinnati, 100; Toledo, 143; Cleveland, 144.5; Columbus, 167.5; Fort Wayne, 169.5; Indianapolis, 177.4.

"It is not probable that the riding habit will differ materially in the various territories, therefore we must conclude that the poor showing of the interurban lines at Cincinnati is mainly due to the fact that they do not reach a suitable or common terminal within the city. It is also reasonable to conclude that the earnings are affected adversely when the interurban lines operate over city streets, and that a rapid transit entrance would increase the earnings.

"While it is true that under usual methods of analysis Cincinnati would be considered too small to justify the large expense necessary for an elevated road or a subway, it is also true that on account of the unusual topographical features of the place and the restricted area of the downtown district it may be considered an exception. Each year will largely increase the cost of building new radial lines to the suburbs, as the territory is building up rapidly, and in a few years the item of right-of-way alone will make the cost of constructing new lines on the surface almost prohibitive.

"A close study of the situation has convinced me that, with the canal site now available, steps should be taken with as little delay as possible to utilize it in such a manner as to constitute the nucleus of an interurban terminal, and my recommendations are based upon this conclusion."

USE OF CANAL

Mr. Arnold then proposes two separate plans for the use of the old Miami & Erie Canal, saying in part:

"Early in my investigation it was ascertained that use might be made of that part of the old Miami & Erie Canal which lies within the city limits, since it has been leased from the State for the city's use as a boulevard, and that under this lease there would be no objection to a subway under the boulevard. A subway along the canal will cost but little over one-half of what similar construction would cost in a city street where travel must be maintained, sewer, water, paving and buildings taken care of, and this, too, without taking into account the saving to the city on account of not having to fill the canal."

The estimated cost of plan No. 1 is $13,089,858, or $256,322 per mile of single track. The estimated cost of plan No. 2 is $12,704,617, or $251,089 per mile of single track. Methods by which these costs could be reduced are also outlined in the report. Mr. Arnold, continuing, says:

"After effecting all possible saving the initial cost of an adequate interurban terminal system will be large, so large that for a few years it will not be able to earn operating costs and fixed charges, and it would appear that the city is not yet ready for it, unless its citizens feel that the need for it is great enough to warrant an undertaking which will have to be carried for some time until it becomes self-supporting.

"The retarded growth of Cincinnati indicates that such a need exists. In 1880 Cincinnati was the eighth city in rank in population in the United States. In 1890 it had fallen to the ninth place; in 1900 to tenth place and, according to the census of 1910, it ranks thirteenth, having been passed by Pittsburgh, Detroit, Milwaukee, Buffalo, Cleveland and San Francisco since 1880. But for the fact that in 1898 Brooklyn lost its identity and became a part of greater New York, Cincinnati's rank to-day would be fourteenth.

"From 1880 to 1910 the population of Cincinnati increased 42.5 per cent, while in area the increase was 107.8 per cent.

"Taking all cities in the United States with a population of 25,000 and over, the increase for the last three decades is as follows: 1880 to 1890, 49.5 per cent; 1890 to 1900, 32.6 per cent; 1900 to 1910, 34.3 per cent. These statistics, taken from the United States census, show that Cincinnati's increase in population for the past thirty years has been only about 30 per cent of that of cities of its class and approximately the same percentage when compared with the increase of all cities with a population of 25,000 and over."

EARNINGS AND OPERATING COSTS

The section of the report dealing with probable earnings and cost of operation says in part:

"Taking into consideration the fact that this is a terminal system, the operating expenses of the terminal will be relatively low, because the car equipment, together with the expenses of operating the cars (exclusive only of power), will be furnished by the companies using the terminal and not by the terminal company itself. For this reason, I believe the distribution of charges shown in Table II, published herewith, measured in per cent of the first cost of the property, may be considered applicable to the first year of paying operation, which will occur about 1923 for plan No. 1, assuming the terminals are completed and placed in operation by the year 1914.

TABLE II.—DISTRIBUTION OF EXPENDITURES; PER CENT OF FIRST COST OF PROPERTY

1. Operating expenses Including (a) accidents, (b) taxes, (c) maintenance, (d) depreciation reserve.	3.87
2. Fixed charges	4.00
3. Reserve for amortization fund which will retire the investment in a reasonable period, assumed in this case to be fifty years..	1.00
Total per cent of first cost	8.87

"This distribution shows that it will be necessary for this property to earn at least 8.87 per cent on an investment cost of $13,089,858 in order to become self-supporting; that is, a total annual income of $1,161,504.

"These earnings are to be derived from a fixed terminal rental assumed as 25 cents per car mile, and the total volume of car traffic for this year (1923) was estimated as 4,600,000 car miles. On the basis of the present annual car movement, all lines tributary to the terminal property would aggregate slightly over 2,000,000 car miles, from which terminal earnings may be derived. This present car traffic is, therefore, less than half of the amount required to support the investment, including taxes and amortization charges. The interurban lines could hardly be expected to pay over 25 cents per car mile, especially during the early lean years. Possibly a sliding scale of charges might be installed by which a higher rental would be justified after the properties have begun to pay well, but again these charges would have to be reduced when the volume of traffic became remunerative, so that, all things considered, an average fixed rental of 25 cents per car mile for a city the size of Cincinnati is the most reasonable figure upon which to base these estimates.

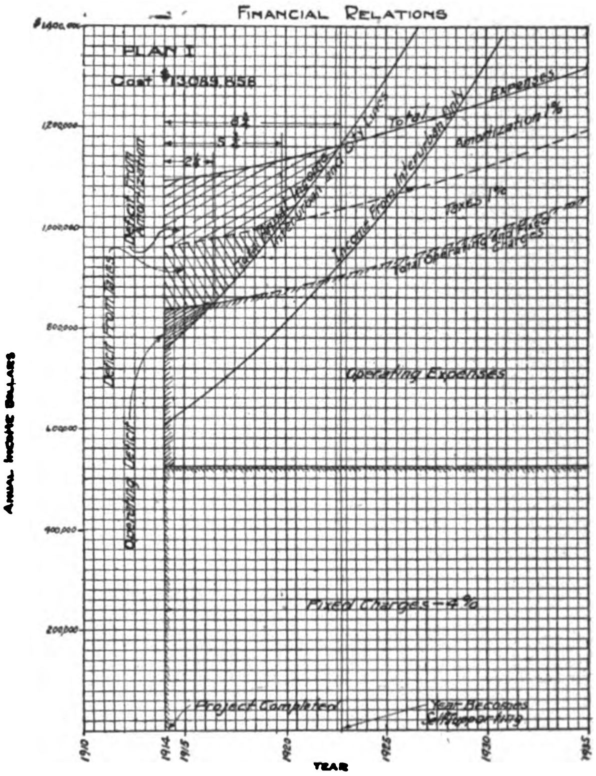
"Included in these earnings is a certain proportion of earnings from high-speed suburban lines of the city system, provision for which has been made in the interurban terminals. It may be confidently expected that there will be a demand for this improved service between city and suburbs which the city lines are not now in position to furnish, and which they cannot afford to ignore as soon as facilities are offered them. Even though express service to the suburbs is maintained only during morning and evening rush hours, this would in all probability add 25 per cent to the revenue to be derived from interurban traffic, which increase has been incorporated in these estimates.

"In all previous estimates of probable income no revenue has been considered from light freight and express business handled by the terminal, except on a car-mile basis, viz., 25 cents per car mile. This I consider a most conservative basis, for it is entirely probable that after the terminal has been in operation long enough to enable this light freight and express business to become well established it will be possible to make an additional charge for terminal service over and above the car-mile rate, and the revenue derived therefrom will materially exceed the cost of handling; consequently, the net earnings will exceed those estimated herein.

"All of the above discussion is based upon the assumption of a complete operating property aggregating $13,089,858 in investment cost, known as plan No. 1. If the complete terminals are not built at the start but various opportunities for reducing first cost are taken advantage of, the fixed charges will obviously be reduced and the operating ratio to fixed charges will be materially changed. Thus, plan No. 1-A, the most simplified of those presented, costing $8,491,803, will only require earnings amounting to $830,000, or 9.78 per cent of the investment, to become self-supporting, which will occur in the year 1916, or a little less than two years after the completion of the terminals.

"Referring to the graphical analysis, published herewith, each of these projects will begin to pay after the expiration of a certain non-earning period, the length of which depends entirely upon the relative investment incurred. In order to show this relation of non-paying periods to earnings, plan No. 1 has been illustrated as typical, the maximum investment of the complete project has been assumed and the minimum investment is taken.

"The probable income of the system has been estimated upon a basis of an increase of 5 per cent per year compounded. This will probably be too high a rate if projected many decades into the future, but within the period shown it is conservative at least for the first ten years. It is further assumed, and I believe conservatively, that this interurban business will increase over present business about 10 per cent immediately upon the opening of the terminal property.



Cincinnati Report—Graphical Representation of Future Earning Power of Proposed System

"Referring to the curves in the illustrations, the point of intersection of the curve 'total income from interurban and city lines' and that of 'operating and fixed charges' indicates the end of the period of operating deficit only, which deficit will accrue for a period of two years in the case of the complete project, No. 1.

"If tax assessments are levied, a deficit will occur for five and three-quarter years in the case of plan No. 1.

"If amortization reserve is charged against the project from the beginning, a deficit will exist for eight and three-quarter years in the case of plan No. 1. However, beyond the maximum terms, it is estimated that the property will begin to accumulate a continuous surplus which may be used to offset the deficits of the early years.

"In the case of a property of this permanent nature whose function is so beneficial to the entire city, it would seem quite justifiable for the city to relieve the property during the early years of the burden of amortization and possibly of taxes for the entire period. In the above engineering estimates taxes have been included in order that the project may 'stand upon its own feet' and the true financial results therefrom may be apparent. However, as a municipal project the elimination of taxes would evidently constitute a considerable relief. Similarly for an amortization reserve of so long a period as fifty years it would be entirely proper to defer the annual payments for a few years until the property has begun to pay for itself. Any relief from amortization charges during the early years will operate to increase the annuity rate during the later years, but this is not considered serious, as the property will in all probability rapidly accumulate surplus after the first eight or ten years' operation.

"On the other hand, if the project is found to be one which the city does not itself undertake, and private capital is willing to undertake it, conditions as regards taxation and amortization should be made liberal enough to insure that both the construction and operation of the property shall be commercially feasible. At the same time, the city should unquestionably retain effective control and supervision of the project from the date of its inception.

PRESENT FINANCIAL STATUS OF INTERURBANS

"Table III, published herewith, shows the percentage of increase or decrease in operating results for all of the interurban roads operating out of Cincinnati for the year ended June 30, 1908, and the year ended June 30, 1912.

Table III.—Percentage of Increase or Decrease in Operating Results

	Year Ended June 30, 1908	Year Ended June 30, 1912	Per Cent Increase
Miles of road	353.09	356.19	0.88
Passengers carried	12,645,029	14,946,878	18.20
Passengers per mile of road	35,812	41,963	17.18
Passenger revenue	$1,250,645.81	1,425,880.76	14.01
Freight revenue	154,229.75	238,842.69	54.86
Total transportation revenue	1,404,875.56	1,664,723.45	18.50
Average fare per passenger	0.0989	0.0954	*3.54
Transportation revenue per mile of road	3,978.80	4,673.70	17.47
Passenger car miles	5,529,320	6,428,241	16.26
Freight car miles	487,212	767,997	57.63
Total car miles	6,016,532	7,196,238	19.61
Passenger revenue per passenger car mile	0.2262	0.2218	*1.95
Freight revenue per freight car mile	0.3166	0.3110	*1.77
Total transportation revenue per total car miles	0.2335	0.2313	*0.94
Passengers carried per passenger car mile	2.29	2.33	1.75
Total car miles per mile of road	17,040	20,203	18.56

*Decrease.

"For the three years from 1909 to 1912 the business of the Indianapolis interurban terminal increased as follows: Passengers carried 24.4 per cent; passenger trains 30 per cent; freight trains 27.6 per cent. At Cincinnati from 1908 to 1912 the increases were as follows: Passengers carried 18.2 per cent; passenger car miles 16.3 per cent; freight car miles 57.6 per cent. This comparison shows that interurban lines at Cincinnati are suffering from the lack of adequate terminals.

"The ratio between the revenue 'per mile of road' and 'per car mile' is the 'car miles per mile of road' or the 'density factor.' The line with the smallest earnings per car mile shows the largest revenue per mile of road because it makes the largest use of its tracks, while the line with the largest earnings per car mile has the next to the lowest revenue per mile of track, owing to the fact that its use of its tracks is very small.

"Neither of these particular conditions is satisfactory; With low earnings per car mile and large mileage per mile of track the platform expense will be disproportionately large and therefore a heavy burden. Neither will the large earnings per car mile of the other line offset the loss occasioned by the infrequency of its service, which shows that its tracks are not being utilized to an extent that will afford sufficient revenue, and therefore the fixed charges will in this case become a burden.

"In Table IV are shown the 'car miles per mile of track,' 'gross revenue per car mile,' 'operating expenses per car mile,' 'net revenue per car mile,' the operating ratio and also the rank of each group of lines as to each of these items.

"In use of their tracks, i.e., density of car traffic or 'density factor,' the Cincinnati interurban lines rank third although they are but 1 per cent below the average of all lines, which shows that in this one respect they are about normal.

Table IV.—Operating Statistics of Interurban Lines of Various Cities.
Year Ended June 30, 1911

Cities	Car Miles per Mile of Road	*Gross Revenue per Car Mile, Cents	Operating Expense per Car Mile, Cents	Net Revenue per Car Mile, Cents	Operating Ratio, Operating Expense to Gross Receipts
Cincinnati, Ohio	19,382	23.33	15.17	8.16	65.0
Columbus, Ohio	18,981	29.34	18.30	11.04	62.3
Cleveland, Ohio	25,210	30.98	16.76	14.22	54.1
Toledo, Ohio	16,096	31.67	18.14	13.53	57.3
Fort Wayne, Ind.	20,252	25.82	15.57	10.25	60.3
Indianapolis, Ind.	18,034	31.77	18.12	13.65	57.0
Average	19,578	29.83	17.23	12.60	57.7

*Revenue from all sources.

"In 'operating expense per car mile' the Cincinnati lines rank first, but their 'gross earnings' and 'net earnings' per car mile rank sixth. In net revenue they show but 65 per cent of the average of all lines of the cities enumerated.

"In 'net revenue per car mile' Cleveland ranks first with 14.22 cents, with Indianapolis second at 13.65 cents, but it must be remembered that in the Cleveland territory there are 112 people to the square mile, while at Indianapolis there are but sixty-seven.

"Finally, in regard to operating ratio, Cincinnati ranks sixth, the same as in 'relative net revenue per car mile.' In other words, its roads occupy the lowest position as earning properties.

"The only conclusion to be drawn from the foregoing statistics is that unless some relief is afforded them the interurban lines will continue to be financially unproductive and therefore unable to do their share in developing and building up the territory in which they operate. These interurban lines are entitled to earnings which will not only show a good return on the capital invested but also keep the properties in first-class physical condition, otherwise they will not fulfil the purpose for which they were built."

ALTERNATIVE PLANS

In the concluding section of the report alternative plans are submitted with the statement that, if concessions are made in the conditions mentioned for plans Nos. 1 and 2, a terminal system may be built at a lower cost than the plan involving all of the features recommended by Mr. Arnold. The alternative suggestions are designated as plans Nos. 3, 4, 5 and 6. Under plan No. 3 the estimated cost is $10,608,075, or $221,694 per mile of track, while further modifications are outlined which would reduce the cost below that figure. The estimated cost of plan No. 4 is $6,478,940, or $203,894 per mile of track. Plan No. 5 involves an estimated cost of $6,926,053, or $203,900 per mile of track. Plan No. 6 shows an estimated cost of $7,055,680, or $204,060 per mile of track. Concerning plans Nos. 4 and 5, which, as shown in the foregoing, are recommended by the Cincinnati Rapid Transit Commission, Mr. Arnold says:

"Plan No. 4, at a cost of $6,478,940, should begin to accumulate a surplus in three and three-quarter years after the project has been completed, with interest at 4 per cent, or in six and one-quarter years at 5 per cent. At the end of three and three-quarter years the accumulated deficit would be about $195,000, and it should require the surplus for three and one-half years to cover this deficit.

"Plan No. 5, at a cost of $6,926,053, shows a deficit for five years with bonds at 4 per cent and for seven and one-half years at 5 per cent. The deficit at the end of five years should amount to approximately $305,000, which should be eliminated by the surplus during the next four and one-half years."

COMMUNICATIONS

T-RAIL CONSTRUCTION IN PAVED STREETS

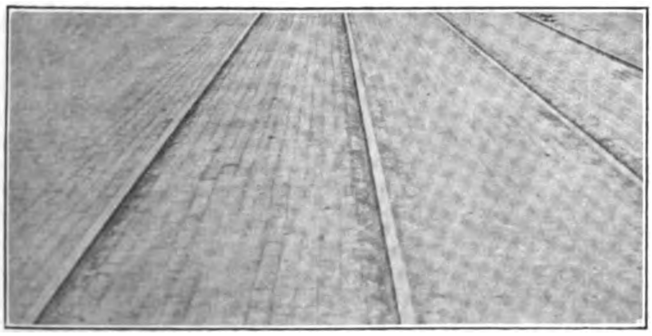
Kentucky Traction & Terminal Company
Lexington, Ky., Feb. 5, 1913.

To the Editors:

I have read with interest the article on page 61 of the Electric Railway Journal of Jan. 11, relative to the matter of paving between the rails on the Illinois Traction System, and also the article on page 209 of the issue of Feb. 1 by A. Swartz.

This company's construction prior to 1911 was practically the same as that described as the standard T-rail construction in paved streets of the Illinois Traction System, with the exception that we carried the concrete 6 in. below the tie instead of surfacing on gravel as in the Illinois Traction plan. Our method of laying the brick pavement was identical with that which is recommended in the Illinois Traction System article. On Jan. 1, 1911, we abandoned this plan because we found that the brick which was carried under the head of the rail, and which of necessity took the wheel wear of all the vehicular traffic, wore out and gave way in the course of three or four years. This allowed water to get into the sand cushion, and during the cold weather of the winter it lifted the remainder of the paving, thereby destroying its value. We also found that the plan of carrying the concrete below the ties made the track construction so rigid that bright spots on the receiving rail and general destruction of the joint occurred much more quickly than we believed would be the case if a more flexible form of construction was used.

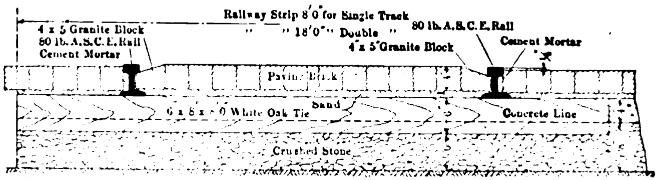
In view of these defects we laid several miles of paving in this city in 1911 according to the method illustrated by the accompanying illustration. This construction consisted in first rolling the sub-grade with a 10-ton road roller and spreading over the sub-grade 6 in. of broken stone, which was then compacted by being rolled with the road roller. On this as a foundation were laid 6-in. x 8-in. x 8-ft. white oak cross ties, which carried the track of 80-lb. A.S.C.E. rail. The track was surfaced by tamping under the ties, during preliminary operation, about 2 in. of broken stone. This broken stone was carried to a point between the ties 2 in. above the base of the tie or 4 in. below the base of the rail. After about two weeks of operation, during which time inequalities of surface were tamped out as they showed up, a 4-in. layer of concrete was laid between the ties, up to the base of the rail, and over this was spread evenly a sand cushion on which the pavement was placed.



Lexington Track—View of Standard Pavement Between T-Rails

This paving consisted of 4-in. by 5-in. specially cut red Missouri granite blocks laid next to and extending under the head of the rail. This block was laid in a bed composed of a dry mixture of one part of cement and two parts of sand. Between these blocks standard vitrified paving bricks were laid parallel with the rail, so that the tops of all the bricks were level with the top of the rail. On the outside of the track and in the devil-strip the bricks were all parallel with the rail and ¼ in. below the top. The entire paving was grouted with a mixture composed of one part of Portland cement and one part of sand.

This structure was laid in the spring and summer of 1911, and up to this writing we have found absolutely not one case of failure in the track or in this paving. We have been unable to discover a single crack in any of the paving blocks, notwithstanding the fact that the winter of 1911 was very cold, the thermometer on several occasions being below zero, with a minimum of 17 deg. below. The granite blocks are taking the wear of the vehicular traffic without any appreciable depreciation.



Note. Granite Block are laid in a bed of a dry mixture of one of cement and two of of sand.
Paving is grouted with a mixture of one of cement and two of sand.

Electric Ry. Journal

Lexington Track—Section of Standard T-Rail Construction

The accompanying halftone, from a photograph taken Feb. 1, 1913, shows a section of this track on Main Street in the city of Lexington. This track is used not only by the cars of all the city lines, but also by the 35-ton cars of the four interurban lines entering Lexington. You will note that we use no drain tile in the center of the track, such as is used by the Illinois Traction System, because our subsoil is of a gravelly clay nature and is self-draining.

George MacLeod, Chief Engineer.

CONSTRUCTION OF AMERICAN AND PRUSSIAN ACCUMULATOR CARS

Accumulatoren-Fabrik Aktiengesellschaft
Berlin, Jan. 27, 1913.

To the Editors:

The information given by Le Roy Scott in the Electric Railway Journal for Aug. 31, 1912, which has but recently come to my attention, is undoubtedly of great interest on account of the figures which he presents relative to the self-propelled cars of the American railways on which Edison batteries are employed. It will probably be of interest to many of your readers to compare his figures with the corresponding ones on the cars of the Prussian State Railways, the batteries of which have been supplied by my firm, the Accumulatoren-Fabrik Aktiengesellschaft, Berlin-Hagen.

The Beach-Edison cars show an energy consumption of 31 watt-hours per ton mile, which is equal to 18.8 watt-hours per ton kilometer on the level. Mr. Scott expresses the opinion that the special design of the car axles is responsible for the low figures. He will therefore be interested to learn that the average energy consumption of the accumulator cars of the Prussian State Railways is less than 18 watt-hours per ton kilometer, and that many of them run on tracks with steep up-grades and frequent stops. The cars in question have the standard design of axle which is usual on European railways.

Mr. Scott is undoubtedly right in asserting that there is no reason why accumulator cars should not be able to take up-grades. It is not at all clear why up-grades should tend to prevent such operation, for it is only a question of employing motors of the right size. The effect of steep gradients on the accumulator car is simply a corresponding decrease in the radius of action. Of course, when up-grades are taken, the voltage of the accumulator sinks in proportion to the increase in the discharging current. Mr. Scott will probably agree with me in saying that in this case the lead accumulator has a considerable advantage over all alkaline batteries, because the voltage of the former does not sink at anything like the rate that it does in the latter. It follows naturally that the car fitted with alkaline cells can take up-grades only at a much lower speed than one fitted with lead cells. This is also the reason why electric automobile users in Europe have dropped the Edison accumulator in a number of cases and taken up the lead accumulator again.

Mr. Scott also states that a trial car developed a capacity of 280 miles in eighteen hours, when charged only four hours during the night at the normal rate and for four hours intermittently during the day at an increased rate. He points out that this method of charging is one of the important features of the Edison battery. As a matter of fact, however, this practice is also very frequently employed in Europe in connection with lead accumulators having large-surface positive plates, and it is also followed in the case of the self-propelled cars of the Prussian State Railways when the working conditions demand such treatment. The normal charge in the latter case is only two hours compared to four hours for alkaline batteries.

At this point I would like to rectify an error made by Mr. Scott with regard to the first cost of the Prussian accumulator cars. They do not cost $20,000 but only $18,000 each. It is a pity that Mr. Scott does not state what the battery in the Beach-Edison car costs. It would have been most interesting to know this figure, as all calculations have hitherto shown that on account of its high price the Edison accumulator cannot be seriously looked upon as an earnest competitor in European acccumulator car work even when we neglect its high internal resistance and its excessive voltage drop at starting and when taking up-grades. Knowledge of the price is also important in order to judge the probable cost of maintenance, for Mr. Scott does not by any means clearly show how he arrives at 0.8 cent per car mile.

One must bear in mind that it is not such an easy matter to compare the life of a lead accumulator and an Edison battery. In the case of the lead accumulator for self-propelled cars about 40 per cent of the first cost is accounted for by the high value of the hard-rubber jars, which are subject only to minimum wear and tear, that is to say, breakage during battery repairs and in collisions. The replating of a battery is also an inexpensive matter, especially when one considers that the old plates can be employed again as raw material for making new ones. It is therefore possible for the contracting firm to carry out the maintenance at a comparatively low figure amounting to 8½ pfennigs per car-kilometer (3.4 cents per car mile) including a maintenance man, or somewhat more than 6½ pfennigs per car kilometer (2.76 cents per car mile) without a maintenance man.

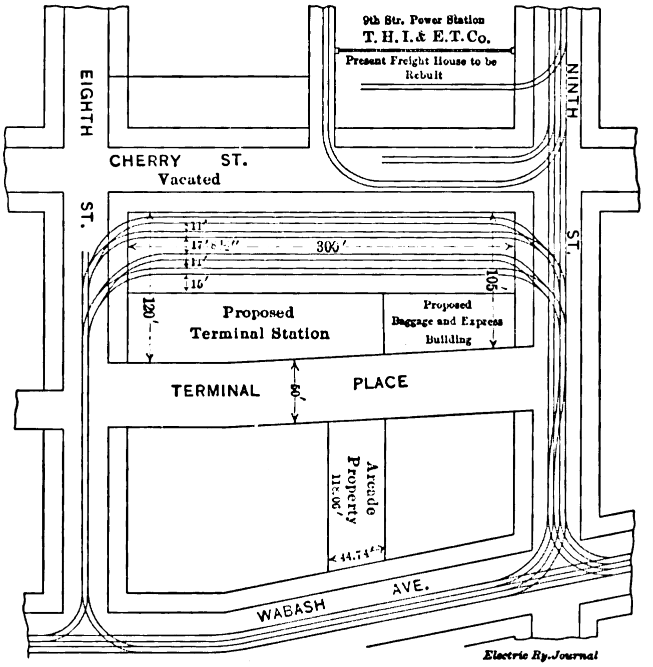
In the case of the Edison battery, however, a complete renewal of the battery is undoubtedly necessary, so that when the original one is worn out the entire first cost must be duplicated.

Mr. Scott calculates the maintenance expenses of the battery at 0.8 cent per car mile, including an item of 0.2 cent for battery maintenance, flushing, etc. It therefore follows that 0.6 cent remains for mere cell repairs. This figure is given under the condition that the battery is renewed after four years of service, with an output of 130 miles to 170 miles per diem. Taking 150 miles as the mean daily output and 330 working days per annum, we get a total output of 200,000 miles within four years, after which time the battery will require renewal, according to Mr. Scott's own statement. As he reckons 0.6 cent for battery renewals, it follows that 200,000 times 0.6 cent, or $1,200, represents the cost of replacing a battery. If we allow 10 per cent to 15 per cent of this figure for the value of the old material, we find that the new battery must cost about $1,400 to $1,500. Mr. Scott has therefore based his calculations on an extremely low price for the battery. This price is only a small fraction of that hitherto demanded by Mr. Edison. I can only assume, therefore, that Mr. Scott's figure of 0.8 cent per car mile is erroneous. It would be extremely meritorious of Mr. Scott if he would clear up the matter somewhat by giving more detailed particulars.

Dr. A. Büttner.

PROPOSED TERMINAL OF TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY AT TERRE HAUTE, IND.

A comprehensive interurban terminal layout for the Terre Haute, Indianapolis & Eastern Traction Company at Terre Haute, Ind., is now in the construction stage. A block of property 155 ft. by 300 ft. just outside the business district has been purchased for this purpose. To provide proper approaches to this property and at the same time segregate the terminal traffic from vehicular traffic between Eighth and Ninth Streets, between which the terminal property lies, Cherry Street, a 65-ft. cross street adjacent to the property, has been vacated by the city. In its place the alley separating the terminal property from the rest of the block has been widened to 50 ft. to provide a driveway to the proposed terminal station and baggage and express building. An attractive entrance to the terminal property has been provided by the purchase of a 44-ft. lot fronting on Wabash Avenue, one of the principal business streets, and the building of an arcade building on this property. This arcade building is two stories high and occupies the entire property, 114¼ ft. deep. It has a glazed white terra-cotta front, and the space on each side of the arcade has been arranged for a number of small shops.



Plan of Terre Haute Terminal Property and Track Arrangement

The terminal property and trackage are shown in the illustration. At the present time the tracks are in place and are being used for passenger and freight terminal purposes. A remodeled store building, situated at the Ninth Street end of the property, serves as a passenger station. The express and freight station occupies the northwest corner of Ninth and Cherry Streets. This building formerly served as a carhouse and was partially remodeled into a freight house some time ago. The present traffic has outgrown these quarters, however, and further additions and remodeling are contemplated.

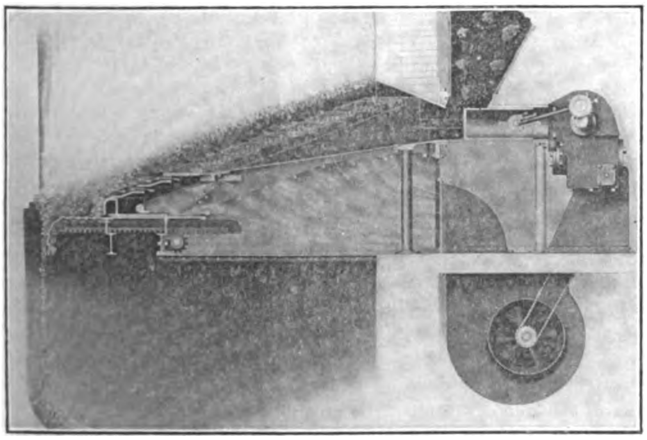
The existing trackage includes four tracks on the terminal property, and these tracks are being used for storage of passenger and express equipment. The two tracks in Cherry Street are being used as team tracks for car-load freight, and one also serves as a lead to the coal track which reaches the old power station directly north of the freight house. This old station is being held in reserve in case of an emergency shutdown at the new generating station. The boiler equipment, however, is connected to the steam-heating system which this company operates, and it requires firing during the winter season.

The existing schedules on interurban lines operating in and out of Terre Haute include eighty trains each way. Four lines enter the city from as many different directions and serve the territory between Terre Haute, Clinton, Indianapolis and Sullivan, Ind., and Paris, Ill. An average of 5000 passengers is handled at the proposed terminal each day. Express and freight service include two express trains handling United States Express Company's business and eight scheduled freight trains which receive and deliver less than car-load shipments. As stated, the arcade building is complete, and it is contemplated that the terminal building, plans for which have been prepared, will be erected in the near future.

A NEW TYPE OF UNDERFEED STOKER

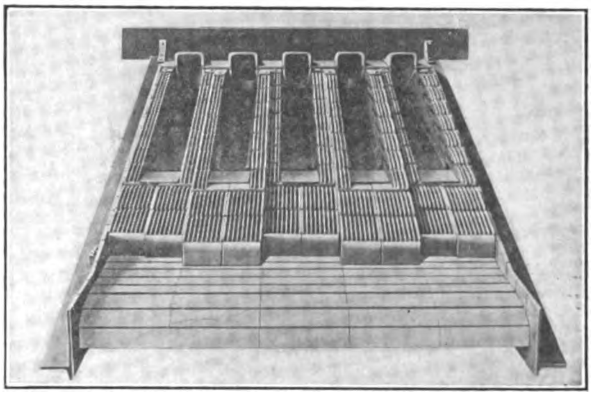
The Sanford Riley Stoker Company, of Worcester, Mass., has just placed a new type of mechanical stoker upon the market after a year of operation of trial installations. The most conspicuous difference between the new stoker and the usual underfeed type is that it has moving fuel-bearing grates in place of stationary tuyères, and moving overfeed grates extending across the entire width of the furnace. These moving grates carry the fuel down an incline of about 20 deg. The positively forced feed, made up of the combined motion of a plunger in the retort and the moving grates, distributes the coal evenly. The nearly uniform thickness of fuel insures active combustion over the whole fire surface by providing a much freer and more uniform passage of air through the coal than is possible when the coal heaps in large masses with adjacent thin spots.

The discharge of refuse is continual and automatic, not periodic, thus avoiding the discharge of large masses of fuel with the refuse. At the lower end of the overfeed grates are pusher noses which force the refuse slowly but continuously toward the bridge, then on and over the ash-supporting plates, which are hinged together in the form of an apron. The plates of this apron hang down over the ends of a rack which controls the size of the opening and is adjustable by hand power. The discharge capacity can be regulated by the amount of travel given to the pusher noses. The discharge of refuse is at such a rate that the fuel is thoroughly burned out and practically cold before discharge.



New Underfeed Stoker—Sectional Side View

The new stoker is reported to be able to break up all clinkers. The continual reciprocating motion of the moving grates, which is in opposite directions for adjacent retorts, forms a shearing line between each pair. This action prevents the formation of clinkers above the air openings. The crusher action of the pusher noses at the bottom of the overfeed grates is effective in preventing the accumulation of clinker of large size at this point, and any obstruction caught in front of a plunger will block that plunger only and, furthermore, it cannot do damage more serious than the shearing of a pin which forms the safety device. This arrangement not only reduces the amount of fire area temporarily deprived of fresh fuel but also by its use the fuel in only one retort has to be overhauled.



New Underfeed Stoker—View from Rear End Showing Retorts and Moving Grates

NEW HYDROELECTRIC DEVELOPMENT

The Kuhn interests of Pittsburgh, Pa., which control the West Penn Electric Company, are preparing to put in three dams on the Cheat River, Va., each of which will produce 50,000 hp and, provided the necessary permission shall be obtained, the first will be in operation about Jan. 1, 1914. Certain dams will also be established on Sandy Creek, in West Virginia, which will provide additional power. The same interests also control the fall at Ohiopyle, Pa., where there is a drop of 110 ft., together with reservoir rights on the Youghiogheny River, so that ultimately about 250,000 hp will be available for commercial rights around Pittsburgh. The West Penn Electric Company has at the present time a steam station at Connellsville, rated at 52,000 hp and operating with coal costing about $1 a ton. The energy is transmitted as far as Butler, Pa., 120 miles away, and at the present time there are some 110 coal mines with connected loads ranging from 200 hp to 5000 hp being supplied from the company's system, not to mention the numerous municipalities centering around Connellsville. With the establishment of the hydroelectric plants referred to a tension of 110,000 volts will be adopted.

INVITATION TO INSPECT SIGNAL SYSTEM

In connection with the forthcoming meeting of the Central Electric Railway Association, which is to be held at Indianapolis on Feb. 27 and 28, C. L. Henry, president of the Indianapolis & Cincinnati Traction Company, has extended to the members of the association and to other attendants at the meeting, both ladies and gentlemen, an invitation to take a trip over the Shelbyville division of his line to inspect the Simmen system of signaling and train dispatching. This apparatus has now been fully installed and is in operation over the entire division. It is announced that the special cars provided by Mr. Henry will leave the Traction Terminal, Indianapolis, on Friday, Feb. 28, at 2:30 p. m., arriving at Indianapolis 6:30 p. m.

News of Electric Railways

Preliminary Draft of Chicago General Merger Ordinance Being Prepared

As a result of the meeting of the local transportation committee of the Chicago City Council on Feb. 13, at which the representatives of the surface and elevated railways presented their outline of a plan for unification and a comprehensive system of subways, a subcommittee co-operating with the corporation counsel has been instructed to prepare a tentative draft of a merger ordinance.

From the outline submitted by the representatives of the railways it would appear that their plan of consolidation conformed in principle to the eleven suggestions made by the local transportation committee. These suggestions were published in the ELECTRIC RAILWAY JOURNAL for Dec. 21, page 1242. The outline presented by the representatives of the railways is as follows:

1. The existing street and elevated railways to be consolidated or merged into one company under appropriate legislation to be sought from the General Assembly authorizing the merger and the construction of subways, and all the lines, including those in subways, to be operated as a unified system.

2. One 5-cent fare to be established for a single continuous ride in any one general direction, with free transfers at all reasonable points to be agreed upon between the various lines of the unified system, whether surface, elevated or subway lines.

3. As far as practicable, downtown terminals to be abolished and through routing of cars and trains to be effected. Routing of cars and trains to be such as to afford the best transportation facilities to and from all parts of the city, the elevated and subway lines to be used for express service so far as practicable.

4. A comprehensive system of rapid transit subways to be constructed and equipped as follows: (a) Subways for the congested downtown district as soon as possible, for trains of the elevated lines. (b) After the completion of the downtown subways, additional rapid transit subways extending in various directions throughout the city as the conditions of traffic and population shall require and warrant. The work of constructing subways to be let to the lowest responsible bidders under duly approved contracts.

5. The combined capital valuation of the merged properties at the outset to be fixed by taking the valuation of the street railways as determined by existing ordinances and adding thereto an amount to be agreed upon as the value of the elevated railroads.

6. The company to provide all moneys required for the subways, as well as for extensions and improvements of existing lines and for equipment, except that the city's "traction fund" shall be applied as far as it will go toward the cost of the downtown subways. The moneys provided by the company, plus an agreed percentage for brokerage, to be added to the capital valuation.

7. The city to have the right to require the existing elevated "loop" to be taken down as soon as the downtown subways shall be completed and ready for operation.

8. The construction and equipment of subways, the additions to capital valuation and regulation of service to be supervised by a board of engineers or otherwise, as may be agreed upon, to the end that the interests of the public, of the city and of the company in the properties, and in the operation thereof, may be properly protected and safeguarded.

9. The city at all times to have representation on the company's board of directors.

10. The earnings of the properties to be applied as follows:

From the gross receipts there shall first be deducted all operating expenses, taxes, renewals and maintenance charges, and out of the resulting net receipts the company to be allowed 7 per cent per annum on the capital valuation.

Of the remaining net receipts (for convenience called "divisible net receipts") 70 per cent to go to the city and be applied as a sinking fund for the amortization of the capital valuation, and 30 per cent to go to the company; provided that if in any year the city's 70 per cent of the divisible net receipts shall be less than $2,000,000, then all the divisible net receipts for such year up to $2,000,000 shall go to the city for the sinking fund and only the balance, if any, above $2,000,000 shall go to the company; and provided further, that the company's percentage of the divisible net receipts shall be decreased proportionately as the capital valuation, including all additions thereto, shall show a net decrease by the application of the sinking fund, and that if, after a decrease, the capital valuation shall again increase, the company's percentage shall be proportionately increased, but shall never exceed 30 per cent.

11. Upon the amortization of the entire capital valuation through the operation of the sinking fund, the properties to be transferred to the city free and clear of debt.

12. The city to have the right at any time to purchase the properties free and clear of debt by paying to the company an amount equal to the face of the capital valuation as it shall then exist, plus 10 per cent thereof.

Following his presentation of the proposed merger outline, W. G. Beale, counsel for the elevated roads, called the attention of the committee to certain features in the outline which were to a certain extent new and had not been discussed before by the committee or the company's representative. The first difference came under the question of a system of subways. Heretofore there has been some contention to the effect that following the completion of a subway which would permit the removal of the Loop structure one should be built along Halsted Street to relieve congestion there. The railways did not believe in binding themselves to any particular location for the construction of subways following the completion of the one in the Loop district. The subject of its location is left entirely to the discretion of the city, and it is probable that the first extension to the proposed subway system may be required at some other point to relieve congestion.

Under paragraph 6 provision is made that the city shall participate in the construction fund as far as the present traction fund will apply. The outline provides that the companies shall provide the balance of the fund required and an agreed percentage for brokerage shall be allowed. Mr. Beale said that possibly 5 per cent for brokerage would be enough, but from past experience in obtaining construction funds it might be necessary to pay more than this amount. The proposition was left open, however, and it will be necessary for the city and the representatives of the companies to agree on some definite per cent before the final draft of the ordinance is made.

Under paragraph 10 of the outline, the fair return to the companies on the capital valuation is set at 7 per cent. Mr. Beale said that he knew the companies would deal with the city on this basis, but as it stood the amount was merely tentative and it may be agreed later that 6 or 6¼ per cent will be sufficient. It will not be hard, however, to draw conclusions, as the fair return on capital invested has been discussed and the committee can consult the different authorities on this particular subject. He said that in the end, however, the subject must be passed on by the stockholders, who in reality were the people with whom the city was dealing.

In reply to a question as to 7 per cent being in excess of what the elevated railways were earning on the approximately $80,000,000 valuation set on the property, Mr. Beale said that they were earning approximately 6 per cent on that valuation at this time. He said further, however, that the gross earnings were limited by the Loop structure, which was taxed to its full capacity at this time. If it were possible to relieve congestion in the Loop, he said he did not believe that there could be a question in anyone's mind that the elevated roads would return as much as 7 per cent on the capital invested. The purpose of the downtown subways is to relieve the Loop situation, which when complete will allow an increase in the traffic on the rest of the elevated structure.

Mr. Beale said that the total capital liabilities, based on $80,000,000 for the elevated roads and $134,000,000 for the two surface railways, would be $214,000,000. After totaling the expected earnings for the surface and elevated railways for the current year, the gross income would be about $40,000,000. Setting aside 60 per cent for operating expense, the profits remaining for the merged companies would approximate $16,000,000. Figuring 7 per cent on the $214,000,000, the capital valuation, a balance would be left for the city in excess of $1,000,000.

In expressing his views to the committee on the merger proposition, L. A. Busby, president of the Chicago City Railway, said there was not the least doubt in his mind that the city and the railway companies were near enough together to draft a tentative ordinance, and that the few points in question could be left blank, the final draft of the ordinance resolving itself into a mere question of phraseology, which he believed could be readily settled in a way satisfactory to both sides.

Interurbans	Terminals	Mileage Under Construction	Track Laid	Grading Completed	Date Completed
Anna-Blue Ridge	Anna-Blue Ridge-Greenville	12	0	12	June, '13
San Benito-Rio Grande	Santa Benito to Santa Maria	240	14	39	*
East Texas Traction	Dallas-Greenville	85	0	14	March, '13
Riviera Interurban	Riviera-Beach	10	8	10	Jan., '13
Southern Texas Traction	Waxahachie-Waco-Corsicana	120	0	90	Sept., '13
Southern Texas Traction	Dallas-Waxahachie	31	31	31	Sept., '13
Fort Worth Southern Trac	Fort Worth-Cleburne	32	32	32	Aug., '13
		530	85	228	

*Indefinite.

At a conference between corporation counsel, the Mayor and the sub-committee, following this meeting of the local transportation committee, corporation counsel were instructed to draft an ordinance along the general lines agreed upon by the city and the companies, and James J. Reynolds, of the harbor and subway commission, was instructed to take up at once with the engineers of the railways the question of routes for downtown subways. He was also requested to prepare figures on prospective earnings of the combined railroads and estimate what the net profits would be to the city on the basis of $214,000,000 capital valuation with 7 per cent to the railways.

Municipal Ownership Ordinance in Detroit

Corporation Counsel Lawson of Detroit and Attorney General Grant Fellows have completed a simplified draft of the old home rule act which was declared unconstitutional by the Michigan Supreme Court before it was put into effect. This draft provides for the revision of city charters piecemeal and contains a clause enabling mayors of cities to appoint commissions with power to condemn public utility properties. In cases of condemnation by such commissions, however, their work must be approved by the electors before it becomes legal.

Public hearings will be held on the proposed new ordinance framed by Attorney Alfred Lucking for the purpose of removing legal barriers to municipal ownership.

Assistant Corporation Counsel Penniman has prepared an ordinance to require the Detroit United Railway to put on additional cars. This ordinance would limit the number of passengers to be carried by each car.

Interurban Railway Construction in Texas

The Commercial Secretaries & Business Men's Association of Texas has recently conducted an investigation of the amount of new electric railway work in progress in Texas. According to the association the electric railways in 1912 constructed and placed in operation in Texas 85 miles of line and graded an additional 143 miles. The new interurban projects now under construction aggregate 445 miles and the interurban electric railways in operation in the State at the present time total 267 miles. One mile of interurban railway was built to every two miles of track laid on steam railroads in Texas in 1912, and the interurban mileage of the state increased 214 per cent compared with an increase of 1 per cent in steam line mileage during the year. Sixty-three miles of interurban railway were constructed during the year in northern Texas, while 22 miles were constructed in the southern part of the State. At the present time 228 miles of additional interurban track are under construction in southern Texas and 217 miles are being built in northern Texas.

The most important lines opened during the year were the Dallas-Waxahachie and the Fort Worth-Cleburne interurbans. Both of these lines traverse portions of the most densely populated and best agricultural sections of the State. The location and length of Texas interurban lines follows: Dallas to Sherman and Denison, 76 miles; Dallas to Fort Worth, 35 miles; Belton to Temple, 13 miles; Bryan to College Station, 6 miles; Galveston to Houston, 50 miles; Forth Worth to Cleburne, 32 miles; Dallas to Waxahachie, 31 miles; San Benito to Rio Grande Valley, 14 miles, and Riviera to Riviera Beach, 10 miles; total, 267 miles.

The accompanying table shows the interurban projects under construction at the present time and those completed in the State during 1912.

Decision Soon in Regard to New York Contracts

Edward E. McCall, the new chairman of the Public Service Commission for the First District of New York, devoted most of the week ended Feb. 15, 1913, his first week in office, to the consideration of the proposed subway contracts with the Interborough Rapid Transit Company and the New York Municipal Railway Corporation. Clarence J. Shearn, attorney for William R. Hearst, who represented John J. Hopper in the latter's application for an injunction to restrain the commission from executing these contracts, applied to Chairman McCall for a reopening of the public hearings on the contracts. This application was made on Feb. 11, 1913, immediately after the Appellate Division had handed down its decision vacating the temporary injunction obtained by Mr. Hopper. Chairman McCall and the other commissioners granted the application and reopened the public hearings on Feb. 13 at the City Hall. The hearing occupied all of the afternoon of Feb. 13 and most of Feb. 14, and during this time the commissioners heard arguments from Mr. Shearn and several other citizens in opposition to the contracts. George McAneny, borough president of Manhattan, and other citizens appeared in favor of the contracts. At 6.30 p. m. on Feb. 14, after all had been given a chance to be heard, Chairman McCall closed the proceeding and took the matter under advisement. It is expected that the commission will reach a decision as to the contracts within the next fortnight.

On Feb. 16, 1913, Public Service Commissioner Maltbie and John Purroy Mitchel sent to Chairman McCall of the Public Service Commission a plan mapped out for new subways to be built by the city and, if necessary, operated by the city, without the aid of private corporations, and to do nearly all that the dual system would accomplish. Their letter to the commission follows in part:

"As you know, we have always believed that an independent, city-built system of subways is preferable to any arrangement with existing companies for construction in partnership. Feeling that you would like to know the alternative to the dual plan which we have to suggest in case the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company declined to accede to a revision of the proposed contracts in a manner fully to protect the city, and believing that an appreciation of the fact that the city has at its command resources that put it in a position of independence will strengthen your hands in dealing with the question which is now before you, we transmit a statement of the alternative which we have to suggest, in the form of a map and a brief outline, descriptive of an independent, city-built system and the method of financing it. The detailed estimates, calculations, and figures which support the statements and conclusions in the outline sent you herewith are in our possession. We need not tell you that we shall be glad at any time to place these in your possession and to discuss with you, in the fullest manner, all phases of the plan which we now present."

President Harmer on Worcester Power Situation

In a press statement issued at Worcester, Mass., on Feb. 14, 1913, J. T. Harmer, president of the New England Railways & Investment Company, discussed the power situation on the Worcester (Mass.) Consolidated Street Railway, and outlined the company's plans for bettering the conditions in this branch of the service. Mr. Harmer stated that contracts have been placed which will increase the capacity of the Millbury steam turbine station from 5000 kw to 10,000 kw, through the addition of a new 5000-kw unit, and that hydroelectric energy from the system of the Connecticut River Transmission Company should be delivered to the Worcester lines in about two months. A tie line carried on steel towers is under construction between Greendale and Millbury, and the supply of energy from the plants of the Connecticut River Transmission Company and its affiliated New England Power Company will be an important factor in the future operation of the Worcester lines. President Harmer said that the proposal to utilize machinery at the old Faraday Street station of the Worcester Electric Light Company was impracticable on account of the lack of suitable converting equipment, and that new apparatus for this purpose could not be obtained sooner than the Millbury station can be enlarged. New substations are being built at Greendale and Millbury, and within the last two years over $400,000 has been expended on the Millbury steam plant, and in addition to the order duplicating the present turbine equipment contracts for more power to the amount of $125,000 have been signed.

Progress on the Salt Lake & Utah Railroad

Walter C. Orem, president and general manager of the Salt Lake & Utah Railroad, New House Building, Salt Lake City, Utah, has made the following statement in regard to the progress on the construction of the company's proposed road between Salt Lake City and Payson, via Provo:

"The company has made splendid headway in acquiring rights-of-way for the line, especially in Utah County. Rails and ties and other equipment are being accumulated along the line, especially at American Fork, Lehi and Provo, and there are at least 15 miles of rails and ties on the scene, with more being received daily. Orders have been placed by the company for almost all the supplies which will be needed for the road, and what remains to be secured will be purchased in the very near future.

"Contracts for grading the road will be let during the coming month, and by April 1, 1913, the company will have upward of 500 teams at work on the grade. From that hour on the line will be pushed to completion as fast as men and money can do the work. Barring unforeseen delays, the company will have the line in operating condition between Salt Lake City and Provo by November, 1913.

"The line will be exceptionally well located, the heaviest grade being six-tenths of 1 per cent and the greatest curve 8 deg."

Governor Foss on the Need for a Utilities Commission

Governor Eugene N. Foss of Massachusetts reiterated the need for the creation of a public utilities commission in Massachusetts in an interview with him which appeared recently in the Boston *Transcript*. The Governor was quoted in part as follows:

"We must have a public utilities board. We need uniformity, machinery, mandatory powers, adjudication and written decisions in the case of all our quasi public service corporations. The same great principle underlies them all. We want to reduce the number of our State commissions by consolidating several of them. We are away behind the times. Thirty out of forty-eight states now have public utilities boards. We have not got the proper machinery, inspectors, accountants, auditors, etc. Therefore our commissions are overworked—that is to say, the men who compose them have to spend their time in detail which should be delegated to subordinates, so that the commissioners themselves could devote their time and energy to passing upon the important questions that come before them. I would have the public utility commission take in the Railroad Commission and the Gas and Electric Light Commission. I would place in its charge the supervision of telephones and telegraphs which the highway commission has and leave to that commission those other duties which it now has but which never should have been imposed on it."

"Seven Sisters" Bills Signed by Governor Wilson

The anti-trust bills introduced in the Legislature of New Jersey which have come to be known as the "seven sisters" were passed by the House on Feb. 19. They were immediately sent to the Senate, which approved them, and were then placed before the Governor, who signed them. All the bills go into effect at once with the exception of one, the main bill defining trusts and prohibiting agreements and acts designed directly or indirectly to restrain trade and making officers and directors of corporations criminally responsible for violations of the act. This measure goes into effect on July 4. The Governor is reported to have said:

"The passage of these measures about completes my program. Of course, there are other worthy bills and I hope that they will be successful, but I was particularly interested in these measures."

Following the introduction of the "seven sisters" into the Legislature Governor Wilson gave out a statement with reference to them in which he said: "They are simply intended to apply in a business-like way what the whole country is agreed upon." The bills make many things prison offenses and it is generally regarded that they greatly restrict trade and the conduct of business affairs and that many corporations with New Jersey charters will be compelled to reincorporate elsewhere in order to carry on their work. Already the American Railways Company, as noted in the ELECTRIC RAILWAY JOURNAL, has taken out a charter in Delaware for the avowed purpose of surrendering its New Jersey charter and bringing its business under the laws of Delaware, as under the New Jersey laws the company, which operates electric railways in various cities, is under the necessity of advancing money to them from time to time to finance their needs, and feels that it cannot do business under the laws just enacted.

Extension of Geary Street Municipal Railway.—The construction of the extension of the Geary Street Municipal Railway, San Francisco, Cal., in Market Street, from Kearny to Sansome Street, where connection will be made with the outer tracks running to the ferry landing, has been ordered by resolution of the Board of Supervisors. The clerk of the board was directed to advertise for bids for the purchase of $120,000 of Market Street Railway bonds on March 17, 1913, at 3 p. m. The funds derived from the sale of the bonds of the special issue will be used to defray the cost of extending the Geary Street line on Market Street.

Veto of Pittsburgh Subway Ordinance Sustained.—The City Council of Pittsburgh, Pa., has sustained the veto by Mayor Magee of the ordinance to grant the Pittsburgh Subway Company a franchise to operate a subway system in that city. The Mayor in his veto declared that the control proposed to be vested with the board of supervision was insufficient. He also took exception to the fact that the subway grantee was to receive power to re-locate or alter work of other companies or individuals in Pittsburgh necessary to the construction of the subway. Prior to action being taken on the grant the Pittsburgh Subway Company divulged to members of the Council its financial ability to do the work provided for in the ordinance. Being asked subsequently to make its representation public, it issued a statement in regard to the backers of the company. According to this statement John B. Carter, 42 Broadway, New York, N. Y., was one of the principals, and a group of capitalists represented by George B. Caldwell, vice-president of the Continental & Commercial Trust & Savings Bank, Chicago, Ill., had agreed to finance the undertaking. A. E. Anderson, of the Pittsburgh District Railroad, has intimated that the Pittsburgh District Railroad will probably renew its efforts to secure a franchise for an underground line from the Council.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

A bill has been introduced into the Legislature which stipulates that all interurban railways and railroads shall provide separate compartments for negro passengers. A bill has been introduced to provide for the installation of toilets on all cars intended for use on the interurban electric railways of Illinois.

OHIO

Mayor Hunt of Cincinnati has prepared a bill for introduction which provides that municipalities may acquire street railway property by condemnation or otherwise, and that bonds may be issued in excess of the limitations made by the Longworth law. Sufficient funds may be taken from the earnings of the property to provide for the interest on the bonds and the sinking fund.

A bill has been introduced in the House giving the electors of Cincinnati the right to determine by ballot whether the city shall issue bonds to build a high-speed electric railway loop, such as has been heretofore mentioned in the ELECTRIC RAILWAY JOURNAL. Mayor Hunt believes that these bills will enable the city to deal with the local street railway upon more favorable terms than would otherwise be possible. He states, however, that a bill should be passed to give the electors authority to decide by vote whether bonds shall be issued to provide funds to purchase the property of the Cincinnati Traction Company, and that another bill should be passed to give cities power to agree with utility companies on the surrender of their franchises.

Mayor Newton D. Baker of Cleveland has sent a similar bill to the Cleveland delegation in the Legislature. It exempts from a city's net debt bonds voted by the Council for the purchase of a public utility, provided that the utility company has sufficient revenue to meet interest and operation charges and provide a sinking fund.

Representative Bigelow has agreed to a substitute for his bill intended to revoke all franchises granted for a longer term than twenty-five years. The substitute would revoke all franchises granted under the Rogers law and continue the operation of the public service company as a tenant at will. A certain rental to be agreed upon would then be paid the city and should the city buy the property these annual payments would be taken into consideration. The city would, under this bill, have the right to control the service, and any disagreement would be referred to the Public Service Commission. Should the city determine to purchase the property, it is provided that bonds may be issued beyond the limitations of the Longworth law, and all money actually put into the property by the company or its predecessors would be returned, with the exception of taxes and license fees.

Representative Mills of Cuyahoga County has introduced a bill that will allow cities to pledge their credit in the issue of bonds beyond the limitation of the Longworth act for the purpose of building or acquiring street railway property. The bonds shall be in small denominations and they may be sold directly to the purchasers at par and interest.

Representative Capelle of Hamilton County has introduced a bill which, if made a law, will render all franchises granted to public service corporations indeterminate. Representative Duffey of Lucas County has introduced a bill to require interurban railways to pay a share of the cost of eliminating grade crossings in cities. A bill doing away with the necessity of securing consents of owners of abutting property on streets where car lines are to be built has been introduced in the House by Representative Bigelow.

PENNSYLVANIA

A public hearing on the three public utilities commission measures now in the House will be given by the judiciary general committee in the hall of the House on the afternoon of Feb. 26. The three bills, one of which has the indorsement of the legislative committee of fifteen created by the republican state convention, another emanating from the democratic party and a third being known as the state administration measure, all provide for more effective regulation by the Commonwealth of the various public service corporations operating therein, and differ only in detail. Supplementary to the republican state convention bill is a bill to regulate the issuance of stocks and bonds, known as the "blue sky law." It is believed that a composite bill will pass both branches of the General Assembly and receive the signature of Governor Tener.

Introduction of new bills into the General Assembly shows little sign of abatement, the total number before the joint body being more than 1000. Among the bills offered in the Senate on Feb. 17 was one to extend for a period of five years the time limit for beginning construction or actual operation of railroads or railways.

WISCONSIN

A number of measures affecting electric railways have been introduced in the Wisconsin Legislature recently. In the Assembly, the following bills were received: To prevent the overcrowding of street cars and to furnish better service to patrons thereof; to prohibit public utilities from increasing the rates specified in the franchises or ordinances granted to them; to give public utilities power to make complaints affecting their own product or service to the railroad commission, the municipality in which the utility operates to be notified of the hearing; to give municipalities the power to acquire public utility properties.

An important bill to restrict the jurisdiction of the Railroad Commission has also been introduced, providing that the commission shall not have power to supervise or regulate the rates or service of street railways in cities of the first, second or third class, but vesting such power in the Common Council and giving it all the powers of the Railroad Commission to hear and investigate such matters and to fix the rates.

In the Senate a bill has been introduced to give persons dissatisfied with rulings of the Railroad Commission the right to appeal from the decisions to the Circuit Court of Dane County, of which Madison is the seat. The burden of proof is placed upon the plaintiff. Another bill extends the right of eminent domain held by railroads to street and electric railways, except in regard to parks and public highways in cities and villages, unless privileges have been granted by franchise. Electric and street railways are also ordered to maintain fences and cattle guards as required of railroads.

PROGRAMS OF ASSOCIATION MEETINGS

National Fire Protection Association

The electrical committee of the National Fire Protection Association will meet in New York on March 26 and 27. Under date of Feb. 15, 1913, the secretary of the electrical committee of the association has issued a bulletin which contains the committee reports and suggestions for changes in the national electrical code which will be considered at the meeting of the electrical committee at the meeting in March in the rooms of the New York Board of Fire Underwriters.

New England Street Railway Club

The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, Mass., on the evening of Feb. 26, 1913. Dinner will be served at 6.30 p. m. and the business meeting will be convened at 8 p. m. The speaker of the evening will be P. F. Sullivan, president of the Bay State Street Railway, Boston, Mass., who will address the members of the club on the subject, "Scientific Management: Efficiency." The special entertainment provided at the last meeting of the club proved so popular that a similar program has been arranged for the meeting on Feb. 26. Attention is called particularly to the fact that the meeting is to be held on Wednesday, Feb. 26, one day earlier than the regular meeting night of the club.

Financial and Corporate

Stock and Money Markets

February 18, 1913.

Following the opening of the market to-day in New York there was a temporary improvement, but the decline in prices was resumed before the day was over and many new low figures were reached. The decline is ascribed to the fact that no relief seems likely to be found from the combination of circumstances which has long depressed Wall Street. Quotations in the money market to-day were: Call, 3½@4 per cent, with the last loan at 3¾ per cent; sixty days, 4½@4¾ per cent.

The Philadelphia market to-day was broad but inactive except for a few issues. The demand for bonds continued good.

The Chicago market to-day was narrow and inactive. Most of the bond transactions were in the local surface railway and elevated railroad issues.

In the Boston market there was very little trading in the railroad issues to-day. The market for bonds was dull and without feature.

In Baltimore the volume of trading was light with very few sales of railway issues. The bond market continued active, the sales totaling $79,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 11	Feb. 18
American Brake Shoe & Foundry (common)	95	92½
American Brake Shoe & Foundry (preferred)	135	133
American Cities Company (common)	47½	47½
American Cities Company (preferred)	76½	75⅛
American Light & Traction Company (common)	400	390
American Light & Traction Company (preferred)	108½	108
American Railways Company	40⅜	40⅜
Aurora, Elgin & Chicago Railroad (common)	43½	43
Aurora, Elgin & Chicago Railroad (preferred)	87	87
Boston Elevated Railway	111	109¾
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	65	65
Boston & Worcester Electric Companies (common)	7	7
Boston & Worcester Electric Companies (preferred)	44	43
Brooklyn Rapid Transit Company	89⅝	88½
Capital Traction Company, Washington	123	122¾
Chicago City Railways	150	150
Chicago Elevated Railways (common)	a35	35
Chicago Elevated Railways (preferred)	91	91
Chicago Railways, ptcptg., ctf. 1	93	90
Chicago Railways, ptcptg., ctf. 2	25	24½
Chicago Railways, ptcptg., ctf. 3	7	7
Chicago Railways, ptcptg., ctf. 4	3	3½
Cincinnati Street Railway	a119	119
Cleveland Southwestern & Columbus Ry. (common)	a6	6
Cleveland Southwestern & Columbus Ry. (preferred)	a30	30
Cleveland Railway	104½	104½
Columbus Railway & Light Company	19	19
Columbus Railway (common)	69	69
Columbus Railway (preferred)	a105	*105
Denver & Northwestern Railway	a117	a117
Detroit United Railway	a80	76
General Electric Company	140¼	139
Georgia Railway & Electric Company (common)	123	123
Georgia Railway & Electric Company (preferred)	82½	83
Interborough Metropolitan Company (common)	18½	17
Interborough Metropolitan Company (preferred)	62½	59½
International Traction Company (common)	a42	42
International Traction Company (preferred)	a95	95
Kansas City Railway & Light Company (common)	a20	20
Kansas City Railway & Light Company (preferred)	a41	41
Lake Shore Electric Railway (common)	6½	6½
Lake Shore Electric Railway (1st preferred)	a91	a91
Lake Shore Electric Railway (2d preferred)	a25½	a25½
Manhattan Railway	132⅛	132
Massachusetts Electric Companies (common)	17½	16½
Massachusetts Electric Companies (preferred)	77⅜	77
Milwaukee Electric Railway & Light Co. (preferred)	a102	102
Norfolk Railway & Light Company	26	26
North American Company	79⅝	79⅛
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	49	48
Philadelphia Company, Pittsburgh (preferred)	41½	41
Philadelphia Rapid Transit Company	27½	27½
Portland Railway, Light & Power Company	67	67
Public Service Corporation	116	116
Third Avenue Railway, New York	37	35
Toledo Railways & Light Company	a6	6
Twin City Rapid Transit Co., Minneapolis (common)	105½	104½
Union Traction Company of Indiana (common)	4½	*4½
Union Traction Company of Indiana (1st preferred)	81	*81
Union Traction Company of Indiana (2d preferred)	34	*34
United Rys. & Electric Company (Baltimore)	24	23¾
United Rys. Inv. Company (common)	27⅞	27
United Rys. Inv. Company (preferred)	54⅞	53
Virginia Railway & Power Company (common)	57	56½
Virginia Railway & Power Company (preferred)	93¾	93½
Washington Ry. & Electric Company (common)	86	84
Washington Ry. & Electric Company (preferred)	90	88
West End Street Railway, Boston (common)	81	81
West End Street Railway, Boston (preferred)	98	97
Westinghouse Elec. & Mfg. Company	71⅜	69¾
Westinghouse Elec. & Mfg. Company (1st preferred)	116	117

*Last sale. a Asked.

ANNUAL REPORTS

Lake Shore Electric Railway

The following is a comparative statement of the results of operation of the Lake Shore Electric Railway system (comprising the Lake Shore Electric Railway, the Lorain Street Railroad and the Sandusky, Fremont & Southern Railway) for the years 1912 and 1911:

	1912	1911
Gross income	$1,326,883	$1,275,476
Operating and taxes	754,821	683,028
Net	$572,062	$592,448
Interest	419,450	416,025
Surplus	$152,612	$176,423
Dividend, first preferred	60,000	60,000
Net surplus	$92,612	$116,423

E. W. Moore, the president, says in part:

"New 0000 grooved trolley wire was erected between the Toledo city limits and Norwalk, and Ceylon Junction and Lorain, together with new hangers and clips. This change was accomplished without expense to the company other than the cost of labor, on account of the low price at which new wire was purchased and the high price at which the old scrap trolley wire was sold.

"A new siding at Clyde known as Elmore Siding, a new siding between Lorain and Vermilion known as Erie Siding, a connection with the Wheeling & Lake Erie Railroad at Huron, and a siding between Sandusky and Slate Cut for commercial use, were installed. There was 4200 ft. of new track built through the village of Genoa (the entire length of the corporation) in advance of paving. This track is unusually well built, 100 lb. 6-in. T-rail, Carnegie and International steel ties used, together with concrete foundation extending the depth of 6 in. below the ties. There was 2500 ft. of track on First Street, Sandusky, relaid with 75-lb. T-rail with continuous splices. There were 35,250 cedar and oak ties, together with fourteen complete sets of switch ties, placed under the track. Approximately 6 miles of track was ballasted with cinders and quarry screenings. In February a contract was placed with the King Bridge Company for the erection of eight steel bridges on this property, four single track bridges on the Toledo Division to replace wooden structures, and four double-track bridges on the Cleveland Division to replace four single-track bridges which are too light for the traffic passing over them. The bridge company, on account of its inability to get steel, was able to complete and erect only one bridge, that carrying our tracks over the Wheeling & Lake Erie Railroad and the Lake Shore & Michigan Southern Railway near Bellevue. The other bridges are under construction and will be erected early in the coming year. The masonry work for the new double-track bridges on the Cleveland Division is completed and ready for the steel. These foundations are built of concrete reinforced with steel bars and old rails. Seven small openings on the Toledo Division between the Toledo city limits and Monroeville have been replaced with concrete culverts.

"A 100-kw motor-driven exciter unit was installed in the Fremont power house. Three 750-kw oil-insulated, water-cooled station transformers, together with necessary switchboard equipment and cables, were installed in Beach Park power station; also one Tirrill regulator. There was installed at Woodville one 75-kw transformer for use in furnishing light and power to the village. There was also installed at Vermilion one 75-kw transformer for the furnishing of light and power to the village of Vermilion. The 1000-kw, 16,500-volt generator at Beach Park was damaged by lightning during the summer to such an extent that it had to be rewound, and in rewinding the generating voltage was reduced to the same voltage as all the other machines in that station.

"During the year a contract was made with the Sandusky River Power Company for the purchase of its entire output. This company is installing near the Fremont plant a hydroelectric plant of 4950-kw capacity. It is anticipated that we shall receive power from this plant about March 1, 1913.

"One pair of Baldwin trucks was purchased. Electric heaters were installed in the vestibule of all cars used in limited service. M. C. B. couplers and anti-climbers were installed on two cars.

"In the shops at Sandusky there were installed one electric welding machine, one lathe, one emery grinder, one bolt cutter and one triple valve grinder; also four air hoists for use in handling cars.

"On Aug. 2, 1912, the company's franchise in Clyde, Ohio, was renewed for a period of twenty-five years.

"The double track on Broadway, Lorain, was rebuilt and paved in advance of new street paving. The suit brought by the city of Lorain some years ago attacking the rights of this company in Twenty-eighth Street and Grove Avenue, covering a distance of approximately 1 mile along the plant of the National Tube Company, was decided by the court in favor of the company, thus establishing the ownership of private rights of way claimed by this company in these two streets."

Washington Railway & Electric Company

The Washington Railway & Electric Company, Washington, D. C., reports earnings as follows for the year ended Dec. 31, 1912:

Gross earnings from operation	$4,618,328
Miscellaneous income	43,233
Gross income	$4,661,561
Operating expenses, taxes, including taxes	2,528,224
Gross income, less operating expenses and taxes	$2,133,337
Fixed charges	1,107,607
Net income	$1,025,730

After providing for fixed charges, the net income was applied as follows:

Net income		$1,025,730
Add profit on investments		1,207
Total net		$1,026,937
Payment of 5 per cent dividend on preferred stock	$425,000	
Payment of 4 per cent dividend on common stock	260,000	
		685,000
Balance		$341,937
Distribution to conductors and motormen under profit-sharing plan	$19,123	
Depreciation in equipment—railways	65,574	
Removal of abandoned tracks	1,046	
Charged off, account Glen Echo Park	1,000	
Fire loss, Thirteenth and D Streets, carhouse	22,514	
Sinking fund requirements—Potomac Electric Power Company	84,700	
Loss due to abandonment of street-lighting equipment —Potomac Electric Power Company	16,841	
Loss on other equipment sold or dismantled during the year—Potomac Electric Power Company	2,327	
		213,125
Credited to profit and loss		$128,812

After closing the accounts for the year, the profit and loss surplus of the Washington Railway & Electric Company on Jan. 1, 1913, is $1,032,516.05.

Lehigh Valley Transit Company

A comparative statement of earnings of the Lehigh Valley Transit Company, Allentown, Pa., for the fiscal years ended Nov. 30, 1912, and Nov. 30, 1911, follows:

	1912	1911
Passenger receipts	$1,242,007	$1.141.138
Operating expenses	650,079	592,458
Net earnings from railway operation	$591,928	$548.680
Miscellaneous and sale of power	269,713	190,343
Net income	$861.641	$739,023
Interest, rentals, taxes, etc	497,844	453,645
Net	$363,797	$285,378
Miscellaneous deductions	3,533	939
Surplus	$360,264	$284,439
Other income	14,178	10,237
Total surplus	*$374,442	$294.676

*From this surplus there should be deducted dividends of $99,566. Other adjustments and deductions, including depreciation, leave the final surplus at this date at $213,146.

R. P. Stevens, president and general manager of the company, says in part:

"Your company owns or controls 158 miles of railway, extending from Allentown to Philadelphia (Chestnut Hill), Norristown, Macungie, Slatington, Egypt, Siegfried, Nazareth, the Bethlehems and Hellertown.

"The rolling stock consists of forty-one open cars, 108 closed cars and thirty-six miscellaneous cars, making 185 cars in all.

"The power house equipment consists of one main station at Allentown and ten well-equipped substations operated in connection with the main power house to provide for a proper and economical distribution of power. The main power house has a maximum capacity of approximately 23,600 hp. It is equipped with modern steam turbines and the latest and most efficient auxiliary apparatus.

"The generating cost during the past year has been materially reduced, and although the total kilowatt output has increased, the total cost of production was less than in the preceding year. To the best of our knowledge the plant is producing current as cheaply as it is produced anywhere in this country under similar conditions, and it is being maintained in a state of highest efficiency.

"Numerous improvements have been made in your property during the past year, the benefits from which should be apparent in the coming year. Convenient combination passenger-freight and express stations have been erected at every important town on the Philadelphia Division and local agents provided at each station. This arrangement, in addition to being a great convenience to the public, gives your company a local representative in each of these towns. Many cut-offs have been completed, putting more of the track on private right-of-way, with good ballast and drainage, and permitting the shortening of the schedule time. Four pay-within city cars, six modern interurban cars and three repair cars have been added to the equipment the past year.

"In January, 1912, the Montgomery Traction Company was merged into your company, and the revision of the Norristown Division was completed on Dec. 1.

"In April, 1912, your company bought one-half of the capital stock of the Norristown Transit Company, which gives your line a permanent entrance into Norristown and a connection with the Philadelphia & Western Railway, thus giving your cars, by virtue of a traffic arrangement, the use of the Philadelphia & Western tracks between Norristown and Philadelphia, and an entrance into the subway-elevated terminal station at Sixty-ninth and Market Streets, Philadelphia. Through service into Philadelphia was inaugurated on Dec. 12, and the increased business obtained by this new service has been very gratifying. The line from Allentown to Sixty-ninth Street, Philadelphia, via the Philadelphia & Western Railway, is almost 5 miles shorter than the steam road to its terminal, the average time only five minutes more, and the round trip fare $1 less, the fare averaking 1¾ cents per mile.

"The new high-speed limited cars are of the latest and most improved interurban type, are 56 ft. in length and are of 500 hp. They are equipped with smoking, toilet and baggage compartments. The conveniences equal those of the modern Pullman.

"The freight service operating from Philadelphia, via Chestnut Hill to all Lehigh Valley Transit Company points has proved a valuable factor in our earning capacity. The gross receipts for the year amounted to more than $40,000, with a net profit of about $14,000. The business is steadily growing in volume, the receipts this year having increased 44 per cent over the year previous, and with the Lansdale-Norristown territory added we have a very promising outlook.

"The Adams Express Company is now operating over the lines of the Lehigh Valley Transit Company and the Philadelphia & Western Railway. Every indication points to a large business in this territory, which has heretofore been monopolized by the United States Express Company, and we can look for substantial earnings from this source.

"The Allentown Bridge Company, all the stock of which is owned by your company, is erecting a toll bridge wholly within the city of Allentown, directly connecting two wards, one a thickly settled section and the other a developing part of the city. It is anticipated that the tolls alone will pay the interest on the cost of the bridge. Your company has the exclusive and perpetual right to operate its cars over the bridge. This will be the largest reinforced concrete bridge of its kind in this country, being 2,600 ft. long, and 150 ft. high.

"Gross passenger receipts for the past fiscal year increased $100,869, or 8.8 per cent. Car mileage increased 136,299, or 3.6 per cent. Operating expenses for the fiscal year 1912 were 52 per cent of the gross receipts, the same as the previous year. Total operating expenses per car mile for 1912 were 16.36 cents. Net operating earnings increased $43,247, or 8 per cent. The surplus revenue from all sources before discount, dividend or depreciation deductions was $374,442, or an increase of 27 per cent. From this revenue surplus, bond discount of $12,677, a depreciation reserve of $117,360, a 2 per cent dividend of $99,566 on the preferred stock and improvement charges of $6,587 were deducted, leaving a final surplus of $138,250 for the year."

Application of United Railroads Denied

The Railroad Commission of California has denied the application of the United Railroads of San Francisco to issue $2,350,000 of five-year notes and of the Market Street Railway to issue $2,150,000 of 5 per cent bonds as collateral for these notes. The commission said in part:

"Upon the failure of the applicant to produce the books as requested, it was announced that no order would be made granting this application, and in view of the fact that these books have not been produced, although ample time has been given, it is the conclusion of this commission that this application should be denied and that it be understood that no favorable action will be taken by this commission on any application presented by the United Railroads or its subsidiaries until the information demanded by the commission has been furnished.

"The applicant is burdened with approximately $40,000,000 of outstanding bonds, and it is conceded that in 1927, when the issue of United Railroads 4 per cent bonds becomes due, there will be approximately $20,000,000 face value of these bonds which the company will be unable to pay at that time, and in view of the fact that many of the important franchises of applicant will expire within a few years after 1929, it cannot be said that the financial condition of applicant is sound, unless it be shown that all of its outstanding obligations not only can but will be paid at maturity, or at least at the time when many important franchises of applicant expire. No such showing has been made to the commission, and as the bondholders must rely upon the sinking fund provided for in the trust deed under which the United Railroads' 4 per cent bonds were issued, and whatever physical value of property may exist at the time of the maturity of these bonds, in the judgment of this commission, these bonds at this time are not certain of payment in full.

"In order to safeguard the payment of the obligations of applicant when they fall due, a large part of the surplus income of applicant should be diverted to these securities and it appears to this commission as proper that the payment of dividends on the large amount of capital stock outstanding should be deferred to the security of these bonds."

Reference to the application of the company to the commission was made in the Electric Railway Journal of Jan. 4, 1913, page 45.

American Railways, Philadelphia, Pa.—The American Railways has taken out a charter in Delaware with a capital of $25,000,000 for the avowed purpose of surrendering its New Jersey charter and bringing its business under the laws of Delaware if the laws governing corporations which are now before the Legislature of New Jersey for enactment are finally passed. The American Railways was organized under the laws of New Jersey in 1899 with an authorized capital stock of $25,000,000, of which about $8,000,000 is outstanding. Jeremiah J. Sullivan, president of the company, is reported to have made the following statement: "Under the new legislation it is made illegal for a holding corporation to loan money to a corporation outside the State or to buy additional properties. The American Railways operates numerous electric railways in various States, and it is necessary to advance money to them from time to time and to finance their needs. We are constantly buying new properties. I do not think we could do business under the proposed laws. I think there is little doubt that many other corporations will take similar action."

Boston (Mass.) Elevated Railway.—The Massachusetts Railroad Commission has approved an issue of $600,000 twenty-year 5 per cent bonds by the West End Street Railway to bear date of Nov. 1, 1912, proceeds to reimburse the Boston Elevated Railway for improvement to property made in accordance with the terms of the lease. The commission has also approved an issue of 4400 shares of additional common stock by the West End Street Railway to be sold at public auction, proceeds to reimburse the Boston Elevated Railway for improvements. In addition the commission has approved the application of $28,727, realized as part of proceeds of bonds issued under order of the board on April 4, 1912, toward the cost of permanent additions and improvements to property.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—MacKenzie & Mann are reported to have purchased $400,000 out of a total of $787,500 of outstanding first mortgage 5 per cent bonds of the Chatham, Wallaceburg & Lake Erie Railway.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—E. W. Moore, president of the Cleveland, Painesville & Eastern Railroad, acting in the interest of that company, has acquired the property of the United Light & Power Company, Geneva, Ohio, furnishing current in cities and rural sections of Lake and Ashtabula Counties. The Cleveland, Painesville & Eastern Railroad will do the electric light and power business in all territory on its line between Cleveland and Ashtabula, except in Painesville, where there is a municipal plant.

Columbus Railway & Light Company, Columbus, Ohio.—Through an application filed with the Ohio Public Service Commission and then withdrawn it was learned that the reorganization committee of the Columbus Railway & Light Company has planned to incorporate an entirely new company, to be known as the Columbus Railway, Light & Power Company, to take over all the companies now operated under lease. The application filed was for permission to issue stock to be exchanged for the stock of the companies as now constituted. It was found necessary, however, for the present companies to secure permission from the Public Service Commission to sell their holdings, and it was decided to have the commission consider all the applications at the same time. This caused the temporary withdrawal of the original application.

Empire United Railways, Inc., Syracuse, N. Y.—The Public Service Commission of the Second District of New York has approved the application of the Rochester, Syracuse & Eastern Railroad, the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Electric Railroad for permission to consolidate as the Empire United Railways, Inc., in accordance with the terms published in the Electric Railway Journal of Feb. 1, 1913, page 228. The Empire United Railways, Inc., was incorporated under the laws of New York with a capital stock of $11,600,000 by Clifford D. Beebe, Hendrick S. Holden, Edward Joy and others, on Feb. 18, 1913.

Halifax (N. S.) Electric Tramway.—At the adjourned meeting of the Halifax Electric Tramway held on Feb. 12, 1913, new directors were elected as follows: J. A. Neville, H. H. Smith, W. M. P. Webster, J. E. Wood and O. E. Smith, Halifax; Sir Frederick Borden, Ottawa; P. J. Mackintosh, E. A. Robert, J. W. McConnell, W. G. Ross and F. H. Wilson, Montreal. The only director re-elected is O. E. Smith. New officers have been elected as follows: E. A. Robert, president; J. W. McConnell, first vice-president; O. E. Smith, second vice-president. The board of directors formerly consisted of nine members, whereas it is now composed of eleven members. The negotiations for the sale of the property to a syndicate which included J. W. McConnell and E. A. Robert was noted in the Electric Railway Journal of Oct. 19, 1912.

Interborough Rapid Transit Company, New York, N. Y.—The stockholders of the Interborough Rapid Transit Company will vote on March 5, 1913, on the plan to authorize a mortgage to the Guaranty Trust Company, New York, N. Y., as trustee, to secure an issue of 5 per cent fifty-three-year gold bonds for an aggregate amount of $300,000,000, to provide for expenditure under the dual rapid transit arrangement with the city and for refunding.

La Crosse (Wis.) City Railway.—The property of the La Crosse City Railway has been taken over by the Wisconsin Railway, Light & Power Company, the incorporation of which was noted in the Electric Railway Journal on Feb. 1, 1913, page 230. Frank B. Desmond, Milwaukee, has been elected president of the La Crosse City Railway to succeed B. E. Edwards and A. G. Casper, Milwaukee, has been elected secretary of the company to succeed P. J. Riegger. Frank P. Hixon and R. C. Whelpley have resigned as vice-president and treasurer respectively of the company, but no successors to them have been elected as yet. It is announced that Peter Valier will remain with the La Crosse City Railway as general manager. The Wisconsin Railway, Light & Power Company has filed for record in La Crosse County a mortgage for $10,000,000 in favor of the First Savings & Trust Company, Chicago, Ill., given to secure an issue of twenty-year 5 per cent bonds.

Los Angeles (Cal.) Railway Corporation.—Harris, Forbes & Company and E. H. Rollins & Sons, New York, N. Y., are offering for subscription to yield more than 5.20 per cent the unsold portion of their block of $3,000,000 of first and refunding 5 per cent sinking fund bonds of the Los Angeles Railway Corporation dated 1910 and due Dec. 1, 1940. These bonds are part of a $20,000,000 issue covering all the property now owned or hereafter acquired by the company.

New York State Railways, Rochester, N. Y.—The New York State Railways has announced that the holders of the temporary fifty-year first consolidated mortgage 4½ per cent gold bonds, series "A," may exchange their temporary bonds for the definitive engraved bonds at the office of the Bankers Trust Company, New York, N. Y.

Penn Central Light & Power Company, Altoona, Pa.—Brown Brothers & Company and Robert Glendenning & Company, Philadelphia, Pa., are offering at par and interest the small unsold part of $1,300,000 of first and consolidated mortgage 6 per cent gold bonds of the Penn Central Light & Power Company of 1913, due February, 1963, but redeemable at 105 and interest on and after Feb. 1, 1918. The interest is payable February and August at the office of the trustees, the Philadelphia Trust, Safe Deposit & Insurance Company, Philadelphia, Pa. The Penn Central Light & Power Company is a Pennsylvania corporation and a consolidation by merger of the Edison Electric Illuminating Company and Citizens' Electric Light, Heat & Power Company, both of Altoona; the Huntington Gas Company and the Wilson Electric Company, Huntington, Pa.; the Lewistown Light, Heat & Power Company and the Mifflin County Gas & Electric Company, Lewistown, and the Hollidaysburg Electric Light & Power Company, Hollidaysburg, Pa. All of the stocks and bonds of the Pennsylvania Hydroelectric Company and all of the stock and some of the bonds of the Lewistown & Reedsville Electric Railway are subject to the lien of the mortgages of the Penn Central Light & Power Company, and these companies are operated in connection with the Penn Central Light & Power Company.

Toledo Traction, Light & Power Company, Toledo, Ohio.—Harris Forbes & Company, New York, N. Y., are offering for subscription $5,822,000 of first lien five-year 6 per cent bonds of the Toledo Traction, Light & Power Company, the successor to the Toledo Railways & Light Company, dated Feb. 1, 1913, and due Feb. 1, 1918. The interest is payable on Feb. 1 and Aug. 1 at the office of the New York Trust Company, New York, trustee. The authorized capital stock of the company is $17,200,000, of which $9,200,000 is common stock and $8,000,000 is 6 per cent preferred stock cumulative after Jan. 1, 1914. Of these amounts $8,881,500 of common stock is to be issued and $7,461,225 of preferred stock is to be issued. The authorized bonded debt will consist of $7,500,000 of first lien 6 per cent five-year bonds and $1,200,000 of second lien 6 per cent five-year bonds. The following statement of earnings of the Toledo Railways & Light Company and allied interurban electric railways for the year ended Dec. 31, 1912, has been made public: Gross earnings, $3,979,275; operating expenses and taxes, $2,789,427; net earnings, $1,189,848; interest on gas and heating and interurban railway bonds not owned by traction company, $209,550; surplus, $980,297; annual interest on first lien 6 per cent bonds, $360,000; balance, $620,297.

Underground Electric Railways, London, Eng.—James Speyer, William Barclay Parsons, L. F. Loree and J. G. Metcalfe, New York, N. Y., have resigned as directors of the Underground Electric Railways, it having been decided best to turn the entire management of the company over to the London directors.

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.—The Washington, Baltimore & Annapolis Electric Railway has taken over the stock of the Annapolis Gas & Electric Company, which has been held by the Annapolis Utilities Company, organized by interests closely associated with the electric railway. The Annapolis Gas & Electric Company serves a population of 9000. It has $100,000 capital stock, with $63,000 first mortgage 6 per cent bonds and $110,000 consolidated 5 per cent bonds.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 75 cents, common.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, common.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

Tennessee Railway, Light & Power Company, Nashville, Tenn., quarterly, 1½ per cent, preferred.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE					
1m., Dec., '12	$60,354	*$28,818	$31,516	$17,341	$14,175
1 " " '11	54,383	*24,654	29,729	15,485	14,244
12 " " '12	385,870	*166,834	219,036	101,349	117,687
12 " " '11	331,465	*144,163	187,302	80,157	107,145
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.					
1m., Dec., '12	$95,454	*$57,085	$38,369	$23,963	$14,406
1 " " '11	83,827	*50,234	33,593	21,029	12,564
12 " " '12	1,064,674	*634,616	430,058	266,029	164,029
12 " " '11	943,472	*553,748	389,724	239,713	150,011
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.					
1m., Dec., '12	$650,442	*$382,804	$267,638	$125,426	$142,212
1 " " '11	550,521	*305,157	245,364	121,530	123,834
12 " " '12	6,389,919	*3,718,297	2,671,622	1,502,572	1,169,050
12 " " '11	5,519,640	*3,162,927	2,356,713	1,274,405	1,082,308
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE					
1m., Dec., '12	$175,134	*$102,012	$73,122	$56,510	$16,612
1 " " '11	169,936	*126,626	43,310	49,668	†6,358
6 " " '12	1,168,770	*619,299	549,471	332,901	216,570
6 " " '11	1,120,503	*665,313	455,190	298,779	156,411
EAST ST. LOUIS & SUBURBAN COMPANY					
1m., Dec., '12	$228,206	*$110,839	$117,367	$48,019	$69,348
1 " " '11	202,702	*85,017	117,685	45,617	72,068
12 " " '12	2,452,568	*1,353,568	1,098,883	578,471	520,415
12 " " '11	2,279,147	*1,270,351	1,008,796	547,525	461,271
GRAND RAPIDS (MICH.) RAILWAY					
1m., Dec., '12	$106,978	*$65,608	$41,370	$14,252	$27,118
1 " " '11	108,609	*60,167	48,442	14,556	33,886
12 " " '12	1,233,588	*700,230	533,358	175,225	358,133
12 " " '11	1,169,393	*660,278	509,115	179,388	329,727
JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.					
1m., Jan., '13	$44,709	*$27,935	$16,774	$12,541	$4,233
1 " " '12	38,466	*24,439	14,027	12,923	1,104
12 " " '13	539,781	*319,424	220,357	152,371	67,986
12 " " '12	471,713	*277,817	193,896	153,122	40,774
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE					
1m., Dec., '12	$47,359	*$32,286	$15,073	$14,400	$673
1 " " '11	45,075	*30,413	14,662	14,446	216
6 " " '12	348,252	*200,629	147,623	86,400	61,223
6 " " '11	339,589	*193,746	145,843	86,705	59,138
PHILADELPHIA RAPID TRANSIT COMPANY					
1m., Jan., '13	$2,002,067	$1,228,131	$773,936	$769,000	$4,936
1 " " '12	1,808,472	1,162,811	645,660	740,322	†94,662
7 " " '13	13,928,191	8,314,906	5,613,286	5,329,921	283,365
7 " " '12	13,152,880	8,021,299	5,131,581	5,170,645	†39,065
PORTLAND (MAINE) RAILROAD					
1m., Dec., '12	$76,693	*$60,247	$16,446	$10,253	$6,193
1 " " '11	72,146	*80,143	7,997	9,743	†17,740
6 " " '12	549,915	*352,290	197,625	61,935	135,690
6 " " '11	542,761	*381,361	161,400	57,518	103,882

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*Includes taxes.
†Deficit.

Traffic and Transportation

The Ticket Seller and the Public

A. D. B. Van Zandt, publicity agent of the Detroit (Mich.) United Railway, was the guest of honor at the February banquet of the Detroit Passenger Club, an organization composed of the ticket sellers and passenger agents of the various transportation companies which have offices in Detroit. Mr. Van Zandt spoke on "The Ticket Seller and the Public" and in the course of his remarks said:

"You, the gentlemen who sell the tickets, are well posted in the passenger operations of your own lines and of the other lines. I say of the other lines because you must know them to know that the line you represent is vastly the superior. If you did not know this you would not be where you are. That is a part of the optimism necessary in the business. You, the gentlemen who sell the tickets, are mighty important cogs in the machinery operating the roads to which you belong. A successful year by the railways depends upon you in no small measure and when I say that I do not limit my meaning to success in purely monetary matters. I say you are important cogs in the machinery because you are the cogs that come closest in touch with the moving public. To most of those who ride —and this includes about all the people—you are the connecting cog between them and the men higher up.

"The presidents of your companies, the general superintendents, the chiefs of divisions are all people of mystery to the riding public. How many Detroiters know, for instance, the president of the Michigan Central Railroad or the man who guides the larger affairs of the Pennsylvania System? As your acquaintances grow in number you become the railways you represent and the railways you represent melt into your personality.

"Truly the personal element is extremely strong with the American public and it is growing stronger every year. The personal standing of yourself with the public is indeed well worth cultivating not only for your own good but for the good of the public utility you represent. As I have said, you are the representatives of your companies with whom the public come in contact and as such you have large duties to perform.

"To you a railway ticket is as simple as adding two and two, but despite the immense aggregate of passenger traffic in the United States most people do not know whether to read a ticket from right to left or upside down. They only know that whatever way they do read it is wrong. The average man simply accepts what you give him in faith that in the course of human events he will reach the haven of rest and be welcomed at the other end. The man or woman who buys a ticket from you, having confidence in you and hence in your road, is entitled to the fullest consideration you can give. A long railway journey often causes no little fear and trembling. This going into strange towns and strange depots is not the most peaceful pursuit and the possibility of going wrong is uppermost in the minds of many. The number of those who heave sighs of relief when the journey is done is by no means small and so it becomes your duty to be patient and careful in dealing with all, opening up to them the full fount of information at your command and seeing that none leave your presence in doubt or with any question still unasked.

"All your corporations have within their organizations departments of publicity—headed by men who, through printed word and picture, impress upon the public mind the beauties of a ride upon your own individual line. The roster of employment does not place you within this department of publicity, but you are nevertheless publicists always. You are advertising agents as well as ticket agents. All the work of the publicity department is of little avail without your co-operation. It would fall to the ground without your personality to make the impression deeper. A pamphlet, an illustration, a bit of description will do its part toward building up the business, but a word from you will make the business certain. Therefore I would say do not be content to pass the printed matter over the counter —talk it over."

Hearing on East Boston Tunnel Toll Reduction

The committee on metropolitan affairs of the Massachusetts Legislature gave a hearing on Feb. 7 upon several bills drafted to eliminate the present toll charge of 1 cent per passenger using the East Boston tunnel, one of the rapid transit lines of the Boston Elevated Railway. Chairman Sullivan of the Boston Finance Commission was the chief advocate of the abolition of the toll, which results in each passenger paying a 6-cent fare when using the tunnel. Mr. Sullivan presented a statement from City Auditor Mitchell of Boston, showing that in 1912 the net receipts from tolls were $134,287, which, added to the rental, which is three-eighths of the gross earnings, or $57,000, totals $191,287. The sinking fund and interest charges call for $150,000. With this excess, Mr. Sullivan claimed that the Railroad Commission is obliged by the terms of the tunnel act to reduce the toll if duly petitioned. Representative B. F. Sullivan and Corporation Counsel Corbett, Boston, opposed the reduction, taking the ground that the tolls are needed to liquidate the sinking fund and interest charges. If the tolls were abolished the city would have to make up the deficit of $93,000 per year. Mr. Corbett emphasized the answer of the Massachusetts Supreme Court in 1906 to a legislative inquiry as to the legality of an act proposed to abolish the tunnel tolls. The court emphatically stated that such enactment would be a repudiation of contract between the commonwealth and the city, and that it would be unconstitutional.

Through Service Between Coffeyville and Parsons.—The Union Traction Company of Kansas, Independence, Kan., has established through service between Coffeyville and Parsons. The distance between the two cities is 50 miles.

Skip-Stop Idea Suggested in Los Angeles.—At the suggestion of President Wheeler, the Public Utilities Board of Los Angeles, Cal., has decided to take up with the electric railways which operate in that city the question of having inbound cars on the interurban lines stop at alternate street corners and the outbound cars stop at corners at which the inbound cars do not stop.

Collision Near Dunkirk.—A westbound passenger car of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., collided with an eastbound freight and express car of the company on the evening of Feb. 11, 1913, 1 mile east of Silver Creek, which is near Dunkirk. None of the passengers was seriously injured, but the cars took fire following the accident and are reported to have been destroyed.

Transportation to Destination.—A car belonging to the Louisville (Ky.) Railway was taken from the carhouse of the company at an early hour recently by a man who claimed former residence and employment as a motorman in St. Louis, Mo. Before the night police chief after his arrest the man declared that a transfer which he held took the form of a contract binding the railway to carry him to his destination. A fine of $5 was imposed.

Accident in Canandaigua.—The lives of more than thirty passengers were endangered when a car of the Rochester & Eastern Railway was derailed and overturned in Canandaigua, N. Y., recently. The accident is ascribed unofficially to the breaking of the front axle on the forward truck of the car. The local fire department at Canandaigua had to be called out to extinguish a fire which started in the car following the accident. The damage to the car from the fire was insignificant.

Protection for Conductors in Spokane.—The City Council of Spokane, Wash., has instructed Commissioner Fassett to take up with the Spokane Traction Company the question of better protection for its conductors during the winter months. The commissioner will endeavor to have the company agree to vestibule the rear platform of its cars or permit conductors to stay inside during the cold weather. If a satisfactory arrangement cannot be effected with the company the Council has announced that it will appeal to the Railroad Commission.

Recommendation for Governing Parades.—The Louisville (Ky.) Railway is interested in a recommendation which the Board of Public Safety of that city has made to the heads of the municipal government. This recommendation is that an official route for street parades and similar processions in Louisville be established and that intervals be determined when such pageants shall break to permit electric railway traffic to pass. The company has experienced considerable difficulty at times in keeping to its schedule because of interruptions from this source.

Suit to Extend Transfer Privilege in Chicago.—Very little real progress has been made in the suit to compel the issuance of transfers between the Chicago (Ill.) Railways and the County Traction Company. The validity of the 1910 traction ordinance granted the Chicago Railways has been questioned. Roy O. West, an attorney who was instrumental in drafting the ordinance, has been called as a witness to explain his position. Emil O. Schmidt, president of the County Traction Company, testified that the company could not operate at a profit if it was compelled to issue transfers to the lines of the Chicago Railways.

Supplementary Petition in Louisville Freight Case.—A supplementary petition has been filed by the Board of Trade and other shippers of Louisville, Ky., with the Interstate Commerce Commission, Washington, D. C., in the case of these complainants versus the Indianapolis, Columbus & Southern Traction Company, Seymour, Ind.; the Louisville & Northern Railway & Lighting Company, New Albany, Ind., and other electric railways connecting Louisville, Ky., with Indianapolis, Ind. In this case through freight routes over the electric railways are sought by the shippers and an original complaint and a response have been filed by both parties to the action.

Complaints Before Pennsylvania Commission.—Certain members of the Birdsboro Town Council have complained to the Railroad Commission that the service furnished to Birdsboro by the Reading Transit Company is inadequate owing to the operation of single-truck cars, not equipped with modern safety appliances. The commission has advised the complainants to file a specific grievance, after which a hearing will be scheduled. W. A. Preston, president of Columbia Town Council, has complained to the Railroad Commission that the Conestoga Traction Company is operating one car on its line with only one man in charge. Walter E. Greenwood, of Coatesville, has complained to the commission that the West Chester Street Railway is over-crowding cars between West Chester and Coatesville.

Electric Express Service Inaugurated at Worcester, Mass.—The Worcester (Mass.) Consolidated Street Railway has begun the operation of an electric express business, a new terminal station having been established on Green Street, near the wholesale shipping district. Service is at present rendered in connection with the Boston & Worcester Street Railway and over the lines of the Consolidated property westward through the Southbridge, Fiskdale, Brimfield and Palmer districts. The Boston freight terminal of the Bay State Street Railway, Boston Elevated Railway and Boston & Worcester Street Railway is being used as a part of the general electric express development in central and eastern Massachusetts, and a striking increase of business between Worcester houses and establishments outside the city and hitherto unprovided with the present Worcester connections, has been noted. Following the securing of the necessary local franchises, the service will be extended toward the north and south of Worcester. The establishment of the present service was delayed about two years by agitation against the granting by the Aldermen of Worcester of an unlimited franchise to transport electric express and freight matter, the company being unwilling to undertake the service under a limited permit. The Massachusetts Railroad Commission favored an unlimited franchise, subject to the usual regulative powers of the board, and as finally granted the permit is not limited as to its duration. The Green Street terminal station is a concrete and brick structure 105 ft. long by 35 ft. wide. It has receiving accommodations for seven teams, with three loading doors and two service tracks capable of handling six cars at a time. Provision has also been made for future storage tracks, and a teaming yard of liberal area has been established. Through and local services are being given daily between Worcester and Boston, with local service between Worcester and Springfield. Frank E. Wood is in charge of the Worcester office as general agent.

Personal Mention

Mr. H. C. Allen has been appointed traffic agent of the Northwestern Pennsylvania Railway, Meadville, Pa.

Mr. G. L. Randall has been promoted to the position of assistant purchasing agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

Mr. P. J. Mitten has resigned as master mechanic of the International Railway, Buffalo, N. Y., to become connected with the Philadelphia (Pa.) Rapid Transit Company.

Mr. W. L. McDonald, of the contract department of the Knoxville Railway & Light Company, Knoxville, Tenn., has been promoted to the position of cashier of the company.

Mr. F. F. Wheeler has been elected president of the Board of Public Utilities of Los Angeles, Cal., to succeed Mr. Thomas Foulkes, who continues as a member of the board.

Mr. George Cooper, who has been acting as auditor of the Knoxville Railway & Light Company, Knoxville, Tenn., has been appointed to the position to succeed J. E. Tappan, deceased.

Mr. Edward G. Riggs has been appointed executive assistant to Mr. Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, with offices in New York.

Mr. R. M. Hannaford, assistant chief engineer of the Montreal (Que.) Tramways, is in charge of the engineering and construction department, in consequence of the resignation of Mr. J. D. Evans.

Mr. H. P. Fant, who has been general manager of the St. John's Electric Company, St. Augustine, Fla., has been elected vice-president of the company and has been appointed general superintendent.

Mr. P. C. Kaercher, who has been purchasing agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been promoted to the power sales department as assistant to Mr. T. L. Sturgeon.

Mr. Walter A. Draper, secretary of the Cincinnati (Ohio) Traction Company, has been elected a vice-president of the Ohio Electric Railway, Cincinnati, in addition to the two present vice-presidents, Mr. Dana Stevens and Mr. J. B. Foraker, Jr.

Mr. F. C. Yockey, who has been secretary to Mr. Charles M. Hatch, general manager of the Northwestern Pennsylvania Railway, Meadville, Pa., will act as chief clerk in the traffic department of the company, the traffic agent of which is Mr. H. C. Allen.

Mr. C. O. Bailey, who has been assistant purchasing agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been made purchasing agent, to succeed Mr. P. C. Kaercher, who has been promoted to the power sales department.

Mr. Edmund Arthur Robert, president of the Montreal (Que.) Tramways, has been elected president of the Halifax (N. S.) Electric Tramway, the property of which was taken over recently by a syndicate composed of himself, Mr. J. W. McConnell, Mr. W. G. Ross and others.

Mr. William McClellan, chief engineer of the Public Service Commission, Second District, New York, gave a talk at the Technology Union, Boston, on Feb. 12, before the Electrical Engineering Society of the Massachusetts Institute of Technology, his subject being "Public Service Corporations and the Public."

Mr. W. B. Tuttle, vice-president of the San Antonio (Tex.) Traction Company, controlled by the American Light & Traction Company, has been elected general manager of the San Antonio & Austin Interurban Railroad, organized recently to build an electric railway between San Antonio and Austin, Tex., a distance of 85 miles.

Mr. George W. Dunlap, whose appointment as mechanical engineer of the International Railway, Buffalo, N. Y., was announced in the ELECTRIC RAILWAY JOURNAL of Nov. 30, 1912, will take over the work with that company which was performed previously by Mr. P. J. Mitten, who has resigned as master mechanic of the company to become connected with the Philadelphia (Pa.) Rapid Transit Company.

Mr. W. R. Willcox, who has just retired as chairman of the Public Service Commission of the First District of New York, had a dinner tendered to him at the Hotel Astor, New York, on the evening of Feb. 17, 1913, by the present members of the commission and the past and present members of the staff of the commission. Among those who attended were: Chairman McCall of the commission, Commissioners Maltbie, Eustis and Williams, ex-Commissioners Bassett and McCarroll, Mr. Travis H. Whitney, secretary of the commission; Mr. Alfred Craven, chief engineer of the commission; Mr. James Blaine Walker, assistant secretary of the commission, and Dr. A. F. Weber, statistician of the commission.

H. G. Throop

F. L. Hinman

Mr. F. L. Hinman, who has been promoted to be shop foreman and master mechanic of the Syracuse and Oneida lines of the New York State Railways, has during the past ten years served in various capacities with the Syracuse (N. Y.) Rapid Transit Company and its successor. He began as a shop apprentice in Syracuse, but spent a year with the Auburn & Syracuse Electric Railway in the shop and power house in Auburn. He returned to Syracuse in 1905 and became clerk in the storeroom and two years later was put in charge of stores for the Syracuse Rapid Transit Railway and allied lines. In 1910 he became chief clerk to Mr. W. J. Harvie, the chief engineer, and two years later was appointed general foreman of the mechanical department.

Mr. Dan G. Fisher, who has been connected with the Strickland interests in Texas for some time, has been appointed assistant general manager of the interurban electric railways controlled by the J. F. Strickland Company, which include the Dallas-Sherman, Dallas-Waxahachie and Dallas-Waco lines. Mr. Fisher is well known in Dallas. He entered business in that city in the circulation department of the Dallas *Times-Herald.* Subsequently he entered the service of the Strickland interests and has been employed by them in various capacities. He is an active member of the Dallas Advertising League and was chairman of one of the committees of that association at the time of the recent national convention of advertising men held in Dallas.

Mr. H. G. Throop, who becomes engineer of lines and buildings of the Utica-Syracuse lines of the New York State Railways, was graduated from Cornell in civil engineering in 1905. After short terms of service on the New York State Barge Canal and in railway location for the Cleveland, Cincinnati, Chicago & St. Louis Railway, he joined the staff of Mr. W. J. Harvie on the West Shore electrification, in which he had charge of field work and of the preparation of special reports. In the fall of 1908 he was appointed engineer of construction and records for the Syracuse (N. Y.) Rapid Transit Company and allied lines and assisted in the construction of the Wolf Street shops, extending substations, etc. After the consolidation of the lines as part of the New York State Railways he continued the same line of work under the title of engineer of buildings.

Mr. J. R. Ayers, of the New York State Railways, has been appointed master mechanic of the Utica lines of that company with headquarters in Utica. Mr. Ayers has been connected with the Utica & Mohawk Valley Railway and the Syracuse Rapid Transit Railway much of the time during the last fifteen years. After a brief period of service with the Lamb Manufacturing Company, Chicopee Falls, Mass., and the Lackawanna Railroad he entered the shops at Utica. In 1903 he left the employ of the railroad to take charge of the paint shops of the Utica & Mohawk Valley Railway and five years later became master painter of the Utica & Mohawk Valley Railway and of the Syracuse and Oneida lines. In 1910 the work of the car-cleaning department was added to his duties. Mr. Ayers was made general foreman of the Utica shops and master painter for the three lines last year.

Mr. G. N. Brown, who has been appointed electrical engineer of the Utica-Syracuse lines of the New York State Railways, was lately assistant engineer of the same company. After graduation from Cornell in electrical engineering in 1908 he started railway work as inspector of car equipment with the Utica & Mohawk Valley Railway, having served during previous summers as car inspector at Utica and bond inspector at Syracuse. In the fall of 1908 he was transferred to Syracuse as car inspector on the Oneida Railway, but returned to Utica after a year as assistant to Mr. H. S. Williams, electrical engineer of the Utica & Mohawk Valley Railway. In November, 1910, he become connected with the Boston & Maine Railroad and took part in the Hoosac Tunnel electrification, afterward acting as switchboard operator in the North Adams power plant. In May, 1912, he became assistant engineer of the three lines which now form the Syracuse-Utica division of the New York State Railways.

Mr. J. P. Barnes, who on March 1, 1912, succeeded Mr. W. J. Harvie as chief engineer of the Syracuse (N. Y.) Rapid Transit Railway and allied lines, has resigned to become connected with Allen & Peck, Inc. He will represent that firm as general manager of the Syracuse & Suburban Railway, which operates an 18-mile line with twenty-one cars from Syracuse to Fayetteville and Manlius. Mr. Barnes was graduated from the Massachusetts Institute of Technology in electrical engineering in 1905. He spent two months as meter inspector with the Utica & Mohawk Valley Railway, nine months as designer with Pass & Seymour, Syracuse, and nearly six years in various capacities with the Oneida (N. Y.) Railway and the Syracuse Rapid Transit Company. During this last connection he assisted Mr. Harvie in the West Shore electrification and in laying out and superintending the construction of the Wolf Street shops in Syracuse. Between 1908 and 1912 he was assistant electrical engineer in connection with the line and power departments of the Syracuse Rapid Transit Railway and allied lines. When the New York State Railways took over the Syracuse Rapid Transit Railway in 1912 Mr. Barnes continued as chief engineer of the consolidated lines. Since Mr. Barnes' resignation on Feb. 15 his duties have been divided among other members of the staff, and the office of chief engineer will be abolished. On Feb. 13, 1913, a dinner was tendered to Mr. Barnes by his immediate associates in the company, and on Feb. 15, 1913, a dinner was tendered to him by the heads of the departments of the New York State Railways.

J. R. Ayers

G. N. Brown

Mr. Safford K. Colby has been elected one of the vice-presidents of the firm of Allen & Peck, Inc. Mr. Colby is well known in the electric railway business. He is an engineer of experience and his association with leading manufacturers has brought him in contact with many of the larger enterprises of recent years. Mr. Colby is an alumnus of the Rensselaer Polytechnic Institute, from which he was graduated in 1894. After eleven months in the employ of the Lake Shore & Michigan Southern Railroad as rod and instrument man, he entered the electric railway business and from May to October, 1895, was engineer in charge of construction for the Troy & New England Railroad. Mr. Colby next entered the commercial field, taking a position as assistant to the manager of the New York office of the Pittsburgh Reduction Company, which afterward became the Aluminum Company of America. After two years in this position he was placed in charge of the New York office of the company. In 1905 Mr. Colby resigned to become treasurer of Pierson, Roeding & Company, San Francisco, and later became vice-president and part owner of the firm. Through his connection with Pierson, Roeding & Company and the principals they represented on the Pacific Coast, among whom were The J. G. Brill Company, the Aluminum Company of America, the Electric Storage Battery Company, the Locke Insulator Manufacturing Company, the Lombard Governor Company, the Fibre Conduit Company, the R. D. Nuttall Company and the tower department of the American Bridge Company, Mr. Colby has been identified with much of the important electrical construction in the western part of the United States. In October, 1912, Mr. Colby was elected a member of the executive committee of the American Electric Railway Manufacturers' Association. He is an associate member of the American Institute of Electrical Engineers and an associate of the American Society of Civil Engineers. Mr. Colby, with his eighteen years of experience in the commercial side of the electric railway business, brings to his new associates knowledge and ability which should prove of great value to them in their many enterprises.

S. K. Colby

OBITUARY

James F. Parker, who has been connected with the claim department of the Quincy division of the Bay State Street Railway, Boston, Mass., for eighteen years, is dead. Mr. Parker was born in Quincy forty-five years ago. He was educated in the Adams School, Quincy, and entered the employ of the Bay State Street Railway as a clerk.

Marcellus H. Young, a former president of the Union Trunk Line, one of the street railways assembled by Stone & Webster as the Seattle (Wash.) Electric Company, is dead. Mr. Young became a member of the board of trustees of the Seattle Electric Company at the time of its formation, but retired from the Stone & Webster properties upon the organization of the Puget Sound Traction, Light & Power Company.

Edward L. Clark, for many years auditor of the General Electric Company, died at his home in Schenectady, N. Y., on Feb. 15, after a lingering illness. The late Mr. Clark was born in Edinburgh, Scotland in 1849. In 1884 he came to America and was employed by Mr. Thomas A. Edison as auditor of the Edison Electric Light Company, New York, N. Y. In December, 1891, he became auditor of the Edison General Electric Company. He had full charge of the work of consolidation of accounts when the General Electric Company was organized in 1892. Two years later he was made assistant to the comptroller of the General Electric Company, the late J. P. Ord, and soon thereafter was made general auditor of the company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Colorado Mines, Railways & Utilities Corporation, Dover, Del.**—Incorporated in Delaware with an authorized capital stock of $25,000,000, consisting of 5,000,000 shares of the par value of $5 each.

***Valdosta (Ga.) Traction Company.**—Incorporated in Georgia to succeed the Valdosta Street Railway. Capital stock, $125,000. Incorporators: W. S. West, J. G. Cranford and E. K. Wilcox.

***Hooppole, Yorktown & Tampico Railroad, Hooppole, Ill.**—Incorporated in Illinois to build an interurban railway from Hooppole to Tampico via Bureau County. Capital stock, $100,000. Incorporators: Charles W. Groves, Henry J. Ringel, George Mathis and James Tonkinson, of Hooppole; R. H. Mathis, of Prophetstown, and John H. Cooley and J. W. Mathis, of Tampico.

***Tipton-Frankfort Traction Company, Tipton, Ind.**—Incorporated to build an electric railway presumably between Tipton and Frankfort. Capital stock, $10,000. Incorporators: E. Purtelle, A. G. Busick and F. B. Russell.

***Farmington & Oakland Interurban Railway, Farmington, Maine.**—Application for a charter has been made by this company in Maine to build an electric or steam railway between Farmington and Oakland, via New Sharon, Mercer and Smithfield. Capital stock, $300,000.

***Houlton (Maine) Street Railway.**—Incorporated in Maine to build an electric or storage battery line from the Canadian Pacific Railroad in Houlton to Limerick and the shores of Nickerson Lake. The authorized capital stock is fixed at $4,000,000, divided into shares of $100, but the amount to be issued at this time has not been decided yet. The company has the right to do a freight, passenger and express business. Incorporators: Arthur R. Gould, Horace N. Crandall, Presque Isle; Parker P. Burleigh and Ira G. Hersey, Houlton.

***Kansas City, Raytown & Lees Summit Electric Railway, Kansas City, Mo.**—Application for a charter has been made in Missouri by this company to build an electric railway from the Metropolitan Street Railway's right-of-way, where it intersects with the Blue Ridge Road, ½ mile east of Sheffield, along the Blue Ridge Road to Hickmand Mills, thence across country to Lees Summit, a distance of 30 miles. A contract for grading has been let to Davidson Brothers Construction Company. Incorporators: F. J. Bannister, Compton J. Tucker, R. E. O'Malley, Luther Davidson and Robert Davidson.

***Ottawa & St. Lawrence Electric Railway, Ottawa, Ont.**—Application will be made to the Ontario Legislature at its next session for an act amalgamating the North Lanark Railway with the Ottawa & St. Lawrence Electric Railway, under the name of the Ottawa & St. Lawrence Electric Railway, and increasing the capital stock from $1,000,000 to $5,000,000.

***American Railways, Philadelphia, Pa.**—Incorporated in Delaware for the purpose of surrendering its New Jersey charter and bringing its business under the laws of Delaware as referred to in the department Financial and Corporate elsewhere in this issue. Capital stock, $25,000,000. Jeremiah J. Sullivan, president.

***Palmetto Railway, Columbia, S. C.**—Application for a charter has been made by this company in South Carolina to build an interurban line from Columbia to Greenville via Prosperity, Newberry, Clinton and Laurens, a distance of 100 miles. Capital stock, $500,000. Incorporators: W. L. Gray, A. J. Christopher and E. S. Hudgins, Laurens, S. C.

FRANCHISES.

Los Angeles, Cal.—J. M. Buckley has received a twenty-one-year franchise from the Council for a double-track line on Fifty-fourth Street from Denker Avenue to the west city limits of Los Angeles.

Bay City, Cal.—The Pacific Electric Railway has asked the Board of Supervisors for a franchise in Bay City. The company has asked the Council for a franchise for an extension of its Alamitos line from the present terminus along Ocean Avenue to Main Street, thence to junction with the main line in Los Angeles.

Martinez, Cal.—The Oakland, Antioch & Eastern Railway, Oakland, has asked the Board of Supervisors for a franchise along the county road from Walnut Creek to Danville for the extension of the San Ramon Valley branch of its line to the Oakland Park stock farm.

Belleville, Ill.—The East St. Louis & Suburban Railway has asked the Council for a twenty-five-year extension of its franchise in Belleville.

Champaign, Ill.—The Danville, Urbana & Champaign Railway has asked the City Council for a franchise over Walnut, Bailey and Market Streets and University Avenue in Champaign.

East St. Louis, Ill.—The East St. Louis Railway has asked the Council for a franchise over Fortieth Street from Waverly Avenue to Forest Place and on Forest Place from Fortieth Street east to the city limits.

Jacksonville, Ill.—It is reported that H. E. Chubbuck, vice-president of the Illinois Traction System, has offered the city $30,000 bonus for a franchise for the Jacksonville Street Railway. The city asks a percentage of the gross receipts for a renewal of the franchise.

Cedar Rapids, Ia.—The Cedar Rapids & Marion City Railway has asked the Council for a twenty-five-year franchise to extend and double-track some of its lines in Cedar Rapids. The company has asked the Council for a franchise to use the proposed new bridge at Third Avenue in Cedar Rapids.

Lexington, Ky.—The Kentucky Utilities Company, Lexington, has asked the Fiscal Court for a franchise along various county turnpikes coming into Lexington.

St. Martinville, La.—The Southwestern Traction & Power Company has received a franchise from the Council in St. Martinville. Right of way has been obtained and work on the line through St. Martinville will probably be begun at once.

Cloudcroft, N. M.—J. C. Jones, Cloudcroft, has received a franchise from the county commissioners to build an electric railway from Cloudcroft down and through James Canyon to the easterly line of Otero County, and from Cloudcroft through Cox Canyon to the easterly line of Otero County. [E. R. J., Dec. 21, '12.]

Lexington, N. C.—The North Carolina Public Service Company, Salisbury, has received a sixty-year franchise from the Council in Lexington.

***East Berlin, Pa.**—The Council has granted a franchise to East Berlin capitalists to build an electric railway in East Berlin. This is part of a plan to build a line between East Berlin and York. Surveys will be begun as soon as the weather permits. It is intended to operate this railway as an independent line. The names of those interested are not yet given out.

Austin, Tex.—The San Antonio & Austin Interurban Railway, San Antonio, has asked the County Commissionerst for a franchise to operate through Travis County. This 80-mile line will connect Austin and San Antonio. Vories B. Brown, San Antonio, president. [E. R. J., Feb. 8, '13.]

Galveston, Tex.—The Galveston Electric Company has received a franchise from the Council for a new line in Galveston. The grant will make it possible for the company to build its proposed new line to the east end of the city of Galveston.

Richmond, Va.—The Virginia Railway & Power Company has asked the Common Council for a franchise over Franklin Street, Richmond.

Milwaukee, Wis.—The Milwaukee Western Electric Railway has asked the Council for a franchise to enter Milwaukee over the tracks of the Milwaukee Electric Railway & Light Company. The company plans to build a line between Milwaukee and Fox Lake. Most of the right-of-way has been obtained.

TRACK AND ROADWAY

Tidewater Development Company, Birmingham, Ala.—This company has completed its line between Birmingham and East Lake.

Calgary (Alta.) Municipal Railway.—This company will build about 18½ miles of city track during the year.

Burrard, Westminster & Boundary Railway & Navigation Company, Vancouver, B. C.—Work will be begun in May by this company on the section of its line between Stave River Falls and Pitt River, 20 miles. [E. R. J., Oct. 26, '12.]

Glendale & Eagle Rock Railway, Los Angeles, Cal.—This company's line, which extends from Fourth and Brand Avenues, Glendale, to Verdugo Park, is to be taken over by a financial syndicate of Los Angeles men. The prospective owners plan to extend the line from Verdugo Park through Montrose to Los Angeles Avenue, in La Crescenta.

Pacific Electric Railway, Los Angeles, Cal.—Bids for grading this company's line to connect San Bernardino and Upland will be opened Feb. 20.

Redwood City (Cal.) Railway.—This company will begin work in March on the construction of its 4½-mile line in Redwood City. George A. Merrill, Redwood City, president. [E. R. J., April 6, '12.]

Crescent City Railway, Riverside, Cal.—This company has awarded the contract for the grading of the extension from Bloomington to Rialto to Oscar Ford, Riverside.

Capital Traction Company, Washington, D. C.—Plans are being considered by this company for a line on Seventeenth Street, from U Street to Pennsylvania Avenue, and on Eighteenth Street, west from G Street, southward to and into Potomac Park, Washington.

Palatka-Hastings Interurban Railway, Palatka, Fla.—This company states that its plans are not yet sufficiently definite to warrant publication as to when work will be begun on its 10-mile line between Palatka and Hastings. Its passenger service will be handled by direct gasoline or by gasoline electric power and the freight will be handled by steam. F. J. Von Angelken, East Palatka, secretary. [E. R. J., Feb. 1, '13.]

Georgia Railway & Power Company, Atlanta, Ga.—It is announced that this company will spend $1,104,000 during 1913 for improvements and extensions to its lines. The greater part of this money will be used to pay for the laying of double tracks.

Hillsboro Electric Light & Power Company, Hillsboro, Ill.—It is reported that this company plans to build a line from Hillsboro to Nokomis, via Schram City, during the summer. A franchise will soon be asked of the Council in Schram City.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—This company held its first annual meeting in Peoria Feb. 10 and elected the following officers: J. L. Soebbing, president; Judge Albert Akers, first vice-president and general manager; W. J. Heintz, second vice-president; C. A. Van Ness, secretary; B. G. Vasen, treasurer. It was stated at this meeting that satisfactory financial arrangements were about to be made and actual construction would be started in the near future on its line between Quincy and Peoria. [E. R. J., Nov. 16, '12.]

Springfield & Jacksonville Railway, Springfield, Ill.—Land owners along the right-of-way of this railway, which ceased operations after securing the right-of-way and grading between Springfield and Jacksonville will attempt to revive the project. A meeting has been called for Feb. 25. It is announced that new financiers for the railway have been secured. John W. Boston is interested.

Laporte, Ind.—Plans are being made by citizens of Laporte for the organization and incorporation of an electric railway to extend from Laporte to Logansport via Bass Lake and Knox. Ora Boserman is said to be interested. [E. R. J., Dec. 14, '12.]

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company is now building 1½ miles of new track in the city of Joplin.

Louisville (Ky.) Railway.—Surveys will be made by this company for an extension of its Orell line from Kosmosdale to West Point, a distance of 3 miles.

Madisonville, Ky.—B. T. Robinson, Morton's Gap, and W. W. Kington are considering plans to build an electric railway from Madisonville to Nortonville. [E. R. J., Dec. 14, '12.]

Baton Rouge (La.) Electric Railway.—This company will build 3 miles of new track during the year.

Rockland, South Thomaston & St. George Railway, Rockland, Maine.—This company plans to build 2 miles of track to South Thomaston.

Frederick (Md.) Railroad.—A 10-mile line from Jefferson through Petersville to Brunswick will be built by this company during the year.

Michigan United Traction Company, Lansing, Mich.—It is said that this company plans to reconstruct the roadbed of its Lansing-St. John's line, a distance of about 21 miles.

Granite City Railway, St. Cloud, Minn.—About 3½ miles of new track will be built by this company during 1913.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—This company advises that it will award contracts in April to build its 12-mile line between Moberly, Huntsville and Randolph Springs. It will also furnish power for lighting purposes in Huntsville. Capital stock, $500,000. Officers: C. H. Dameron, president; W. T. Dameron, vice-president; W. M. Evans, secretary; G. P. Dameron, treasurer, and John J. Mundinger, chief engineer, all of Huntsville. [E. R. J., Feb. 15, '13.]

Piedmont & Northern Railway, Charlotte, N. C.—Work will soon be begun by this company on its extension to Concord, N. C.

Brazil, Devil's Lake & Minneapolis Electric Railway, Devil's Lake, N. D.—This company has not yet decided when it will begin the construction of its 5-mile gasoline and steam railway in Devil's Lake. The company will operate eleven cars and will locate its repair shops at Devil's Lake. Capital stock authorized, $100,000; issued, $10,000. Officers: A. B. Fox, president and general manager; J. B. Richey, vice-president; Vernon E. Fox, secretary, and C. W. Glasgow, treasurer. [E. R. J., Dec. 28, '12.]

Halifax (N. S.) Electric Tramway.—About 2½ miles of new track will be built in Halifax by this company during the year.

Porcupine-Rand Belt Electric Railway, Porcupine, Ont.—The organization of this company is now completed. It holds an Ontario charter of incorporation; it has a Quebec charter, and it is proposed to secure a Dominion incorporation. Preliminary surveys have been made for several routes under existing charters, viz: From Dane, via Larder Lake, to North Temiskaming and Liskeard; from Ruel, on the Canadian Northern Railroad, to Lake Porcupine and the National Transcontinental Railway via West Shining, Tree Lake and the Mattagami River, and from Dane to Swastika and the Great North Bend, Montreal River, to South Porcupine. It is proposed to use single storage battery cars, with trailers for freight. There are several good water powers along the routes which it is proposed to develop for recharging batteries. The company is authorized to make agreement for running rights with railways with which its line may connect. The following officers have been elected: F. G. Earl, New York, president; S. A. Adila, Toronto, vice-president; H. S. Rowland, Toronto, secretary and treasurer, and C. R. Fullerton, Liskeard, Ont., chief engineer. [E. R. J., Dec. 7, '12.]

St. Thomas (Ont.) Street Railway.—About 1 mile of new track will be built by this company in St. Thomas.

Oregon Electric Railway, Portland, Ore.—Among the improvements planned by this company will be the extension of its line from Eugene to Roseburg, via Cottage Grove, and from Roseburg to Myrtle Point and Coos Bay and thence south along the coast to San Francisco.

Altoona & Logan Valley Electric Railway, Altoona, Pa.—This company has been asked to extend its tracks by building a loop from the present terminus at East End in Altoona to the Red Bridge by way of the cemetery.

Easton (Pa.) Transit Company.—This company announces that it contemplates an expenditure of $250,000 during the year to improve its lines in Easton, Phillipsburg, Palmer and Freemansburg.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—This company will build 1 mile of new track in Sherbrooke during the year.

Carolina Traction Company, Rock Hill, S. C.—During the year this company plans to build 8 miles of track.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has placed in operation its 3-mile extension to Vestal. The company has under construction a 5-mile extension along the Kingston pike.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Work will be begun on March 1 by this company on its electric line between Salt Lake City, Provo and Payson. The company will purchase power from the Utah Power & Light Company and will operate eight or ten cars. W. C. Oram, Salt Lake City, president. [E. R. J., Dec. 21, '12.]

***Tacoma, Wash.**—Plans are being considered to build an 11-mile municipal electric railway in Tacoma from Eleventh Street and A Street to Dash Point. Nicholas Lawson and S. C. Davis, Tacoma, are interested.

Monongahela Valley Traction Company, Fairmont, W. Va—Surveys have been made and it is reported that bids will be asked by this company in April for the construction of its line between Salem and Lumberport. The track will be laid with 80-lb. rails.

SHOPS AND BUILDINGS

San Francisco, Oakland & San José Railway, Oakland, Cal.—This company has awarded the contract to the Twohy Brothers, Spokane, Wash., for the enlargement of its terminal facilities at Oakland.

Atlanta & Carolina Railway, Atlanta, Ga.—During the year this company plans to build new carhouses and repair shops in Atlanta.

Springfield (Ill.) Consolidated Railway.—This company plans to build an addition to its carhouses at Springfield. The structure will be of steel and concrete construction. It is estimated to cost amout $5,000.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has leased the L. E. Ford building on North Market Street in Champaign, which it plans to use as a passenger station.

Tri-City Railway & Light Company, Davenport, Ia.—Property in Rock Island has recently been purchased by this company and it will soon build new carhouses and repair shops between Third Avenue and Fifth Avenue east of Twenty-fourth Street.

Des Moines (Ia.) City Railway.—During the next two months this company plans to build a new carhouse with a capacity for sixty cars in Des Moines.

Winnipeg (Man.) Electric Railway.—During the year this company will build a new carhouse with a capacity for 100 cars at Winnipeg.

Detroit (Mich.) United Railway.—Work was begun by this company on its new general repair shops in Detroit.

POWER HOUSES AND SUBSTATIONS

Edmonton (Alta.) Radial Railway.—During the next few months this company expects to purchase one 750-kw motor generator, switchboards and transformers. The company has installed a new 2000-kw turbo-generator at its power house in Edmonton.

Toledo Railways & Light Company, Toledo, Ohio.—During the next few weeks this company expects to purchase one 6000-kw turbo-generator with boilers and auxiliary apparatus.

Southeastern Ohio Railway, Light & Power Company, Zanesville, Ohio.—During the next few weeks this company plans to build a new substation at Crooksville, Ohio. The company expects to purchase a rotary transformer and lighting transformers for its Roseville and Crooksville substations.

Cumberland Railway, Carlisle, Pa.—During the next few weeks this company expects to purchase one 100-kw, 600-volt generator and one water turbine.

Rhode Island Company, Providence, R. I.—This company will add to its power plant equipment one 15,000-kw Curtis turbo-alternator. The unit will be built and installed by the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Boston & Worcester Street Railway, Boston, Mass., has ordered two 36-ft. closed cars from the Wason Manufacturing Company.

Philadelphia & Garrettford Street Railway, Upper Darby, Pa., has purchased two 51-ft. passenger and baggage car bodies from the Jewett Car Company.

Monongahela Valley Traction Company, Fairmont, W. Va., has purchased two 42-ft. and two 43-ft. passenger car bodies from the Jewett Car Company.

Alton, Granite & St. Louis Traction Company, Alton, Ill., has ordered from the American Car Company ten 26-ft. closed cars with Brill No. 22 special trucks.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., lost a passenger car and a freight and express car in a fire which resulted from a collision near Silver Creek.

Charleston-Dunbar Traction Company, Charleston, W. Va., has ordered one 52-ft. passenger, baggage and smoking car body from the Jewett Car Company.

Birmingham Rapid Transit Company, 1025 First National Building, Birmingham, Ala., is in the market through the Kelly Company, its engineers, for forty city cars.

Tidewater Southern Railway, Stockton, Cal., has ordered from the Jewett Car Company three 51-ft. passenger, baggage and smoking car bodies and one 45-ft. passenger car body.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has ordered ten 53-ft. 8½-in. passenger and smoking car bodies and one 46-ft. express car body from the Jewett Car Company.

Lehigh Valley Transit Company, Allentown, Pa., has ordered from the Jewett Car Company three 50-ft. express car bodies and six 56-ft. combination passenger, baggage and smoking car bodies.

Southern Traction Company, Dallas, Tex., noted in the Electric Railway Journal of Feb. 1, 1913, as having issued specifications for twenty-two 53-ft. interurban cars, has ordered this equipment from the St. Louis Car Company.

Birmingham, Ensley & Bessemer Interurban Railway, Birmingham, Ala., has purchased twenty-five dump cars from the William J. Oliver Manufacturing Company for use in line construction work which it has under way in and around Birmingham.

TRADE NOTES.

F. H. Allison, Pittsburgh, Pa., has been appointed general purchasing agent in charge of all office and factory supplies for the American Vanadium Company and the Flannery Bolt Company, Pittsburgh.

Standard Heat & Ventilation Company, Inc., New York, N. Y., has appointed Frank N. Grigg its district manager with offices in Washington, D. C. Mr. Grigg was eastern representative of the Adams & Westlake Company for the past ten years.

H. W. Johns-Manville Company, New York, N. Y., held its annual salesmen's conventions on various dates from Jan. 2 to Feb. 8 at Milwaukee, Boston, New York, Philadelphia, Pittsburgh, Cleveland, Chicago, St. Louis, New Orleans, San Francisco and Toronto. More than 600 salesmen and department managers of the company were in attendance.

Weir Frog Company, Cincinnati, Ohio, has elected B. W. Rowe, formerly president, as chairman of the board of directors, and O. De G. Vanderbilt, Jr., as president of the company. During the past four or five months Mr. Vanderbilt has been in Cincinnati, where he has had active charge of the extensive additions and changes to the company's plant which are about completed. These improvements will increase the output of the plant from 25 per cent to 35 per cent.

Curtis Truck & Forging Company, Decatur, Ill., has been organized as the successor to the Curtis Motor Truck Company. Those in charge of the new organization will continue to make Curtis trucks, but, in addition, will engage in a general forging and manufacturing business, soliciting any business for which their plant is adapted. Those who now have Curtis trucks in service may be assured that the new company places its services at their disposal. A general sales office has been opened at 450 People's Gas Building, Chicago, Ill., and works and general offices are located at Decatur, Ill.

Pressed Steel Car Company, Pittsburgh, Pa., reports that the gross business for the year ended Dec. 31, 1912, amounted to $19,019,403, from which profits of $95,343 remained after paying the preferred stock dividend. This balance was equivalent to 0.76 per cent on the $12,500,000 common stock against 0.14 per cent earned in the previous year. President Hoffstot said in the report that the company's plants were operated continuously throughout the year, but the margin of profit was exceedingly small owing to keen competition. The orders secured in 1911, which carried over into 1912, were executed on an advanced labor and material market. Nothing was applied to the depreciation account, and the balance was added to the previous surplus. The total surplus reported was $7,460,184. The report states that the plants have been well maintained and that the Western Steel Car & Foundry Company, hitherto operated under a lease, has been bought on the basis of a small cash payment and the assumption of an existing mortgage maturing in 1942.

Massachusetts Chemical Company, Boston, Mass., is offering to the electrical trade three new insulating varnishes. Walpole clear insulating varnish is an amber-colored varnish of unusual flexibility and penetrating qualities. It comes through intact when it is subjected to an initial puncture test of 1000 volts per mil of thickness. Walpole black insulating varnish is oil-proof, water-proof and acid-proof and of even higher initial resistance, 1500 volts per mil being guaranteed by the company. It is used especially for insulating armatures and field coils of street railway motors. These two baking varnishes are supplemented by a new Walpole black varnish which is designed for finishing coats. It is made on an alcohol base which permits air drying in thirty minutes and gives the tough, elastic water-proof, acid-proof and oil-proof coat that remains black and lustrous. Richard F. Norvell has recently associated himself with the Massachusetts Chemical Company as traveling salesman and special representative.

General Railway Equipment Company, New York, N. Y., was on petition adjudged bankrupt on Feb. 18. At the same time a petition was filed against the United States Electric Company, a subsidiary company. The petitions were filed for Matthew B. Sentner, both being on claims assigned to him by the Kellogg Switchboard & Supply Company, Chicago, Ill. The petition in each case alleges that the company is insolvent. The General Railway Equipment Company was incorporated in Maine in April, 1912, with an authorized capital stock of $15,000,000, to manufacture railway equipment, principally complete systems of automatic safety equipment. The company authorized an issue of $1,500,000 preferred and $4,500,000 common stock to take over the following companies, which have an outstanding capital stock of $2,155,000: United States Electric Company, National Telephone Selector Company, Sandwich Electric Company, Electric Switch & Signal Company, Charter Electric Company, Sandwich Pole Changer Company and International Telegraphic Call Company.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, is mailing a folder which is descriptive of the National railroad trolley guard.

Ackley Brake & Supply Company, Inc., New York, N. Y., has issued Folder A-1913, which contains several bulletins relative to its brake and supply business. Bulletins A and B describe and illustrate the Ackley adjustable and no-staff brakes for export. Bulletin No. F-1 lists and describes the various types of Monarch refillable fuses. Bulletin G is devoted to "Tool Steel" gears and pinions for which the Ackley Brake & Supply Company, Inc., acts as export agent. The "Automatic" trolley guard is described and illustrated in Bulletin G-1913.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MARCH 1, 1913 No. 9

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office..............................1570 Old Colony Building
Philadelphia Office........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

BAD LIGHTING OF STREETS

Adequate lighting of streets is a proper municipal obligation which is disregarded by many cities at the cost of lives and limbs of citizens. Particularly in the largest cities, where the noise of vehicular and street railway traffic creates confusion at the busy twilight and early night hours, the municipal governments have a duty to meet in the provision of brilliant lighting, and they should not avoid it or leave it to private or semi-private organizations. Strong police regulations for the control of traffic and their systematic enforcement would do much to supply the confidence needed by pedestrians who have to steer their way across crowded streets, but they cannot take the place of good lighting. Furthermore, the quality of thorough protection of crossings which traffic squads should establish has not yet been attained in most cities, and it will require years to develop in the smaller cities the public respect for regulations on this subject which is necessary. All that the electric railways can do to induce their cities to improve street lighting will be well-directed effort in the public service of eliminating conditions that lead to accident.

WANTED, MORE A. E. R. A. MEMBERS

Is there any reason why an electric railway company or an electric railway man should not be a member of the American Electric Railway Association? We have never heard a good reason for staying outside the association, but there are a dozen good, compelling reasons for going into it. Besides the specific reasons, there are many of a general character, one of these being the steady growth of the association and the equally steady growth of its useful activities. Seventy per cent of the electric railway mileage of the country is now comprised in the company membership, but only a little more than 35 per cent of the operating companies are within the fold. The average mileage of member companies is 88, while the average for non-members is only 22 miles. Consideration of these figures suggests that some of the smaller railways are not good bargain hunters, for a road paying only from $15 to $75 annual dues gets exactly the same benefits that are enjoyed by a system whose membership costs $600. That there is strength in union is a national motto that applies as well to railways as to states. The Electric Railway Journal believes that every traction company not now a member of the American Electric Railway Association should ponder this motto in its application to the duty owing to itself and to the industry at large, consider the work that the association is doing for the welfare of all and the modest outlay required to co-operate in this work, and then decide whether an association membership, besides being in a sense an obligation, is not a good investment as well.

ONE OBJECTION TO OPEN STORAGE

The economy of open or closed car storage yards probably has been discussed as much as any other problem in electric railway practice. Many theories have been advanced which tend to show the disadvantages of one as compared with the other. Even in localities where the climatic conditions are most disadvantageous to open storage that plan is followed by some companies because they believe that it presents economical possibilities. Recently a prominent engineer, who has had wide experience in handling rolling stock under different conditions, advanced a theory on the deterioration of paints which, if correct, may have some bearing on the question. It had been observed that on a certain road with single-end equipment the rear end required a new coat of paint long before it was necessary on the front end. The difference manifestly could not be due to weather conditions alone, because the entire car exterior was exposed. Paint deterioration was most noticeable during periods when there was considerable moisture in the air or heavy deposits of dew. Further investigation showed that on early trips the cars left the storage yard with a coating of moisture from the dew, and then in passing over the dry streets suction caused a heavy deposit of dust at the rear end. This led to the conclusion that open storage was a fundamental factor in the consequent deterioration because the dust deposit contained quantities of acid, ammonia and alkali, all of which, as is well known, are very detrimental to paint skin in the presence of moisture.

THE MENACE OF THE SKYSCRAPER

Elsewhere in this issue there is published an extract from a speech made by George McAneny, president of the borough of Manhattan, New York, at the dinner of the New York Chapter of the American Institute of Architects in New York, on Feb. 21. Mr. McAneny said that he proposed to recommend the naming of a commission to inquire into the advisability of regulating the height of buildings in New York. His remarks are of particular interest because he has had considerable to do with laying out the proposed rapid transit routes in that city. He says that in laying out these routes "we have kept the correct principles of city planning constantly in mind and have laid down routes selected by the city and for the city's reasons and not by the operating companies alone, interested as they naturally are in the continuation of the richer short hauls and the concentration of traffic upon those lines that pay best from a commercial railroading point of view." The peculiar formation of Manhattan Island and the very great prices which land fetches in New York have worked naturally to the development of the skyscraper, but the railroads do not relish its development to anything like the extent that Mr. McAneny would have us believe. The concentration of these buildings in one locality brings operating problems that are almost unsurmountable and imposes on the management conditions which are seldom, if ever, offset by any accruing advantage. The skyscraper and the handling of the crowd which it disgorges at practically fixed hours is a condition which must be met by the operating companies, while the short haul, which Mr. McAneny assumes to be the concomitant of the skyscraper, is a theory. Who that is familiar with Cleveland and Detroit would assume that the local railways benefit by the congested store and office section at the Public Square in the former city and on lower Woodward Avenue in the latter? Surely both the cities and companies in these cases would benefit if the offices and stores were thinned out and spread along the Euclid and Woodward Avenue lines respectively. The best interests of the city are generally the best interests of its railways, and the day is probably not far distant when Seattle and Nashville—we think it is—will lament their present boast that the tallest buildings in the Far West and in the South respectively are to be found in these cities.

NEGOTIATIONS FOR CONSOLIDATION IN CHICAGO

Negotiations between representatives of the Chicago companies and the city authorities concerning the proposed consolidation of elevated and surface properties have reached the point where some consideration is being given to the details of a new ordinance. The intention is that the relations between the companies and the city shall be governed by a new franchise ordinance instead of by the 1907 ordinances, which affect only the surface companies, and by the existing contracts with the elevated lines. This will permit uniform treatment of questions which were not settled satisfactorily in the existing measures or in such a way as to promote consolidated operation.

The 1907 ordinances have been in effect long enough to demonstrate features of incompleteness which can be corrected in a new measure. For some time during the pending negotiations it has been argued generally that a plan for amortization of some of the capitalization of the surface railways should be included in a new ordinance. The reason for this course was made plainer by the statement of Bion J. Arnold last week. Mr. Arnold said that practically 25 per cent of the outstanding capitalization of the present railways represented intangible values and that the absence of a provision for decapitalizing these values was the great weakness in the 1907 ordinances. He recommended that the earnings above the allowed returns to the companies on their investments be used to amortize the excess value. After the retirement of intangible values the earnings, if desired, could be applied to the reduction of capitalization.

In the Chicago case it is proposed, in effect, to accept an agreed cost of property, to allow a definite rate of return thereon, and to apply earnings above that sum toward reduction of the amount of the investment as it will stand on the books. Whether the earnings remaining after a provision for the return on the investment are applied to the actual retirement of capital obligations or are used for additions and betterments to the property is immaterial as far as the principle is concerned; the final result of the one policy would be to reduce the capitalization to a figure representing the value of the tangible property and the result of the other policy would be to increase the investment in the property to a figure representing the value of the outstanding capitalization. Thus eventually, in either case, if the policy was continued the required length of time, capitalization and tangible value would be the same.

An arrangement for amortization of this character would mean a valuation with determination of the relative proportion of tangible and intangible values. But if that is made with the express understanding that the object of the determination of intangible values is to work out detailed plans whereby these values may be amortized, the interests of the companies would be protected. The amortization of intangible values over a long period of years, if the capital costs of the properties have been fixed by proper methods of accounting, is a fair way to reduce capitalization because the community should give reasonable protection to the owners of outstanding securities on the property.

Another suggestion made by Mr. Arnold is based on the inadequacy of the provisions of the 1907 ordinances relating to the operating expense charges for upkeep. He suggested that the present allowance of at least 6 per cent of gross receipts for maintenance and repairs and of 8 per cent for renewals and depreciation could be handled more easily if they were combined and that the fund for both purposes should be increased to 16 or 18 per cent. Under the 1907 ordinances it has been necessary to decide what expenditures should be charged to each fund. This requires decisions that must be made arbitrarily at times and involve apparent inconsistencies. Since the object obtained is not so much an arbitrary distinction between maintenance and renewal expenditures as it is the upkeep of the property, the combination of the funds would allow the companies to use money for either object according to the necessities of the moment. If the upkeep of the property from earnings is assured, it is not important whether that is done through a maintenance or a renewal account. The proper solution of these questions will be an important factor in the permanent protection of the capital value of the properties and in the success of their combined operation under a new ordinance.

EDUCATING THE OFFICE EMPLOYEE

So much is said and written nowadays about the value of publicity that it may be of interest to point out one instance where it has been successfully applied in a somewhat neglected direction, namely, educational publicity for the employee. Two years ago the mechanical department of the Brooklyn Rapid Transit System instituted annual meetings of its officials and office employees. The purpose of these meetings is to review the work done during the past year, to make comparisons with preceding years, to consider the work ahead and to discuss how methods and costs may be still further improved. This is the great get-together meeting of the year, when the *esprit de corps* of the department is revitalized by personal intercourse. It is entirely distinct from the conferences which are held from week to week by the foremen and assistant foremen to discuss pending problems. Furthermore, the office forces are kept in touch with the current work of the department by means of bulletins and circular letters. The annual meeting, however, offers the opportunity of summarizing the year's activities and of explaining to the rank and file the purposes and tendencies of the management. The scope of this information will be appreciated best by noting some of the data which were circulated at the last meeting.

First of all, the announcement was made that the work of the department had been laid out so as to permit as far as possible the employment of a uniform force throughout the year, thus assuring the continued services of good men who otherwise would leave the service because of the ebb and flood conditions which obtain in most railway maintenance shops. Again, the consistency of the management in desiring to have an accurate yet clear and easily prepared system of records was emphasized by the announcement that typewriting machines and desks were to be provided for all shops. Explanation was made of a new system of promulgating instructions which is to consist of a book of rules in addition to such instructions as are issued from time to time on specific topics. The instructions were to be serially numbered and classified according to subject so that the men would be able to familiarize themselves readily with standard practices. The improvements which past betterments in management policies and mechanical practices have brought about were demonstrated in tangible form by a table of car-mile maintenance costs for the fiscal years from 1903 onward and by figures showing parallel reductions in the number of car defects. The tables were accompanied by an analysis to enable the men to appreciate the causes for variations, such as the fact that certain extraordinary improvements were charged to maintenance instead of capital account. Even such points as the policy of specializing each shop for a certain line of maintenance and the consequent elimination of certain shops entirely were explained at length. The new tools bought or under order for the several shops were also named.

It is doubtful whether any other electric railway in the country has taken its office employees so fully into its confidence as has been done in the case cited, but the results have justified this departure. Few occurrences are more humiliating to an intelligent man than to be told by an outsider about some important change in his own organization. The appetite for news is one of the oldest and strongest passions of the human race, and those who cater to its just gratification are likely to reap an abundant crop of good will and that obedience which comes from knowing the reasons for rules and instructions.

PROLONGING THE MECHANICAL LIFE OF TIES

Very little if anything is being done by interurban railways to prolong the mechanical life of treated ties, although a few street railways in the larger communities have taken the precaution of using tie plates and screw spikes in the best types of track construction in paved streets. Preservation of mechanical life is of vital importance to obtain the full benefits possible with treated timber. The effects of side sheer and spike renewals must receive careful consideration. Tests to date show that red oak treated with 10 lb. of creosote per cubic foot will give twenty years of service, so far as physical life is concerned. It cannot be expected that rail and connections under heavy traffic will be fit for main-line service for this length of time, and they must be renewed. Neither can anyone expect the spikes to withstand the lateral thrust for anything like this period. This latter condition, as well as rail renewals, will require the replacement of the spikes several times during twenty years. Each renewal or resetting of a spike necessitates its location at a different point on the tie face, and in time it will be impossible for the trackman to keep from driving it in an old hole. The tendency to destroy the wood fiber as well as the shearing action of the rail will destroy a tie's usefulness long before the maximum physical life is obtained.

The best way to reduce to a minimum this mechanical destruction is by employing a tie plate of sufficient dimensions to distribute the maximum load considerably within the safety limits of the wood-fiber bearing value. In addition to this a spike which may be removed and replaced without making a new hole in the tie should be used. It is not sufficient to use tie plates to obtain the longest service; the bearing on the tie must be uniform over the whole surface of the plate. Hewn ties should receive more attention in this particular than sawn ties, and accurate adzing is required on the bearing surface of each tie to produce the maximum result. Sawn ties not only give a true bearing surface but have been found to take preservative treatment better than hewn ties. This may be attributed to the cross-cut fibers in the longitudinal surfaces, which permit a more uniform distribution of the preservatives.

As a final argument of the case in hand we wish to call attention to the bulletin on this subject issued by the Forest Service Department of the United States Department of Agriculture. The subject of prolonging the life of treated timber is discussed in detail, but a concrete example from a cost standpoint emphasizes its importance more than anything else. For instance, it is considered that four years is the average life to be obtained from an untreated red-oak tie which costs 45 cents and twenty years from a creosoted tie of the same timber which costs 82 cents. After these prices are added to the cost of placement and to the cost of tie plates and interest, it is found that the annual track charge for an untreated tie is 24 cents and that for a treated tie is 9.8 cents. The net result to be gained in this particular instance is obvious, but consider the result when proper precautions have not been taken to produce a maximum mechanical life. Eliminate tie plates from both treated and untreated ties, and the effect of side shear is more than five times as great on the one as the other, and after shearing starts it gains impetus. A casual observation of the ties in any section of track will show that signs of side shear develop after but a few years in service, and one may readily draw conclusions as to the probable depth of this shearing action at the end of fifteen or twenty years.

HOW NOT TO DO IT

We have heard much and we are going to hear more of the importance of bringing about an era of good feeling—based upon a good understanding—between utility companies and the public, and of the best means of accomplishing this aim. The most recent, but by no means the only, indication of how large this subject looms in the minds of railway and electrical men was the joint meeting of the public policy committees of the American Electric Railway Association and the National Electric Light Association, to which reference was made in last week's issue of the Electric Railway Journal.

That good feeling between utility companies and the public can be brought about and maintained on no other foundation than confidence in the honesty, fairness and efficiency of these companies is plain to all. Frequently injustice is done to the public service corporation even when it is not at fault; frequently the sins of the fathers are visited upon descendants who are not only free from blame but who are making every effort to redeem the faults and mistakes of the past. But how can this condition be cured and public confidence gained if fresh cause is given for legitimate complaint and new texts are provided for the anti-corporation sermons of reasonable as well as unreasonable critics?

These observations are suggested by an incident which took place this week in the District of Columbia. Last summer Congress authorized the rehabilitation of a motor bus line to run from the northern section of the city, via Sixteenth Street, to Pennsylvania Avenue and Fifteenth Street. This law requires the coach company, beginning Feb. 24, to give free transfers to the cars of the Capital Traction Company and the Washington Railway & Electric Company. It requires these two railways to honor such transfers and to issue free transfers from their cars to the coaches. A day or two before this coach service (which is operated through streets not served by the railways) was to begin, and while the public was congratulating itself upon the starting of a well-equipped bus line with the advantage of free transfers to the car lines, the traction companies announced that they would not comply with the law, basing their refusal upon the ground that it is unconstitutional. The temper of the public under these conditions is not improved by the publication of a three-year-old letter from one of the companies, refusing to enter into the transfer arrangement later made obligatory by Congress, for the reason that the proposal did not commend itself on grounds of either "profit or policy."

This may be so, and, further, the law may be unconstitutional, but in popular estimation it is the law until it is wiped off the statute books by the courts. Naturally the Washington public wants to know why the law should not be executed for the benefit of the public, instead of suspended at the demand of the railways, until the courts decide upon its constitutionality. If after a year or two of delay the courts declare the law to be one that it was within the powers of Congress to enact the public has no redress for the deprivation it has suffered. On the other hand, if the railway companies complied with the law and it was later invalidated, they would lose no more than the cost of carrying a few transfer passengers. And against this loss there would be the profit of having obeyed the law.

Back of the companies' refusal to carry out the provision of the coach transfer law is, of course, the fear that it may be construed as establishing a precedent that would menace adequate revenue for the railways. But this does not appease, it only further irritates the public, who can hardly be expected to consent cheerfully to deprivation of a granted privilege because it might be the forerunner of further benefits.

Be it remembered that we are discussing this case as an exhibit of how not to be popular, and with the conviction that electric railways must get more money for their service and give fewer transfers. But this conviction should not blind us to the fact that refusal to obey, until it is adjudicated, a law which confers privileges valued by the public and not in themselves burdensome upon the railways is not a good way to set about securing justice and good will from public opinion.

A NEW ENGLAND POWER NETWORK

It is only within very recent years that the power transmission network has made its way into New England practice. It started its career of usefulness, like many other improvements in transmission matters, on the Pacific Coast, where engineers got used quite early to covering considerable distances and developing powers smaller than would suffice for doing a good business as independent generating stations. Now, however, there are several sizable networks in New England, and of the latest of these we publish a description this week. It is the plant which supplies the Waterbury-New Britain territory and some neighboring towns along its lines. Like all proper networks, it is based on water power but carries steam power for such use as may be necessary in addition. The main plant which serves as a basis for the development is the hydroelectric plant at Bulls Bridge on the Housatonic River. This is equipped with 6000 kw capacity in six units. The generating potential is unusually low, only 1150 volts. A small portion of the energy from this plant is delivered, raised to 6600 volts, for transmission to some neighboring points, while the main body of the output is transformed to 33,000 volts for reaching over to Waterbury and New Britain.

The transmission line is a little out of the ordinary, first in that it is of stranded aluminum cable, which, generally speaking, has found very small use in the United States, and, second, because the transmission system consists of independent pole lines each carrying one circuit. The poles themselves are of chestnut with wooden cross-arms. It seems to us rather likely that this simple construction will be less subject to complete interruptions than the more customary arrangement of putting both circuits on a single steel tower line. Steel construction is an excellent thing, yet it is rather an open question whether it is worth sacrificing the independence of separate lines for the sake of getting both lines on one steel tower. At Waterbury, on the Naugatuck River, is the steam station, with some 7000 kw capacity in turbo-generators. This capacity is sufficient to handle the whole load now on the system, but ordinarily is used merely as an auxiliary to the hydroelectric plant. The Waterbury generators feed into busbars which are connected by their step-up transformers to the 33,000-volt transmission system. Thence the circuits run on to New Britain. This part of the transmission line is also of aluminum, but both circuits are on a single pole line, the independent constructions not having been carried beyond Waterbury. At New Britain the system is tied through suitable transformers to the transmission plant at the Hartford Electric Light Company.

The transformers in the Hartford plant which operate the New Britain connection receive two-phase current from the Hartford turbo-generators and deliver it as three-phase to New Britain, or the operation can be reversed, if for any reason power should be sent through from the New Britain end. Hartford, as our readers will remember, has besides its big steam plant two hydroelectric transmissions from the Farmington River. The whole system, which stretches out branches in various directions, consists therefore of five stations, two steam and three hydraulic, working together for mutual service, although the Hartford plant is quite distinct from the Waterbury-New Britain plant, except as the two are tied together as a matter of convenience. The very fact that this interconnection has been made, however, adds materially to the usefulness of both systems. It is not in the least necessary that plants should be solemnly merged in order that they may gain most of the material advantages of union. A working agreement for the interchange of power is, so far as the public is concerned, just as valuable as joint ownership and is often to be preferred.

IMPROVEMENTS ON BOSTON ELEVATED SYSTEM

Elsewhere in this issue is printed an account of some of the latest developments of the Boston Elevated Railway Company's system subsequent to the completion of the Cambridge subway about a year ago. It would be difficult to cite an example of more rapid progress toward the completion of a comprehensive scheme of urban transit than has been made within the past few years by the Boston company or one that better exemplifies the advantages of unified control and administration in the carrying forward of so great a development. The general characteristics of the Boston system have been maintained throughout the entire period from the opening of the original elevated service in 1901 to the present hour. They are presumably familiar to many of our readers and need not be elaborated here; but in passing over the earlier history of the Boston rapid transit system it is worth noting that every addition to it has been a new and valuable transportation agency from the public point of view, and that in no single instance have the improvements effected been placed in service at the cost of impoverishing the transportation interests of the community as a whole or by virtue of excessive economies in the service formerly given in local districts. Each new rapid transit line has added free transfer points where it has been articulated with the rest of the system and has from its opening day of service shortened the time of transit between the heart of the city and the outlying districts to an extent little less than revolutionary. Probably no other system in the world gives the possessor of a nickel so large an opportunity to enjoy a varied journey over interconnecting lines of such diversified character, often without even the effort of asking for a free transfer check. Express service on the rapid transit lines and local distributing or collecting service on the closely related surface routes form the key to the Boston problem, and while it may be that the passenger receives almost an unreasonable amount of service for a single fare, there is no question that the facilities reviewed in the article have stimulated traffic and are appreciated by every thinking resident of the New England metropolis.

The Boston management has been quick to learn the lessons taught by experience in developing such a system and handling its daily traffic, and the improvements described show that no amateur hands are in command of the program. Thus, at the Sullivan Square terminal, the principles of handling a complex transfer situation by the adoption of separate loading and unloading platforms, the installation of loop facilities for articulated surface car service, the use of escalators to relieve platform congestion and the separation of inward from outward passenger streams mark an improved station design; at the Green and Dover Street elevated stations increased capacity is the dominant feature of the designs outlined, and, perhaps most notable of all, the consideration given to safety of operation in the design of the East Cambridge elevated extension for surface cars, in its superb track and roadbed construction and signal and interlocking drawbridge equipment, will arouse the interest of every reader who has ever borne operating responsibilities. The extension of the Cambridge subway to the Stadium station, a loop-track and single-platform installation used only a few days each year but capable of handling some 35,000 passengers per hour, deserves mention, as does the moderate power demand of the system in view of its magnitude, together with the design of a new division building on a site where space was highly restricted but exceedingly valuable from the transportation standpoint. These features are all part of the progress of a system no longer distinctly local in its characteristic problems. They are but a part of the larger development of the company's program, but, like other improvements already described in this journal, they are all of individual interest. The topography of Boston has nothing of the commonplace in it, and the transportation development of the larger community is not likely to lack interest as it proceeds, if the treatment of the problems of expansion continues along the present progressive lines.

Recent Improvements on the Boston Elevated System

A Description of Further Extensions of the Rapid Transit Lines at Boston Since the Completion of the Cambridge Subway, Including Improvements at the Sullivan Square Terminal and Characteristics of the East Cambridge Viaduct

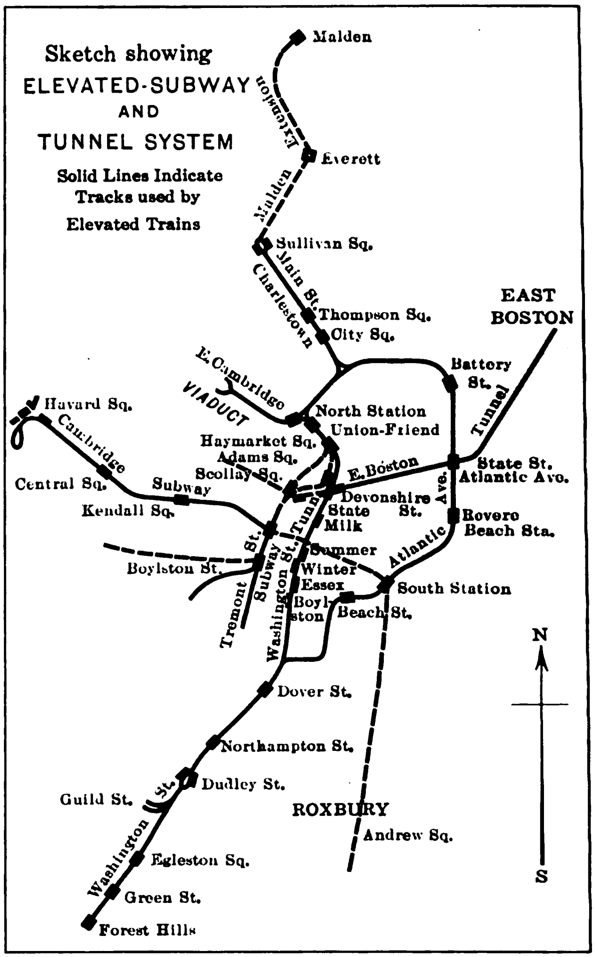
Continuous expansion of the transportation facilities of the Boston Elevated Railway Company furnishes the engineering visitor to the New England metropolis with a never-failing object of interested study. The variety of service rendered and the facility of traffic interchange between surface, elevated and subway lines, the comprehensive development of the system according to a broad and definite program and the rising standards of service rendered the public are some of the external signs of a steady progress which has made the last twelve years the most notable in Boston transportation since the use of electric motive power superseded the horse on the local surface lines a quarter of a century ago. From the opening of the original elevated lines in 1901 to the inauguration of service in the Cambridge subway in 1912, the more important changes and improvements on the Boston system during the period have been described fully in this journal, and the general characteristics of the company's lines and service need not be reiterated in this and a following article which will review some of the latest developments on the system in relation to the existing conditions of service and operation.

EARLY EXTENSIONS

The accompanying map shows the principal rapid transit lines of the company, including those under construction or authorized by the Legislature for early building. Elevated trains are operated between Sullivan Square and Forest Hills via the Washington Street tunnel in each direction, and between Sullivan Square and Dudley Street via Atlantic Avenue, and an extension of the elevated structure is in prospect in the near future between Sullivan Square, Everett and Malden. The Tremont Street subway, its branches and the East Boston tunnel are operated by surface cars, and an extension of the latter into the West End of Boston for a distance of about 0.5 mile is now under construction. A subway for train service was opened between Park Street, Boston, and Harvard Square, Cambridge, in March, 1912. On June 1, 1912, an elevated extension for surface cars was opened to traffic between the North Station, Boston, and Lechmere Square, East Cambridge. In addition to the extension of the East Boston tunnel previously mentioned, there are now under construction a subway from the Charlesgate district of the outer Back Bay eastward under Boylston Street to Park Street, and an extension of the Boston connection of the Cambridge subway from Park Street to the South Station, under Winter and Summer Streets. The latter subway is to be extended without delay to Andrew Square, Dorchester. These new subways will furnish rapid transit across town and greatly improve the handling of traffic between the heart of the city and suburban points at present unprovided with the quickest service to and from the business center. The Boylston Street subway will be traversed by surface cars, while the extension of the Cambridge subway connection to the South Station and Andrew Square will, according to present plans, be utilized by multiple-unit trains.

BENEFITS OF THE RAPID-TRANSIT ROUTES

As previous articles have pointed out, these rapid-transit lines are all operated upon the scheme of providing express service with few stops between the heart of the city and distributing stations from 3 miles to 5 miles distant, the utmost facility for free transfer being allowed at the latter points between high-speed trains or cars and rolling stock providing service of a more local character to and from the outlying suburbs. Between all the intermediate stations of the rapid-transit lines a local service is also furnished by surface cars giving and receiving transfers issued in connection with the high-speed equipment operated overhead or underground. A tabulation of the average saving in time per passenger between the terminal points of certain rapid-transit routes is given below, and it will be noted that the combined saving for the few runs taken exceeds an hour.


Sketch showing
ELEVATED-SUBWAY AND TUNNEL SYSTEM
Solid Lines Indicate Tracks used by Elevated Trains
Malden
Extension
Everett
Malden
Sullivan Sq.
Main St.
Charlestown
Thompson Sq.
City Sq.
EAST BOSTON
Battery St.
Tunnel
E. Cambridge VIADUCT
North Station
Union-Friend
Haymarket Sq.
Adams Sq.
Scollay Sq.
E. Boston
Atlantic Ave.
State St. Atlantic Ave.
Devonshire
State St.
Milk
Revere Beach Sta.
Havard Sq.
Cambridge
Central Sq.
Subway
Kendall Sq.
Summer
Winter
Essex
Boylston
Beach St.
South Station
Boylston St.
Tremont St.
Subway
Washington St. Tunnel
N
S
Dover St.
Northampton St.
Dudley St.
Guild St.
ROXBURY
Andrew Sq.
Washington St.
Egleston Sq.
Green St.
Forest Hills

Electric Ry. Journal

Boston Improvements—Map of Principal Lines

SAVING IN TIME PER PASSENGER ON RAPID TRANSIT LINES

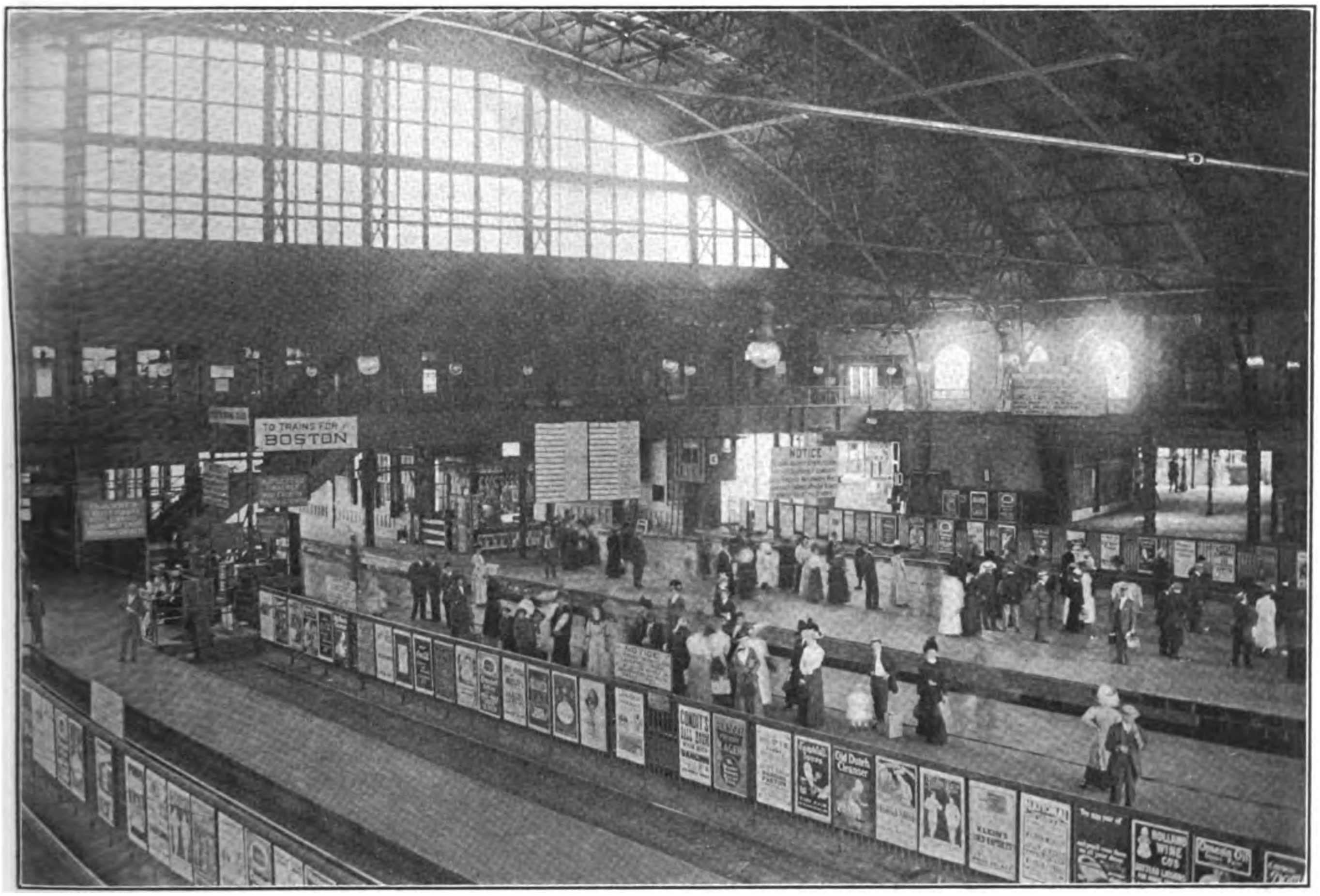
Character of Route	Between	Miles	Saving in Minutes
Elevated and tunnel	Dudley Street-Sullivan Square.....	4¾	26½
Elevated	Forest Hills-Dudley Street.........	2½	8
Subway	Harvard Square-Park Street.......	3¼	15
Tunnel (East Boston)	Court Street-Maverick Square.....	1¼	24½
Elevated-Viaduct	North Station-Lechmere Square....	1⅛	6

In general. it may safely be said that every passenger entering and leaving the city of Boston's business district by a rapid-transit line saves roughly half an hour as a result of these developments, provided he begins his journey 3 miles from his destination. The Boston suburban area extends to a circumference of at least 10 to 15 miles' radius from the City Hall, depending upon local conditions. The population of the entire district, or Greater Boston, metropolitan area, is about 1,500,000, and the average number of rides per capita per annum is now about 206. The present system of the company covers about 472 miles of track used by surface cars and 35 miles used by trains, or 507 miles of total track as of June 30, 1912. During the fiscal year ended on this date the company carried 310,310,009 revenue passengers, operated its cars 54,790,173 revenue miles and made 6,073,706 round trips. The revenue car hours were 5,091,005 and the total revenue from car operation was $15,527,825. The total investment in the system, including expenditures for additional facilities now under construction, and upon which fixed charges must be paid, is about $120,000,000.

By the construction of the original elevated system in 1901 between Dudley Street and Sullivan Square, half a million people were in effect brought 2 miles nearer downtown Boston, and the two largest steam railroad stations in the city, the North and South terminals, were connected by a direct line and brought within seven minutes of one another, compared with a previous running time of about twelve minutes on the surface under the most favorable daytime conditions. The opening of the East Boston tunnel at the end of 1904 immediately eliminated a journey, including a surface car and ferry boat transfer, requiring thirty minutes, and a district populated by 80,000 people was changed from the least to the most accessible ward of Boston. The inauguration of service in the Washington Street tunnel in November, 1908, not only effected the savings in time previously outlined but enabled the capacity of the elevated system to be increased by 70 per cent through the provision of station platforms long enough to accommodate eight-car trains in place of the five-car limit imposed by the operation of trains through the Tremont Street subway. Connection with the Tremont Street subway was established for passenger interchange at Haymarket Square, and the entire tunnel, with staggered station platforms, close proximity to the street surface and short length of about 1 mile, became for the public convenience an elongated terminal under the busiest section of the most crowded thoroughfare in New England. In November, 1909, the Forest Hills elevated extension was opened for traffic, and improvements were made at the Dudley Street station, which enabled the capacity of the latter to be raised to 1640 cars per hour, the Forest Hills terminal station accommodating 1140 cars per hour. The opening of the Cambridge subway in March, 1912, provided a striking improvement in transit facilities on the west of Boston proper and substantially transferred the entire central portion of Cambridge between Harvard Square and the Charles River Basin to the heart of the greater city.

The opening of the East Cambridge extension on June 1, 1912, relieved some of the most narrow and congested streets in the community and provided a marked improvement in service between the suburban territory tributary to the Lechmere Square district and the business center of Boston. Residents of many parts of Somerville were thereby brought five minutes nearer the downtown area than could be done by the Sullivan Square and elevated train route, and in connection with the beginning of service on the extension important improvements were effected in the transfer facilities at the North Station between surface and subway cars and elevated trains operated to widely varying destinations.

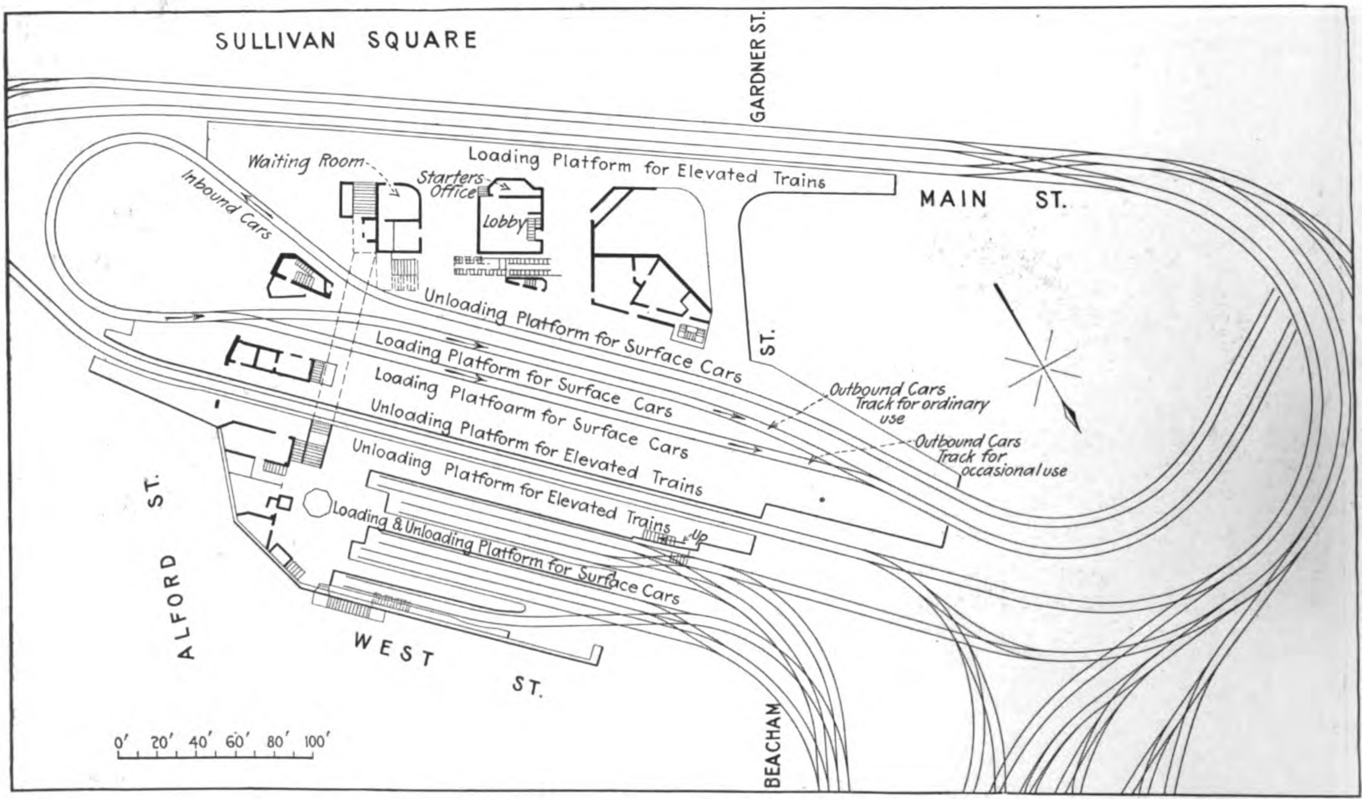
The Boylston Street subway, now under construction by the Boston Transit Commission, will relieve one of the most congested thoroughfares in the city and furnish greatly improved transit facilities between the suburban districts of Allston, Brighton, Brookline and parts of Newton, Watertown and Waltham and the business district. It is



Boston Improvements—Train Shed at Sullivan Square Terminal; Passages to Southbound Train Platform at Right; Bridge at Rear

estimated that a saving of about ten minutes in running time will be effected in each direction, compared with the present surface schedules, and in the rush hours the economy in running time will appear still more marked. The subway begins at an incline in Commonwealth Avenue near Charlesgate West, and after passing under an outlet of the Fenway watercourses continues under Newbury Street to Massachusetts Avenue, after which it runs diagonally into Boylston Street and thence follows a straight line eastward under the Back Bay, passing through Copley Square, and approaching Park Street via the Public Garden and Boston Common district, terminates, according to present plans, at Park Street, which is the most important traffic center on the system. The details of the Park Street terminus have not as yet been determined.

The extension of the Beacon Hill tunnel, or Boston connection of the Cambridge subway, to the South Station, now under construction, will at once effect a great reduction in the time required to reach the largest railroad terminal in Boston from the Cambridge and outlying districts, besides providing easier and quicker access from Back Bay points through transfer facilities at Park Street. At present the South Station can be reached for a single fare by a roundabout route from Park Street, involving a surface transfer at Bolyston Street, or by a circuitous trip through the Tremont Street subway and over the Atlantic Avenue elevated lines. The time required to make this journey is little, if any, shorter than that imposed by a direct walk between the two stations, but with the opening of the subway extension the South Station will be brought within three minutes of Park Street and within eleven minutes of Harvard Square, Cambridge. Similarly, a notable reduction in running time will be effected by the further extension of the subway from the South Station to Andrew Square for residents of South Boston and Dorchester, at present largely dependent upon surface line routes in entering and leaving the business center.


SULLIVAN SQUARE
GARDNER ST.
MAIN ST.
Waiting Room
Starters Office
Lobby
Loading Platform for Elevated Trains
Inbound Cars
Unloading Platform for Surface Cars
Loading Platform for Surface Cars
Loading Platfoarm for Surface Cars
Unloading Platform for Elevated Trains
Unloading Platform for Elevated Trains
Up
Loading & Unloading Platform for Surface Cars
ST.
Outbound Cars Track for ordinary use
Outbound Cars Track for occasional use
ALFORD ST.
WEST ST.
BEACHAM ST.
0' 20' 40' 60' 80' 100'

Boston Improvements—Plan of Track Layout at the Sullivan Square Station

The Malden extension of the elevated lines from Sullivan Square will be 3 miles long and will reduce the running time between Malden Square and Sullivan Square to six minutes, the present schedule of the surface cars being sixteen minutes. A station will be provided for the populous city of Everett at an intermediate point in the line. With the completion of this extension the company will have in operation eleven continuous miles of double-tracked elevated structure between Malden and Forest Hills, and the time of transit from terminus to terminus will be about thirty-five minutes, compared with about one hour and twenty minutes by surface cars under the most favorable conditions.

The extension of the East Boston tunnel to an outlet in the West End in the neighborhood of Hancock Street will provide additional facilities for one of the most densely populated districts of the city of Boston, and will connect the Bowdoin Square region with the north and south rapid transit service. At present the traffic capacity of the East Boston tunnel is considerably limited by the use of a stub-end terminal at Court Street, sixty cars per hour being the maximum. The completion of the extension, which will be about ½ mile in length westward from Scollay Square, will furnish an outlet permitting a much greater freedom of car movement in the tunnel and will enable the company to establish a through service, if it considers it expedient, between East Boston and Cambridge.

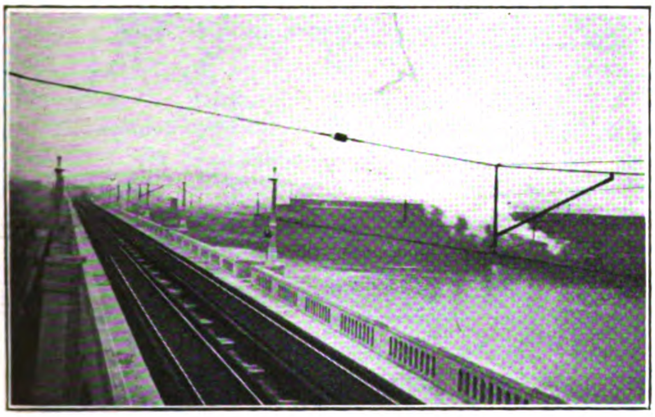
The improvement in rapid transit facilities in recent years has resulted in a reduction in the one-way running time to the figures given in the following table, which shows the schedules and distances involved between various outlying rapid transit terminals and the business center of the city. The interstation time and distance are also given for the elevated train service between the North and South steam railroad terminals.

RUNNING TIMES ONE WAY ON PRINCIPAL RAPID TRANSIT RADII

Between	Miles.	Minutes	M.P.H. Schedule Speed
Forest Hills-Summer Street..........	4.8	15½	18.6
Dudley Street-Summer Street.........	2.26	7½	18.1
Dudley Street-South Station.........	2.95	8	22.1
North Station-South Station.........	1.75	7	15
Maverick Square-Court Street........	1.42	5½	15.5
Harvard Square-Park Street..........	3.25	8	24.4
Sullivan Square-South Station.......	3.08	11	16.8
Sullivan Square-Milk Street.........	2.31	9	15.4
Lechmere Square-Scollay Square......	1.06	6	10.6

IMPROVEMENTS AT SULLIVAN SQUARE

The improvements at the Sullivan Square elevated station were outlined in the ELECTRIC RAILWAY JOURNAL of Dec. 18, 1909, page 1218, and were placed in service in August, 1912. In brief, the station was rearranged to provide for the separation of inward and outward traffic; new platform facilities were put into use, and the installation as a whole was altered to be in readiness to handle the train service on the future extension to Everett and Malden. The surface cars, formerly berthed on the west side of the train shed on stub tracks, are now operated around a loop with complete separation of their unloading and loading functions, and the incoming and outgoing trains make separate stops for unloading and loading at platforms connected chiefly by an overhead bridge. On the east side of the train shed the surface car service remains substantially as before, but temporary arrangements have been made to permit the loading of elevated trains on the main arrival track from surface cars on the east side of the train shed, prior to the opening of rapid transit service to and from Malden. The interurban car service on the lower level of the station has also been much increased. The accompanying plan of the station shows the final arrangements adopted, which include the relocation of the train starter's office to the west or loading train platform and which provide for a substantial increase in the space available for the public on the western platform areas of the building. The elevated tracks are arranged to permit looping trains through the station or continuing them to Malden upon the completion of the extension to that city, and as stated before, the conditions have been much improved on the public platforms by the establishment of service in and out of Boston via the East Cambridge viaduct.

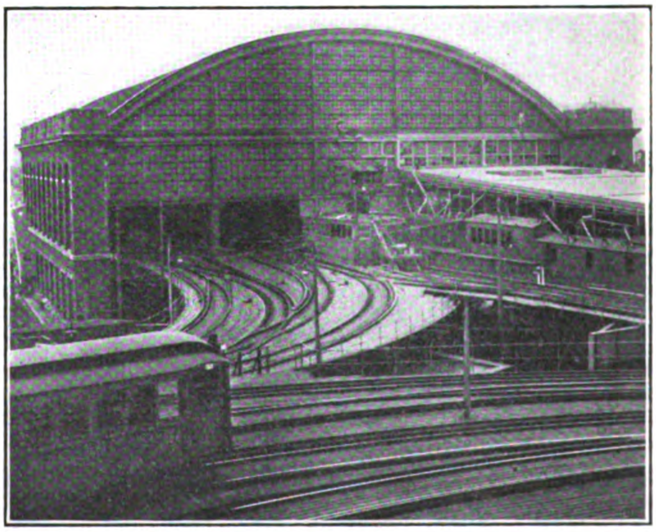


Boston Improvements—East Cambridge Viaduct Extension from Drawtender's Tower

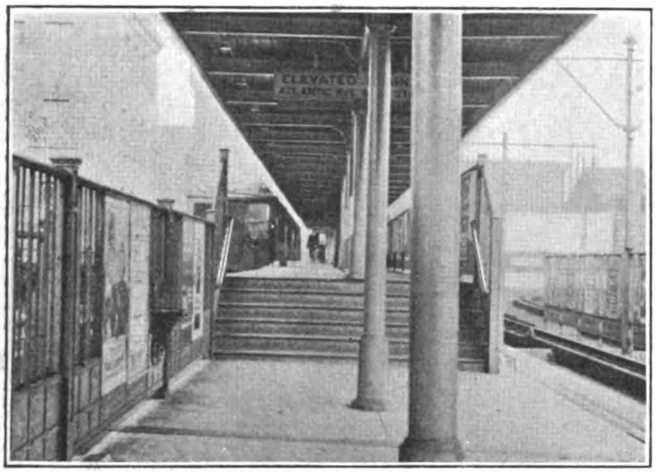
The southbound train platform at Sullivan Square affords the most extensive accommodations for passengers of all those on the system. It is 350 ft. long and about 12 ft. wide at its extreme northern end, the width increasing to a maximum of nearly 60 ft. on the southern end. Three passageways from 15 ft. to 30 ft. in width connect the train side with the portion devoted to surface car unloading, and in addition a stairway 10 ft. wide connects with the bridge utilized by passengers on the east side of the main train shed. Eight-car trains can easily be loaded at this platform, and it is equipped with a waiting room, news stand and other public conveniences. On account of the frequency of the train service it was unnecessary to provide more than nominal waiting room facilities. The platform is connected with the surface or street level below by two ascending type Otis escalators operated at a speed of 80 ft. per minute and having a capacity of 4500 passengers per hour each. The escalators are of the step type, with treads 16 in. deep and 24 in. wide, the vertical rise of each escalator being 21 ft. 9 in. and the length of the incline 43 ft. 6 in. Each escalator is driven through gearing by a 15-hp, 550-volt d.c. motor located in a concrete chamber off a mezzanine floor under the trainmen's lobby, shown in the plan already mentioned, behind the starter's office. These moving stairways are operated continuously during the hours of train and car service. By furnishing a quick means of ascent from the discharging surface cars which enter the terminal on the street level, they do away with traffic congestion on the loading and unloading areas served by the latter cars.

Boston Improvements—Southbound Train Platform, Sullivan Square Terminal

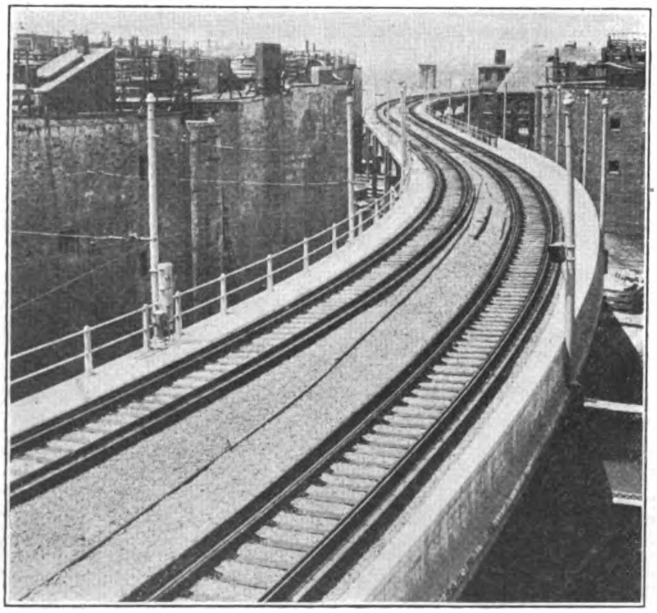
The west train platform is overlooked by a starter's office 8 ft. wide and 25 ft. long, raised about 6 ft. above the platform level and equipped with large bay windows commanding an unobstructed view of all approaching trains. The starter's office is furnished with one Bell and two company private telephones, two receiving and sending telegraph sets connected with the dispatching offices, towers and other important operating centers, a track model 6 ft. long of the elevated lines entering and leaving the station, with 3-cp, 10-volt, 5.8-watt miniature lamps located in the positions corresponding to the automatic block signals outside the terminal for a distance of about 1¼ miles on the approaching side of the elevated structure, and a number of switches and keys controlling the operation of platform destination signs, train gongs and bells, and miniature lamps indicating the elevated train route displayed in the



Boston Improvements—Extension of West Surface Car Platform at Sullivan Square to Handle Additional Traffic terminal over the arrival track in the center of the train shed. The latter indicator is operated manually from an interlocking tower which controls the switch and signal positions on the surface car approach tracks and it is illuminated by ten 8-cp, 55-volt lamps. The route signs set up from the starter's office are controlled by electromagnets governed by switch positions set by the train starter on duty at the bay window.

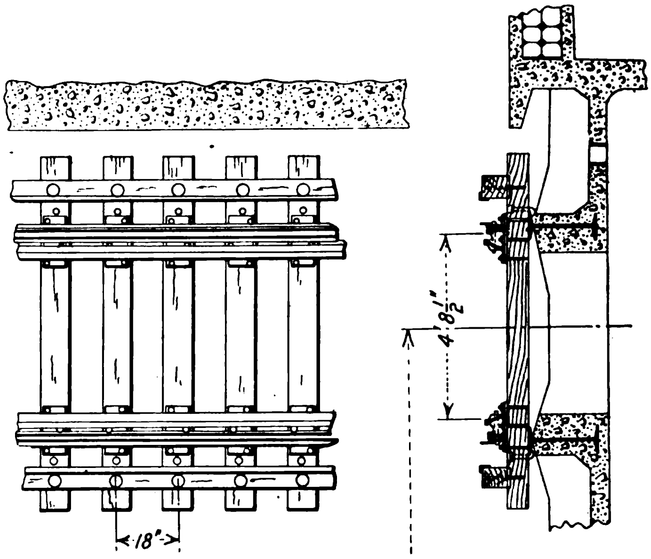

Boston Improvements—Shuttle Train Platform for Short Connection Between Atlantic Avenue Trains and Viaduct Car Platform

The main train shed is lighted by about thirty 660-watt inclosed-arc lamps of the direct-current type, hung about 21 ft. above the platforms. The latter were extended on the west side of the station to a total length of about 365 ft., and the space now available permits fourteen surface cars to be loaded on this side of the building at any one time. The platform extensions are illuminated under an additional roof, shown in the engraving on page 361, by 16-cp incandescent lamps placed in rows about 14 ft. apart, the lamps being about 6 ft. apart longitudinally and about 14 ft. above the floor. The bridge connecting the east platform with the west train platform crosses the train shed at its southerly end at a height of 15 ft. above the floor. It is 11 ft. wide and is provided with illumination by ten 16-cp lamps carried 9 ft. above the floor and mounted on standards at the railing. A locker room for trainmen is provided under the westerly platform. At Sullivan Square an emergency lighting connection is made with the local central station service, so that the platforms will not be thrown into darkness in case of an interruption of the regular railway service.

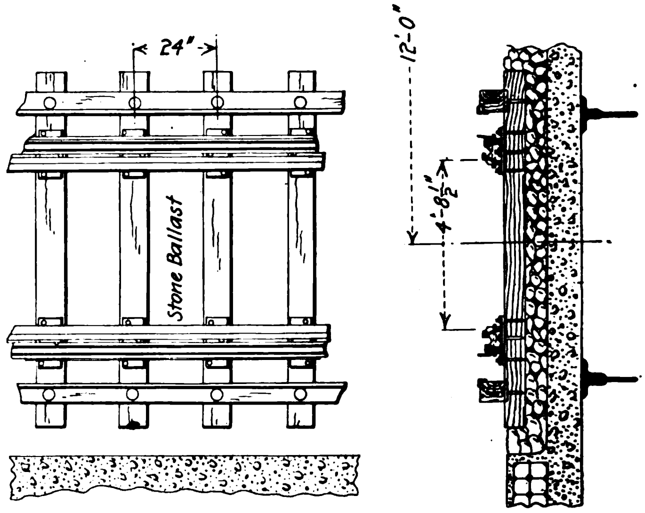

Boston Improvements—Elevated Section of East Cambridge Extension

EAST CAMBRIDGE VIADUCT, TRACK AND DRAWBRIDGE

The East Cambridge extension illustrates the latest practice of the company in the block signaling of surface cars and in track and roadbed construction for viaduct service. Furthermore, it is a striking contribution to the bridge architecture of Boston. The most conspicuous feature of the extension is a reinforced concrete viaduct about 1700 ft. long located on the down-stream side of the Charles River dam and provided with a two-leaf bascule drawbridge of the Strauss trunnion type. The viaduct is one of the most imposing street railway bridges in the world. The total cost of the extension, which consists of an elevated section running westward from the North Station and approaching the viaduct proper after a turn to the north from Causeway Street, besides the viaduct itself, was about $3,500,000. This viaduct has eight spans and is built with a clear open space beneath from end to end, so that future longitudinal use of the under area may be had if desired. The general design of the bridge was the work of Peabody & Stearns, of Boston, architects for the Boston Elevated Railway Company. The design was evolved from a long and careful study which included various materials of construction and



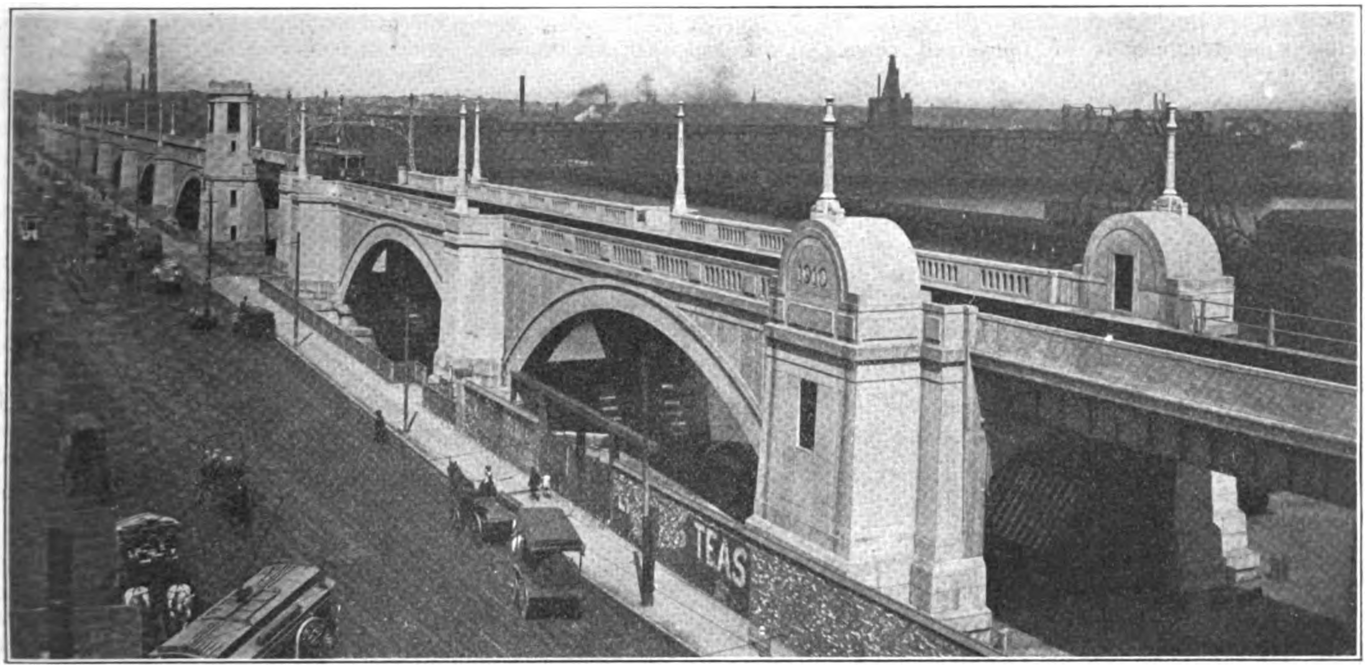
Half Plan and Section on Charles River Bridge



Half Plan and Section on Elevated Structure

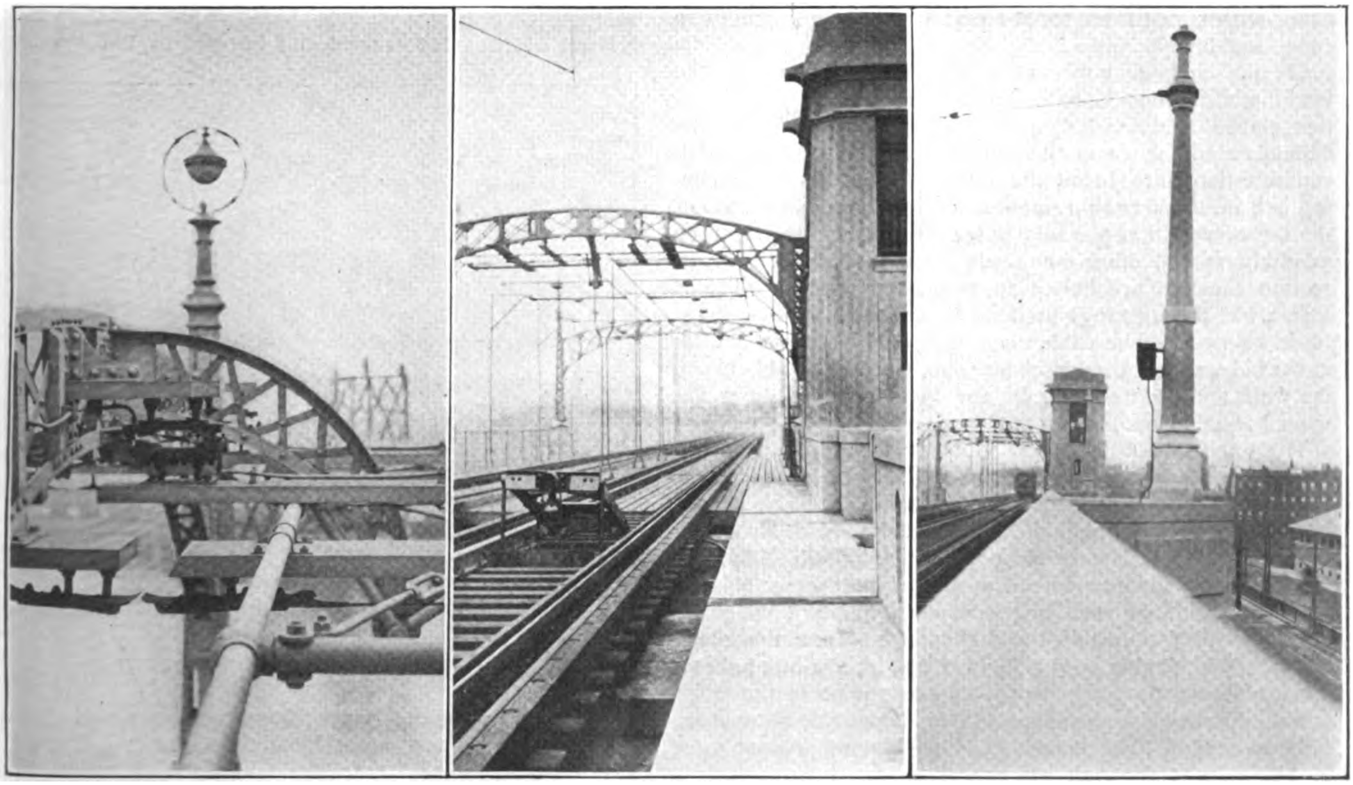
Boston Improvements—Typical Cross-Sections on East Cambridge Extension

different span lengths. On account of the established location of the lock of the Charles River dam, the draw had to be placed eccentrically in the bridge. An ordinary steel elevated structure would have been the most direct and economical method of providing for the clear passageway below, but the inferiority of the appearance of such a construction necessitated its being ruled out. The original design for the floor was a solid reinforced concrete slab carrying ballast. This was abandoned mainly for the reason that it would have been troublesome to free it from snow, although incidentally the saving in weight by using the type of open floor adopted was of great advantage in reducing the load upon the foundations. On the bridge proper the floor is of the open type, as shown in the accompanying drawing, while a ballasted floor is used on the elevated railway section approach to the viaduct.



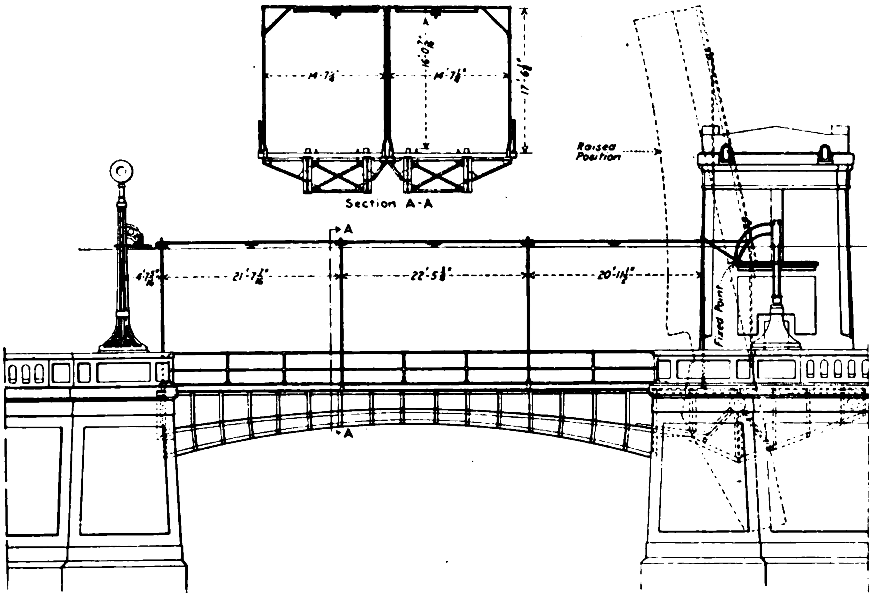
Boston Improvements—General View of Viaduct on the East Cambridge Extension

Following the decision to use an open floor on the viaduct, the possibility of using reinforced concrete stringers to carry the ties was considered but was not adopted. It was thought that it would be difficult, if not impracticable, to get the tops of these members sufficiently true to line and grade to secure uniformity of cross ties, and the easy renewal and attachment of ties would have presented grave difficulties. In the construction adopted, in which steel I-beam stringers were embedded in concrete, a standard elevated railway floor system was made possible. The



Boston Improvements—Installations on the East Cambridge Extension, Showing Feeder Tap Contact at Draw, Motor-Operated Track Bumper and Block Signal Approaching Draw

foundations are of concrete carried on 5790 wooden piles. The bridge is 31 ft. wide between piers. On account of the failure in the Boston district of concrete exposed to salt water it was decided to face the piers with granite from a grade 2 ft. below mean low water to a point 5 ft. above the finished roadway on the dam. Above this finished grade the superstructure is of reinforced concrete made of crushed Chelmsford granite and granite dust. The elevated structure on the extension is carried over Prison Point Street, the tracks being supported by four plate girders of 72-ft. 8-in. span and 6 ft. depth, the outsides being provided with balustrades formed of lattice girders incased in concrete.

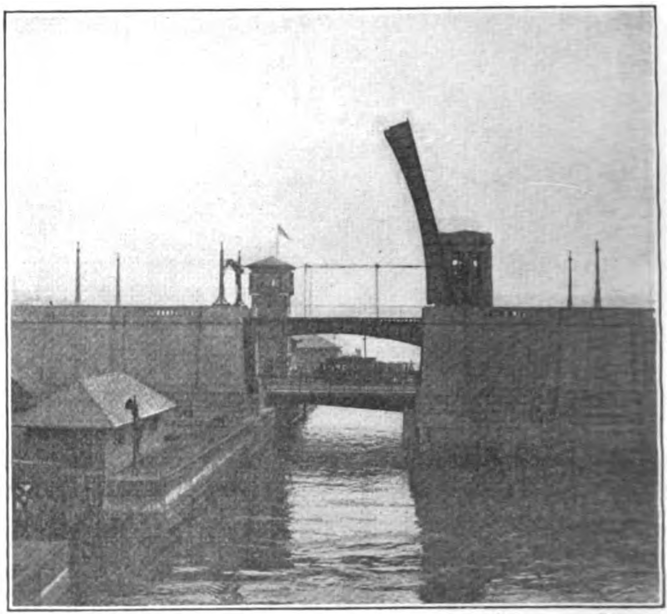


Boston Improvements—Pantograph Mechanism on Draw Span of the Charles River Bridge

On the elevated structure section of the extension the track is laid upon 6½-in. x 8-in. x 8-in. treated yellow pine ties placed 24 in. apart on centers in stone ballast, the ballast extending from the top of the tie to the top of a concrete floor 6 in. below the bottom of the tie. The flooring is 8 in. thick and on one side surrounds a cable conduit the top of which is placed 3 in. below a footwalk for track maintainers and other employees. On the bridge or open section the ties are bolted to 20-in. longitudinal I-beams 4 ft. wide, the openings between floor beams varying from 12 ft. to 14 ft. The cable conduit is carried under a walk at the side, a clearance of about 6 in. being allowed between the walk and the tie end. On the open section the ties are spaced 18 in. apart on centers.

The extension is built for double-track service, and the track consists of 33-ft., 85-lb. A. S. C. E. rails laid in Duquesne joints and fastened to the ties with screw spikes. Inside guards are provided throughout the entire structure, these being in each case composed of a 57½-lb. Z-bar inclined toward the service rail at an angle of about 60 deg. On the outside of each rail head a wheelguard weighing 47 lb. per yard is installed and about 6 in. from the guard a 6-in. x 8-in. timber with a ¼-in. x 2½-in. x 2-in. angle on the inside edge is bolted to the ties as shown in the track cross-sections. An elevation of 3 in. is provided for outer rails on curves. The service rails are bonded at each joint by two 300,000-circ. mil copper bonds.

Two No. 00 B. & S. trolley wires are used, one over the center of each track. A section of about 1000 ft., including the bascule approaches, is of catenary construction, the standard span being about 150 ft. Reinforced concrete trolley poles are used on the bridge, these being about 20 ft. long. They comprise in each instance a standard iron pole incased in concrete sheathing. The trolley poles were cast in a vertical position, the reinforcement being attached to the iron pole itself. Wooden suspension braces are used on the catenary section. The messenger cables are of 5/16-in. steel and stranded. At each span a ½-in. cross-suspension steel cable is used. The trolley is suspended about 18 ft. above the rail with both types of construction. On the ordinary overhead trolley section of the extension the span between successive cross suspensions is about 50 ft. Where the draw occurs the trolley wires are supported by a pantograph which folds up with the draw and is designed to keep the trolley taut at all times. The pantograph is composed of 2-in. extra heavy wrought-iron pipe framing with malleable-iron swiveled ball fittings and cross bracing of ¾-in. diagonal wrought-iron rods fitted with sleeve nuts to permit adjustment of tension. The trolley pans are attached to wrought-iron bases carried by the framing, and the latter is supported by pipe columns hinged at top and bottom and arranged to fold toward the deck of the bascule leaf as the latter is raised. The feeder tap contact at the end of the draw to supply power to the draw sections of trolley wire consists of a pair of semi-elliptical copper contacts carried on phosphor-bronze springs supported on slate bases, the latter being supported by bolts on 3-in. maple strips which are attached respectively to the fixed and movable portions of the draw structure. A view of this device is shown in a halftone view on page 363, and the main features of the draw pantograph are shown in an accompanying drawing.

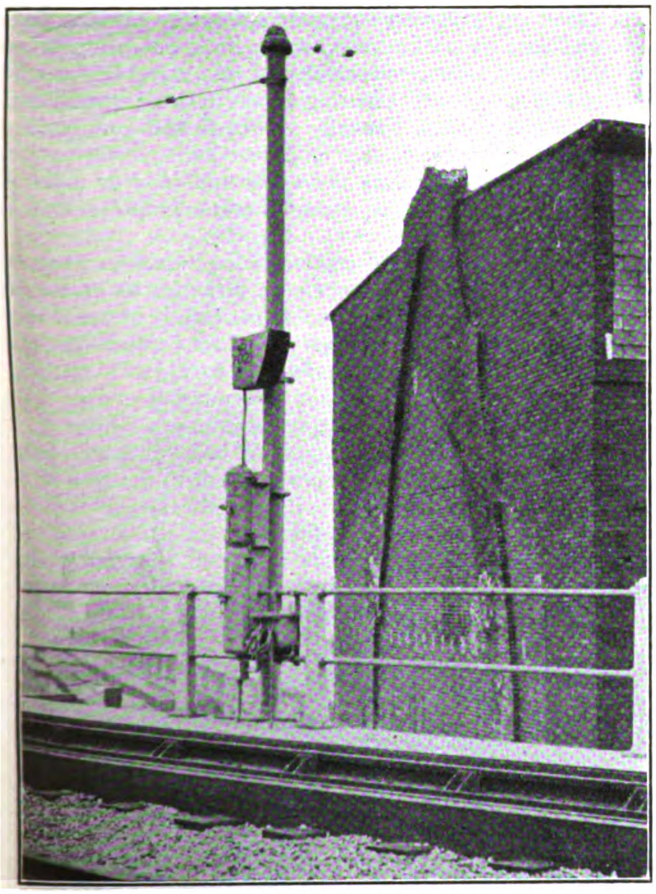


Boston Improvements—Draw Open on Outbound Track, East Cambridge Extension

The draw proper is of steel construction and is 75 ft. in over-all length. It is raised and lowered by two Westinghouse 40-hp, 550-volt, d.c. motors located, with gearing, brakes and rheostats, in the lower portion of a three-story drawtender's cabin of reinforced concrete situated at the side of the viaduct. The draw is equipped with an underhung or pivoted counterweight weighing 110 tons and is provided with a lock operated by a 3-hp, 550-volt, d.c. motor located under the roadbed on a covered platform and connecting with the lock shaft by a worm gearing. The bascule leaves may be raised separately or together, and while both 40-hp motors are ordinarily operated in raising the draw but one is necessary for the work.

A special feature of the draw, which was described in the ELECTRIC RAILWAY JOURNAL of Sept. 21, 1912, page 461, is a motor-operated bumper located in the center of the approach to the opening on each side and about 30 ft. from the bascule. Each bumper consists of a riveted steel frame pivoted to two castings bolted to the ties. Normally the top of the frame is a little below the top of the rail, but before the draw is raised a 3-hp motor raises the bumper in the track, completely blocking the passage of the car, the frame forming an angle of about 20 deg. against traffic. About ten seconds are required to raise or lower the bumpers.

The control of the draw movements and of the locks, bumpers and signals governing the approach of cars is centered in an operating room in the drawtender's tower, where a three-panel switchboard is mounted parallel to the tracks, so that a clear view can be had in each direction. The lock, signals and main motors are all interlocked to prevent any possible accident. In the cycle of opening and closing the draw all approach signals are set at danger by the operation of hand levers in an interlocking machine in the tower; the bumpers are then raised, the bridge leaves unlocked and the bascule opened. In closing, the reverse takes place. The interlocking is greatly facilitated by the use of contactors in the more important circuits. The bumper motors start on line voltage without the use of rheostats. Magnetic brakes are provided on the main draw motors, and in addition an emergency braking outfit is installed, with foot lever control in the operating room. Indicating lamps are provided to show the draw operator the exact status of all apparatus, and an automatic bell signal, which is continuously in circuit when the draw is open, is in service. Emergency bell signals are also provided in boxes on the viaduct to enable the draw operator to call the attention of motormen in exceptional cases. The signals cannot be set free while the draw is raised. Between 6:15 and 9:10 a. m. and between 4:15 and 7:40 p. m. the draw cannot be opened on account of the rush-hour traffic then handled.



Boston Improvements—Typical Block Signal, East Cambridge Extension

The draw was built by the Pennsylvania Steel Company, of Steelton, Pa., and the interlocking equipment was supplied by the Union Switch & Signal Company, of Swissvale, Pa. The entire operation of setting the danger signals, unlocking the draw, raising the bumpers and the draw itself occupies less than a minute. Electrically illuminated navigation signals are provided with control from the operating room, and the latter is connected with the Sullivan Square terminal station and with the locking room of the Charles River Basin by special telephone lines.

SIGNALS OF EAST CAMBRIDGE EXTENSION

The East Cambridge extension is provided with sixteen blocks of automatic signals controlled by track circuits and operated by alternating current. The signals are of the shielded lamp type, without semaphores, and utilize a single rail. Each signal consists of two bulls'-eyes, respectively green and red, surrounded by a narrow hood and mounted about 9 ft. above the rail on a trolley pole at the right of the track. Behind each bull's-eye are mounted two 8-cp, 55-volt incandescent lamps, the lenses being 5 in. in diameter in each case. The track circuits vary from 350 ft. to 800 ft. in length, and the relays, resistances and transformers used in connection with the several blocks are mounted at the side of the structure, the wiring being carried to and from the signal casings in pipe conduit. Energy for the operation of the signal system is supplied through the Kendall Square substation of the company, from which a 550-volt rubber-covered cable of from No. 4 to No. 0 section is run to the viaduct and thence along the elevated section to the North Station. Near the latter point, and beyond the Causeway Street entrance of the structure, two middle sidings are in service, and each of these is provided with a hand-operated electric bull's-eye signal, governing movements toward the main line and interlocked with the main-line signals outside. The signal circuits are run in the conduits at the side of the viaduct and elevated structure before mentioned. The power supply for the extension is independent of the surface and subway feeders in the vicinity. A 1,000,000-circ. mil feeder runs from the Lincoln power station to the draw and a 500,000-circ. mil feeder from the Kendall Square substation to the other side of the draw. There are no return cables in service on the extension. "Slow" signs equipped with five 4-cp lamps each are in service near the Causeway Street curve of the extension.

SECOND ARTICLE

A later article will describe the new transportation facilities at the North Station, the principal features of the new headquarters building of the Seventh surface lines division and of the new Stadium station, the present power demands of the Boston system and other improvements.

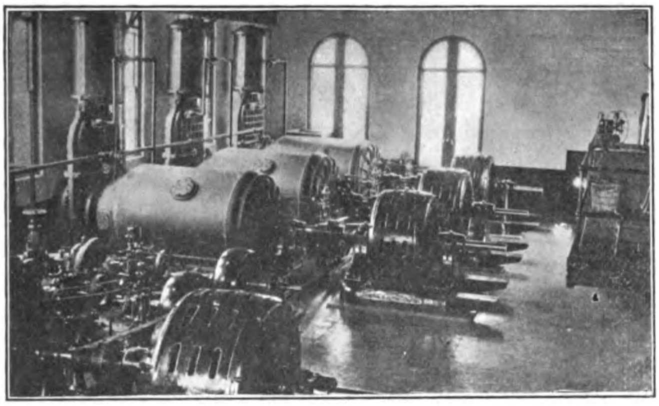
Sir E. White, a member of the London County Council, of which body he was chairman in 1911, said at a political meeting on Jan. 31 that the latest figures showed there was a falling off of tramways receipts of nearly £90,000. The loss on the workmen's cars was £85,000 a year. The tramways contributed an enormous sum to the tax funds of the district through which they passed, whereas the omnibuses contributed nothing. The actual cost which a tramcar had to bear in this way was £202 per annum, while the amount paid by the omnibus in the form of license and the petrol tax was only £50. Sir Edward expressed the opinion that it was a mistake for London to have been responsible municipally for the tramways. He would rather the tramways had been run by what they called the "trusts."

A Modern Power Network—the Waterbury-New Britain System*

A Description of the Waterbury-New Britain Power Generating and Transmission System—A Combination of Three Hydroelectric and Two Steam-Electric Plants with a Total Output of 26,200 Kw—Energy Is Transmitted at 11,000 Volts and 33,000 Volts to Be Converted at Substations for Use on Both A.-C. and D.-C. Circuits

BY CHARLES RUFUS HARTE, ASSISTANT ENGINEER NEW YORK, NEW HAVEN & HARTFORD RAILROAD

The present-day practice of supplying electrical energy for a large territory from a central station materially improves the efficiency of the service. On the other hand, the increased seriousness of a breakdown at the center leads the well-conducted system into extensive insurances. Spare capacity is installed to the extent of one or more main units; piping and wiring are so arranged that the service of any piece of apparatus can, in necessity, be taken up by the other machines of the same class, and, where practicable, connections are made with similar plants in adjoining territory. A system comprising all these methods of protection is that which supplies electrical energy to the Waterbury-New Britain district.



Connecticut Power—Interior of Bulls Bridge Station

BULLS BRIDGE HYDROELECTRIC PLANT

The original plant is the hydroelectric development on the Housatonic River at Bulls Bridge, just above Gaylordsville. The head of a narrow gorge gives ideal conditions for the low-arched concrete dam, while a low swale to the westward provides a large flood passage controlled by flashboards on the crest of the concrete spillway. From the dam a canal skirts the hillside on the east side of the river for a distance of some 2 miles, ending in a large forebay.

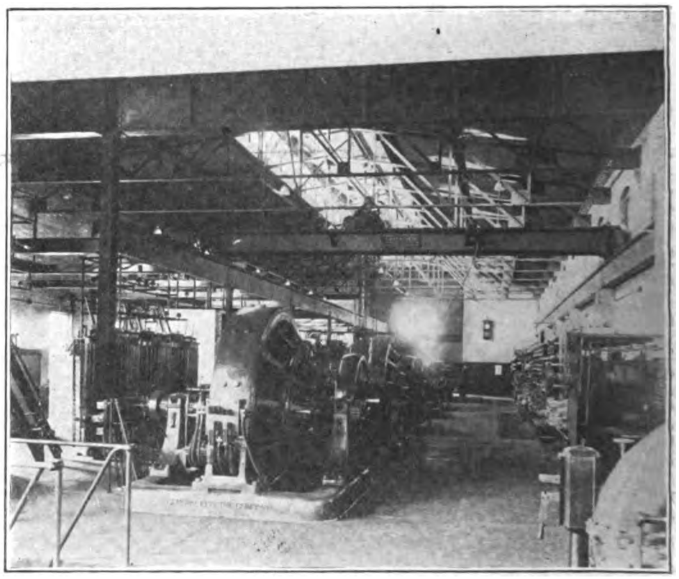
From the forebay the water is led to the station by a steel penstock 13 ft. in diameter to the first turbine connection and decreasing thereafter at each turbine connection to 5 ft. diameter at the last, after which it turns up vertically as a standpipe, with its lip at the level of the main dam crest, this standpipe serving both to assist in governing and to relieve the penstock from shocks due to sudden closing down of the gates.

This concrete station contains six horizontal main units, the water end of each consisting of a balanced pair of runners controlled by a type B Lombard governor, direct-connected to a General Electric revolving-field, three-phase, sixty-cycle, 1150-volt generator of 1000 kw capacity, running at 400 r.p.m. Field current at 110 volts is furnished by two exciters driven by independent cone-flume turbines, one having in addition an induction motor for emergency use. In the fall, when the eels are migrating, these smaller turbines, although of nearly 200 hp each, are at times actually choked to a standstill by fragments of the eels chopped up by them.

A 60-in. gate valve with hydraulic operating cylinder on each supply tap permits cutting out any main unit without interference with the others, and the completion of contracts already let for an additional penstock and standpipe each 8 ft. in diameter, with valve connections to the present penstock and part of the turbines, will permit operation of at least part of the plant under almost any adverse circumstances, besides greatly assisting in the task of governing. Incidentally, the 96-in. butterfly valves in the connections are among the largest of this type ever built.

Facilities for overhauling the apparatus and for making repairs are given by a hand-operated crane which spans the building.

The current from the generators is led by cables in floor conduits to two sets of busbars with switches so arranged that either bus can have any combination of generators and transformers connected through it. From these busbars the current passes to be transformed to higher voltages. A part is raised to 6600 volts for transmission to the New England Lime Company's plant at Boardman's Bridge, and a little later this line, operating at 11,000 volts, will both serve the lime company and furnish current to the New Milford Electric Light Company. By far the larger proportion, however, is stepped up through six 850-kw single-phase water-cooled transformers to 33,000 volts, at which potential are operated the lines to Waterbury, 27 miles away, and to New Britain, 50 miles distant. As there are seven transformers, much leeway is given for emergencies and repairs.



Connecticut Power—Waterbury Substation

TRANSMISSION LINE FROM BULLS BRIDGE

The transmission line consists of two three-wire circuits of stranded aluminum, those to Waterbury having conductors ½ in. in diameter, each circuit having its separate and independent pole line, except for thirteen poles in Washington, where right-of-way troubles compel the use of one line of poles for both. The poles are chestnut, the majority being 35 ft. long, the wires forming an equilateral triangle 60 in. on a side where but one circuit is on a pole, the triangle being 48 in. with two circuits.

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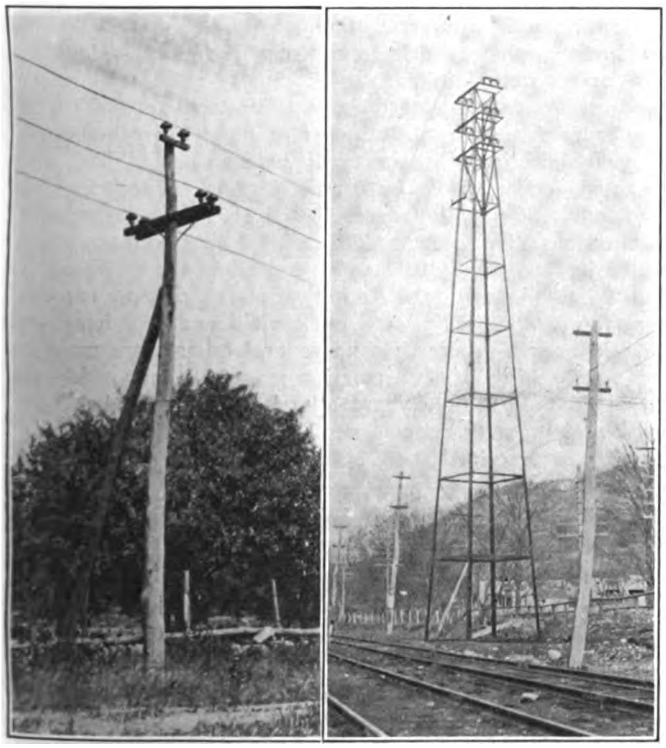
*Abstract of a paper read at a meeting of the Connecticut Society of Civil Engineers, New Haven, Conn., Feb. 12, 1913.

The insulators are designed for a working potential of 45,000 volts and are carried on an oil-treated oak pole top pin 3 in. square by 20 in. long, and by a 4-in. x 5-in. two-pin cross-arm. On angles the pole pin is replaced by a short two-pin arm set parallel to the general direction of the line. This arm is bolted against the pole without gaining and can rock a little to adjust itself to differences in pull in the adjacent spans. The Washington double-circuit poles have steel angle-iron arms and insulators 14 in. in diameter by 12 in., designed for 60,000 volts.

WATERBURY STEAM PLANT

At Waterbury a steam station containing two 1500-kw Westinghouse-Parsons, one 3000-kw General Electric-Curtis and one 4000-kw Allis-Chalmers-Parsons turbo-alternator, generating three-phase, sixty-cycle current at 2300 volts, is able to carry the load of the entire system, but normally takes only what the Bulls Bridge plant does not. The present turbine room has space for another unit when needed. The station is of brick, on concrete foundations, and its construction was notable chiefly for its speed, ground having been broken May 26, 1910, and the first unit started Dec. 18 of the same year. It is located on the Naugatuck River, which furnishes the condensing water, a low weir forming a suitable pool. The weir proper is of concrete, with a cut-off curtain of steel piling about 30 ft. deep.

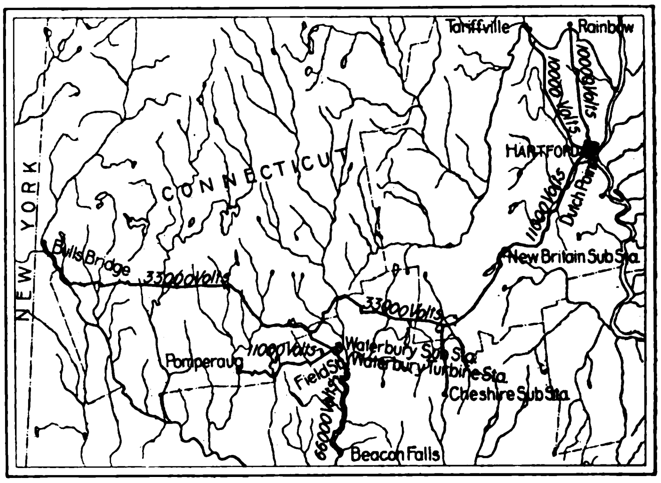
On the easterly side of the station, about 150 ft. from the river, which is on the westerly side, is a well 12 ft. in inside diameter, with concrete walls 1 ft. thick, the lower 8 ft. being pierced by a series of some 270 holes 3 in. in diameter. The lining has a steel cutting edge at the bottom. It was cast above the surface in sections 8 ft. long and was sunk by undermining the edge, which is at present 38 ft. below the surface.



Connecticut Power—Single Pole with Top Cross-Arm on Bulls Bridge 33,000-Volt Line, and 90-Ft. Steel Tower at Waterville on New Britain Line

Coal, in original cars, is delivered by the steam railroad to a private siding and is hauled by an electric motor to a sunken hopper, from which it goes, through crushers and screens, to a supply bin and then by traveling weigh hoppers to the Jones underfeed stokers.

The eight 500-hp Bigelow-Hornsby boilers are in groups of two on opposite sides of a firing alley and are equipped with Foster superheaters, while Sturtevant economizers behind the batteries utilize the last available heat of the gases after they have left the boilers. Forced-draft fans in the basement, one driven by a Terry steam turbine, the other by an electric motor, and engine-driven induced-draft fans in a gallery overhead insure proper movement to and out of the short steel stacks. The boiler room basement, in addition to the forced-draft apparatus, has an industrial railway for removing the ashes and contains the feed-water pumps and the main steam and water systems. The feed-water system is connected with the city service and the well, the latter being for emergency use only.



Connecticut Power—Map of Territory Tied in from Bulls Bridge to Hartford via Waterbury and New Britain

The turbo-alternators are carried on high concrete foundations pierced by arched passages in which are set the Alberger condensers, the pumps being on the floor just outside. The cooling water is led in from the head of the pool by a long open channel with concrete walls, through a screen chamber, into the intake tunnel, which is about 4 ft. square. A similar parallel tunnel delivers the discharge to the pool at the dam. The small turbo-alternators run at a speed of 3660 r.p.m. and the two large ones at 1800 r.p.m. The turbines effect their own cooling through a fan wheel on the main shaft and a system of ducts leading out of doors. Field current is furnished by a pair of turbine-driven exciters, each of 100 kw capacity.

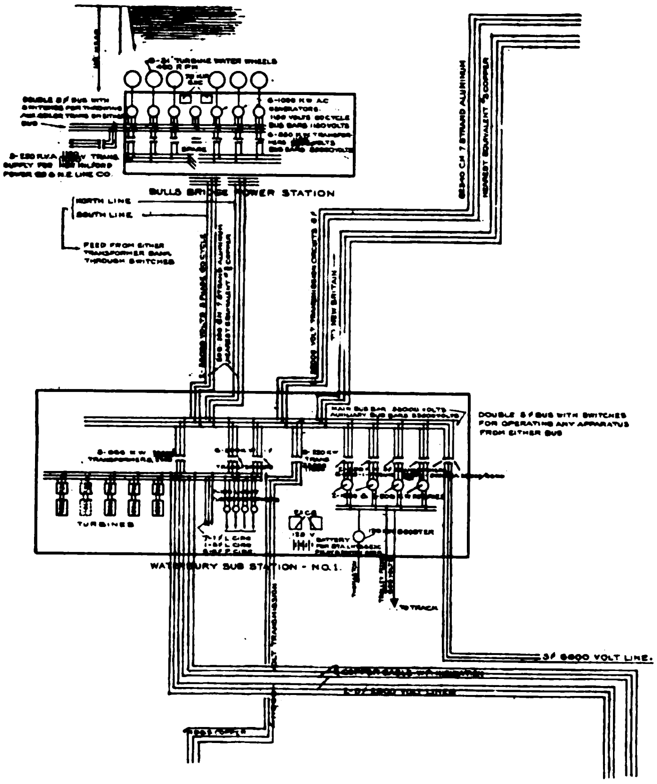
TRANSMISSION LINE FROM WATERBURY PLANT

The main units at the Waterbury plant feed into interconnected sets of 2300-volt busbars, which are connected through suitable air-cooled transformers to the 33,000-volt busbars. From the latter run two three-wire circuits of ⅜-in. diameter stranded aluminum wire to New Britain. For the first 2½ miles they are on the Bulls Bridge-Waterbury line poles, after which they branch off on a single-pole line, with a triangle of 48 in. on a side. The main lines go through to New Britain, a branch leaving at Milldale to feed the Cheshire substation. Except at Waterville, where a single span of 570 ft. clears the Naugatuck River, the plant of the Waterville Corporation and the Naugatuck division of the New York, New Haven & Hartford Railroad, there are no special constructions on this line. The Waterville span, in No. 0000 stranded hard-drawn copper cable, has a sag of 14 ft. and is carried by Archbold-Brady anchor towers 90 ft. high on concrete foundations. At New Britain the lines connect with 33,000-volt busbars, from which a series of air-cooled transformers feed the 2300-volt substation busbars, while three 500-kw transformers connect the system with the Hartford Electric Light Company's system some 10 miles away through a 10,000-volt transmission, overhead to the Laurel Street substation, Hartford, and underground in cable to the Dutch Point station.

PLANTS AT DUTCH POINT AND ELSEWHERE

The Hartford Electric Light Company also has a compound system. The main plant at Dutch Point has 7500 kw capacity in Westinghouse-Parsons turbo-alternators, generating two-phase, sixty-cycle current at 2300 volts. The Hartford-New Britain line is fed from this station by transformers, which not only step up the lower voltage but also change the two-phase current to three-phase current, or the reverse if New Britain is feeding Hartford.

The main power circuits and two other transmission lines are also taken off the Dutch Point busbars. The lighting service, however, is from the Pearl Street substation, to which go not only the 2300-volt feeders from Dutch Point but the two 10,000-volt transmission lines from the Farmington River hydroelectric plants, one at Rainbow, 9½ miles away, containing two 600-kw turbine-driven units operated under a head of 35 ft., the other at Tariffville, 10 miles away, with two 750-kw units operated under a 32-ft. head. The transmission line from this latter plant, of stranded aluminum ⅝ in. in diameter, is interesting because of its white porcelain insulators, a color very commonly used abroad but hardly ever in this country.



BULLS BRIDGE POWER STATION
NORTH LINE
SOUTH LINE
FEED FROM EITHER TRANSFORMER BANK THROUGH SWITCHES
TURBINE WATER WHEELS
1000 KW AC GENERATORS
7 STRAND ALUMINUM
COPPER
NEW BRITAIN
MAIN BUS BARS
DOUBLE 3 ɸ BUS WITH SWITCHES FOR OPERATING ANY APPARATUS FROM EITHER BUS
TURBINES
BATTERY
BOOSTER
WATERBURY SUB STATION - NO.1.
TO TRACK
3ɸ 6600 VOLT LINE.

Connecticut Power—Transmission and Distribution Between Bulls Bridge and Waterbury

SCHEME OF DISTRIBUTION

Briefly, then, this district is fed by five primary stations of an aggregate rated capacity of 26,200 kw. Within the limits of the transformers at each point current can be taken from the other plants, while duplication and interconnection of apparatus and lines permit the isolation of a broken-down unit with the least possible interference with general operation.

The substations change the current transmitted to them into the various forms for direct use, Waterbury exhibiting to the best extent the variety of such uses.

It has been noted that the turbo-alternators and, through transformers, the 33,000-volt transmission lines come to 2300-volt busbars, and that the connections are so arranged so as to give any combination desired. From these busbars are taken directly the 2300-volt lighting and power circuits, some current being used at this voltage, but the larger portion reducing to lower potential at the points of use through transformers. Fed from the same busbars a series of tub transformers furnish current of constant quantity for the series arc light service, the voltage varying with the number of lamps in use. Still another set of transformers reduces the potential to 430 volts for the rotary converters, which rectify the current and deliver it as continuous 600-volt supply for the trolley lines, a portion of this direct current operating a booster which raises the potential of the feed for the Thomaston trolley so that it shall be at the desired 600 volts when it reaches the end of the line. Finally current at 2300 volts is transmitted direct from these busbars to the Field Street substation, where transformers reduce it to 170 volts, rotary converters change it to 220-volt continuous current, and the connections give 110-volt and 220-volt current for the Edison three-wire lighting system. Here, too, as a safeguard, is a storage battery which, normally idle but connected to the line, supplies current to make up the deficiency if a sudden load exceeds the capacity of the rotaries, recharging as soon as the overload is past.

Besides these uses of the 2300-volt current there are two sets of transformers directly connected to the 33,000-volt busbars. One of these furnishes 11,000-volt current for transmission 8 miles to a substation on the Woodbury line, where transformers and rotaries deliver it as 600-volt continuous current for the trolley. The other set of transformers furnishes 6600-volt current for transmission 10 miles to Beacon Falls, but while this is also for trolley supply, instead of transformers and rotaries this substation has motor-generator sets. The alternating current drives synchronous motors direct-connected to 600-volt continuous-current generators.

Compared to some of the great Western networks with twenty or more large stations and hundreds of miles of transmission line, this is small indeed, but it has until recently stood alone as by far the largest network in New England. To-day, however, the Boston Edison and the Connecticut River Power Company are operating two great networks, one wholly of steam generation, the other mixed hydraulic and steam; the Amherst Power Company is pushing from Turner's Falls to Springfield and will have the lines in operation shortly, and several other large projects are approaching the construction stage. It may safely be predicted that in five years all of New England will be covered by power networks of the general character of the system described.

MIDDLE WEST UTILITIES BUREAU OF SAFETY

The Middle West Utilities Company, which is the holding organization for something over 230 plants situated in smaller cities and towns in Illinois, Indiana, Kentucky, Missouri, Oklahoma and the New England States, has organized a bureau of safety which will act in an advisory capacity relative to the various subsidiaries. These subsidiaries include electric lighting and power plants, gas plants, heating plants, ice-manufacturing plants, interurban railways, street railways and water-works plants. The diversified character of the properties has made it necessary to include in the organization inspectors familiar with possible safety appliances in each class. This corps of safety inspectors will organize local safety bureaus, will make addresses to the different local organizations relative to safety of operating methods, and will inaugurate a systematic plan of safety work on each local property. The work of the bureau will include not only the recommendation of different safety appliances but also a campaign of education relative to safer methods.

NEW ENGLAND STREET RAILWAY CLUB MEETING

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on Feb. 26, with President Thomas Lees in the chair, a total of 233 members and guests being present. The occasion was marked by the largest attendance in the history of the club except that at the annual banquets. Following the election of eight new members, the address of the evening was given by P. F. Sullivan, president Bay State Street Railway Company, Boston, Mass., his subject being "Scientific Management." Mr. Sullivan delivered an eloquent speech upon the importance of striving after increased efficiency in the larger fields of human progress, reviewing the development of modern civilization from the era of conquest to the present day and showing the necessity of co-operation among the forces working to carry the industrial world forward. He paid a high tribute to German methods of industrial, scientific and governmental administration and contrasted the inefficiencies of American national, state and municipal government with the former.

Turning more particularly to public utilities, Mr. Sullivan outlined the interrelation and mutual dependence of the public, capitalists and employees, sketching in bold strokes the need of a better understanding of the purposes and needs of each. Capital, he said, had been to blame for many of the misunderstandings which had borne fruit in labor troubles; it had voluntarily assumed many risks for which it had to bear the penalty, if there be one, and too often the interests of the employee had been overlooked. By recourse to the principle of collective bargaining, the employee had come to the front as a factor in affairs, and the future depended upon his education and upon the exercise of a spirit of fraternal interest and understanding by all parties. The education of foreign-born employees in the spirit of American institutions was a responsibility which the employer should no longer overlook.

Mr. Sullivan outlined the manner in which governmental inefficiencies and extravagance increased the cost of living, and he discussed the so-called vicious circle of wage increases to meet rising living expenses, followed by still further increases in the cost of daily life resulting from such additional wages. The lines forming the Bay State company's system paid in 1888 taxes amounting to 2.5 per cent of the gross income, and these could be compared with taxes of the present time which represented 6.4 per cent of the gross revenue. Had the same proportion been maintained, there would have been a saving last year of about $355,000. He added that in no other part of the world was the voting power of capital so small as in the United States, and to neglect to educate the voter was to fail to realize the possible efficiency of the man behind the ballot as a factor in the right conduct of affairs. Capital had been short-sighted where it had failed to train the human machine and to conserve its powers with the same skill and interest that it had applied to machinery in general.

The speaker called attention to the fact that twenty-six street railways in Massachusetts earned or paid no dividends, according to the last returns of the Railroad Commission. The causes were named by some as hostile legislation, an unreasonable public and labor difficulties; but if these companies had paid no taxes and if their wage disbursements amounted to only half the present totals, they would still be unable to pay dividends. These particular roads were built under a statute in which capital had almost a controlling voice. Capital was not forced to build, and it had to take the consequences of having done so. There were onerous conditions facing the transportation companies, but unfavorable as they were, worse experiences lay ahead unless the employer and employee could be brought together. No other capital was so poorly paid, he said, as the $200,000,000 invested in Massachusetts street railways.

Mr. Sullivan closed with an earnest plea for the harmonizing of labor and capital through the bringing about of a mutual understanding which will do away with the present threatened crisis in modern industry.

DESSAU-BITTERFELD 60,000-VOLT CABLE

Some experiences with the high-tension underground cable installation of the Dessau-Bitterfeld single-phase section of the Prussian State Railroads, as described in the Electric Railway Journal for Nov. 25, 1911, are presented by L. Lichtenstein in the Jan. 2 issue of the *Elektrotechnische Zeitschrift.*

The energy is transmitted from the power plant to the substation at 66,000 volts, and for this purpose there are available not only the overhead line but two underground cable lines, one of the latter being built by the Siemens-Schuckert company and the other by the Felton-Guilleaume company. Each of these three lines is sufficient to transmit the whole energy so that two lines are always held in reserve. Operation was begun in April, 1912, and since that time energy has been transmitted alternately over the two cable lines for periods of a week each, while the overhead line has been held in reserve. The distance of transmission is 2.5 miles.

The Siemens-Schuckert conductor is an aluminum wire strand of 0.155 sq. in. cross-section. The dielectric consists of impregnated paper and has a thickness of 0.5 in. Around the paper insulation is a lead armor covered with a layer of jute with a coating of asphaltum and lime. The permissible current is 240 amp. For this current the increase in temperature, when stationary condition has been reached, is 25 deg. C. The cable can transmit continually 14,400 kva. The same heating conditions and the same voltage drop could have been obtained with cable using a copper conductor of 0.088 sq. in. cross-section. Aluminum was chosen in order to increase the diameter of the cross-section of the conductor for the purpose of decreasing the effective electric field intensity at the circumference of the conductor. This is with aluminum 4200 effective volts per millimeter, while with copper it would have been 4790 volts per millimeter. The difference is 14 per cent. Of course, when using the copper conductor it would have been possible to get the same value of the electric field intensity by increasing the thickness of the dielectric. If that had been done, the internal diameter of the lead armor would have been 42.9 mm instead of 39 mm. The cable was made in lengths of 2460 ft. Tests of the cable made in the cable works show the insulation resistances at 15 deg. C. to be 4800 megohms per mile, the resistance at 15 deg. C. to be 0.44 ohm per mile, and the capacity to be 0.704 microfarad per mile. From this it follows that the dielectric constant of the insulating material is 3.35.

Each cable was placed in a stoneware pipe filled with sand. After the cables had been laid underground the capacity was found to be 0.2728 mf per mile, the insulation resistance 8620 megohms per kilometer and the resistance 0.424 ohms per mile. From this value of the resistance it follows that the temperature of the cables in the ground is 4 deg. C. (39 deg. Fahr.). This is in good agreement also with the high insulation resistance of 13,792 megohms per mile (against 4800 in the test in the plant). After continuous use for a year and a half there was an accident to a high-tension transformer, and the use of the cable had to be discontinued temporarily. A fault was found in the transformer and in the cable. On this occasion the electric constants of the cable were re-determined and it was found that they had not changed at all in the year and a half they had been in operation and that the cable was otherwise in good condition. The fault must, therefore, have been due to external forces. This is also probable because the other cable developed a fault shortly afterward, while both have since operated satisfactorily.

Central Electric Railway Association

An Account of the Proceedings at the Annual Meeting Held at Indianapolis, Ind., Feb. 27-28—Abstracts Are Presented of Papers and Reports on Car Equipment Maintenance, Fare Registration, Coupler Installation, Interline Freight, Central Electric Traffic Association, etc.—The Discussions, as Telegraphed, Are Also Included

ECONOMIES IN MOTOR MAINTENANCE

BY J. C. THIRLWALL, RAILWAY AND TRACTION ENGINEERING DEPARTMENT, GENERAL ELECTRIC COMPANY

An efficient and regular inspection of motors is the prime factor of economical maintenance, yet a first-class system of inspection need not be expensive. Modern motors, equipped with auxiliary oil wells, should run under ordinary conditions at least 1500 miles between armature bearing oilings, which in ordinary city service would bring them into the shop only about twice a month, on heavy interurban service possibly once a week. The regular oiling of bearings is, of course, an essential, and in most cases the cars are in the shop when this is done. At such times it is a matter of but a few minutes' work for one man to remove the commutator cover, to wipe off the inside of the shell, the commutator and the brush-holder insulators with dry cheesecloth, to examine the brushes for wear or breakage and to make certain that the hammer spring tension is what it should be. The ordinary workmen should be able to make this inspection on four-motor equipments in average condition within a half hour. The cost per motor mile of such inspection is almost negligible, amounting to less than $1 per motor per annum under the heaviest service.

INSPECTION AND LUBRICATION

In the case of the non-interpole motors, without auxiliary oil wells, the charge will be larger, both because more frequent oilings are necessary and because more should be done to the motor itself at such periods. On account of their increased tendency toward heavy flash-overs, every precaution should be taken to reduce the number of such defects and to minimize their effects and severity. In nearly every case a flash-over is the direct result of heavy sparking or flashing between the commutator and brushes, or between the brushes and brush holder, caused by poor contact or poor commutation. This generates a gas which fills the air space between the commutator or the brush-holder and the nearest exposed portion of the shell or the bare commutator V-ring. Current carries across this gas-filled space, setting up an arc which may go across to the shell or to the V-ring, or from the positive to the negative brush holder. In either case it must go to some uninsulated part of lower potential in order to carry over sufficient current to do any damage.

It is impossible to prevent sparking under the brushes in the case of non-interpole motors, and especially where the commutators are not slotted, but it is possible to prevent this spark from developing into severe "flash-overs" by the complete insulation of all exposed parts on which an arc might find a ground. For all practical purposes such an insulation can be provided by repeated applications of insulating paint or varnish, using a small amount of gasoline for a dryer. This latter point is essential, as the paint must be dry before the car leaves the inspection pit. The paint should be applied to the entire inner surface of the shell that can be reached through the commutator and openings, top and bottom. I should advise at least fifty coats, applied consecutively at each inspection on classes of motors that have had flash-over records, and it is important that before applying each coat the surface shall be carefully wiped clean with a dry cloth, an especially thorough job being done where there are any traces of oil on the shell interior. This should be supplemented by the liberal use of shellac upon the commutator string band and V-ring and upon the brush-holder bodies where they extend closest to the shell. Care must be taken, of course, to see that neither paint nor shellac gets upon the commutator or brushes, and in every case the inspector should finish by carefully wiping off both. The use of compressed air for blowing out the entire interior of the motor, after removing the bottom hand-hole plate, is also excellent practice, where the shop has facilities for such cleanings. Blowing should always precede all painting or shellacking and be the first step of the inspector's work. Inspectors should be provided with small spring balances to maintain uniform brush tension on all motors for particular service.

All this sounds like a lot of work, but as a matter of fact there are shops in which these points are being daily covered and where one man averages four motors per hour, the cost for labor and material together averaging approximately $2.50 per annum per motor, making approximately 40,000 miles a year. I will illustrate the economy effected by this system of maintenance. The motors in question had been in service from eight to eleven years. They averaged, for at least two years, four flash-overs per motor per year, each of these flash-overs being serious enough to cause trouble reports to be turned in by motormen. Grounded and short-circuited armatures averaged two per year per motor. A fair annual cost figure for repairs was approximately $50 per motor.

One year after the commencement of the methods I have mentioned the flash-overs had decreased by nearly 90 per cent. The number of armatures removed and sent to the armature room for repairs had decreased 70 per cent, and the repair bills for the entire year following showed a nearly proportional decrease, averaging only about $20 per motor, including the cost of bearing renewals. In other words, an annual cost of $30 per motor was saved by an increased expenditure on inspection of about $1 per motor, a very good return on the investment. While other factors contributed toward this result, they were mainly refinements of existing methods. Thus in all of the older types of motors a large part of their defects, in particular grounding of coils or of brush holders and short-circuited commutators, is caused by oil from the bearings working along the shaft into the motor, where it is spattered over the entire interior and not only causes rapid deterioration of the coil insulation but facilitates the accumulation of brakeshoe and carbon dust on the brush-holder insulators, on the commutator string band and between commutator segments. To keep oil from the interior of the shell has been one of the most serious problems of the designing engineer, and great improvements in this respect have been made in motors produced during the past few years. On the older types the design is such that any great surplus of oil passing through the bearings above that actually required for proper lubrication is certain to enter the motor in greater or smaller quantities. To keep this to the least possible amount, it is essential that the minimum amount of oil consistent with the prevention of hot bearings should be carried in the wells. A shop foreman can make no better use of a portion of his time than in determining what this minimum shall be and in educating his oiler to the stage where he will use the specified amount at each oiling, no more and no less. The greatest care should be given to the commutator and bearing. Experience and common sense show that the work done and the heat produced at the commutator and armature bearing are much less than at the pinion end, and therefore less oil is required for proper lubrication. In general, it is safe to say that this amount should be approximately three-fifths of that necessary for the pinion end. On motors with auxiliary wells, where the actual level can be measured, the oil level can be carried fully 1 in. lower. On the older types a specified amount must be periodically added, and measures holding the exact quantities determined by the foreman should be provided for the oiler to insure that he will apply the correct amount at each end. The motor inspector should closely watch signs of oil inside the motor and should call attention to the fact when he finds one in this condition. Any great number of motors so reported will be a fair indication that too much oil is being added to the bearings. The reduction of the amount used will not only decrease the lubrication bill but the cost of motor repairs as well, the latter to a very striking degree.

The prevention of hot bearings, or of damage caused by worn bearings, is by no means solely dependent on the amount of oil used. The fit of bearings, alignment of the motor and the proper meshing of gear and pinion are all points that enter into the problem. The proper preparation of the waste, where such is used, the grade of felt used in feeders, or the adjustment of the feed on oil cups, and their cleanliness are points that demand careful study and attention. The actual amount of oil required for proper lubrication of any bearing is almost infinitesimal, provided that the amount can be distributed over the entire surface of the bearing and that the bearing and shaft have no high spots.

Another point on which great economies are often possible is in the selection and care of the brushes. When many chipped or broken brushes are found it will pay to try other grades or different makes until the brush best suited to that particular service is found. In one instance, some two years ago, the brush bill for 100 two-motor cars operating in an Eastern city was reduced from $4,000 a year to about $400, a saving of 90 per cent, by changing from a brush that was giving very satisfactory results in all other motors on the system but which in this particular series of cars was averaging only about six weeks' life, because of breakage. This is probably an extreme case, but similar results even on a smaller scale are well worth seeking.

THE OVERHAULING SHOP

And now we come to the overhauling shop. No matter how efficient the inspection is made, it should be supplemented by removing the motors from the trucks, opening them up and placing all parts in the best possible operating condition at regular intervals, if the best results both in point of service and of costs are to be obtained. The factor which determines these intervals, or the time between such overhaulings, should be the condition of the bearings. If conditions are such that armature clearance can be gaged at each inspection, it should be possible to catch all motors on which bearing wear is excessive before the armatures touch the pole pieces. If by reason of rough track conditions frequent breakage of babbitt occurs in the shells, a definite time limit should be set somewhat less than the average time that trouble-giving bearings have been running since they were installed. In other words, bearing troubles should be anticipated and the motors opened often enough to enable the shop force to maintain the bearings in the very best possible condition. When the motors are opened up for this purpose all parts should be thoroughly cleaned and reinsulated.

The experience of different companies shows that the armatures should be blown out very thoroughly with compressed air, preferably inside a suction box or at least at a considerable distance from the place where freshly painted or shellacked motor parts are placed. Following this blowing, the oil collars should be scraped free of all caked dust and carefully wiped off with dry waste. The string or tape band over the mica ring should be removed, the mica ring and V-ring heavily shellacked and a new tape band installed, and this should be wide enough to overlap the V-ring about 1/8 in., thus insulating it from possible flashes. The tape band and adjacent upright section of the commutator should then have a thick coat of shellac or insulating paint. If this is done and if oil can be kept from the band thus prepared, it is certain that grounds at the end of commutators through the mica insulation can be absolutely eliminated, as a smooth, glazed surface impervious to moisture is presented, which can be wiped clean of dust with a dry cloth at each inspection.

The commutator slots should be cleaned out with a scraper or, preferably, a metal brush and all beading which might tend to short-circuit adjacent segments removed. If there are any flat spots, these should be turned off in a lathe. On all the older types the brush-holder insulators or yokes should be removed from the shell, and if they are not in perfect condition should be scrapped and replaced with new ones. If they are mechanically perfect, that is, neither cracked nor broken and the surface smooth, they should be cleaned off and receive a heavy coat of shellac or of insulating paint, and this should be allowed to dry hard before they are replaced. In fact, it is better to have some fully dried spares on hand, so as to allow the ones treated twenty-four hours in which to dry, using them again in the day following their removal.

The spacing of the brushes on the commutator should be measured to make certain that the number of commutator segments between brush centers agrees with the manufacturer's diagram. Any variation from the original design due to improper alignment of brush holders or shifting or warping of the yoke is certain to result in excessive sparking, with consequent rapid brush wear, overheating and tendency to flash-overs. The tension of each brush-holder spring shoud be tested with a spring balance and adjusted to the standard fixed upon.

Fields should be examined and if possible tested for short-circuits or baking. If not solidly clamped, shims should be inserted and the coils drawn solidly down upon pole pieces. Leads and terminals should be examined and placed in first-class condition, chafed insulation, loose terminals or broken stranding being the chief points to care for. The leads, fields, armature and the entire interior of the shell should all receive a heavy coat of insulating paint or varnish, and this should be done as early in the day as possible so that they shall have dried before being returned to service. Trouble is frequently caused by the neglect of this precaution, because painted surfaces before drying hard will pick up and retain brakeshoe dust or carbon dust very readily, thus nullifying the very purpose for which the paint is applied, namely, the thorough insulation of all parts.

The damage caused by hot armature bearings and the consequent stripping of coils upon the pole faces, and the damage to cores and to shafts, is so great that the greatest precautions to prevent them are distinctly measures of economy. Some points found helpful in this direction are to use nothing but new waste or feeders in the armature heads, renewing this material at each overhauling, thereby lessening the bad effects of sand or dirt which is certain to be found in greater or less quantities in second-hand waste or felts. With ordinary cleaning, however, these can usually be employed a second time in axle bearings or in the journal boxes. A press by which the surplus oil can be reclaimed from used waste or feeders can be made to save large sums in lubricants, and a settling tank into which live steam can be introduced is still better. The bearings should be carefully fitted to the shafts, which should be calipered, and if high or low spots exceeding 0.010 in. variation from the normal diameter are found the shaft should be trued up in a lathe. All bearings should be babbitted to a smaller inside diameter than the standard size of the shaft on which they are to be used and then bored out in a lathe or boring mill, this bore to be from 0.010 in. to 0.015 in. larger than the size of shaft as calipered in the overhauling shop. This will automatically compensate for the wear of shafts in service. The boring of bearings out of center will disturb the magnetic balance of the motor and is a practice that should never be permitted. It should not be necessary in remounting the motors on the truck to force the suspension bolt holes in the shell and the suspension bar into line by prying on the shell with a pinch bar. Such prying invites axle-bearing troubles by throwing the bearings out of alignment with the axle. Where difficulty in lining up these holes exists it is better to put a slot in the suspension bar to permit mounting the motor without forcing. On all split bearings the inside contact edges should be eased off to prevent a sharp edge from cutting off the flow of oil. At the end of bearings next the thrust collar a radius should be turned in a lathe, to reduce friction and cutting at this point and to facilitate the working out of oil to the collar.

It is, of course, impossible to go into all of the details constituting the most advanced practice in motor maintenance, but the results obtained on a number of our largest and most progressive electric railways in service efficiency and reductions in operating costs by a close adherence to the general principles advocated in the foregoing discussion are a guarantee of their effectiveness.

MOUNTING OF RADIAL COUPLERS

BY A. L. PRICE, SALES AGENT OHIO BRASS COMPANY

It has only been within the last few years that the real requirements of a coupler have been appreciated and a coupler adequate to such requirements has been sought. Let us first consider the requirements which have to be met in interurban operation.

INTERURBAN COUPLER REQUIREMENTS

For interurban lines we must have a coupler which is not only suitable for individual roads but with which the cars will also be equipped for operation in trains for running over foreign track and for intercoupling with steam cars. The coupler as selected by your association is not only the generally recognized standard upon your own roads but its resulting successful operation has so impressed those in other sections of the country that it is making itself a nation-wide standard.

Once we know the height at which to mount the couplers and the definite operating conditions to be met in train service we must provide a proper setting for the couplers. Many times this means the raising of the car body, changing the radius of the buffer band, changing the location of steps, changing the location of fender irons, brake staffs, etc., and also altering the pilots. This may sound like making the "tail wag the dog," but the breaks of grades and short radius curves actually exist, and consequently the coupler must have free vertical movement and sufficient lateral swing. I emphasize the point that to a certain extent the car must be made to fit the coupler instead of putting aside for later consideration the selection of any coupler which can be mounted upon it by hook or by crook, with resulting inefficiency in operation. Upon several occasions purchasers have furnished blueprints showing the underframing of their cars without any provision for coupler mounting. After the cars were built and the couplers mounted, the cars were sent around curves whereon the steps were battered to pieces, and later considerable expense was incurred by taking off about 6 in. from the ends of the steps.

Couplers on the different roads ought to be mounted to a standard height. For reasons already known to you, this height was established the same as that of the steam railroads, namely, maximum 34½ in., minimum 31½ in. If you do not care to or cannot for some reason mount your couplers to the standard height, you will be confronted with a very perplexing problem should you desire to interchange traffic with your electric neighbors or handle steam road cars.

I would direct your attention to one condition which has not been overcome by the adoption of the M.C.B. coupler. A coupler upon steam railroad cars is always rigidly mounted, and when such a coupler is connected with a radial coupler it limits the efficiency of the latter at curves. A radial coupler connected with a steam railroad coupler will not pull a steam car around a curve which has a radius of much less than 80 ft. Of course, the M.C.B. contour lines in themselves provide for a certain amount of radial movement. (Here Mr. Price showed models of coupler heads and explained their operation.)

The dimension of 43 in. has been prescribed as the proper height from rail to car sills, and as soon as this height is decreased and the couplers mounted at the standard height the vertical movement is limited and the value of the coupler impaired. The standard coupler height cannot be maintained where drop platforms are being used. Hence drop platforms on interurban cars are being quite generally discarded wherever train operation is being considered. If the elimination of the drop platform does not bring the height of the sill to the requirement, the car body can usually be raised on the trucks to the proper height. If an attempt to reach 43 in. should show a discrepancy of 1 in. or 1½ in., trains can still be operated, because the depth of the coupler knuckles will compensate for the deficiency, but the coupling usefulness will be impaired, particularly when a new, lightly loaded car is coupled with an old, loaded car on which the springs have settled and the wheels have been turned down once or twice at the shops.

Some endeavor to circumvent conditions by mounting their couplers tightly against the sills or by trying to procure a coupler having the head offset upward from the draft gear immediately in front of the buffer band. This introduces a special design which tends to weaken the coupler, and an added expense which eventually may outweigh the cost of making proper changes in the construction of the cars. Other points which should not be overlooked are delays in repairs in foreign territory, due to inability to obtain non-standard parts, and lengthening of air hose and jumper cables due to the use of a coupler which necessitates a separation of at least 18 in. to 20 in. between cars.

If the sills of the cars are of wood, the anchorage and the supporting pieces for the slide bar often can be sunk into the sills. This assists quite materially in giving the coupler standard height without raising the sills to 43 in. However, when such a scheme is adopted, care should be exercised not to interfere with the vertical or lateral movement of the coupler. As the coupler swings laterally, it is preferable to have its pulling face project uniformly at all points. The standard projection, as prescribed, is 6 in.; therefore, with a coupler 4 ft. 9 in. long the ideal radius for the buffer band is 4 ft. 3 in. (Mr. Price then presented a diagram showing a fairly ready means to determine the angular swing of a coupler.)

Experience indicates that the carrier slide bar should be supported at intervals not exceeding 12 in., thereby tending to distribute the downward strain. Some support their slide bars by means of through bolts passing through the slide bar, then through a spacer and then through the sill. The heads of these bolts should be countersunk flush with the underside of the slide bar that they may not interfere with the sliding of the carrier. In one case the breakage of eight new coupler heads was due to the fact that the through bolts had worked loose and the heads were so low that the carrier could not swing. Thus the point of leverage formed when taking curves was rapidly breaking the coupler bodies.

Another experience developed the fact that stop blocks

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were being placed upon slide bars to prevent the coupler from swinging beyond the desired angle, but the stop blocks were not properly placed, so that upon taking a short curve they also acted as a point of leverage to break coupler heads.

It is sometimes found that a through bolt must be placed immediately below the paneling or at some other quite inaccessible point. In some instances a through bolt at one end and a lag screw at the other can be used with supporting castings or forgings.

Application of radial couplers to dump or work cars is quite common and many of these have flat ends. There are also passenger cars, which, comparatively speaking, have ends that are quite flat. When these cars must operate on short radius curves it is often necessary to build false buffers upon the ends to support the carrier slide bars.

COUPLERS FOR CITY CARS.

City cars must also provide for vertical and lateral movement of the couplers, but as they have no interchange of traffic no general standard type of coupler is necessary. Therefore, each road can establish a standard for its own particular conditions and work. For instance, if the heights of the cars vary, one standard height should be determined upon for all couplers. It is obviously best that the couplers be mounted so that they maintain a horizontal position.

As the coupler must always swing sufficiently to take the shortest radius of curve and enable the cars to travel this curve, it is quite necessary to determine the location of the very worst break in grade and shortest radius curve on a system and to design the coupler equipment accordingly.

After locating the shortest radius of curve, it is quite necessary to provide space upon the car so that the coupler will swing sufficiently to take such curves and to ascertain how far the coupler will swing. (Mr. Price then exhibited several charts to illustrate this point, and also one showing how the approximate radius of a buffer band on an old car could be obtained when a drafting board was not available).

Finally, I would like to mention particularly a few essentials which correlate general conditions and car coupling conditions with car specifications as they are generally made up.

1. Consider the center track radius thoroughly. A 35-ft. center radius seems to be, so far as I know, the shortest center radius track curve in this territory. Therefore, it might be considered as a standard. If a curve was found at some point of a trifle shorter radius and cars from more than one system should find it necessary to travel over it, it would pay to change its radius, if possible, to 35-ft. center radius to permit its use by any interurban car. It is also very important to know whether the curve is measured for center radius or inside radius.

2. The length of the coupler as prescribed by your standards is fixed.

3. The prescribed projection of the coupler beyond the buffer band is 6 in.

4. The maximum swing of the coupler from center to pull and push cars around curves in a satisfactory manner is 60 deg.

These four conditions seem to be quite positively "fixed conditions." Therefore, why not adopt standard specifications for cars having a specified over-all length, distance between truck centers and standard location of steps so that all interurban cars will embody uniformity? Then there will be no question of their ability to operate over any railway system which constructs its cars according to the same standard. Indeed, this standardization in connection with cars can well be carried to a point where it will take care of the other conditions common to all railways desiring to interchange traffic.

THE HUMAN FACTOR IN FARE COLLECTION SERVICE

BY JOHN F. OHMER, PRESIDENT OHMER FARE REGISTER COMPANY

Capital is invested in your property to produce revenue; revenue is founded upon your fare collections, and it is to that important part of the operation that I invite your attention. Referring to questions on various subjects submitted to member companies of the American Electric Railway Association at the Chicago convention last October, let us note the wide difference in the opinions of railway managers as expressed in their answers to the statement that "The committee would be glad to have data showing percentages of increase in revenue resulting from operation of prepayment cars, if you are willing to furnish same." Nineteen out of forty did not answer; one answered, "Earnings are falling off, not due to cars"; one answered, "Difficult to determine"; one answered, "Does away with missing fares"; six answered, "Cannot state"; one answered, "Not in position to state"; two answered, "No definite data"; two answered, "Eight per cent"; two answered, "Seven per cent," and others evaded the question entirely.

It is apparent from these answers that most companies do not employ proper means for arriving at definite conclusions as to fare revenue.

The means for operating a railway system should be fitted to meet the conditions. If a plurality of fare mediums is required, then means are required for keeping, in detail, each fare unit under its own classification. To say that transfers have no value unless they are registered, and that if they are not registered they cannot be manipulated, is absurd. Of course, if transfers are recorded with 5-cent fares, or if other fares differing in value are recorded together, then the conductor is tempted to practice manipulation. Most railway managers now realize the advantage of fixing a value for tickets and other fares and of recording them, separately, in their own classification.

At the last meeting of the Transportation & Traffic and Accountants' Associations, held in Chicago in October, 1912, resolutions were adopted recommending the registration of tickets at their respective values.

FARE BOXES

The introduction of prepayment cars was accompanied with fare boxes of various types. They were placed in service on the premise that conductors should not have access to the fares deposited, and it was asserted by many managers that if the passenger deposits the fare no record of the deposit is necessary. Many managers are changing their opinions in that respect, however.

Referring again to questions submitted to member companies, I find that in answer to the question "Do you also use an ordinary register in connection with the fare box?" eighteen respond "yes" and ten respond "no"; and to the question "Is cash deposited in fare box accessible to conductor?" two respond "no" and seven respond "yes." To the question "Do you believe conductor should have access to this money?" seventeen respond "no" and fourteen respond "yes." These conclusions indicate that in due time more attention will be paid to the human factor, which is so seriously involved, and that the conductor will assume the whole responsibility in the fare collection service.

Railway managers are aware of the elasticity of the conscience of many car patrons, and yet, under the fare box principle, the public is trusted implicitly while the conductor is deprived of the confidence which should be given to him. The practice of compelling the passenger to deposit his fare often works an imposition on him, increases the opportunities for manipulation, and offers greater temptation to the conductor than any other known method. The human factor and its relation to the traveling public must receive consideration. To make your road popular with the public, you must make the conditions just as pleasurable as possible.

The conductor should have your confidence and then he can command the respect of the public and with it render better service. He should assume the sole responsibility for the collection and accounting of fares. If the responsibility is divided, the conductor, the passenger and the man who empties the box are all confronted with temptation, and the road thereby sustains an irreparable loss. It is not the fare box but the system of operation which accompanies it that we oppose.

Devise for your conductor ways and means for keeping a comprehensive, intelligent and businesslike system of his transactions, and then measure his value as a conductor by his record. If the system is right and is properly enforced it will be easy for you to determine the measure of efficiency each conductor in your service has attained; but you must remove from him, so far as possible, all temptation. Not until this is done can you ever expect the best results.

The argument that the conductor need not register or that he can register for a fare other than the one collected has been made against the system of recording each fare, separately, under its own classification. Exclude the means for recording each fare separately, and you encourage the derelict conductor and discourage the man who is inclined to be honest.

We have always advocated a system to be used in connection with the operation of the registers. This system comprises the following practices:

Keeping an accurate, detailed, untamperable printed record of each fare collected, in its proper class.

Conductor recording the fares according to their values and under the proper classification.

Conductor returning to passenger the proper change.

Conductor making an accurate return to the company for all classes of fares collected.

Entailing upon the conductor the necessity of turning in to the cashier each and every fare collected.

Transcribing the data from the printed register record into the books of the company.

Keeping a merit record of the work of each conductor, through which the company is able to measure his moral worth, as determined by the efficiency and accuracy with which he collects and registers his fares.

This system gives a continuous audit on fare collections and provides valuable information concerning the moral worth of each human unit in your business.

The following comparison, for the months of January and February in the years of 1910, 1911 and 1912, of general averages of conductors operating our registers on the Denver (Col.) City Tramway Company and the Syracuse (N. Y.) Rapid Transit Railway shows a gradual improvement, year after year, and is an indication of the results to be obtained from the use of the Ohmer system:

	Denver City Tramway		Syracuse Rapid Transit Railway	
	January, PerCent	February, Per Cent	January, Per Cent	February, Per Cent
1910	94.25	94.43	.....	90.85
1911	95.07	95.55	94.72	94.87
1912	96.23	96.44	94.91	95.01

A comparison of conductors' general averages from June, 1912, to January, 1913, inclusive, on the Denver City Tramway and the Syracuse Rapid Transit Railway follows:

The Denver City Tramway Co. 1912	General Average, Per Cent
June	95.57
July	95.66
August	95.50
September	96.23
October	96.15
November	96.60
December	96.48
1913	
January	96.96

Syracuse Rapid Transit Railway Co. 1912	General Average, Per Cent
June	94.77
July	94.99
August	95.02
September	95.04
October	95.47
November	95.14
December	95.18
1913	
January	95.48

We have always contended that the practice of our system tends to concentrate the minds of conductors on their duties and to educate their mentalities in the exercise of their duties other than that of collecting and recording fares.

It may be pertinent to remark that our system has been so satisfactory to the management of the Denver City Tramway that, beginning with Jan. 1, 1913, it adopted a similar merit system for recording the work of motormen who operate coasting recorders.

If all fares collected by the conductor belong to the company, then he should turn in his entire collections regardless of the amount he has registered. For example, your conductor collects $35.80 and, owing to mistakes made by him, registers only $32. Which one of these two amounts do you think rightfully belongs to the company? If the conductor is permitted to settle according to his registrations, he will turn over to the company the $32 and retain the difference of $3.80.

I can scarcely believe that any manager would adhere to such a method, but nevertheless it is true that many of them do so. It is unnecessary to give the conductor access to the register record. If he is an honest man and is doing his duty, he does not care for the record. If his registrations are right and his returns are made in full, the record will prove his case; on the other hand, if he is a dishonest man, he does not want anything better than access to the register record so that he can make his settlements accordingly.

[Mr. Ohmer concluded his paper with some remarks on the benefits of welfare work in securing the hearty cooperation of the employees.—Eds.]

INTERLINE FREIGHT BUSINESS

BY C. O. SULLIVAN, TRAFFIC MANAGER WESTERN OHIO RAILROAD COMPANY

The subject assigned represents that class of freight that is handled over two or more lines, and in time, with proper development and attention, will make the most profitable class of business that is handled by the interurban lines, but this development will depend largely on the interurban lines broadening out and being equipped with heavier motors, plenty of cars and longer sidings so located as to facilitate loading and unloading, the building of tracks into industries and securing the location of industries along and on the lines. This class of freight business is to-day in its infancy on the interurban lines, but there is vast room for development, and this is the one class that must be developed if we would hope to continue to show increases and have a surplus at the end of the years to come.

In the early days of interurban railways the freight business was not thought of as being a big source of revenue, and even to-day there are lines that are still under this impression and handle no freight at all, depending entirely on the passenger and express business for their income.

The interurban lines were built a few short years ago with the thought of handling passengers only, but after a few years this class of business had been developed, in their local territory, to such an extent that it was not showing the necessary increase, and it was then they began to cast around for other classes of business that would produce the desired results.

It occurred to the operators at this time that small packages of merchandise might be handled to increase the earnings. This class of freight was handled for a time on passenger cars with good results; but after the merchant and shipper became acquainted with the fact that they could telephone in the morning and have their supplies in the afternoon, or within a few hours after ordering, the freight business began to develop, unsolicited, to such an extent that it could no longer be handled on passenger cars. The operators then saw the necessity of putting on freight cars to handle this class of freight business, which consisted of short hauls or local freight business, and freight cars were accordingly started, in most places making one round trip each weekday between the terminals of their local lines.

Realizing that the freight business was profitable, the interurban companies then decided to develop it further by putting solicitors in the field, and through their efforts the local freight business has grown to such proportions that to-day it requires two or three local freight trains each day to take care of this class of business. At this time the interurban railways are handling a large percentage—I think I am safe in saying they handle the greater part—of the local freight handled in interurban territory, and this has been made possible by the prompt delivery which has done much to develop this class of business.

With the development of the local freight business through solicitation, it was shown that there were great possibilities of still further increases in the revenue of the lines in the long haul or interline freight business. This fact was brought out by numerous inquiries made to our solicitors for rates to and from points off their respective lines. Acting on this suggestion, through rates and routes were established, and to-day, with but few exceptions, C.E.T.A. territory is covered by through rates and shipments can be made to and from almost any point in this territory on through rates the basis of which is the same as on the steam lines. We have been unable, however, to establish through rates to some of the territory served by interurbans, but we hope the day is not far distant when such rates will be established, extending into the States of Pennsylvania, New York, Michigan and Illinois as well. If, however, the interurban lines interested are unwilling to establish such rates, I think the fact will probably be referred to the commission, which will order such through rates established, as at this time the shippers are demanding through rates via the interurban lines on account of the prompt service, and in many instances express themselves as willing to pay a rate even higher than that established by steam lines, though, of course, not so high as express rates, on account of the superior service of interurban lines.

The development of interline freight business, less-car-load, has been such that to-day freight is being interchanged at junction points by car loads instead of a few packages as was the condition a few years ago. On many of the lines the interline freight business handled is far in excess of the local freight, and with this class of business in its infancy it surely will be developed to such an extent as to require trains instead of single cars to handle it. Even to-day many of the lines that formerly operated with a single car now find it necessary to handle two or more trailers to take care of the interline freight. In many instances through cars are operated from one large terminal to another over two or more lines which do not handle any local freight at all but are loaded entirely with interline freight. In this connection I might mention the through service that is operated between Toledo and Fort Wayne. These cars are operated for the benefit of long haul or interline freight only from Toledo to Indiana points and make no local stops en route, the distance being 137 miles. There is also the through operation between Toledo and Dayton and Dayton and Toledo, a distance of 162 miles, operating over three lines en route. These cars are operated for interline freight only and do not handle any local freight en route. They leave Toledo and Dayton at 6 p.m. and arrive at the opposite terminals early the following morning, distributing freight at the larger stations en route except on the originating line. This business has developed to such an extent that it now requires two-car trains in each direction to handle the interline freight, and if it continues to maintain the present increase it will require three cars with the opening of the spring business. Another service of this kind is operated between Indianapolis and South Bend, a distance of 163 miles. This service is also operated over three lines.

The through cars between Indianapolis and Fort Wayne constituted, I believe, the first through interline service to be inaugurated by interurban lines, and my understanding is that it has been very profitable and has done much toward increasing the interline freight business between these points.

The development of the less-car-load interline freight business has brought with it the interline car-load business. This I believe is the class that should have particular attention and development, as it is the most profitable. We receive a higher rate on the less-car-load freight, but we are at the expense of numerous handlings, which bring with them the possibility of loss and damage claims, causing dissatisfaction to shipper and receiver, while with the car-load business the cars are loaded by the consignor, unloaded by the consignee and the only expense is in the transportation. As this class of freight is handled in box or trail cars behind our regular freight motors, this cost is very small.

Car-load freight business has been greatly retarded for various reasons, the most important of which is the lack of standardization of equipment. Especially is this true with respect to the drawbars generally used.

The trouble we have been confronted with in the past was the fact that all cars would not interchange, some lines having one equipment, some another, and in some instances car-load business which could have been secured was of necessity refused because the delivering or intermediate carrier was unable to handle the cars of the initial lines owing to differences in equipment.

To-day these conditions have been corrected on most lines, but there are lines still in this condition of being unable to interchange their cars with those of foreign lines. If the interurban lines expect to continue the development that has been started, this condition will have to be eliminated in all cases, as with the development it will be necessary for cars to be so equipped that they can go to any place in C.E.T.A. territory. If different equipments were used on steam railroad cars, it would result in the costly transfer of loads at junction points, a condition which a shipper tries to avoid, as he wants his freight handled as little as possible. It would also cause delay to shipments and would be the means of great loss of business on this account. I say again this condition must be corrected if we expect to increase our interline car-load freight business.

An agent or a freight solicitor is greatly handicapped in securing new business owing to this condition. He should be in such a position, that when he secures loading for any distant point he can be sure that any available car can be loaded and can be interchanged at any junction regardless of how many roads it may be necessary for the shipment to travel over.

Through the foresight of some lines which have equipped with standard drawbars, I know of car-load shipments that are moving over the interurban lines for 350 miles to 400 miles, and in this distance they travel over three or four lines. These shipments are secured to the interurban lines because of the fact that much better time can be made than by steam railroads.

This is an important factor when shippers are routing their car loads, as has been demonstrated by the numerous fast freight lines that operate over the steam lines. For this service the shipper is willing to pay a higher rate in order to get his commodity on the market at the first possible moment.

While the C.E.T.A. territory is but a drop in the bucket as compared with the steam line territory for interline business, it is nevertheless true that shippers who were formerly at the mercy of the steam lines to move their freight now appreciate the fact that the interurban lines are here to stay and are able to give them equally good, if not faster, service at rates in most instances on the same basis. This unfortunately was a mistake, made when the rates were first put into effect on interurban lines, as the superior service of interurban lines is as much entitled to a higher rate as is the fast freight service operated over steam lines. As stated before, this we know to be true from the fact that many shippers, in their efforts to have through rates established over the interurban lines to points which are not now reached, have in fact expressed themselves as willing to pay a rate 15 per cent to 20 per cent higher than the regularly established rates on steam lines, in order to get fast and prompt movement of their freight.

Another condition that has greatly retarded the development of interline freight business is the fact that at many places there are no sidings suitable for loading and unloading. In other places where there are sidings these are not long enough to accommodate more than one car and cannot be blocked with a car for loading or unloading, as it might be necessary to use the sidings for passing trains. This is a very important factor in the development of interline freight business. It should have due attention and suitable sidings should be provided.

An instance of this kind with which the writer is familiar was where a car-load shipment was made to a foreign line and, arriving at its destination, was set off on a siding at that point. The siding not being suitable for unloading, it was necessary for the consignee to unload from a siding about 3 miles in the country, which was the available unloading siding closest to the town. This caused the consignee extra expense to haul the shipment to his place of business in the city and he demanded reimbursement from the originating carrier. As you can see, this is another condition that will have to be corrected before we can successfully develop along the line of interline car-load business.

Among other things which have retarded this development of interline freight business have been the different rules and exceptions in effect, and it is only recently that there has been any uniformity in this respect. For this reason an agent before accepting a shipment had to familiarize himself with the rules and exceptions to the official classification governing the movement over possibly one or more foreign lines. This trouble has, however, been overcome, and on March 8 a uniform exception to the official classification will become effective, which will govern the movement over all lines, members of the C.E.T.A., alike.

Another feature which was made effective Sept. 1, 1912, and will greatly assist along the line of development of interline freight business was the adoption by about two-thirds of the member lines of a system of through billing for interline freight. Formerly a shipment had to be rebilled at various junction points, which made the junction agent's work very heavy, but with the new form of billing the shipment is billed at the originating point and this bill accompanies the shipment through to destination. This will eliminate any possibility of the shipment being billed wrongly at junction points, thereby doing away with possibilities of overs and shorts. It will not only relieve the agent of the rebilling but also of the junction settlements, as the latter will now be made through the auditor's office. In fact, this will do away with a volume of work for junction agents, giving him more time to attend to other duties, such as seeing that all shipments received are properly weighed, correctly classified and rated, thereby insuring for the lines all revenue justly due.

In addition to our solicitors, it is necessary for our agents to keep their eyes open for all new business or anything that is getting away from us and keep the traffic department advised of all things of this nature and in making his daily, weekly or monthly collections to do his best to secure more business. It can be readily seen that in relieving our agents of this routine work they gain more time to increase the business at their respective stations.

Each solicitor should watch his territory for shipments that arrive by other than interurban routes and try, if possible, to secure routing from the consignee for the next shipment; but if the shipment is routed by the consignor, so advise the traffic man at the originating point and he may be able to secure the future shipments. By working together much good can be accomplished and the interline freight business be greatly increased.

One of the greatest difficulties which we encounter to-day in securing interline car-load business for the interurban lines is the fact that many of the industries along our lines have steam railroad tracks into their places of business for loading and receiving car-load freight. We find many cases where the consignee desires his freight routed for interurban line delivery, but the shipper objects to hauling freight from his warehouse to the interurban lines when it can be loaded from the warehouse into the steam-line car with one handling. In order to overcome this, it will be necessary for the interurban lines to develop in this respect by getting factories, elevators and other industries located on their lines, and also by building industrial or factory tracks into plants already in operation. This will insure at least a part, if not all, of the inbound and outbound business of the plant, and if this cannot be handled to destination by interurban lines, it may be possible to arrange delivery through steam lines from junction points.

In many instances the factories in the towns and cities along the interurban lines are not served with a steam line track into their place of business, but are forced of necessity to haul their material to and from the railroad. These are the places at which we should get a foothold and, if possible, build tracks to them. With it made possible for them to load directly into your cars at their place of business, you are sure of a nice increase in tonnage, and if it is necessary to handle it in connection with some steam railroad, this will bring you closer to an interchange with the steam lines. Through this method you will be able to deliver and route business via the steam line that it could not otherwise touch, and by giving it the inbound business routed via its line there will also be an inducement for it to furnish you with equipment for outbound loading from these factories.

I know of interurban lines that to-day are doing this and thus increasing their revenue with car-load business that otherwise they could not handle owing to lack of equipment and an outlet to various destinations over the country not reached by interurban lines.

I was recently told of one of our member lines that has installed such an industrial track to serve a flour mill, a woolen mill, a grain elevator and a large wool warehouse all owned by the same firm. It will handle their entire inbound and outbound business in connection with a steam line, which will increase the business of the electric line approximately 300 carloads per year. The business will be handled on proportional rates made to use in combination with the steam-line rates from the junction point. This is made necessary on account of the steam line refusing to join in through rates, but the combination will equalize the through rates from originating point to destinations made possible by the difference in the through rates between the originating point and the junction with the steam line.

While the steam line is unwilling to establish through rates, it is, however, willing to allow the interurban line to handle its equipment and furnish empties for outbound loading from these factories, as it thereby secures approximately 300 loads that otherwise it could not touch, and by so doing it is made possible for the interurban line to increase its business to the same extent.

Since the building of this track, I am told that the company has been asked to extend this track so as to serve a coal yard, a lumber yard and a planing mill, which have had to haul by team all their material to and from the railroad entering their town, and with this additional business the revenue of the interurban line will be increased approximately 100 car loads more each year, making approximately 400 car loads secured on account of the industrial track built. Such possibilities are scattered over the entire interurban territory and if taken advantage of properly will be the means of large increases in earnings of interline freight business for the interurban lines.

I have endeavored to outline the interline freight business as it is to-day, showing a few of the possibilities for increasing it and also the obstacles that exist to this development. The latter can be easily remedied with a little attention, thereby insuring handsome increases to your lines.

The competition being so keen, it is necessary to keep in close touch with all shippers and receivers, to keep them advised of any new territory opened up by through rates or through service and anything else that might work to their advantage, to correct any imaginary or real trouble they may have and to show them all the courtesy possible, as courteous treatment and attention are what make friends and get us business.

ANNUAL REPORT OF THE SECRETARY-TREASURER OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

BY A. L. NEEREAMER

Your secretary-treasurer begs leave to submit herewith his report for the year ending Dec. 31, 1912.

The interurban railway membership at that time consisted of fifty-eight lines, representing 3841 miles, and in addition we have one city line. During the past year we have lost one interurban line of 154 miles. This leaves a net increase of four lines and 169 miles over the year 1911. The four lines do not comprise the entire 169 miles as several extensions have been built and added to the mileage of the lines already members. During the year 1912 we had 131 members in the supply men's department, a decrease of eight members from the year 1911.

Total receipts for the year 1912, including cash on hand on Jan. 1, 1912 of $1,202, were $8,446. Total disbursements were $6,805, leaving $1,641 on hand on Dec. 31, 1912.

A comparison of the figures will show that we have handled considerably more money in the office in 1912 than we did in 1911, while the operating income remained about the same. This is due to the collection of funds for the official interurban map, joint weight and inspection bureau and the reprinting of several tariffs. These items were paid for out of the funds of the association and recharged to the participating carriers on the customary basis. After the close of business for the year 1912 we had cash on deposit to the amount of $1,641 and bills receivable in the amount of $135, making a total balance of $1,776.

In 1910 a proposition was presented to the association through Mr. Whysall, who was then president, to issue an official interurban map. After due consideration in the executive committee this subject was placed in the hands of the Traffic Association and I am pleased to report that during the past year that association has completed its work and approximately 50,000 of these maps are now in the hands of shippers and the traveling public.

There are still many lines in our territory, particularly in the eastern portion, that are not members of this association, and while your secretary has made every endeavor to secure these lines he has not been successful. The association can be of great benefit to all interurban lines in the territory and every endeavor should be made to increase the membership.

In conclusion the secretary desires to express to the officers, committees and members of the association his sincere thanks for their hearty assistance and co-operation during the year that has just passed.

ANNUAL ADDRESS OF THE PRESIDENT OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

BY W. S. WHITNEY

Since the annual meeting of 1912 of your association there has been a net increase in the mileage, represented by new lines and extensions of old lines, of 169 miles over the mileage of the year 1911. The withdrawal of one interurban line lost the association 154 miles. There was a decrease of eight members in the supply department as compared with the year previous.

From the statement of your secretary-treasurer you will note there has been quite a gain in the financial strength, although the expenditures have been increased somewhat by reason of the expenses of the Central Electric Railway Accountants' Association, which was heretofore handled as a separate organization and whose finances did not enter into the accounts of the Central Electric Railway Association.

The prospects are that additional mileage will be added to the association within the next few months; also that some of the present member lines will become parties to the Central Electric Traffic Association, adding strength in that department, which, in my estimation, is one of the most important divisions of the association. This will increase the scope of the territory to be covered by the present interline passenger tariff and also provide additional territory for the increase in the freight business.

These two classes of traffic present the principal avenues for material increase in gross revenue to member lines, offering, as they do, the opportunity to compete with steam lines; and the development of this class of traffic will work to the benefit of all lines in the territory. The results of long-haul passenger business have clearly demonstrated the fact that this class of service can be materially increased by the elimination of transfers, and these increases will be in evidence when there is a decrease in the strictly local passenger business or where it remains stationary.

The same condition is true of freight traffic. There is an adverse feeling in the minds of shippers toward having their shipments transferred at junction points, as the results are unsatisfactory because of the damages arising not only to the packages but to the contents. Through service will serve to increase the earnings from this source. To obtain this desired result it will become necessary to adopt standards for freight equipment to facilitate the exchange of trailer cars between all interested lines.

Early in August, 1912, the joint map published under the auspices of the Central Electric Traffic Association, following the recommendation of former President Whysall, was placed in the hands of the member lines for distribution to the public. There has been a very great demand for this over the entire territory and beyond it. The demand fully justifies the expectations, and I consider this one of the best steps that have been taken to advertise and bring into prominence the interurban service in the territory of the association.

In entering the sixth year of its existence the Central Electric Railway Association does so in sound financial condition with prospects for a continued steady growth.

In conclusion I wish to thank the members of the association individually for the assistance and support given me during my term of office, and I also wish to thank the various committees for the assistance rendered by them in considering the numerous subjects brought up before the association during the year. I bespeak for my successor the same treatment accorded me.

ANNUAL REPORT OF THE CHAIRMAN OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

BY A. L. NEEREAMER

The past year has been one of great harmony and increased value to the association and much important work has been transacted. The official interurban map was inaugurated at a meeting of the Central Electric Railway Association held in Toledo, Ohio, in March, 1910, and at a meeting held in May of that year was referred to this association to work out the details. A committee was appointed who worked faithfully and diligently upon the proposition until its members were able to see the actual results as a reward of their labor. At this point I desire to extend to these members the compliments which they deserve for their energy and bulldog tenacity. About 50,000 of these maps have been distributed throughout this territory since Aug. 1 and the demand is still heavy.

Of the membership of the Central Electric Railway Association, forty-six lines, representing 3278 miles, participate in the tariffs and other publications of this association. This is an increase of three lines and 164 miles over 1911.

During the past year Official Interurban Railway Equipment Register No. 1 has been published and filed with the Interstate Commerce Commission. This register is participated in by twenty-seven carriers.

The interchangeable 1000-mile ticket is now participated in by thirty-two lines with a total of 2546 miles, a net decrease of two lines and 45 miles.

The joint and local baggage tariff is now participated in by thirty-nine lines, making a net increase of one line over the preceding year. Two lines were eliminated by being absorbed by other companies and three new lines participated in the publication.

The chairman files the official classification for thirty-nine lines, a net increase of seven lines over last year.

During the past year the tariff covering the interchangeable 1000-mile ticket was reissued twice and the joint and local baggage tariff was reissued once. These reissues were caused by changes in the names of companies and to cover the participation of new companies. Eight supplements were issued to the official classification. Of these eight, three were on less than statutory notice granted your chairman by the Interstate Commerce Commission and the various state commissions. This work resulted in the saving of much time and expense to the lines participating.

The interchangeable 1000-mile ticket is again brought to your attention. This ticket is still keeping up its popularity and approximately 18,000 have been ordered and placed in the hands of the agents for sale since its inception, and we believe that the sales of this ticket could be materially increased by the use of judicious advertising.

Among the important subjects which are now in the hands of committees for early definite reports are the following: the joint weight and inspection bureau and the joint interline folder. Both of these subjects are handled by committees representing the parent body but appointed from members of the Traffic Association.

The experiment of the joint weight and inspection bureau at Indianapolis for ninety days during the past summer demonstrated that the interurban companies were not receiving the revenue for the transportation of freight to which they were entitled. The report which was submitted to the member companies at the close of the experimental period showed that there was a total gain of 789,691 lb. with an increased revenue of $1250. This averaged for every working day during the experiment 11,362 lb. and $18 increased revenue. It is expected that the committee in charge of this will make a definite report to the executive committee so that this association can expect to receive definite information at the next meeting.

PROCEEDINGS OF THE ANNUAL MEETING

(By Telegraph)

The annual meeting of the Central Electric Railway Association was held at the Hotel Washington, Indianapolis, Feb. 27 and 28, with eighty members in attendance.

THURSDAY'S SESSION

The Thursday session opened with President Whitney in the chair. Following the reading of the minutes of the preceding meeting, six new members were elected. Charles L. Henry, president Indianapolis & Cincinnati Traction Company, then announced that it had been decided to postpone the signal inspection trip over his line. As there were no reports ready from special committees the president then proceeded with the program. On account of the unavoidable absence of J. C. Thirwall, his paper on "Economies in Motor Maintenance," as published elsewhere in this issue, was read by J. B. Cox, of the General Electric Company.

In the discussion which followed, R. N. Hemming, Union Traction Company of Indiana, mentioned the advisability of using air pressure not to exceed 30 lb. in cleaning motors. Higher pressures had a detrimental effect due to sand-blast action. He also said that his company had tried all kinds of string bands and had concluded that impregnated asbestos cord gave the best results. Impregnation filled voids and eliminated moisture.

G. H. Kelsay, also of the Union Traction Company, inquired as to common practice in repairing bruised laminations of armature and field. Was it better to remove laminations and repair or could the work be done without removal?

Mr. Cox replied that the method of repair depended on the extent of damage to metallic surfaces. In some cases it was possible to repair by scraping away the damaged metal. In reply to the question concerning string bands, Mr. Cox said that asbestos cord was good, but if it became saturated with oil or water it was more detrimental than other kinds.

Mr. Hemming then said that his practice had been to remove laminations and straighten them by rolling and applying insulating paint afterward. He did not find it good policy to depend on superficial inspection to determine the extent of injury from short-circuits. Many cases had been found where the injury appeared slight, but removal showed a different result. It was wise to inspect often in order to check further damage once the bruising action had begun. To reduce damage from short-circuits which fuse and destroy the effectiveness of the old-type armature band, he had adopted a combination tin channel wire and solder band which would fail only when burned through.

W. H. Evans, Edgar Allen Manganese Steel Company, asked if it was general practice to overhaul motors in interurban service on a mileage basis. That method had been found satisfactory for elevated, subway and street railway cars, but it was not so successful with interurban rolling stock.

Mr. Cox replied that it was the tendency some years ago to adopt the mileage method for all rolling stock, and that method still held for city cars. The best master mechanics, however, did not depend on mileage records for inspection and overhauling, as the damage might become very serious once it had started. It was now the practice on interurban roads to check conditions often by rigid inspection and by overhauling motors whenever required. He mentioned instances where the bearing life had been increased 100 per cent through close attention, and by overhauling the motors on the cars that showed the worst conditions. Serious damage might be prevented by not adhering to the mileage basis. As a rule, however, mileage records formed an excellent guide for overhauling.

Mr. Hemming then inquired what the effect was of sweating armatures at low temperatures. Would it develop serious results and was it best to wipe the commutators before returning them to service? He also requested information relative to dipping instead of painting armatures. Would the dipping close vents and increase the temperature?

In reply, Mr. Cox advised wiping the sweat from commutators, particularly when unaccountable trouble developed. Such trouble might be due to moisture. The quantity of moisture which was likely to cause trouble, however, differed with the locality. As to the practice of dipping armatures instead of painting, he recommended the former if closing the air ducts did not raise the temperature above the critical point. Ducts through the laminations did what they were intended for, but they also carried carbon dust into coils with detrimental effect. It was well to close them in case they were not required to keep the armature below the critical temperature. He also advised one coat of paint every time the armature was removed. The drying process was one thing to watch when the dipping method was employed. The armature should be revolved until dry in order to prevent the collection of paint on one side, thus avoiding the possibility of overbalancing.

Mr. Hemming said he had not considered the overbalancing effect in revolving armatures during the drying period after dipping, but simply to gain uniform heating. He also said that he had tried dipping the armatures with the commutator end down and had found that the insulating paint filled pockets which would not drain. This trouble had been eliminated by dipping with the commutator end up.

The importance of the accurate boring of armature bearings was then discussed. In reply to a question as to its effect on the life of armatures and bearings, Mr. Cox stated that accuracy in boring was not so important in railway motors as in stationary motors. Inaccuracy in line would reduce the life of the bearing. The best practice in railway motors was to bore slightly high. Although the attraction of the upper pole pieces would thereby be increased a trifle, the weight of the armature would offset this disadvantage. However, this recommendation would not apply if the motors were worked up to their maximum, because special conditions would then arise.

It was then commented that boring high should not be adhered to in double-end operation. Two motors have an up thrust resulting in more wear in the upper bearings. This suggestion was met by the statement that during a large percentage of the time cars were crossing, which dropped the entire load on the lower bearing.

Following this discussion the association extended a vote of thanks to Messrs. Thirwall and Cox.

FARE COLLECTIONS

John F. Ohmer, president Ohmer Fare Register Company, then read a paper on the human factor in fare collection. An abstract of this paper is published elsewhere in this issue.

Mr. Henry, in commencing the discussion, asked how the averages showing the improvement in records were compiled. Mr. Ohmer explained that a point was counted against the conductor for every variation between his returns and the records. The object was to remove temptation and to get a complete record.

Mr. Henry said he believed in human nature, but he contended that the object of all precautions of this nature was to check a possible inclination to be dishonest which might develop in any man. This was, however, not a reflection on conductors any more than it was on auditors, treasurers or executive officials. One of the main features of such a plan was that it provided a complete record. Mr. Ohmer said that the conductor was the agent of the company and should be led to co-operate so as to promote the interests of the company.

John F. Keys, general passenger agent Detroit United Railway Company, believed passengers on interurban lines were entitled to receipts for fares. On the interurban lines of that company a system of duplex tickets was used and it was a rule that conductors should not check their records. The arrangement had some features similar to the Ohmer system and had been working very satisfactorily.

L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, thought it was just as important to have checks for conductors' returns as for office employees'. Mr. Henry said that he was using a receipt of which the stub was not visible to the conductor. If a man continued to make reports of collections seriously different from those which his record indicated as correct it showed that his work was unsatisfactory.

C. V. Funk, Ohmer Fare Register Company, described an incident which occurred after the installation of the Ohmer system on the Columbus, Delaware & Marion Railway where a passenger claimed that he had overpaid a conductor one dollar. The returns of the conductor proved that the statement was correct. A policy which required the payment of all cash on hand permitted the prompt return of such overpayments to passengers by the auditor. F. B. Morgan, Cleveland & Sharon Electric Railway Company, suggested that passengers should be sufficiently interested to see that proper returns were made.

INTERLINE FREIGHT

C. O. Sullivan, traffic manager Western Ohio Railroad, then read a paper on interline freight, which is published elsewhere in this issue.

F. D. Norveil, general passenger and freight agent Union Traction Company of Indiana, said that the paper pointed out opportunities of which some roads had taken advantage and many other opportunities of which they should take advantage. Every traffic man on the railways composing the Central Electric Traffic Association was proud of being a member of that organization because it had accomplished the things which it had started to accomplish. The association, he said, came into existence four years ago and the members could point to many things which had been accomplished which could not have been done in any other way. He believed that the association was the best traffic association in existence, combining as it did passenger, freight, express and every other feature of revenue-producing business on electric railways. The companies in the association had the most comprehensive tariffs, rules and regulations existing in the electric railway industry.

Continuing, Mr. Norveil said conditions had changed frequently, new additions had been built, consolidations had taken place and restrictions by commissions were being brought to the notice of the association constantly, yet the association was as near abreast of all changes as any group of transportation companies in the country. All of these conditions had been made possible only by hearty co-operation and by the support of the parent body. One of the last of the many tariffs issued for the joint use of electric railways was the interline demurrage tariff. Unfortunately the railroad commissions of Ohio and Indiana seemed to feel that the national demurrage rules promulgated by the Interstate Commerce Commission contained clauses not in harmony with the conditions of the traffic situation in those States; consequently the national demurrage rule was not acceptable to either of the state commissions. Furthermore, the rulings of the Ohio and Indiana commissions were not in harmony, and it was necessary for railways which had lines within the two States of Ohio and Indiana to have three sets of demurrage rules, one adapted to the Indiana regulations, another to fit conditions in Ohio and still another to be used for interstate business.

Mr. Norveil added that this situation had been cleared up by joint conferences of the various commissions involved, and the association was now in position to issue one demurrage tariff covering all requirements. Mr. Norveil then quoted from a communication received by Chairman Neereamer of the Traffic Association regarding demurrage rules which, he said, constituted the best argument that could be made as to value of united action and was the best argument that could be placed before lines not now members of organizations. It was to their interest to act together in their interline business. This was the platform upon which the roads must figure on building up the greatest increase of traffic in the future. Every inducement in the form of through passenger and freight train service, more and better facilities for handling traffic, prompt action on claims and all courtesy that employees showed to the public would tend toward the upbuilding and the maintenance of increased revenues.

Charles J. Lavey, traffic manager Cleveland, Southwestern & Columbus Railway, said that the traffic men would like to hear from managers of some roads that did not participate in interline freight business, and in reply, J. F. Starkey, general passenger agent Lake Shore Electric Railway, said that he favored the establishment of a department for interline freight business.

FRIDAY'S SESSION

The Friday session opened with a reading of the paper on "The Mounting of Radial Couplers," by A. L. Price, which is published elsewhere in this issue. At the conclusion of the paper G. K. Jeffries, Terre Haute, Indianapolis & Eastern Traction Company, emphasized the importance of standardizing coupler mounting, wheel centers and extreme length of car body over buffers. All of these matters were correlated and should receive attention at the same time. He recommended that the standardization committee take up the work of developing standards and advising the association as to the proper clearances on sharp curves, with special reference to platforms and other permanent structures. Mr. Jeffries also brought out the importance of standardizing coupler mountings to provide for interchangeability of cars, thus making interline business possible.

Mr. Hemming also urged the importance of standardization of coupler mountings and clearances. Numerous details in car design were affected by mounting, particularly as applied to train service operation. He said that truck centers would be affected by car length, and in deciding the distance between truck centers side clearance at the ends and center of car must receive consideration.

Mr. Hemming also recommended that the standardization committee take up the question of car heating and ventilation in relation to the number of passengers on car. This investigation should include size of heaters, piping, kind of fuel, rate of firing, etc.

Mr. Jeffries also called attention to the subject of heating in its relation to amount of passenger traffic. Some cars were too cold and others were too warm, needing additional ventilation. It was hard to arrive at a satisfactory conclusion as the opinions of passengers differed, some wanting cold cars and others warm. At the conclusion of this discussion the standardization committee was instructed to consider the subject and report.

Mr. Keys called attention to the fact that moving-picture films had been secreted under seats by a man who then left the car immediately, and that they had been removed at the end of the run by another man who boarded the car and looked under the same seat for the package. This practice had been broken up. Mr. Jeffries said that the same practice had been discovered on one line running from Indianapolis.

President Whitney announced that L. M. Clark, master mechanic Indianapolis Traction & Terminal Company, would give a demonstration of the oxy-acetylene process of welding and cutting off for the members who were interested.

President Whitney also stated that the place of the June meeting had not yet been decided. A decision would be made later and the members would be notified by Secretary Neereamer.

The report of the standing auditing committee was then presented. It stated that the accounts of the secretary and treasurer had been checked and verified. The committee was composed of Walter Shroyer, L. T. Hixon and E. L. Kasemeier.

Mr. Neereamer then read his annual report as secretary-treasurer. This is published elsewhere. The report was accepted and filed.

Mr. Whitney then read the annual presidential address, which is also published elsewhere in this issue.

Following this address Secretary Neereamer presented the report of the nominating committee, which consisted of F. D. Carpenter (chairman), C. E. Palmer, S. D. Hutchins, A. Benham and E. B. Peck. The officers nominated were as follows: President, Arthur W. Brady; first vice-president, E. F. Schneider; second vice-president, C. L. Henry; secretary-treasurer, A. L. Neereamer; executive committee, H. A. Nicholl, W. S. Whitney, C. N. Wilcoxen, G. H. Crall, R. A. Crume, F. W. Coen, E. L. Kasemeier, J. F. Keys, C. O. Sullivan, A. Benham, S. D. Hutchins and Will H. Bloss.

The secretary was then instructed to cast one ballot for the nominees, who were then declared elected.

President-elect Brady was called to the chair, and after thanking the members for the honor given him, he said he would be well content if he could keep the association in the path of progress it had pursued so successfully in the last few years. He was a thorough believer in the work done by this and other associations. Anybody who looked over the history of the electric railways of this country knew that those in this part of the United States were performing their service for the public much better because of the work of the Central Electric Railway Association.

J. Edward Krause, president of the Hotel Washington, expressed pleasure that the members of the association had been his guests. Of the newly elected officers and committee members, Messrs. Henry, Neereamer, Nicholl, Wilcoxen and Bloss made short addresses expressing thanks for the honor of their election.

The meeting was then adjourned.

At the annual meeting of the Central Electric Traffic Association on Feb. 26 Chairman Neereamer was reelected and routine business transacted.

REPORT OF MAIL COMPENSATION COMMITTEE

The special committee of the American Electric Railway Association which appeared before the joint committee of Congress on postage on second-class mail mater and compensation for transportation of mail, on Feb. 7, after consideration of the matter, has asked the joint committee to make a definite recommendation on the subject of compensation for carrying United States mail in independent and compartment cars of electric railway companies. The railway committee asks the committee of Congress to make a recommendation that the Postmaster-General be authorized and directed to allow for space used in electric railway postal cars the rate of 1½ cents per linear foot on all cars not exceeding 30 ft. in length for each mile run in the performance of service, and that a minimum mileage of service should be provided of 30,000 miles per year for each car required in the service.

INSTALLATION OF SIGNALS IN INDIANA

The Railroad Commission of Indiana has requested the interurban electric railways which it has ordered to install signals this year to close their contracts and proceed with the work. The date set for the completion of the entire block signal protected sections, which was fixed originally at July 1, 1913, was not changed. The conference in regard to the installation of the signals was held Feb. 20, 1913.

VALUE OF PROPERTY IN NEW YORK REORGANIZATION CASE

The New York Public Service Commission, Second District, has rendered a decision in the case in which the Westchester Street Railroad asked authority to issue capital stock. This company was organized to acquire all but a small portion of the track of the former Tarrytown, White Plains & Mamaroneck Railway, which was sold at foreclosure sale. The Westchester company asked for the authorization of $912,023 capital stock to meet the cost of purchase and other expenses. In its decision the commission approves the rule laid down by the Legislature in Section No. 55a of the Public Service Commissions law, that the value of an existing property for the purpose of capitalization is to be ascertained by "taking into consideration original cost of construction, duplication cost, present condition, earning power at reasonable rates and all other relevant matters." Taking into consideration all of these matters the value of the property was determined as $400,000. The decision was written by F. W. Stevens, chairman of the commission.

VALUE OF THE PROPERTY

In regard to the value of the property Mr. Stevens says in part:

"The determination of the value of property by governmental authority may become necessary in a variety of cases, but for our purposes we may consider only the three principal classes: (1) assessments for purpose of taxation; (2) valuations in the fixing of rates to be charged by public service corporations; (3) valuations necessary in the authorization of capitalization of such corporations. In the first two classes rules for fixing value have been very largely considered by the courts. In the third class such rules have not, so far as I am aware, been laid down by any judicial authority which is binding upon this commission.

"The net result of the cases in the United States Supreme Court in which the method of valuing the property of solvent railroad corporations for the purposes of taxation has come up for consideration is that the commercial method of valuation is the one which is to be followed, as giving the most satisfactory results.

"Liberal extracts have been made in the decision from the opinion of the New York Court of Appeals in the Barker case, 47 N. Y., 70, which, however, should be consulted in full, for the purpose of showing that the real ground of decision was not that the cost of production was necessarily a true basis of value, but that it was the only practical and practicable basis. Whether the court succeeded in finding a just rule is not the question. It adopted the cost of reproduction, with all its known inconsistencies and absurdities. Thus, in one town, 5 miles of track may have been constructed upon level ground at little expense, while in an adjoining town the same amount of track may have been constructed at great expense, including a tunnel, an expensive fill across a deep gorge or a highly expensive bride across a river. The portion of the road in the town of lesser expense would be of as great value to the operation of the road as the other and would contribute as much of its earning power, and yet the assessment might be but one-tenth or one-twentieth part of that in the adjoining town.

"It must be noted that the opinion of the court, in none of its reasoning, attempts to sustain the position that if the road could be valued as a whole the cost of reproduction would be the controlling factor or even a factor of very much weight.

"Six cases are the only New York decisions which need engage our attention. They cover a period of approximately forty years and give a complete view of the judicial utterances during that time upon the point involved. In five of them the net earnings rule is adopted as the better and fairer basis of assessment, with a recognition in some of them that cost and reproductive cost may be resorted to for information and instruction.

"Fixing value for the purpose of rate making has been discussed chiefly by the United States courts. The leading case in the United States Supreme Court on this question is Smyth vs. Ames, 169 U. S., 466, decided in 1898. This method of arriving at the 'value' of the property of a public service corporation has been very extensively cited as well as lauded in unstinted language. It demands analysis and study. The problem is stated by the learned court to be the ascertainment of the 'fair value of the property being used by it [the corporation] for the convenience of the public.' It then proceeds as follows, the language being divided by me for convenience of reference into numbered paragraphs:

"'And in order to ascertain that value (1) the original cost of construction, (2) the amount expended in permanent improvements, (3) the amount and market value of its bonds and stock, (4) the present as compared with the original cost of construction, (5) the probable earning capacity of the property under particular rates prescribed by statute, and (6) the sum required to meet operating expenses, are all matters for consideration and are to be given such weight as may be just and right in each case.'

"Reduced to concise language and stated in terms having a well-known and definite meaning, the court merely says that in determining value the matters for consideration include (1) cost of property; (2) reproductive cost; (3) commercial value; (4) net earning power.

"It does not limit consideration to these matters, but expressly recognizes that there may be others, offering, however, no indication of what they may be. It is beyond question that if we make reproductive cost the test of value a result will be reached in the great majority of cases different from that which would follow either from commercial valuation or from capitalization of net earnings. This is undoubtedly the case in the comparison of any two theories. The capitalization of net nearnings will rarely, if ever, produce the same amount as commercial valuation. If one of these methods is adopted in its entirety, such adoption necessarily excludes the others. If all are to be considered, what relative weight is to be given to each?

"Taking the case in hand as a fair example, we find that we have no evidence as to the cost of the property, and it is a fair assumption from the facts known to us that to ascertain such cost with reasonable precision is impossible. The commercial valuation is an impossibility for the reason that the bonds and stock of the corporations which have owned the property never had any market value. The capitalization of net earnings cannot be considered, for in effect there have been no such net earnings. Reproductive cost can be approximated. If the value of property were always equal to reproductive cost, truly a happy state of affairs would exist. There could be no such thing as loss in venture, except from the depreciation by decay or wear of the property itself. A railroad could be built from nowhere to nowhere without business of any kind and yet its value would continue to be what it would cost to reproduce it.

"There is not to my knowledge, in any reported opinion, a thorough discussion of what constitutes value.

"The diversity of judicial opinion as to the rule for determining the value of a complex property used as a unit in the public service for the purposes of taxation and the fixing of rates apparently leaves the commission free to investigate as to the proper method to be pursued in capitalization cases. It is, perhaps, not too much to say that the failure of the courts to analyze carefully the problem has left the situation obscure upon the principle.

"There can be no question that 'value,' with reference to the purposes of taxation, fixing of rates and capitalization, means value in exchange. This was clearly brought out by Adam Smith nearly a century and a half since and has remained a recognized truth with all economists since his day. The homely speech of the people expresses roughly the same truth that is contained in the most precise and elaborate reasoning of economists when they say 'A thing is worth what it will sell for.'

"In cases where the sole attraction of a property which gives it exchange value, or, in other words, creates a desire for its ownership, is pecuniary gain the measure of the desire, and hence of the ratio of exchange, is clearly the amount of gain which it is believed can be realized. This fundamental consideration indicates that the net earnings rule of valuation, when properly and carefully applied with due regard to all the features of the individual case, is probably the one having the surest support of basic principle. It is also the one which accords with the practice of shrewd, broad-minded, successful men of business.

LEGISLATIVE RULE FOR FIXING VALUE

"The Legislature has very recently determined the rule for fixing the value of property involved in reorganizations of insolvent corporations. By amendments to the public service commissions law it was declared that the commission shall determine the amount of capitalization of corporations reorganized under and pursuant to Sections 9 and 10 of the stock corporation law, and the amount of the capitalization shall not exceed the fair value of the property involved. The value of the property is to be ascertained by 'taking into consideration its original cost of construction, duplication cost, present condition, earning power at reasonable rates and all other relevant matters.' The language quoted is from new Sections 55a, 69a and 101a, and definitely determines, so far as the property or reorganized corporation is concerned, that all of the aforesaid matters may be taken into consideration by the commission required to determine the value.

"This rule established by the Legislature for determining value in one class of capitalization cases can well be extended to all capitalization cases coming before the commission.

ELEMENTS FOR DETERMINING VALUE PRESENT IN THIS CASE

"The evidence in this case and the records of the commission place before us the following matters from which we are required to determine the value: (1) reproductive cost less depreciation; (2) past earning power of the road, with a general knowledge of the prospects for future growth and business; (3) price which the property realized at open competitive sale."

The decision then takes up the three matters mentioned. The conclusions reached on these points are stated in part as follows:

"At a hearing held Aug. 31, 1911, it was arranged that a revaluation of the road as to its reproductive cost, less depreciation, should be made by the engineers of the company and the engineer of the commission. After prolonged investigation they have agreed upon results which will be accepted. Their conclusions are as follows: Power and car equipment, $237,739.98; track and way, $207,954; total reproductive cost less depreciation, December, 1909, $445,693.98.

"The road as a whole, before it came into the possession of the applicant, was a bad loser, saying nothing of depreciation and unpaid taxes. The net deficit, exclusive of the depreciation, unpaid taxes as stated and fixed charges, for the period 1904-11, both inclusive, was $37,872. Since the road has been in the possession of the applicant there has been a marked improvement in gross earnings."

The decision then explains the necessity of considering a situation arising from a franchise complication which is in the courts for adjudication. The predecessor company accepted supplementary franchises providing for a rate of fare of 5 cents from White Plains to Mamaroneck. When the present company acquired the property it re-established the fare of 10 cents. According to the statement of the company the enforcement of the lower rate of fare from Dec. 8, 1909, to Sept. 30, 1911, would have turned a net revenue of $12,339 into a deficit of $6,077. In view of the judgment of the lower court that the franchise conditions are binding and of the evident view of the applicant that the existence of these conditions causes a serious diminution in the value of the property, the commission treats these conditions as a factor of considerable importance in determining the value of the property.

Chairman Stevens describes the competitive bidding at the foreclosure sale of the property between the Third Avenue Railway interests and representatives of the New York, New Haven & Hartford Railroad and says it is more than probable that the bidders considered the franchises of the company to be of value. As the public service commissions law forbids the capitalization of franchises and the applicant saw fit to pay for the franchises as a part of the value of the property, to that extent capitalization by stock issue is denied.

"With the improvements which the applicant is making on the road," the decision continues, "and with the general efficiency of operation which ought to accrue from good management, this operating ratio should be reduced very considerably, which would make an improvement in net income even without increase in operating revenues. There is, however every reason to believe that the operating revenue will continue to increase."

SUMMARY OF CONSIDERATIONS AS TO VALUE

In this summary and conclusions Chairman Stevens said:

"Referring now to the matters before us, from a consideration of which we must determine the value of this property, we have first a reproductive cost less depreciation of $445,693.98; second, the past earning power of the road, a net deficit from its inception to June 30, 1911, leaving wholly out of consideration all fixed charges and returns upon capital invested, coupled with the reasonable prospect that in the immediate future the loss will be changed to profit to some extent (the net income, however, will be diminished to some extent by reason of the franchise restriction); third, the precise amount which the property realized at open competitive sale was $882,400.78. It must, however, be found from the evidence that in making this bid the purchaser took into consideration franchise values which we are not permitted to capitalize and also rated the physical condition of the road as much superior to what it was found to be. After full consideration of all these matters, it is the judgment of the commission that the value of the road at the time of the purchase did not exceed the sum of $400,000. There are some matters of expense connected with the acquisition of the property which are properly capitalizable and should be added to this sum."

A dissenting memorandum was filed by Commissioner Sague, who said in part:

"In this case I think the earning power theory is used to reduce the capitalization below a proper amount. If the present low earning power is used as a basis for reducing capital, it would appear that the corporation might fairly expect permission to increase its capital if a future increase in net earnings appears to justify it. There is, however, no indication in previous decisions of the commission to show that consent to such increase would be given."

The Bureau of Foreign and Domestic Commerce is about to issue a monograph dealing with the manufacture of electrical instruments and meters in Europe. The report is by H. B. Brooks, commercial agent of the Department of Commerce and Labor, who recently inspected thirty-one of the most important electrical works of England, France, Germany and Italy. The products of each concern are treated in detail, and descriptions are given of the building, equipment, labor conditions, kinds of material used and the markets in which the products are sold.

COMMUNICATIONS

CONSTRUCTION OF AMERICAN AND PRUSSIAN ACCUMULATOR CARS

Federal Storage Battery Car Company
Silver Lake, N. J., Feb. 25, 1913.

To the Editors:

The writer has noted with much interest the communication from Dr. A. Büttner in your issue of Feb. 22, but it does seem idle to consider a single articulated type of lead-acid battery car, weighing as in this instance 25 tons and operated at a maximum speed of 31 m.p.h. on a road in Germany, where lead battery manufacture, railroad wages and electrical energy are all cheaper than in the United States, in comparison with any one of the thirty different types of Beach-Edison cars produced in this country.

Furthermore, it is of no avail to discuss in public print the theoretical features of the two types of cars and batteries—the lead-acid compared with the Edison nickel-steel-alkaline. It is merely a personal assumption for Dr. Büttner to suppose that there is no theoretical reason why lead-acid battery cars cannot climb as heavy grades or operate on short intermediate charges at as high rates as the Beach-Edison cars when it is a fact that our cars are to-day operating regularly in many places over grades varying from 5 per cent to 13 per cent, and current taken from the battery for a given run is being replaced in from three to thirty minutes. Our cars may well stand now solely and exclusively upon their merits, namely, upon the results obtained by the unprejudiced gentlemen who buy the cars from us and who operate them because they earn a profit on such operation.

Lead-acid battery cars were first produced in 1885 and lead-acid batteries were first produced a century ago. The oldest standard Edison nickel-steel-alkaline battery, which is in use to-day, was installed in an auto-truck only seven and one-half years ago. Our oldest standard car, although a previous experimental car was abandoned, was used three years ago on the Washington (D. C.), Spa Springs & Gretta Railroad for a few months and subsequently was sold to the Suffolk Traction Company at Patchogue, N. Y., where it has been in continuous service to this date with the original battery and with no battery renewals whatever.

Now, let us claim credit not for what we plan for the future but for what we have actually accomplished in our short but successful past. These are the records which Beach-Edison cars have established:

First—A car that has remained in continuous service the longest time without battery renewals and at a battery maintenance cost of 2 mills per car mile and that maintains to-day the same capacity as when installed three years ago.

Second—The greatest daily mileage—264.

Third—The greatest mileage per single battery charge on a test run—175 miles.

Fourth—The heaviest grades in regular service negotiated by battery cars; originally 2½ miles of constant 5 per cent grade. Our more recent installations involve long grades up to 13 per cent.

Fifth—The greatest continuity of service—running one hour, boosting at high rate for thirty minutes—maintained twenty-four hours per day.

Sixth—Battery car service which has not been interrupted by the coldest climates—as in Alaska, Montana, etc.

Seventh—Battery cars which are operated in the hottest climates—Chile and Cuba, with outside temperatures of 95 deg. to 103 deg. Fahr. Battery cars under high rate charging operated continuously eighteen hours a day without undue heating of cells.

Eighth—Fastest speeds. First 12 m.p.h., then 20 m.p.h., then 25 m.p.h., then 30 m.p.h., then 35 m.p.h., then 40 m.p.h., and recently 50 m.p.h. on level track.

Ninth—First storage battery train (multiple unit). Owing to the high energy consumption of the only multiple-unit control available, we developed for this a unique and highly successful control of our own.

Tenth—Largest vehicle of any description ever driven successfully by a storage battery. Railway cars of 50 ft. length singly and in trains.

Eleventh—Greatest number of passengers moved by a storage battery conveyance in regular service—170 passengers in train.

Twelfth—Greatest normal and overload horse-power of motors and battery per ton of dead weight of car—5-hp motors normal per ton; 500 per cent guarantee overload capacity of batteries for fifteen minutes.

Thirteenth—Lowest energy consumption at speed of 25 m.p.h., per train mile (three cars)—2.78 kw-hr. per train mile, 0.926 kw-hr. per car mile, 0.04 kw-hr. per ton mile.

Fourteenth—Lowest operating maintenance expense—7 cents per car mile.

Fifteenth—Longest life of battery in vehicle use at original capacity—seven and one-half years in auto-trucks.

Sixteenth—Only industry and organization ever devoted consistently and exclusively to the development and production of completely equipped battery cars and trains.

Seventeenth—Sold 78 per cent of all battery cars in 1912 and have over fifty separate railroad customers to-day—more than all other self-propelled car manufacturers of the United States combined.

When it comes to theorizing and prophesying, we also have the best of it. We believe that at no very distant day we shall have battery locomotives capable of operating the Twentieth Century Limited train of the New York Central Railroad from New York to Chicago on the present schedules, but we ask only that you credit us with those actual achievements hereinbefore enumerated.

Le Roy Scott,
Assistant Secretary and Sales Manager.

ELECTRIFICATION IN ITALY

Societa Italiana Westinghouse
Vado Ligure, Italy, Feb. 13, 1913.

To the Editors:

We have just seen the article entitled "Heavy Electric Traction on the Continent" in your issue of Jan. 4 and take this occasion to correct and elaborate the statement therein concerning the electrification of the Turin-Pinerolo line of the Italian State Railroads. According to your report, the Administrative Board of the Italian State Railways has been considering the electrification of this line on the single-phase system for the purpose of reaching a decision with regard to the use of three-phase or single-phase for future electrification. In connection with this point, we wish to state that, according to the Oct. 15, 1912, issue of *Revista Tecnica delle Ferrovie,* which is the official organ of the State Railways, it has been decided also to apply the three-phase system to the Turin-Pinerolo line. It is important to note that this decision was taken at a time when the tests of the Loetschberg tunnel single-phase equipment had been made public. The Italian State Railroads have no reason whatever to abandon the three-phase system, which offers so many advantages and from which all inconveniences have been completely eliminated. In Italy the practical application of heavy electric traction is already twelve years old, so that the Italian State Railways possess not only a vast experience but also types of locomotives and overhead material which are the outcome of that experience. In short, the experimental stage in Italy has been passed, the present constructions being the result of many years' practical service.

It may also be well to elaborate your data concerning the present status of electrification in Italy. The Valtellina line, electrified since 1902, and the Giovi line (Compasso-Pontedecimo-Busalla) and the Mont-Cenis line (Bardonecchia-Modane) are now in service, while the Savona-S. Giuseppe-Ceva division of the Savona-Turin line, as well as the Milan-Lecco line, are in an advanced state of construction. From this it will be seen that Italy has a whole network of state railway lines, operated with identical characteristics, namely, three-phase current, a frequency of 15 cycles to 16⅔ cycles, and a line potential of 3000 volts to 3800 volts, and using similar types of locomotives. At the present time there are in service nine locomotives built by Ganz & Company, of Budapest, and forty locomotives built by our company, while sixty-one locomotives, of which forty-five have five coupled axles with 2000 hp rated capacity and sixteen have three coupled axles of 2600 hp rated capacity, are also being constructed by our company. These two types of locomotives, practically speaking, are those which will operate all electric service on the Italian State Railways, that is to say, heavy freight trains as well as passenger trains reaching an average speed of 62 m.p.h. In conclusion, it may be of interest to state that the State Railways are about to present to Parliament an electrification program covering further lines.

Pontecorvo.

SCHEDULES FOR 1912 CENSUS OF ELECTRIC RAILWAYS

The Bureau of the Census has begun to mail schedules to the companies for the 1912 census of electric railways. The census is to be taken under the direct supervision of W. M. Steuart, chief statistician for manufactures.

In the work of preparing to send copies of the schedules to electric railway companies the bureau tried to make a list of all railway companies that are controlled or operated from a central office and to send to that office the blanks for all of the properties controlled. The bureau also intended to send directly to each railway company not operated from a central office the schedule for its report. Where it appeared from the records of the bureau that the railway companies operated central electric light and power stations as separate departments for which they would want to make separate reports, schedules for such stations were included with the railway schedules. While every effort was made to comply with the purposes thus outlined, it is thought that the records may not be entirely complete and may not show in every instance, therefore, whether a lighting department controlled by a railway company is operated as a separate department for which accounts would be kept independent of the accounts of railway operations. Owing to the possibility that the records may not be complete in this respect it is possible that some railway companies will receive schedules for lighting plants in cases where the information is properly included in the report for the railway system, and where therefore no separate return would be required. It is possible also that in some instances the railway companies that operate separate lighting plants will not receive separate schedules for such plants. Questions relating to these matters should be taken up directly with the Bureau of the Census.

E. Dana Durand, director of the census, in his statement giving a reference to the act of Congress which authorizes the census of electric industries, states that the statistics for the 1912 census should relate to the calendar year ended Dec. 31, 1912. Except in the case of a number of employees all questions that relate to a single date such as mileage of tracks, cash on hand, etc., should be of the date of the last day of the year covered by the report.

As in previous cases where a census of electric railways has been taken, Mr. Durand states that the answers to inquiries in regard to financial matters will be held absolutely confidential. The separate reports will be combined so as to show totals for all companies in each state. The information will be used only for the statistical purposes for which it is given and will not be disclosed to any individual, state or local authority or other bureau or department of the federal government.

The schedule for operating properties covers all electric railways and all street railroads irrespective of the kind of motive power used. The schedule for operating companies for the 1912 census is changed in some details from the previous form used for this purpose, but follows the same general lines as in the past. In addition to the usual statistics relating to types of cars and their equipment, the schedule will show the number of prepayment cars and the number of electric locomotives.

In the computation of car mileage the individual car is to be considered the unit. A motor and one trailer may be treated as a unit, however, if this is the practice of the company. The inquiries relating to financial operations conform generally to the system of accounts adopted by the American Electric Railway Accountants' Association and the Interstate Commerce Commission. All companies irrespective of size are to use the condensed statements provided. A form of balance sheet is also included.

The section relating to employees, salaries and wages says that if possible the number employed on Sept. 16, 1912, should be given. Additional questions are provided in the schedule for electric railways which operate electric light and power plants.

The schedule for non-operating and lessor companies provides for a classification of track, a brief statement of income account and a balance sheet.

REQUEST FOR SAN FRANCISCO CONVENTION RESERVATIONS

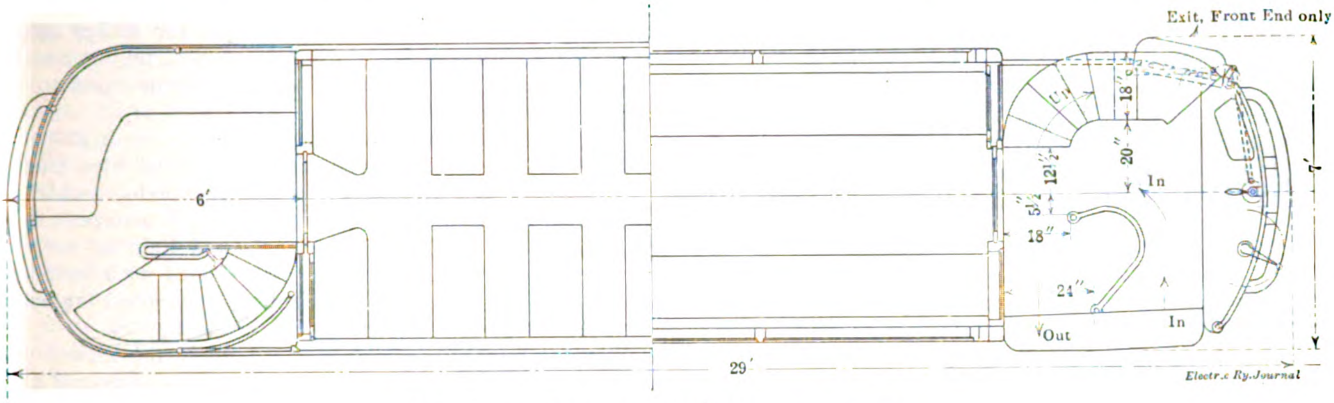
H. G. McConnaughy, secretary of the American Electric Railway Manufacturers' Association, has sent under date of Feb. 25 a letter to all members of the association in which they are informed that the American Electric Railway Association has decided to hold its 1915 convention in San Francisco, in October, during the Panama-Pacific International Exposition. Mr. McConnaughy's letter is accompanied by two report blanks, on one of which the member firm is requested to indicate whether it will make an exhibit at the San Francisco convention and, if so, how many square feet of space it will require for exhibit purposes; on the other the member firm is requested to state the number of hotel rooms of the several kinds specified which it would like to have reserved for the week of the convention. The letter states with regard to the exhibits that a committee has been appointed to complete arrangements as soon as the individual members have expressed their wishes on this subject. The same committee also has agreed to take up the question of hotel accommodations, and it is desirable that the hotel blank should also be filled out and mailed immediately after receipt from Mr. McConnaughy in order that arrangements can be made for hotel accommodations before the options expire.

The information obtained from these blanks will help the committee on convention location of the American Electric Railway Association to make final arrangements for the exact date of the convention and for other matters in connection therewith when it visits San Francisco during the last week in March.

A company named the Chemins-de-fer Electriques de la Champagne has been formed in France to build a system of local railways in the departments de l'Aube et de l'Yonne. The lines will be of meter gage and the extent of the system about 120 miles. The lines will operate with single-phase current furnished by a hydro-electric company.

DOUBLE-DECK PREPAYMENT CARS AT ABERDEEN —OTHER DEVELOPMENTS

The first foreign application of the prepayment idea to double-deck cars was made early in December, 1912, by the Aberdeen Corporation Tramways. At present one converted car is in service, but arrangements have been made with the International P-A-Y-E Tramcar Company, Ltd., London, Eng., for licensing ten cars to be used this spring.



Part Plans of Double-Deck Prepayment Cars

The accompanying illustrations are views of the rear and front platforms of the first car. The view of the front platform shows the passengers leaving at the left, a chain being installed between the stanchion and bulkhead to prevent them from alighting on the devil-strip side. The use of the front platform for exit in addition to the exit aisle on the rear platform is quite a departure from British practice and it is expected to facilitate greatly the loading and unloading of cars.

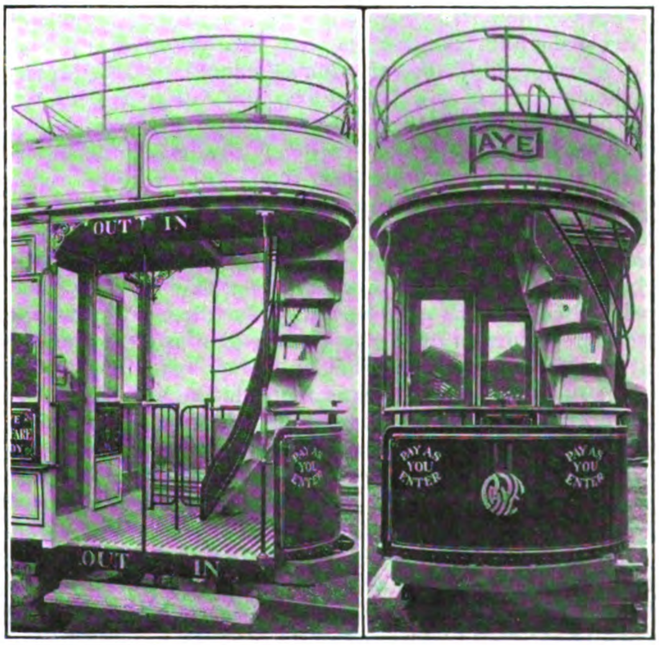
Two kinds of tickets, as hereinafter described, have been provided by the licensing company for use on these cars. On bridges and circular routes where more than one penny fare is included in the trip each ticket contains only the names of two stages marked in heavy type along the border. The center of the ticket bears a colored band, the color differing according to the exit zone. It is therefore easy to detect over-riding since all the tickets given up in one zone must be of one color. The second tickets will be used on ordinary routes where the fare is a penny from one end to the other. The stages will be numbered in heavy type so that the conductor, who knows the numbers, will have no difficulty in punching the ticket correctly.

A.1 Sauce
ENTRANCE
EXIT

Front and Rear Platforms of Aberdeen Double-Deck Prepayment Car

The P-A-Y-E Company has also licensed ten new double-deck cars for the Leicester Corporation Tramways. These cars are to have the exit and entrance arrangements indicated in the accompanying drawing. It is proposed to place the cars in operation during the present winter. Should they prove successful about 175 cars will be remodeled for the same method of operation. Colored tickets will be used in Leicester to take care of the four zones, but numbers will be used in cities with a great many zones like Glasgow. A machine has been developed whereby the correct exit zone ticket will be given out by the conductor under any conditions.

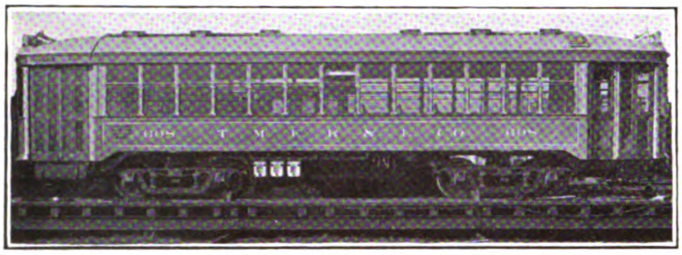
It is reported that the Boulevard Chemin de fer Électrique Central, a new suburban line between Paris and the forest of St. Germain, will operate fifty cars on the prepayment principle. At present, it is experimenting with a center-entrance car which handles two classes of passengers. The growth of the prepayment idea abroad is also indicated by the fact that negotiations are now under way for installations in Moscow, Russia, and Shanghai, China. In fact, prepayment designs are being considered by more than thirty foreign electric railways.



Models of Prepayment Platforms as Arranged for Double-Deck Cars with Drop Platforms

NEW CARS FOR MILWAUKEE

The Milwaukee Electric Railway & Light Company has recently received and put in operation thirty semi-steel cars of the pay-as-you-enter type built for double-end operation. In general, the interior arrangement conforms to that in the cars which the company is now engaged in rebuilding. In the main construction details and general appearance, however, the new equipment is a considerable departure from the earlier cars.



Milwaukee Car—Side View, Showing General Design

The general dimensions of the new car are as follows: Length of car over corner posts, 33 ft. 8 in.; length of car over bumpers, 47 ft.; width of car over belt rail, 8 ft. 5 in.; height, top of roof to floor, 8 ft. 1⅛ in.; height of floor above rail, 41 5/16 in.; truck centers, 22 ft. 8 in.; distance center to center of posts, 29⅝ in.; diameter of wheel, 34 in.; seating capacity, 52; total weight, 49,000 lb., including weight of electrical equipment, 13,100 lb.; weight of car body per passenger, 942 lb.

BODY CONSTRUCTION

One side of each vestibule is supplied with double folding doors which open out, leaving a clear entrance 3 ft. 8 in. in width. The opposite side is provided with a single folding door which also opens out and leaves a 2-ft. 4-in. opening. The narrow opening forms the exit at the motorman's end of the car and the wide opening the entrance at the opposite end of the car. A rail leading from the center of the bulkhead is so arranged as to separate the passengers boarding from those alighting on the rear platform, as well as to enable the passengers to steady themselves as the car starts, a feature which has been found to be very necessary upon a large open platform. A small platform in the corner adjacent to the bulkhead and opposite the wide entrance door forms the conductor's station. A fare box which is of the "coffee can" type peculiar to Milwaukee and the conductor's door-operating handle are located on the narrow portion of the bulkhead which projects into the car at this point.

One of the novel features is found in the vestibule doors which are built with all glass panels. Polished woven wire glass was set in the lower panels and clear glass in the upper. The wire glass is ¼ in. thick and the clear glass is of 39 oz. crystal plate. Both sets of entrance and exit doors are wired in series with a light signal at the motorman's station. He depends entirely on these signals for starting the car, as the customary bell cord and bells for signals are used in special cases only. Push buttons ring a bell at the motorman's end of the car.

Other unusual features in the platform equipment include the motorman's seat, which is applied to a bracket supported on the hand brake staff. The absence of a bulkhead made it necessary to install on the vestibule ceiling just back of the motorman's station a curtain which may be pulled down and attached to a fastening in the floor. The conductor's station is also supplied with a small folding seat which is hinged to the side of the car so that it may be swung out of the way if desired.

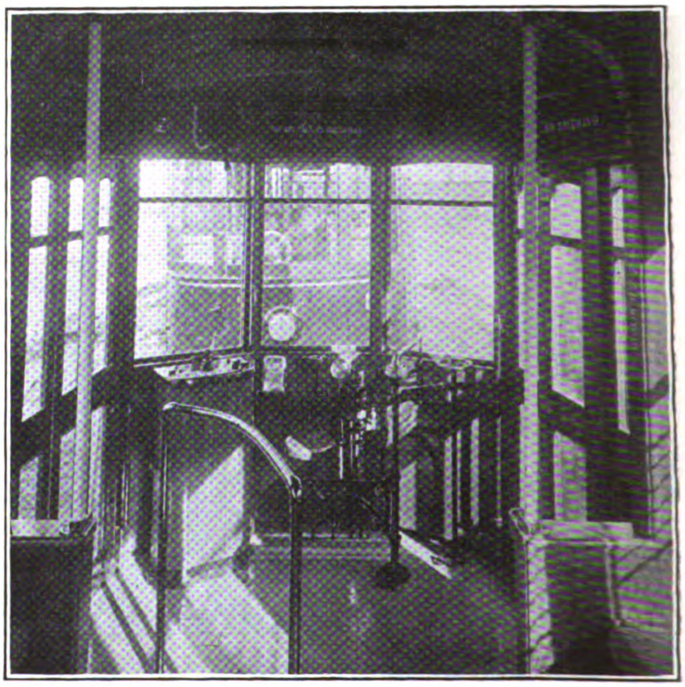
The car body is provided with seats for fifty-two passengers. Fourteen cross-seats with pressed-steel pedestals and upholstered in rattan are spaced at 29⅝-in. intervals in the center of the car body. Four 7-ft. 9-in. longitudinal seats occupy the remaining space in the body at the ends. One of the cross-seats at the center of the car is removed during periods of low temperature so as to make way for a forced-draft heater. The space under the longitudinal seats is utilized for sand boxes, battery for the motorman's signal, air reservoir and triple valve at one end of the car, and a duplicate sand box, a signaling device and a box to contain wrecking tools at the other end.

The new cars are equipped with complete brake rigging for hand and air brakes. The air-brake system is that of the National Brake Company, arranged for trailer operation. In addition to this, hose connections, piping and fittings necessary for through train line connections to the trailer have been provided.

All wiring and electrical apparatus has been installed to conform to the requirements of the Board of Fire Underwriters, the wiring being installed in conduit which is grounded. A jumper socket for electrical connections to trail cars, for bells, starting signals and lighting circuits, has been installed. This socket is provided with four contacts so that when the jumper plug is applied complete connections are made for the four circuits.

A special feature of the car wiring is the motor connection box. This box and the leads are so arranged as to make disconnections quickly and to eliminate the use of tape on the leads. Essentially the connection box consists of an insulating block on which brass clamp terminals are mounted. A sleeve is permanently applied to the end of each motor lead by sweating it in position. The cover for closing the connection box is of malleable iron insulated and bolted to the center sills.

The car body is mounted on Baldwin trucks on which are mounted four 50-60-hp Westinghouse interpole, box-frame motors. An unusual feature in connection with the rolling stock used on the Milwaukee railway is that in addition to providing an overhead circuit breaker in each vestibule, the motors are protected against overloads by fuses. The motor control is General Electric K-35. Plans and specifications for these new cars were prepared by the mechanical department of The Milwaukee Electric Railway & Light Company under the general supervision of H. A. Mullett, superintendent of motive power and equipment, and they were built by the St. Louis Car Company.



Milwaukee Car—Interior View of Vestibule

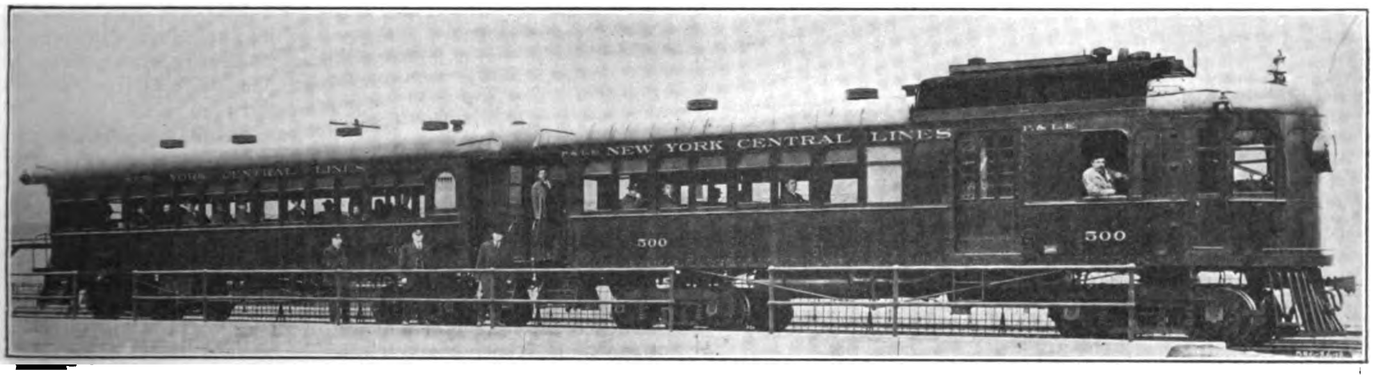
TWO-UNIT GAS-ELECTRIC TRAIN ON THE PITTSBURGH & LAKE ERIE

The accompanying illustration is an excellent view of the two-unit gas-electric train now in service on the Pittsburgh & Lake Erie Railroad between Pittsburgh, Pa., and College, ½ mile west of Beaver Falls. The complete system of this division of the New York Central Lines extends from Youngstown in northeastern Ohio to Pittsburgh, where it branches into two sections, one going to Brownsville and the other to Connellsville in southwestern Pennsylvania. The road handles an extensive freight business, its equipment consisting of 249 locomotives and 24,608 freight cars, in addition to 140 passenger and 468 miscellaneous cars.

The service of this gas-electric motor train is unique. It is the first instance where a self-propelled car of the type has been employed in this country on a main-line heavy four-track road for local runs and interpolated between the schedules of limited trains. The motor car differs from the standard sizes heretofore developed by the General Electric Company. It is much shorter and is designed essentially for operation with a trailer. The seating capacity of the combination, however, is greater and equals the best ruling practice of interurban roads.

On the trial trip of the train from Pittsburgh to College, a distance of 31.2 miles, the outgoing run was made in forty-nine minutes, including three stops, at Coraopolis, Woodlawn and Aliquippa respectively. Returning with two stops, the Pittsburgh section was reached in forty-two minutes. As the train is equipped with motors of 200 hp total, it is capable of averaging easily 50 m.p.h.

The motor car is 42½ ft. long, 10 ft. 5 in. wide, weighs 36 tons and seats forty-two people. It is partitioned into three compartments—one 20 ft. 5 in. long, designed for a smoker, in which the seats are finished with Spanish leather; a small section for baggage, 6 ft. long, as the traffic requirements do not call for the transportation of bulky express matter, and a cab, 12 ft. long, containing the power plant apparatus. It is equipped with a rear platform entrance. The trailer is 38 ft. long over the body, weighs 22 tons and seats eighty people, making a total seating capacity for 122 passengers. The seats are cushioned with friezette plush. Front and rear platform entrances are provided. Throughout the cars the interior trim is of mahogany, highly finished, and the decks are ceiled with composite board. A preliminary description of this equipment was published in the Electric Railway Journal for Oct. 19, 1912.



Two-Unit Gas-Electric Train on Pittsburgh & Lake Erie

A large number of time clocks have been placed on the various tramway lines of Leeds, England. The conductor registers each time he passes a clock, which records the time. This has done away with timekeepers and has assured more regular running of the cars. Similar clocks are in use in Liverpool and Manchester.

A DOUBLE-DRUM CONTROLLER FOR CRANE MOTORS

There are several applications of electric cranes and hoists in which the exigencies of the service demand, first, constant hoisting speeds with all loads; second, a wide range of speeds with all loads and, third, a very slow creeping speed with all loads. The control of d.c. series motors to fulfil these conditions, and especially the last named, has offered considerable difficulties to crane builders and users. One of the most usual methods of control has been to adopt a series controller with two, or at the most three, resistance notches arranged in parallel with the armature. While this arrangement can be made to give a small torque at low speeds, the increments of torque are necessarily great owing to the small number of notches.

The British Westinghouse Electric & Manufacturing Company, Ltd., in order to avoid jerking or dropping loads and to provide a creeping speed over a wide range of torques, has introduced a controller with two drums, the main drum, comprising the usual series starting and controlling notches and being operated by a crank handle, and the auxiliary drum, which is operated by a small hand wheel arranged to cut resistances in or out in parallel with the motor armature. The two drums are interlocked mechanically in such a way that the auxiliary drum can be operated only when the main drum is in either the first or second hoisting position, that the current is never broken on the auxiliary drum, and that the parallel armature resistance cannot be left in circuit while rheostatic braking is going on, because this would cause the load to drop. Neither can the main drum be moved beyond these two notches unless the auxiliary drum is in the "off" position. There are eight or ten notches, according to size, on the auxiliary drum so that a total of seventeen or twenty-one creeping speeds can be obtained on the hoisting side, not including the other notches on the main series drum. At the same time, the controller can be used as an ordinary rheostatic braking controller if desired.

Two standard ratings of the resistances are furnished, an eight-minute rating and a continuous rating. The former is suitable for starting a motor against full-load torque during a period of eight minutes out of fifteen. The continuous rating will allow either the main drum or the auxiliary drum to be left on any notch continuously and is the rating recommended for general use. An additional field-exciting resistance is supplied if required to insure that a braking effect will be obtained on the rheostatic braking notches at the instant the load commences to lower, and this resistance is in circuit during the time that the controller handle is on any of the rheostatic braking notches.

The New South Wales government has approved a project for the construction of electric underground railways in Sydney, the city section of which is to consist of three lines instead of two, as originally recommended.

LONDON LETTER

(From Our Regular Correspondent)

As a result of the absorption of the Central London Railway and the City & South London Railway by the Underground Electric Railways of London, which brings these companies into the Sir Edgar Speyer group of underground railways, a number of important changes have taken place in the directorates and management. Lord Knollys, Lord Rathmore and Robert Fleming have resigned their seats on the board of the Central London Railway, and Lord George Hamilton, Col. Sir Herbert Jekyll and A. H. Stanley have been appointed in their place. A. H. Stanley has been appointed managing director of the company. H. F. Parshall has tendered his resignation as a director, and the Hon. Sydney Holland has been elected to fill the vacancy. Lord George Hamilton has become chairman of the board. With regard to the City & South London Railway board, J. F. S. Gooday, S. Barclay Heward and Edwin Tate have resigned, and Admiral Sir Cyprian Bridge, T. C. Jenkin, who has resigned as general manager of the company, and A. H. Stanley have been elected in their place. A. H. Stanley has been appointed managing director. Lord George Hamilton has resigned as chairman of the London Electric Railway and Lord Farrer has been appointed in his place. Lord Knollys has been elected to a seat on the board. It will be observed that A. H. Stanley has been appointed managing director of both the Central London Railway and the City & South London Railway, and as he is already general manager of the Baker Street & Waterloo Railway, the Great Northern, Piccadilly & Brompton Railway, the Charing Cross, Euston & Hempstead Railway and the Metropolitan District Railway, he will now be manager of practically the whole of the underground electric railways of London.

It seems somewhat strange that the Metropolitan Railway could not see its way to amalgamate with these interests, but the board of that company decided that it was not to the interests of the company to fuse financially with the Metropolitan and the Underground Railway group. At a recent meeting of this railway it was stated that these fusions of interests were undoubtedly brought about by the serious and increasing competition of the motor omnibuses, which are now controlled by the Underground group, and that the tubes which had been absorbed had suffered very much from this competition. The Metropolitan company's position, on the other hand, was quite different. Less than one-half of the total revenue of the company was derived from traffic in competition with the motor buses, the main part of the receipts being from long-distance traffic, from freight traffic and from exchange with various trunk lines. The relations of the company with the Underground group are friendly and it has an understanding with the Underground group by which they work together in mutual interest, with a view to eliminating unnecessary competition.

Last November the Manchester Tramways Department, in view of the congestion of the tramway traffic in the central area, appointed a special sub-committee to consider and report upon:

(1) The probable increase of tramway traffic during the next twenty years.

(2) The provision necessary to diminish the increasing congestion by (a) widening of existing streets or the construction of new streets; (b) the acquisition of an arterial center; (c) the construction of subways for tram traffic.

3. The extent to which the financial resources of the tramway undertaking can be applied for this purpose.

The committee has issued its report. The number of passengers carried in 1905 was about 127,000,000, whereas in 1912 the number was nearly 175,000,000. If this rate of increase is maintained, the number will reach 386,000,000 in 1932. It has also been proved that the cost of operating cars in the congested central area is expensive, 2.26 units per car mile being required, as against 1.39 per car mile on a suburban portion. It is thus estimated that if all the cars in the central area could be operated at an average speed of 8 m.p.h., a saving of about £20,000 per annum could be effected. It is evident, however, that whatever plan is ultimately determined upon, the cost will be great, as street widening is very costly and the construction of subways would cost probably about £400,000 per mile. The committee recommended that the general manager and the permanent way engineer be instructed to visit certain cities in the United Kingdom and abroad, study traffic conditions in those cities and report thereon for the further guidance of the committee prior to issuing their final report.

The Corporation of Glasgow has approved the proposals for the extension of the city tramways over nine new sections of roads or streets. In order to carry out one of the proposals it will be necessary to build a new high-level bridge over the River Kelvin. It is also evident that the question of a new bridge over the Clyde—to carry new north and south lines of tramways—will have to be faced, as the continued extension of the system from the city outward is throwing into the center and on the present bridges an ever-increasing volume of traffic.

The Hastings Tramways intends to apply at the next session of Parliament for statutory authority to work the whole of its tramway system by means of overhead wires. At the present time the company's tramways along the sea front are worked by the Dolter surface contact system, which the preamble of the proposed bill alleges "is not satisfactory, owing to defects which are inherent to the system." The preamble further states that the board of trade has intimated that it may be necessary to call for the discontinuance of the use of the Dolter surface contact system in the interests of general safety, and it is therefore expedient that such system should be discontinued. It is understood that the Corporation of Hastings, which approved the Dolter system, will oppose any overhead system of electric traction along the sea front.

As a result of the recent poll on the question of Sunday trams, the Bournemouth Town Council will run a service on Sundays from 2 p. m. to 10 p. m., such as in the opinion of the general manager will best meet the convenience of the public. The employees will be paid at the rate of time and a quarter for Sunday work.

The North Eastern Railway has decided to electrify its mineral line between Shildon and Newport (Middlesbrough), a distance of 18 miles. The electrical energy will be purchased from the Newcastle-on-Tyne Electric Supply Company, in connection with the Cleveland & Durham County Electric Power Company and the Cleveland & Durham Electric Power, Ltd. The company has decided to build ten electric freight locomotives at Darlington. The order for the electrical equipment of the locomotives has been placed with Siemens Brothers, who have also secured the contract for the equipment of the permanent way, while the substation apparatus will be supplied by the British Thomson-Houston Company. The railway has decided to equip this line in preference to others, as the traffic is largely self-contained.

At a meeting of the Midland Railway statements were made in regard to the contemplated electrification of the company's suburban routes. The company is already committed to electrify the Southend route and now contemplates the electrification of the line formerly known as the Tottenham & Forest Gate Railway, running from Kentish Town, through Upper Holloway, Crouch Hill, South Tottenham, Walthamstow and Leyton, to East Ham, where connections are made with the main line between Tilbury and London. The main line from Kentish Town to St. Pancras will also be equipped for electric operation. At the same time, it is proposed to electrify the line to St. Albans, passing through Cricklewood, Hendon, Mill Hill and Elstree, and to connect with the extended tube of the London Electric Railway beyond Golder's Green.

Even the South Eastern & Chatham Company has made a move toward the electrification of its suburban lines. A start will probably be made with the company's Metropolitan section, which runs from Moorgate to Victoria. This line taps the thickly populated areas of Camberwell, Brixton, Clapham and Battersea. It is also probable that in the near future the Crystal Palace lines, with extensions to Nunhead and Greenwich, and the lines running from the city to Herne Hill, Penge and Bickley, and New Cross and Bickley, will be electrified. It will be seen, therefore, that practically all of the great railways with terminals in London are already electrifying or considering the electrification of their suburban lines.

A. C. S.

News of Electric Railways

Philadelphia Equipment Trust Approved

Both branches of City Councils of Philadelphia, Pa., have passed the ordinance granting consent to the Philadelphia Rapid Transit Company to issue car-trust certificates against its rolling stock to the amount of $4,200,000. The bill further authorizes the company to acquire from time to time additional equipment "by further leases and agreements which may be made the basis of further issues of car-trust certificates and to guarantee the payment of such certificates with the dividend warrants, said issue not to exceed in any case 80 per cent of the cost of said equipment."

The stockholders of the Union Traction Company, Philadelphia, at a special meeting on Feb. 26, 1913, voted unanimously in favor of the $4,200,000 car-trust plan. Besides assenting to the proposed issue of equipment-trust certificates, the stockholders voted to release any lien or interest in the 950 near-side cars and eighty elevated cars already bought and controlled. The certificates will be guaranteed by the Philadelphia Rapid Transit Company. It is explained that the Philadelphia Rapid Transit Company preferred to issue short-term car-trust certificates for equipment so as to use the proceeds of the long-term $10,000,000 loan, of which only $2,000,000 has been issued, entirely for permanent improvements, in which rolling stock is not included. The car-trust certificates will be issued in the denomination of $1,000 and are to run for twelve years with interest at 5 per cent per annum.

Municipal Ownership Resolution in Toledo.

A resolution paving the way to city ownership of the street railways in Toledo, Ohio, has been approved by the Council committees and will come before Council within a very short time. The text of the resolution is as follows:

"Resolved, That a committee consisting of the Mayor, director of service, city solicitor, president of the Council and three members of the Council is hereby authorized to consider the advisability of taking over, in whole or in part, the property of the Toledo Railway & Light Company by purchase, condemnation or otherwise, said property of the above mentioned company consisting of its street railway system, electric light and power departments, artificial gas and heating departments, the Toledo, Ottawa Beach & Northern Railway, also its parks, known as the Toledo Beach and the Casino, all the above properties lying within or without the boundaries of the city of Toledo.

"Be it further resolved, That if, in the judgment of the majority of the above-mentioned committee, it seems wise at this time to take ever the above-mentioned properties, in whole or in part, then this committee is further authorized to submit a plan to the City Council for purchasing that portion of the above-mentioned properties, as recommended by the said committee, by condemnation or otherwise, and for financing and operating the same by the city of Toledo, so as furnish the citizens and taxpayers of Toledo transportation, light, power, heat and recreation at the lowest possible cost consistent with the best of service."

The city authorities believe that if the amendment to the constitution does not clear the way for immediate municipal ownership, the adoption of home rule government by cities will do so.

It has been decided to operate one of the principal lines for a certain period with pay-as-you-enter cars with a view to their ultimate adoption for all lines.

Replying to a request for better service, Frank R. Coates, president of the company, said that the service has been increased 59 per cent in the last ten years, while the population of the city has increased only 30 per cent. In 1903 there was one car for every 878 persons and in 1913 there is one car for every 716 persons in the city. Each of the cars in use at present accommodates twice as many people as were handled in many of the cars ten years ago.

The ordinance introduced by Councilman Starner some time ago, providing for a 3-cent fare on all lines and universal transfers, was laid over by the committee until the complete report of the operation of the company for 1912 has been presented.

Kansas City Appraisals

Bion J. Arnold, as special commissioner under appointment by the federal court to value the property of the Metropolitan Street Railway, Kansas City, Mo., reports that a fair sum to represent the capital value for adoption in any new contract with the municipalities where the properties are located would be $36,700,000, including the Westport Company, and $35,000,000 without it. These values, in the commissioner's judgment, should be apportioned as follows: Metropolitan System—Kansas City, Mo., $28,000,000; Kansas City, Kan., $5,600,000; Independence, Mo., $350,000; Jackson County, Mo., $700,000; Rosedale, Kan., $350,000. Westport Company—Kansas City, Mo., $1,200,000, and Jackson County, $500,000. Mr. Arnold says:

"An analysis shows that 81 per cent of the appraised value, 83 per cent of the investment value, 83.8 per cent of the gross revenue, 79 per cent of the car miles and 75.9 per cent of the track miles are located or originate in Missouri. The true division of the recommended fair value cannot be determined by averaging the above percentages, but since the principal elements to be considered in such a division, namely, the actual investment and the gross revenue, are in substantial agreement, your commissioner believes that, taking all the facts into consideration and so long as the property is operated as an entity, the division between Missouri and Kansas on a basis of 83 per cent and 17 per cent respectively is fair and reasonable."

On this basis Mr. Arnold determines the apportionment as follows: Kansas City, Mo., 80 per cent; City of Independence, 1 per cent; Jackson County, 2 per cent, making Missouri's total 83 per cent; Kansas City, Kan., 16 per cent, and Rosedale, 1 per cent, making Kansas' total 17 per cent.

The city's experts place a valuation of $16,272,593 on the physical property of the Metropolitan Street Railway in Kansas City, Mo., and Jackson County. In making the inventory they took no cognizance of property owned and operated by the company in Kansas, as it is to have no part in the pending franchise negotiations. The city's totals include the Westport Belt and the Independence lines, with more than $1,000,000 voluntarily added on a basis of 8 per cent for capital that was idle during the period of construction of the lines. The city's estimates are:

	Cost	Present Value
Track, 216.734 miles	$4,133,698	$2,885,097
Bridges, viaducts, trestles	1,036,384	854,493
Grading	201,019	201,019
Paving	1,784,169	1 083,631
Electrical distributing system	1,567,339	1,321,089
Rolling stock	3,734,153	2,358,525
Power plant and substation equipment	2,484,413	1,907,634
Shop equipment	86,896	86,896
Building	1,920,095	1,493,224
Furniture, fixtures	30,692	26,174
Real estate	2,335,009	2,335,009
Right of way	112,925	112,925
Condemnations	45,250	45,250

Eight per cent added for interest and taxes on capital lying idle during course of construction work, approximately $1,205,377.

It was arranged to resume the franchise negotiations on Feb. 18. Previous to their resumption Judge Evans, the city counselor, in an interview outlined some of the conditions that the representatives of the city had decided to insist upon. He said that the rate of fare would be one of the essentials of control which the city would demand if the franchise was extended. The city would also demand to become a partner in the management of the company and to have a voice in the expenditures and a certain degree of supervision over the issuance of additional security. The city would also demand a voice in determining the number of cars to be operated and in the regulation of service and schedules. The city would also reserve the right to purchase the property of the company at any time upon reasonable notice of such intention, all disputes to be settled by the Circuit Court. All rights now reserved to the city in the pending peace agreement would be retained, including the control of the matter of building extensions. In return the company would get an eighteen-year extension of its franchise after the expiration of the present grant in 1925. At a conference on Feb. 18 between the representatives of the city and the officials of the company, the latter made it plain that the conditions noted briefly above were the ones that they would insist should be incorporated in the proposed franchise extension ordinance.

Progress in Preparation of Chicago's General Traction Merger Ordinance

The sub-committee of the local transportation committee of the Chicago City Council and Corporation Counsel Sexton are holding regular sessions in connection with the preparation of a skeleton ordinance for the merger of the surface and the elevated railways in Chicago. Bion J. Arnold, chairman of the Board of Supervising Engineers, has been called in from time to time to obtain his views on some of the points to be embodied in the ordinance.

The first important questions to be raised by the corporation counsel in the preparation of this ordinance were as follows: First, whether there shall be a board of supervising engineers as provided in the 1907 ordinance. Second, whether advertising shall be allowed in street cars. Third, rates of fare; shall there be a flat rate for every one, or shall decreased rates be allowed for children? Fourth, the question of charging for street cleaning and sprinkling on the lines. Fifth, whether there shall be a maintenance fund such as provided for in the 1907 ordinance. In discussing these questions the sub-committee, assisted by Bion J. Arnold, decided that the board of control shall consist of a constructing engineer, an operating expert, an expert accountant, a lawyer and a business man. Through this board it is proposed to exercise the power of regulating operation as well as maintenance of the transportation system. It is also proposed that the City Council shall have the authority in all questions of extensions and new construction, although the board would have the right to make recommendations. The Council also would have certain initiative and veto power over the authority of the board in the operation and maintenance of the line.

It was the sense of the committee that politics should be eliminated from the appointment of the members of the supervising board, but at the same time they believed the members should be appointed by the Mayor and confirmed by the Council. At the conclusion of the discussion Mr. Sexton was instructed to incorporate a plan by which only a part of the board's membership shall expire in any four-year period. This arrangement would not permit any incoming administration to change the entire personnel of the board from year to year. It was decided to limit the amount of advertising to be carried.

Rapid Transit and City Planning

George McAneny, president of the borough of Manhattan, speaking at the dinner of the New York Chapter of the American Institute of Architects in New York on Feb. 20, 1913, outlined plans for a "city beautiful" on the "civic center" idea. He said that he hoped to see ultimately the appointment of a city-planning commission, which would have such work in charge. Mr. McAneny said that he would recommend the naming of a commission to inquire into the height of buildings. In this particular he said in part:

"The laying out of rapid transit lines that will enable the people to reach more comfortable homes in the outlying and at present more or less undeveloped sections of the city must go hand in hand with the checking of abnormal building in those sections that are now at the city's center. In laying out our so-called 'dual system' of rapid transit lines we have kept the correct principles of city planning constantly in mind, and have laid down routes selected by the city and for the city's reasons, and not by the operating companies alone, interested as they naturally are in the continuance of the richer 'short hauls' and the concentration of traffic upon those lines that will pay best from a commercial railroading point of view.

"When these contracts are signed I think we had better get promptly to work upon the proper regulation of the height of buildings, or at least upon the careful consideration of what ought to be done or can be done, and I believe that you will now find the Board of Estimate quite prepared to make a start.

"One of the assistant engineers of the Public Service Commission told me a few weeks ago that if all the people who will be employed in a building of the type of the Woolworth Building were to leave at the same hour in the evening, it would take the northbound ten-car subway express trains, leaving the Brooklyn Bridge station upon the present headway, a little over half an hour to carry them away. There could be no better illustration of the point of what I am saying.

"Our downtown streets are already so greatly congested, morning and evening and at the noon hour, that they can scarcely hold more, and some of the uptown streets are beginning to present similar problems."

Attitude of Boston & Albany Railroad Toward Electrification

J. H. Hustis, vice-president of the Boston & Albany Railroad, appeared before the joint legislative committee on railroads at Boston, Mass., on Feb. 18, 1913, and explained at length the attitude of that company as regards electrification. He said in part:

"To electrify the road for passenger service within the metropolitan district will cost approximately $6,413,300. Allowing for normal increase in travel and all possible economies under electric operation, it has been carefully estimated that electrification would entail an added net loss in operation of nearly $550,000 per annum. Gross passenger revenue in the district under consideration is approximately $1,300,000. To electrify for both passenger and freight service and to operate both services by electricity, as proposed, would add materially to the cost as given. To electrify the Grand Junction branch, running from Cottage Farm to East Boston and passing through Cambridge, Somerville, Charlestown, Everett and Chelsea, would, for grade-crossing eliminations alone, cost approximately $4,500,000.

"It has been suggested that the burden of this increase in expense be met by increasing fares in the district electrified. On the present volume of traffic this would mean increasing fares fully 40 per cent. The active electric railway competition in the territory affected would not admit of any increase. On the basis of present rates the number of passengers carried would have to be doubled to meet carrying charges on the additional investment.

"That the New York, New Haven & Hartford Railroad proposes to electrify about Boston is given as one reason why the Boston & Albany Railroad should electrify, but the Boston & Albany Railroad's problem is its own and ought not to be confused with those of other roads. Another reason given is that the Boston & Albany Railroad is now controlled by the New Haven, and that the two should be considered an entity. If that were true, it would not be sufficient reason, but it is not true.

"Passenger and freight rates of the Boston & Albany Railroad have remained practically stationary for the past ten years or more. Expenses for material and labor have increased tremendously. During this same period wages have likewise increased, and this has been particularly true during the past several years, when increased wages and improved working conditions have resulted in increased compensation as follows: Engineers, 35 per cent; firmen, 30 per cent; conductors, 34 per cent; trainmen, 42 per cent; cent; yardmen, 54 per cent.

"It must be apparent that the operating management of the Boston & Albany Railroad is satisfactorily handling a very largely increased traffic at rates which are substantially the same as twelve years ago, and with reasonable expedition, regularity and economy. It has suffered in its operating showing, as have all the railroads, in the enormous increases in expenses, yet its unit costs of operation compare favorably with other roads of similar character. The lessee company has, moreover, not allowed the yearly deficit since 1906 to stand in the way of appropriating more money for improvements.

"Matters have reached a point where the volume of business, at the rates which have been in effect for more than a decade, just about enables the company to meet its operating expenses, leaving practically no surplus. Any contraction in its volume of business, any reductions in rates, or any additional burdens, such as that proposed by compulsory electrification, would prevent the road from earning its guaranteed rental and would restore or increase the annual deficit, which on the date of the last report to the Railroad Commission aggregated $5,000,000."

Public Relations in Buffalo.—Mayor Fuhrman of Buffalo, N. Y., is reported to have expressed himself as follows recently: "I am pleased with the attitude of President Connette, of the International Railway. I have had frequent conferences with him and am convinced that the company will make improvements within a year which will make the people sit up and take notice."

Decision in Toronto Case.—The Ontario Railway & Municipal Board has dismissed the application of the city of Toronto, Ont., to require the Toronto Street Railway to operate the section of the Toronto & York Radial Railway commonly known as the Queen Street East stub. The commission holds that as no franchise or agreement now covers the line the obligation of the company terminated with the agreement.

Senate Passes the Physical Valuation Bill.—The United States Senate has passed the physical valuation bill as amended at the suggestion of Senator La Follette. The measure differs somewhat from the bill already passed by the House, but that body, it is well understood, will agree to the measure as passed by the Senate. The bill provides for the valuation of the property of all common carriers engaged in interstate commerce, including telephone and telegraph companies.

Another Pittsburgh Subway Ordinance.—The public service and surveys committee of the Council of Pittsburgh, Pa., on Feb. 20, 1913, laid on the table the proposed ordinance of the Pittsburgh District Railroad for a subway franchise. It has been announced that the project will be considered when the names of the backers of the company have been disclosed. The Council recently sustained the veto by Mayor Magee of the ordinance to grant the Pittsburgh Subway Company a franchise to operate a subway system in the city.

American Capital in Mexico.—According to figures compiled by Consul Letcher, at Chihuahua, Mexico, American investments in Mexico represent $1,057,770,000, as compared with $321,302,800 by England, $143,446,000 by France and $118,535,000 by all other foreign countries. The greater part of the American capital is in railway and mining securities. In the public utility field American capital is greatly exceeded by that of other countries. According to the consular report American capital invested in Mexican tramways, power and electric lighting plants aggregates only $760,000, as compared with $8,000,000 in English capital, $5,155,000 in Mexican and $275,000 in capital of other countries.

Members of New England Railroad Conference.—Simeon E. Baldwin, Governor of Connecticut, who was chosen chairman of the New England Railroad Conference at its first meeting in Boston recently, has appointed George M. Woodruff and Costello Lippitt to represent that State. Eugene N. Foss, Governor of Massachusetts, has named Chief Justice Marcus F. Knowlton and Admiral Francis T. Bowles, retired, to represent that State. Marsden J. Perry and Henry L. Lippitt will represent Rhode Island. The Governors of Maine, Vermont and New Hampshire have not yet announced their appointments. The conference was organized to deal with the general railroad situation in New England.

Pueblo Company Complimented.—The Pueblo *Chieftain*, in referring to the construction record of the Arkansas Valley Railway, Light & Power Company, Pueblo, Col., recently said: "One of the greatest conveniences, and at the same time the least paying, is the system of 'owl' cars. It affords transportation for the belated wayfarer and the man whose work keeps him late at night. The tracks have been pulled up and the light rails replaced with heavy steel. The promise that the people of the extreme southern sections of the city should have transportation facilities has been kept; also the building of a line to City and Mineral Palace parks. New and modern cars have been introduced, and there is not a more courteous, obliging and capable force of motormen and conductors in the United States."

Traction History in Lexington.—The Lexington *Herald* published in a recent issue an illustrated article covering more than three pages under the caption of "Traction History in Lexington: Story of Stable Developments." The article was illustrated with numerous photographs of scenes along the line of the company and of the exterior and interior of its carhouse and power house. A complete roster of the officers and heads of departments was also published, together with statistics in regard to the company, covering capitalization, total number of employees, annual pay roll, number of cars, interurban mileage, city mileage, etc. Portraits were published of F. W. Bacon, vice-president of the company; J. R. Allen, general solicitor; Thomas D. Murray, secretary; R. C. Stoll, general counsel; Henry Bush, superintendent of transportation; Capt. Michael Feeney, the oldest employee of the company, and John D. Sallee, general freight agent. The article showed evidence of care and thoroughness in its preparation.

Additional Municipal Lines Proposed in San Francisco.—Street railway transportation was a topic of debate at the meeting of the Supervisors of San Francisco, Cal., on Feb. 10, 1913, following the receipt of a message from Mayor Rolph calling attention to the need of securing additional facilities for reaching the exposition site. The discussion resulted in the city engineer and board of public works being instructed to prepare plans and estimates of the cost of building an electric railway on Van Ness Avenue, between Market and Bay Streets, as an extension of the Geary Street Municipal Railway, also to prepare plans for other lines to the exposition. Another resolution passed directed the public utilities committee to report upon the feasibility of carrying out the plans prepared by Bion J. Arnold for handling the exposition traffic. The city attorney was also directed to ascertain what legal rights are possessed by the harbor commissioners to grant the use of the tracks of the belt railroad on the Embarcadero to the municipal railroad, also to compel the United Railroads to exchange transfers with the municipal railway. A resolution authorizing the valuation committee to negotiate with the Presidio & Ferries Railroad for the purchase of its rolling stock at the expiration of its franchise on Dec. 10, 1913, was referred to the public utilities committee.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

INDIANA

Another straphangers' bill to take the place of the one recently killed has been introduced in the Senate. The bill specifies that when any steam, interurban or city railway habitually neglects to operate enough cars to seat comfortably all passengers the company shall be subject to a fine of from $100 to $500 for each day's offense. Representative Spencer has introduced a bill in the Legislature which would make it unlawful for any interurban railway, city railway or heat and light company in Indiana to require any switchboard operator to remain on duty more than eight hours continuously in any period of twenty-four hours. The Senate has passed the Harlan "blue sky" law.

A statement of more than 1000 words was issued on Feb. 22, 1913, over the signatures of Charles L. Henry, president and general manager of the Indianapolis & Cincinnati Traction Company; Arthur W. Brady, president of the Union Traction Company of Indiana, and Robert I. Todd, president and general manager of the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company, defining the attitude of the interurban electric railways of Indiana toward the pending public utility legislation and pointing out how similar legislation in other states had worked to the embarrassment of the companies and to the detriment of the investors and the traveling public.

NEW YORK

The abandonment of practically all the workmen's compensation bills pending in the Legislature and the substitution of a so-called compromise measure embodying features of the Murtaugh-Jackson, Foley-Walker, McClellan-Esquirel, Carswell and Argetsinger bills was agreed to by the Senate insurance committee on Feb. 26, 1913. Senator Ramsperger, chairman of the insurance committee, in a statement regarding the new bill says it provides a definite schedule of compensation to workmen injured in the course of employment and to their dependents in cases of death, and requires an employer to insure his obligations with stock and mutual companies or with a State-managed insurance fund, or he may carry his own insurance if he can furnish satisfactory evidence of financial strength.

WISCONSIN

Several amendments to the act relating to stocks and bonds of public service corporations have been introduced in the Legislature, concerning the purposes for which such corporations may issue stocks, regulating the issuing of stocks and bonds and giving the Railroad Commission wider powers in regulating the financial affairs of these companies. Another House measure gives municipalities the power to issue bonds to pay for any authorized subscriptions to corporations for building railroads of any kind, electric included. Another proposed measure requires interurban railroads to transport material used in the construction and maintenance of streets and highways. All street railway companies in the State will be required to issue transfers according to a measure introduced by Senator Lilley by request. Counties are to have the power to construct, purchase or acquire by condemnation any street or interurban railway by a Senate bill which has been referred to the committee on corporations.

PROGRAMS OF ASSOCIATION MEETINGS

New York Electric Railway Association

It has been decided to bring forward the date of the quarterly meeting of the New York Electric Railway Association at Lake George to March 6 and 7, 1913, instead of March 11 and 12, as announced in the ELECTRIC RAILWAY JOURNAL of Feb. 22, page 225. The proceedings will consist of an informal dinner at 8 o'clock on Thursday evening, March 6, at which addresses will be made by prominent speakers, and a business session on the following day, beginning at 10 a. m., both taking place at the Fort William Henry Hotel. Reservations for rooms should be addressed to Albert Thieriot, manager Fort William Henry Hotel, Lake George, N. Y. The program will consist of the following papers and question box:

Paper, "Some Power Distribution Problems," by H. J. Childs, manager power distribution of the United Traction Company, Albany, N. Y.

Paper, "Operation of Trailers in Connection with Peak Load City Service," by George L. Radcliffe, general manager of the Cleveland Railway.

Paper, "Schedules," by J. J. Dempsey, superintendent of elevated lines of the Brooklyn Rapid Transit System.

Paper, "The Successful Claim Agent," by William H. Hyland, claim agent of the Fonda, Johnstown & Gloversville Railroad.

After the reading and discussion of the foregoing papers the question box will be opened to answer the following questions:

What is your attitude toward standard instructions covering the operations of workmen in the inspection and maintenance of equipment?

Should timekeeping be done by the auditor's department or by the department involved?

What are the relative merits of concrete and composition floors for cars as compared with wooden floors?

What is the best kind of joint to use in paved streets for a small road which cannot afford expensive apparatus for installing riveted or welded joints?

Are any injurious results occurring to rails or equipment where the rail is rigidly supported on a concrete foundation?

Is there any good preservative treatment for wooden ties other than creosote?

Is it desirable from the standpoint of the transportation company to reply through the press to public complaints or criticisms relative to traffic matters? What rates are charged for the transportation of newspapers on city and interurban cars, flat rates per package or by weight? Has the "paster" method been found satisfactory?

Is it better to contract with newspapers for transportation for space or to pay cash for all space used?

Has it been found practicable and desirable to contract with hotels or commercial concerns for the "call" of their places of business by conductors of cars?

Keystone Railway Club

The fifth meeting of the Keystone Railway Club will be held at the Hotel Walton, Philadelphia, Pa., on March 10 and 11, 1913. At the session on March 10 the routine business will be transacted. It will be called at 8 p. m. The session on March 11 will be called at 9.30 a. m. and the following program of papers and questions for the question box will be presented:

Paper, "Electric Railway Management," by William H. Heindle, general manager of the Wilmington-Philadelphia Traction Company, Wilmington, Del.

Paper, "Parks and Their Transportation Problems," by C. F. Crane, superintendent of the Eastern Pennsylvania Railways, Pottsville, Pa.

Paper, "Motor Testing and Trouble Finding," by H. W. Branson, of the Service Engineering Company, Philadelphia, Pa.

The question box will be opened with these questions:

How often should car wheel axles be removed from under high-speed interurban cars? To assure against broken axles is 300,000 miles a safe mileage for axles in service?

Please give information as to whether inside-hung brake rigging, if properly designed, is as good as outside-hung brakes with brake beam holding brake-shoe heads in place, or are brake-shoe heads held better by brake beams?

Can brake shoes be held square against wheels without brake beams as well as with brake beams?

Give best method of field testing. How is it done and what apparatus is best for making this test?

Has any member had any experience with electric welding? Is it a paying proposition in a shop having only fifty four-motor cars to maintain?

Should cars equipped with air brake exceed 100 per cent braking efficiency for interurban service? What is proper braking efficiency for city cars?

Society for Electrical Development, Inc.

The following program of papers has been announced for the meeting of the Society for Electrical Development, Inc., which is to be held in the United Engineering Societies Building, New York, N. Y., on March 4 and 5, 1913:

Paper, "Aims of the Society," by J. M. Wakeman, general manager of the Society for Electrical Development.

Paper, "Where the National Electric Light Association Comes In," by Thomas Commerford Martin, executive secretary of the National Electric Light Association.

Paper, "The News Value of Electricity," by Frank H. Gale, advertising manager of the General Electric Company.

Paper, "Electricity and the Architect," by Frank E. Wallis, of Wallis & Goodwille.

Paper, "The Dissemination of News," by Dr. Talcott Williams, director of the School of Journalism, Columbia University.

Paper, "Co-operation in the Electrical Industry," by J. Robert Crouse, of the National Quality Lamp Division.

Paper, "An Electrical Advertising Campaign," by William D. McJunkin.

Paper, "Selling a Commodity," by E. St. Elmo Lewis.

Paper, "Merchandising Co-operation," by W. E. Robertson, vice-president of the Robertson-Cataract Company.

Paper, "Efficiency in Local Advertising," by J. C. McQuiston, of the Westinghouse Company.

Paper, "Electrical Development and the Electrical Contractors," by Ernest Freeman, president of the National Electrical Contractors' Association.

The opening address will be made by Henry L. Doherty, president of the society.

Financial and Corporate

Stock and Money Markets

February 26, 1913.

The trading on the New York Stock Exchange to-day was considered very satisfactory, and was a pronounced change, strength being shown from the opening. Large numbers of orders to sell bonds were canceled and the bond market was steadier and furnished a basis for a better tone in the stock list. Even the issues of the recently promoted industrials established in some cases materially higher prices. Rates in the money market to-day were: Call, 3 per cent; sixty days, 4¾ @ 5 per cent; four, five and six months, 4½ @ 4¾ per cent.

In the Philadelphia market trading was narrow to-day in the purely local list. Philadelphia Rapid Transit trust certificates gained ⅝, selling at 25⅝.

In the Chicago market to-day Chicago Railways series one and two advanced, but Chicago Railways Company's 5's, series B, dropped 2½ points to 83½. Otherwise the bond list remained firm.

In the Boston market to-day trading was more active with prices firmer.

In the Baltimore market to-day the trading in stocks was very dull and sales totaled only 789 shares while the bond transactions amounted to only $24,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 18	Feb. 26
American Brake Shoe & Foundry (common)	92½	90½
American Brake Shoe & Foundry (preferred)	133	130½
American Cities Company (common)	47½	47½
American Cities Company (preferred)	75⅞	75¼
American Light & Traction Company (common)	390	390
American Light & Traction Company (preferred)	108	108
American Railways Company	40⅛	40
Aurora, Elgin & Chicago Railroad (common)	43	43
Aurora, Elgin & Chicago Railroad (preferred)	87	85¼
Boston Elevated Railway	109¼	108
Boston Suburban Electric Companies (common)	7½	7¼
Boston Suburban Electric Companies (preferred)	65	65
Boston & Worcester Electric Companies (common)	7	5½
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	88½	88¼
Capital Traction Company, Washington	122¾	122⅞
Chicago City Railways	150	150
Chicago Elevated Railways (common)	35	30
Chicago Elevated Railways (preferred)	91	91
Chicago Railways, ptcptg., ctf 1	90	92
Chicago Railways, ptcptg., ctf. 2	24½	23¼
Chicago Railways, ptcptg., ctf. 3	7	6½
Chicago Railways, ptcptg., ctf. 4	3½	3½
Cincinnati Street Railway	119	111
Cleveland Southwestern & Columbus Ry. (common)	6	6
Cleveland Southwestern & Columbus Ry. (preferred)	30	30
Cleveland Railway	104½	103½
Columbus Railway & Light Company	19	18
Columbus Railway (common)	69	69
Columbus Railway (preferred)	*105	88½
Denver & Northwestern Railway	a117	117
Detroit United Railway	76	76
General Electric Company	139	137½
Georgia Railway & Electric Company (common)	123	a123
Georgia Railway & Electric Company (preferred)	83	83½
Interborough Metropolitan Company (common)	17	17
Interborough Metropolitan Company (preferred)	59½	57½
International Traction Company (common)	42	42
International Traction Company (preferred)	95	95
Kansas City Railway & Light Company (common)	20	20
Kansas City Railway & Light Company (preferred)	41	38
Lake Shore Electric Railway (common)	6½	6½
Lake Shore Electric Railway (1st preferred)	a91	91
Lake Shore Electric Railway (2d preferred)	a25½	25½
Manhattan Railway	132	132½
Massachusetts Electric Companies (common)	16½	16½
Massachusetts Electric Companies (preferred)	77	76
Milwaukee Electric Railway & Light Co. (preferred)	102	102
Norfolk Railway & Light Company	26	*26
North American Company	79⅛	77½
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	48	45
Philadelphia Company, Pittsburgh (preferred)	41	40½
Philadelphia Rapid Transit Company	27½	25
Portland Railway, Light & Power Company	67	67
Public Service Corporation	116	115
Third Avenue Railway, New York	35	35⅛
Toledo Railways & Light Company	6	2¼
Twin City Rapid Transit Co., Minneapolis (common)	104½	104½
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	23¾	23¼
United Rys. Inv. Company (common)	27	24
United Rys. Inv. Company (preferred)	53	49½
Virginia Railway & Power Company (common)	56½	55½
Virginia Railway & Power Company (preferred)	93½	92½
Washington Ry. & Electric Company (common)	84	84¼
Washington Ry. & Electric Company (preferred)	88	87⅞
West End Street Railway, Boston (common)	81	77
West End Street Railway, Boston (preferred)	97	97
Westinghouse Elec. & Mfg. Company	69¾	69½
Westinghouse Elec. & Mfg. Company (1st preferred)	117	115

*Last sale. a Asked.

ANNUAL REPORTS

United Railways Company of St. Louis.

The following report summarizes the result of the operation of the property of the United Railways Company, St. Louis, Mo., for 1912:

Gross earnings:		
Revenue from transportation	$12,156,767	
Revenue from operation other than transportation	94,323	
Total		$12,251,090
Current operating expenses (including depreciation)		7,828,501
Surplus over operating expenses		$4,422,589
Taxes		652,222
Income from operation		$3,770,367
Income from other sources		64,917
Gross income from all sources		$3,835,284
Deductions from income:		
Interest on funded debt	$2,695,001	
Interest on notes payable	1,195	2,696,196
Surplus		$1,139,088

Robert McCulloch, the president, says in part:

"The passenger revenue for 1912 was $12,084,080, an increase over 1911 of $328,190, or 2.79 per cent. Other revenue from transportation increased $4,164. Revenue from operation other than transportation increased $4,583, and income from other sources increased $20,187. The gross earnings and other income for the year 1912 were $12,316,008, an increase of $357,125 over 1911, or 2.99 per cent. Total operating expenses (including depreciation) and taxes increased during the year $490,661.

"The number of passengers carried during the year follows: Revenue passengers, 5 cents, 238,976,636; revenue passengers, 2½ cents, 5,409,928; total, 244,386,564; transfer passengers, 113,001,983; grand total passengers, 357,388,547. The percentage of revenue passengers using transfers during the year 1912 was 46.24 per cent. The passenger car mileage totaled 40,783,189, and the mileage of other cars totaled 314,504, making the total revenue miles 41,097,693.

"On July 1, 1912, 5 per cent bonds of the Cass Avenue & Fair Grounds Railway became due and were extended for a period of ten years, or to July 1, 1922, at the rate of 4½ per cent per annum, reducing the fixed charges $9,000 per annum.

"The amount charged to the fund for personal injuries, property damages and other expenses connected with the claim department amounted to $607,237, being an increase of $101,709 over the year 1911, $68,699 of which was for settlement of old claims of the St. Louis Transit Company.

"During 1912 there was expended and charged to capital account for added property the sum of $130,678, as follows: Real estate, buildings, tools and fixtures, $39,542; road and track, $68,733; electric line, providing for use of Keokuk power, $16,106; power plant, buildings and improvements, $9,707; total, $134,090, less $3,411 for equipment which was sold.

"The total mileage in single track on Dec. 31, 1912, was as follows: City track, 348.46 miles; county track, 112.67 miles; total, 461.13 miles. During the year 0.49 mile of track was added and 0.37 mile was removed.

"Since 1904 the amount of track reconstruction, renewal and extensions of track by the company in the city and county has been as follows: 1904, 21.56 miles; 1905, 8.90 miles; 1906, 29.18 miles; 1907, 21.65 miles; 1908, 32.99 miles; 1909, 39.93 miles; 1910, 45.34 miles; 1911, 32.69 miles; 1912, 25.85 miles; total for nine years, 258.09 miles.

"Of the 258.09 miles of track laid during the nine years 1904 to 1912 inclusive, 143 miles were entirely new track of the most modern construction, consisting of heavy rail laid on concrete and paved in the most approved manner. The expenditure for these 143 miles of new track was $4,147,000. The expenditure during the same period for the remaining 115.09 miles of track, which were not entirely renewed, and for new special work was $3,047,905.

"During the year the necessary work to keep the overhead and underground lines in thoroughly good repair was performed.

"The necessary work to keep in thoroughly good repair the bridges and buildings belonging to the company was performed. Among the larger works of this department was the completion of a 25-ft. diameter reinforced concrete culvert at Schmidt Road on the Creve Cœur Lake line. This culvert replaced a high wooden trestle which had become decayed. A new fireproof reinforced concrete wash house was built at Park and Vandeventer Avenues, to take the place of one destroyed by fire.

"In 1903 the company decided that, instead of building additional power plants to supply its increasing power requirements, it would contract with the Union Electric Light & Power Company for that supply. The contract then entered into will soon expire and a continuing contract for power has been made with the Mississippi River Power Distributing Company for water power transmitted from the new dam at Keokuk. Work was begun on a new substation at Gravois and Mississippi Avenues.

"The necessary work to maintain the power stations and substations of this company in thoroughly good operating condition has been performed. Work was commenced on the necessary changes and additions to the power plants and substations to prepare them for the water power expected during the year 1913. During 1912 the company required a total capacity of 70,000 hp for the operation of the road. Of this amount 30,000 hp was purchased and 40,000 hp provided from the stations of this company.

"In addition to the regular repair and maintenance work the following work was done during the year: Twenty-five new steel fireproof cars of the most modern design were built; twelve cars which had been completely destroyed by fire were rebuilt; two steel center-entrance trail cars were built; forty-eight open cars were converted to closed cars, being practically new cars; 587 cars were rebuilt, renewed and painted; six automobile utility wagons were built; 1100 fare boxes were built. All cars were provided with a new fender required by the city authorities.

"During the year 1443 cars passed through the repair shops for truck repairs, body repairs or painting. The physical condition of the property is better than at any previous time and is still being improved."

Louisville Railway

The annual meeting of the stockholders of the Louisville (Ky.) Railway was held recently at the office of the company in that city. The officers and directors were all re-elected. The principal business transacted was the decision of the company to make no change in the declaration of dividends upon common stock, although a special committee of directors was appointed a short time ago to determine whether or not the corporation has greater earning capacity than present methods of accounting indicate. The regular quarterly dividend of 1 per cent upon common stock has been declared, along with one of 2½ per cent, semi-annual, upon the company's preferred, both payable on April 1. The important items in the Louisville Railway's report for the year ended Dec. 31, 1912, follow:

Passenger revenue (city lines)	$3,004,455
Revenue from mail and advertising	17,442
Revenue from interurban lines	214,192
Income from other sources	129,288
Gross income	$3,365,377
Operating expense	$1,790,037
State, county and city taxes	250,294
Interest on debt, paid and accrued	535,833
Dividend on preferred stock	125,000
Total expenses and charges	$2,701,164
Net earnings	$664,213
Common stock dividend	$545,650
Depreciation machinery	45,000
Depreciation cars	45,000
Income account	28,563
Total	$664,213

Ten new cars have been added to the interurban lines of the company, additional real estate has been purchased and improvements in interurban tracks as well as power circuits have been made. The sale of $1,000,000 of bonds was recently authorized, it was stated, and the construction of a $1,000,000 power house has been commenced. The most important line improvements during the year were the construction of the crosstown line, 7 miles in length, the extension of the Sixth Street line, and the commencement of work at the western terminal of Main Street, together with the erection of a new carhouse at Twenty-eighth Street and Broadway.

Summary of Stone & Webster Operations for Year

A combined statement of the capitalization and earnings and expenses of the electric railway, electric lighting, gas and water power companies under the management of Stone & Webster Management Association for the year ended Dec. 31, 1912, follows:

CAPITALIZATION

Bonds and coupon notes outstanding	$80,742,700
Preferred stocks outstanding	33,579,400
Capital and common stocks outstanding	59,057,100
	$173,379,200

EARNINGS AND EXPENSES—1912

Gross earnings	$23,925,414
Operating expenses and taxes	13,839,417
Net earnings	$10,085,997
Interest charges	4,075,222
Balance	$6,010,774
Bond sinking and mortgage improvement funds	532,820
Balance	$5,477,954
Income from other sources	77,405
Balance	$5,555,360
Dividends paid	3,699,119
Balance for reserves and depreciation	$1,856,241
Total disbursements for the year 1912, for interest on bonds and notes and for dividends	$7,774,342
Miles of equivalent single track owned	1,224.8
Passengers carried (including transfers)	318,203,000
Total connected electric lighting load, equivalent to 16-cp lamps	2,136,960
Total commercial power load, approximately, hp	137,400
Total combined power station capacity (of which 110,200 hp is generated by water power), approximately, hp	276,780
Total gas output, cu. ft	1,306,949,800

Columbus Railway & Light Company

At the annual meeting of the Columbus Railway & Light Company, Columbus, Ohio, held on Jan. 28, 1913, Samuel G. McMeen, president of the company, made brief mention of the negotiations begun last May for the consolidation of all the properties now operated by the Columbus Railway & Light Company into one corporation, eliminating the leasing arrangement. He said the plans had been agreed upon by the boards of the various companies interested and were now being perfected by a committee composed of ten men, two from each of the companies, as previously noted in the ELECTRIC RAILWAY JOURNAL.

The total number of revenue and transfer passengers carried during 1912 was 76,357,610, as against 69,162,757 during the year 1911. This was an increase of 10.4 per cent in total passengers. The increase in revenue passengers was 10.8 per cent and in transfer passengers 8.9 per cent. The increase in revenue passengers for the first three months of 1912, at the rate of seven tickets for a quarter, was 8.8 per cent. The increase in passengers for the remaining nine months of 1912 under the rate of eight tickets for a quarter, was 10.9 per cent. This was explained by Mr. McMeen as demonstrating that reduced fare has stimulated use of the service, but not enough to offset the fare reduction.

The gross receipts of the company for 1912 were $2,944,052, against $2,812,685 in 1911, a gain of about 4½ per cent. Operating expenses aggregated $1,596,215, as compared with $1,503,057 in 1911, an increase of about 6 per cent. Net earnings for the year amounted to $1,347,837, against $1,309,628, a gain of 3 per cent. Surplus for the year after the payment of rentals to lessor companies, taxes, interest and depreciation, aggregating $1,272,823, was $75,014, which, added to the accumulated surplus of $101,770, left a net balance to income account of $176,784. The directors were all re-elected.

The Columbus Railway & Light Company applied to the Public Service Commission of Ohio on Feb. 24 for authority to consolidate its underlying properties in a new corporation, to be known as the Columbus Railway, Light & Power Company. The new organization is really the Columbus Traction Company, which has revised its charter and changed its name to the Columbus Railway, Light & Power Company. The commission is asked to allow the company to increase its capital stock from $1,000,000 to $10,226,800 for the purpose of purchasing the capital stock of the Columbus Railway, the Columbus Edison Company and the Columbus Light, Heat & Power Company. The new stock is to be divided as follows: Series A, $1,163,040 of 6 per cent preferred stock; series B, $4,353,260 of 5 per cent preferred stock to be participating up to 6 per cent, and $3,710,500 of common stock. According to the petition the Columbus Railway now has $3,500,000 of 5 per cent cumulative preferred and $3,500,000 of common stock outstanding; the Columbus Edison Company has $750,000 of 6 per cent preferred and $750,000 of common stock outstanding, while the Columbus Light, Heat & Power Company has $516,300 of 6 per cent cumulative preferred and $210,500 of common outstanding.

The plan of exchange recited by the application provides for $3,500,000 series B, 5 per cent preferred, to be exchanged for $3,500,000 Columbus Railway preferred, on a share-for-share basis, and $3,500,000 common to be exchanged for the common stock of this company on a like basis. Stock of the Columbus Edison Company will be acquired on a share-for-share basis, the new company issuing $750,000 series A, 6 per cent preferred for the senior securities of that company and $750,000 series B, 5 per cent preferred for the junior shares. For Columbus Light, Heat & Power Company stock, $413,040, series A, 6 per cent preferred of the new company will be issued to take up 80 per cent of the preferred; $103,260, series B, 5 per cent preferred, will be issued to take up 20 per cent of the preferred, and $210,500 common for the common.

Disposition of Southern Pacific Electric Lines

The San Francisco *Chronicle* commented as follows recently upon the disposition of the electric lines of the Southern Pacific Company under the dissolution of the merger in accordance with the dictates of the Attorney-General:

"While Southern Pacific officials anxiously await the detailed programme for the proposed segregation of the Southern Pacific and the Central Pacific, they share the general opinion that in so far as the electric railroad situation across the bay is concerned, the Southern Pacific, as soon as the sale of the Central is concluded, will cease to operate Central Pacific or Southern Pacific Coast lines. The old Southern Pacific Coast lines, it is understood, are to be sold to the Central.

"If this proves correct, the following lines will be operated by the Central Pacific when the segregation program is carried out, if it is carried out: That from Halvern, near Hayward, to Alvarado, with a mileage of 2.63; that from the Alameda Mole to High Street, Alameda, via Encinal Avenue, with a mileage of 6.80; that from the Alameda Mole to Fourteenth Street, Oakland, via Webster Street; that from Pacific Avenue and First Street, Alameda, via Mastic to Eighth Street and Central Avenue, with a mileage of 1.46; that from First and Harrison Streets in Oakland, to Fruitvale, via Alameda, with a mileage of 6.22.

"These lines, it is understood, were named to the United States Attorney-General by Union and Southern Pacific directors as the electric lines to go with the Central Pacific. There was a question, it is understood, as to which should retain them, the Southern Pacific Company having carried out the electrification work at great expense. The two Southern Pacific Coast lines to be sold to the Central are the lines running from the Alameda Mole to Fourteenth Street, Oakland, via Webster Street, and the line extending from the Alameda Mole to High Street, Alameda, via Encinal Avenue. The Southern Pacific, it is understood, will retain its Berkeley lines and all those not named as Central Pacific or Southern Pacific Coast properties.

"The Stockton division lines which the Southern Pacific is slated to lose are the main lines from Tracy to Brighton and that from Lathrop to Fresno. The following branch lines, which, as Southern Pacific branches from the Central Pacific main lines, have no outlets, are scheduled to be sold to the Central Pacific: That from Galt to Ione, Woodbridge to Valley Spring and that known as the Oakdale branch from Stockton to Merced. These branches are between Sacramento, Stockton and Merced and will become Central Pacific branches.

"In so far as the line from Telhama to the Oregon border is concerned, it is understood by Southern Pacific officials thit it will be leased for a term of ninety-nine years to the Southern by the Central. This would make it practically a Southern Pacific property, and, it is understood, no joint trackage agreement will be made. The Benicia short line from Sacramento to Oakland, however, is to be operated under a joint trackage agreement by the two roads."

Traction Bill to Permit Chicago's General Merger Being Prepared

In addition to the work of preparing a skeleton ordinance to cover the terms of the merger of the surface and elevated railroads of Chicago, Ill., Corporation Counsel Sexton, of the Chicago City Council, called in the attorneys of the railways to discuss the preparation of a bill which would authorize the general merger. The Chicago City Railway is operating under a special charter and the Chicago Railways under the street railroad act of Illinois. In addition the elevated roads were organized under the steam railroad act. These differences make the merger impossible until a bill permitting the general merger is acted on favorably by the Legislature. The general conference was attended by Corporation Counsel Sexton for the city, William G. Beale, representing the elevated roads, L. A. Busby, representing the Chicago City Railway, and W. W. Gurley, representing the Chicago Railways. The scope of the proposed legislation has been agreed upon and as soon as the bill can be drafted it will be presented to the Legislature.

Central Arkansas Railway & Light Corporation, Hot Springs, Ark.—The Central Arkansas Railway & Light Corporation has been chartered in Virginia, with a capital stock of $10,500,000, by Federal Light & Traction Company interests, presumably to take over the property of the Hot Springs Street Railway and the Hot Springs Water Company. The officers of the Central Arkansas Railway & Light Corporation are: William L. McKee, Brooklyn, N. Y., president; Louis C. Gerry, New York, treasurer; John B. Marsh, New York, secretary.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—P. H. Gadsden, president of the Charleston Consolidated Railway & Lighting Company, has issued the following statement in regard to the negotiations to transfer the Seashore division of the company to the Charleston-Isle of Palms Traction Company, the organization of which was noted in the Electric Railway Journal of Nov. 23, 1912, page 1084: "The contract with James Sottile, president of the Charleston-Isle of Palms Traction Company, for the purchase of the Seashore division of the Charleston Consolidated Railway & Lighting Company was conditioned among other things upon securing the release of the property by the trustees of the mortgage. At the last moment doubts were expressed by the trustee of its power to release. Mr. Sottile suggested several plans for our consideration which would permit of the formal transfer of the property to him, but none of them effectually met the legal questions involved. It became necessary, therefore, to postpone the date for final settlement and transfer of the property until this question could be satisfactorily determined. In the meantime it was agreed that we should operate the property for the account of the purchaser from Feb. 1 until the final settlement and transfer was effected."

Chicago (Ill.) Elevated Railways.—Charles H. Ireland has been elected a director of the South Side Elevated Railroad to succeed Charles V. Weston, resigned.

Chicago (Ill.) Railways.—The Chicago Railways has sold $4,000,000 of its 5 per cent first mortgage bonds to Harris, Forbes & Company, New York, N. Y. The proceeds of the sale will be used for rehabilitation purposes during the current fiscal year and will cover the cost of new track, additional cars, substations and carhouses. The amount of the issue now outstanding is $40,055,000.

Choctaw, New Castle & Western Railway, McAlester, Okla.—B. R. Stephens, general superintendent of the Choctaw Railway & Lighting Company, McAlester, has filed a suit in the Superior Court against the Choctaw, New Castle & Western Railway Company asking for the appointment of a receiver. The company operates 3 miles of standard-gage road and has one locomotive and two cars.

Cleveland (Ohio) Railway.—The Public Service Commission of Ohio on Feb. 10, 1913, approved the application of the Cleveland Railway for permission to issue common stock of the par value of $3,600,000 to be sold at not less than par, the proceeds to be used to retire $3,000,000 of bonds of the Cleveland Electric Railway which mature on March 1, 1913, and to pay for extensions and betterments.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—United States District Judge Sater has dismissed the petition for the sale of the Columbus, Delaware & Marion Railway and the foreclosure of mortgages aggregating $300,000.

Connecticut Company, New Haven, Conn.—The announcement was made on Feb. 22, 1913, that the directors had authorized C. S. Mellen, president, "to negotiate a lease of the electric railways owned by the Connecticut Company from New London north to East Thompson, Conn., to the Shore Line Electric Railway. This will give the Shore Line Electric Railway a through line from New London to New Haven and north to East Thompson."

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Power Company is reported to have arranged to take over the property of the Tennessee Power Company.

Hudson & Manhattan Railroad, New York, N. Y.—Kuhn, Loeb & Company and Harvey Fisk & Sons, New York, N. Y., and Robert Fleming & Company, London, Eng., acting as readjustment managers, announce that more than 96 per cent of the first mortgage 4½ per cent bonds and more than 90 per cent of the preferred and common shares and voting trust certificates of the Hudson & Manhattan Railroad have been deposited under the plan for the readjustment of the finances of the company. Further deposits of bonds and shares will be received temporarily.

Indiana Railways & Light Company, Kokomo, Ind.—The Kokomo Public Utility Company, the Kokomo, Frankfort & Western Traction Company and the Kokomo, Marion & Western Traction Company were consolidated recently as the Indiana Railways & Light Company, as previously noted in the Electric Railway Journal, and the new company has organized permanently. The common stock of the company is $2,000,000 and the preferred stock $1,000,000, $350,000 of which is to be issued at once. An issue of thirty-year gold bonds to the amount of $5,000,000 has been authorized, $1,780,000 of which has been issued. The new company is carrying on all the business transacted by the three old companies, namely, is operating the electric railway between Frankfort and Kokomo and between Kokomo and Marion, operating the city lines in Kokomo and doing the entire electric lighting and power business in Kokomo, Greentown, Swayzee, Converse, Amboy, Russiaville, Forest and Michigantown. The officers of the company follow: George J. Marrott, president; L. J. Kirkpatrick, vice-president; T. C. Reynolds, secretary, treasurer and general manager; P. H. Palmer, assistant general manager, and C. C. Trees, assistant secretary.

Kansas City Railway & Light Company, Kansas City, Mo.—The committee acting for holders of certificates of deposit of the 6 per cent notes of the Kansas City Railway & Light Company, due Sept. 1, 1912, announces that it has arranged for the payment by the company on March 1, 1913, at the office of the New York Trust Company, New York, N. Y., of interest on said notes from Sept. 1, 1912, to March 1, 1913, at the rate of 7 per cent per annum. The interest received by the committee will be paid at the same time and place to the holders of the certificates representing the notes.

Kentucky Traction & Terminal Company, Lexington, Ky.—The Kentucky Traction & Terminal Company has filed a deed with the county clerk at Lexington conveying permanently to the Kentucky Utilities Company its new power house and all the equipment installed in the plant.

Louisville (Ky.) Railway.—The Louisville & Interurban Railroad has decided to increase its capital stock from $3,750,000 to $4,000,000 and to issue the stock to the Louisville Railway to compensate that company for improvements made to the property of the Louisville & Interurban Railroad.

Massachusetts Northeastern Street Railway, Haverhill, Mass.—The Massachusetts Northeastern Street Railway has petitioned the Railroad Commission of Massachusetts for authority to purchase the Amesbury & Hampden Street Railway and also for authority to issue capital stock to be exchanged for the stock of the Amesbury & Hampden Street Railway on a share-for-share basis.

Morris County Traction Company, Morristown, N. J.—The State Board of Public Utility Commissioners of New Jersey on Feb. 22, 1913, approved the application of the Morris County Traction Company for permission to issue bonds amounting to $4,179,000 contingent upon the company reducing the capital stock from $3,000,000 to $300,000. The bond issue is to be secured by a general mortgage for $5,000,000 to be given to the Safe Deposit & Trust Company, Pittsburgh, Pa., as trustee. The plan for reducing the capital of the company was referred to in the Electric Railway Journal of Dec. 21, 1912, page 1253.

New York & Stamford Railway, Port Chester, N. Y.—The Public Service Commission of the Second District of New York has authorized the New York & Stamford Railway to issue $573,000 of first and refunding mortgage 4 per cent bonds, the proceeds to be used to meet loans and notes for capital purposes.

New York (N. Y.) Railways.—The board of directors of the New York Railways has authorized payments on April 1, 1913, to the adjustment mortgage income bondholders of 2¼ per cent for the six months ended Dec. 31, 1912.

Northampton (Mass.) Street Railway.—The Northampton Street Railway has applied to the Railroad Commission of Massachusetts for permission to issue $150,000 of additional common stock, to be offered to stockholders at par, the proceeds to pay floating debt, for the purchase of equipment and for new carhouses and road improvements.

Northern Electric Railway, Chico, Cal.—The Railroad Commission of California has authorized the Vallejo & Northern Railroad to sell its property to the Northern Electric Railway. The Vallejo & Northern Railroad was constructed under a separate organization as an extension of the Northern Electric Railway.

Public Service Company of Northern Illinois, Chicago, Ill.—The Public Service Company of Northern Illinois has completed the purchase of the property of the Pontiac Light & Water Company, Pontiac, Ill., and the Bloomington, Pontiac & Joliet Electric Railway.

Union Railway, New York, N. Y.—Judge Lacombe, in the United States District Court, has signed a final decree in the suit brought in 1908 by the Lorain Steel Company against the Union Railway for material supplied. In his order, Judge Lacombe discharges Frederick W. Whitridge, appointed receiver of the Union Railway March 31, 1908, and dismisses the suit brought by the Lorain Steel Company.

United Railways Investment Company, San Francisco, Cal.—Mason B. Starring, president of the United Railways Investment Company, is quoted as follows: "By the payment of $200,000 of its serial notes, which matured on Feb. 15, the total issue of the United Railways Investment Company's serial notes has been reduced by more than one-half. The New York Trust Company already holds $223,000 of the investment company's 5's, purchased for the benefit of the sinking fund. The Pittsburgh Railways by its contract with the new Duquesne Light Company has relieved itself of the necessity of financing its future requirements. The natural gas department of the Philadelphia Company, which earlier in the winter suffered somewhat in its sales to domestic consumers by reason of the warm weather, is now catching up in that respect."

Toledo Traction, Light & Power Company, Toledo, Ohio.—As stated previously in the Electric Railway Journal, a Maine corporation, known as Toledo Traction, Light & Power Company, has been organized, and through stock ownership controls the local operating companies in Toledo. What, if any, changes will be made in the operating force in Toledo has not yet been determined. It is expected that the various committees will now disband and all pending legal proceedings be dismissed. Henry L. Doherty & Company, New York, N. Y., acquired a substantial interest in the common stock voting trust certificates of the new company and the future operations will be carried on under their direction.

Washington Water Power Company, Spokane, Wash.—At the annual meeting of the Washington Water Power Company, William I. Frothingham, New York, N. Y., was chosen a trustee of the company to succeed the late Hinsdill Parsons, New York. Benjamin B. Lawrence, New York, was chosen a member of the finance committee to succeed Mr. Parsons. The names of the trustees follow: W. A. White, William I. Frothingham, Francis S. Banks, Frank Lyman, Theodore F. Hicks, Harold T. White, Jonathan Bulkley, Oscar F. Zollikoffer, Benjamin B. Lawrence, Guy Du Val, Edwin C. Merrill, all of New York; Philip Cabot, Boston, and Henry M. Richards, D. L. Huntington, J. P. M. Richards, W. J. C. Wakefield, N. Fred Essig, L. M. Davenport, W. S. McCrea, all of Spokane. The Washington Water Power Company operates 109 miles of line and has a total of 193 motor cars and ten trail cars. It sells power and does lighting. Its lines connect Cheney, Spokane and Medical Lake.

Dividends Declared

Chicago (Ill.) Elevated Railways, quarterly, $1.50, preferred participation certificates.

Elmira Water, Light & Railroad Company, Elmira, N. Y., 2½ per cent, preferred.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

EL PASO (TEX.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$81,229	*$40,382	$40,847	$3,920	$36,927
1 " " '11	73,494	*38,396	35,098	6,999	20,099
12 " " '12	793,320	*430,217	363,103	69,661	293,442
12 " " '11	691,607	*406,802	284,805	81,226	203,579

GALVESTON (TEX.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$42,794	*$24,182	$19,611	$7,652	$11,959
1 " " '11	39,921	*22,336	17,585	8,504	9,081
12 " " '12	493,995	*270,267	223,728	93,512	130,216
12 " " '11	443,716	*255,366	188,350	84,763	103,587

GALVESTON-HOUSTON ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$183,391	*$108,199	$75,191	$33,722	$41,469
1 " " '11	137,104	*85,169	51,935	20,077	31,858
12 " " '12	2,027,656	*1,182,682	844,975	405,656	439,319
12 " " '11	1,523,169	*960,591	562,478	230,843	331,735

HOUGHTON (MICH.) COUNTY TRACTION COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$26,421	*$15,960	$10,461	$5,740	$4,721
1 " " '11	24,814	*13,913	10,901	5,227	5,675
12 " " '12	307,506	*174,735	132,771	67,233	65,538
12 " " '11	300,963	*178,411	122,552	62,435	59,817

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$48,626	*$33,183	$15,442	$10,762	$4,680
1 " " '11	51,090	*29,695	21,396	9,196	12,200
12 " " '12	562,537	*378,112	184,026	118,986	65,040
12 " " '11	567,548	*348,447	219,101	98,851	120,250

NORTHERN TEXAS ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$170,933	*$89,758	$81,175	$24,662	$56,513
1 " " '11	143,155	*76,428	66,727	20,327	46,400
12 " " '12	1,790,762	*941,690	849,073	266,073	583,000
12 " " '11	1,622,875	*889,994	732,881	250,254	482,627

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$27,878	*$16,632	$11,246	$7,334	$3,912
1 " " '11	26,835	*14,806	12,029	7,076	4,953
12 " " '12	286,537	*192,674	93,863	86,353	7,510
12 " " '11	265,296	*160,749	104,547	81,168	23,378

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$23,837	*$14,183	$9,654	$6,317	$3,337
1 " " '11	34,607	*14,948	9,359	6,317	3,042
12 " " '12	285,429	*176,459	108,970	76,470	32,501
12 " " '11	286,716	*179,163	107,563	61,736	45,817

PUGET SOUND TRACTION, LIGHT & POWER COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$725,642	*$416,705	$308,937	$172,977	$135,960
12 " " '12	8,313,848	*4,772,299	3,541,549	1,976,251	1,565,299

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$68,447	*$49,447	$19,001	$17,349	$1,652
1 " " '11	62,079	*46,237	15,843	15,591	252
12 " " '12	747,058	*551,052	196,007	194,795	1,211
12 " " '11	696,668	*511,034	185,634	184,478	1,156

TAMPA (FLA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo., Dec., '12	$66,797	*$34,361	$32,436	$4,791	$27,645
1 " " '11	66,390	*34,601	31,796	4,551	27,239
12 " " '12	753,835	*394,629	359,205	53,757	305,449
12 " " '11	691,323	*377,767	313,556	59,241	254,315

*Includes taxes

Traffic and Transportation

What the Commutation Ticket Implies

In the matter of the complaint of the board of trustees of the village of La Salle against the International Railway, Buffalo, N. Y., as to tickets for transportation between La Salle and Niagara Falls, in which it was held by the Public Service Commission of the Second District of New York that the company was not precluded by the issuance of the first form of ticket from substituting therefor another more in the form of a commutation ticket, the commission in its decision refers as follows to the subject of commutation tickets:

"The commission expressly disclaims here the giving of an exact definition of a commutation ticket. It is of the opinion, however, that the strip of tickets originally issued by the International Railway cannot be classed as a commutation ticket. We think that the idea of a commutation ticket implies the use of the same by the holder thereof upon each day in the week or month, or at least upon each working day thereof, and that it shall be used for a return as well as an initial trip. The word commutation also implies a sale of the ticket at less than the regular straight fare between the points named therein. A strict interpretation of the word 'commutation' as used in the parlance of transportation at the present time would limit the use of the ticket to one person and provide that it should not be transferable. This is departed from by the ticket now proposed by the respondent to the extent that it may be used by any person holding the book and presenting the same to the conductor.

"In the same manner and in the same parlance a commutation ticket implies the idea that a book entitling the holder to a certain number of rides shall be used within a limited time, and at the end of that limited time those rides which have not been used are forfeited. This provision also is waived by the form of tickets now offered by respondent. It may be used at any time and by any number of persons provided they are together at the time when the book is presented.

"By the terms of Subdivision 3 of Section 33 of the Public Service Commission law a distinction is shown between various forms of reduced rate tickets, and they are described as mileage, excursion, school or family commutation, commutation passenger tickets, half-fare tickets for the transportation of children under twelve years of age, or any other form of reduced rate passenger tickets or joint interchangeable mileage tickets. This would seem to indicate that a commutation passenger ticket was not to be classed with mileage or excursion, school or family tickets, but implied something different. We think that the characteristics which differentiate commutation tickets from the other forms named are those which have been generally indicated above. There may be others which are not here enumerated and the definition is not intended to be exact."

Accident Prevention Campaign in Atlanta

The Georgia Railway & Power Company, Atlanta, Ga., has started a public safety league of 25,000 members. The company intends to enroll in its league all the school children of the city, all automobile owners and drivers, motormen and conductors and as many citizens as possible. Permission will be secured for lecturers paid by the company to visit the public schools and to speak to the children upon the danger from street cars, automobiles and vehicles. In addition, pamphlets containing the gist of these lectures will be printed and distributed. As soon as the league is well under way it will enter into co-operation with the public safety committee of the Chamber of Commerce for the purpose of putting into effect recommendations that this committee recently made to the public.

W. H. Glenn, manager of the Georgia Railway & Power Company, said recently:

"We desire to go the limit in preventing street car accidents. That we have in a measure succeeded in reducing accidents where the public is under our control is shown by the fact that we have hauled over 300,000,000 passengers without fatal accident to any of them, with the possible exception of two who sprang from rapidly moving cars. We feel that our efforts should be extended beyond the point where we have control of the public, inside of the cars, and reach those who may be subject to accident in the streets in connection with automobiles, street cars and other vehicles. In order to do this the importance of being watchful while in the streets must be impressed on the public mind, and we think the organization of a public safety league, with as many members as can be enrolled, is the most practical method of educating the public on this subject."

The members of the committee on public safety of the Chamber of Commerce of Atlanta conferred recently with the officials of the Georgia Railway & Power Company in regard to the public safety league which the company is organizing. During the conference the subject of fenders was touched upon, and the officials of the company assured the committee that all cars will be equipped with the fenders that have proved the greatest aids to safety. The new pay-as-you-enter cars are fitted with fenders, and the cars which have been in service will be similarly equipped as speedily as possible. The board of education has agreed to coöperate with the public safety league in the enrolment of children as members of the league.

Near-Side Stops in Rock Island and Moline.—The Tri-City Railway, Davenport, Ia., will after March 1, 1913, stop all its cars in Rock Island and Moline, Ill., on the near side of the street.

Hearing in New Jersey on Height of Car Step.—The Board of Public Utility Commissioners of New Jersey held a public hearing in Jersey City on Feb. 21, 1913, upon complaints involving the height of steps on cars of the Public Service Railway.

Free Transportation for Providence Employees.—The Rhode Island Company, Providence, R. I., has announced that it will arrange to transport its employees free at all times. At present the men are transported free only when they are in uniform.

Reduction in Fare Ordered.—An order has been issued by the Board of Public Utility Commissioners of New Jersey directing the Riverside Traction Company, Camden, N. J., to operate one car each morning and one each evening for the convenience of about 400 workingmen who ride between Riverside and Palmyra and to charge a 5-cent fare for the trip. The fare has been 10 cents.

Vaccinating Louisville Employees.—The employees of the Louisville (Ky.) Railway are being gradually vaccinated, pursuant to a recent order of the State Board of Health to the effect that all employees of electric railways and other public utilities shall be made immune from disease and incapable of transmitting infection to the public. The vaccination of the force of the company is proceeding so as not to interfere unduly with the company's operations.

Open Vestibule Favored by Men.—The Railroad Commission of Pennsylvania has advised Mrs. Catherine D. Smith, Reading, who complained that the Reading (Pa.) Transit Company failed to protect its conductors and motormen, that no complaint had been received from these employees and that it had in fact been represented to the commission that the men preferred open vestibules to the closed ones. Under these circumstances and in view of the further fact that the public is not directly interested, the commission refrains from taking action in the matter.

Transfer Suit in Chicago.—All the evidence has been concluded in the mandamus suit before Judge Foell in which the villages of Oak Park and River Forest are trying to compel the County Traction Company, Chicago, Ill., and the Chicago Railways to issue universal transfers. A. W. Harris, president of the Harris Trust & Savings Bank, the last witness, said that the operation of the County Traction Company was unprofitable and that any action which would result in reducing the company's earnings would force the property into the hands of a receiver.

Accident Prevention on Michigan United Traction Company.—The department of publicity of the Michigan United Traction Company, Lansing, Mich., has started an accident prevention campaign which will extend over six or eight months. A series of blotters and posters depicting common forms of accidents and containing words urging their elimination will be distributed in the public schools the first of each month. Only one type of blotter will be given out at the different schools at one time and in a similar way a car card will be posted in a prominent place in all the city and interurban cars of the company. The subject matter on the blotters and postal cards will be changed from month to month. In addition a series of advertisements will be inserted in the papers urging the public to join in the safety crusade.

Certiorari Writ in New York Suburban Fare Case.—Petitions for rehearings on orders recently issued by the Public Service Commission of the Second District of New York reducing commutation and other rates between points in Westchester County, New York, were filed with the commission by the New York, New Haven & Hartford Railroad and the New York Central & Hudson River Railroad. Both petitions recited that the order is in violation of the constitutions of the State of New York and of the United States, and that under state laws the companies are authorized to charge for transportation of passengers the sum of 3 cents per mile on any part of their railroads in the State, and that the operation of the orders of the commission would amount to a confiscation of property without due process of law. The orders of the commission to the companies were referred to in the ELECTRIC RAILWAY JOURNAL of Feb. 15, 1913, page 309. On Feb. 25 the commission denied the application for rehearings. The New York Central Railroad secured a writ of certiorari from the Appellate Court on Feb. 27, 1913, which will act as a stay and permit a review of the case by the court.

Further Lehigh Valley Transit Improvements.—The Lehigh Valley Transit Company, Allentown, Pa., has decided to buy new passenger and express cars to care for the rapidly increasing business on the Allentown-Philadelphia division. It also proposes to take all tracks off public highways on the Philadelphia division, except through towns. About 20 miles of track will be shifted to private right-of-way before June 1, 1913, and by the end of the year no trains will be run on the public roads. All franchises have been granted and property secured for these changes. It is anticipated that the increase in business will soon necessitate double-tracking the entire division and all work done hereafter on grading, bridges and right-of-way will provide for this expansion. Most of the line is already laid with 80-lb. rails, and in relaying the rest rails of similar weight will be used. The company will run two-car or three-car trains as soon as the new equipment which has been ordered is received and the necessary revision of curves has been completed. The additional equipment ordered includes six new passenger cars similar to the limited cars now in service, costing $12,000 each, and three 60-ft. express cars of the same equipment and power as the passenger cars, arranged to run in trains with the latter. It is expected that train service will be begun in April.

A Gentlemanly Protest.—The St. Louis *Post-Dispatch* published the following letter recently under the caption "A Gentlemanly Protest": "During my two days' sojourn in your city I have noted with great surprise and amusement the controversy going on in your paper between a bunch of pinheads and the local street railway. How an enterprising and up-to-date newspaper can lend itself to the publication of such buncombe and folly is beyond me. It is needless to dwell upon the absurdity of the demand made by those soreheads and it is needless to say that you know that they are absurd and not feasible. These very pinheads, yourself included, would be the first to rebel against an ordinance for cars that have received their quota of seated passengers to pass up the rest on the corners all along the route. Should one of the seated ones alight there would be a dozen to fight for the vacant seat, anxious to get to his or her destination. I know you will say, 'Let them put on more cars,' but where would they put them? If the street railway should put on double the number of cars now in service, not all passengers could be accommodated with a seat, and where it now requires thirty minutes to go a certain distance, it would require about 130 minutes to go the same distance if the streets were choked with cars. But why tell you this? You, my dear editor, know this as well as I, but the disinterested onlooker realizes that you must have an axe to grind. I dare you to publish this letter."

Personal Mention

Mr. W. G. Astle has resigned as chief clerk in the car shops of the Dominion Power & Transmission Company, Hamilton, Ont., to become storekeeper of the Toronto (Ont.) Electric Light Company.

Mr. Henri Camp was named as secretary of the Union Internationale de Tramways et de Chemins de Fer d'Interêt Local at a meeting of the committee of direction held at Brussels on Feb. 1, 1913. Mr. Camp succeeds the late Paul t'Serstevens, who was general secretary. His headquarters will be at the headquarters of the association, namely, 15 Avenue de la Toison d'Or, Brussels.

Mr. George G. Holding has been elected secretary and treasurer of the London (Ont.) Street Railway. Mr. Holding has been identified with business interests in Toledo, Ohio, for many years. He entered the service of the Toledo Railways & Light Company ten years ago as pay roll clerk and was advanced until he held the position of chief clerk in the office of the auditor of the company. He resigned from that position to go into business for himself, but subsequently re-entered the service of the company.

Mr. J. M. McElroy, general manager of the Manchester (Eng.) Corporation Tramways, is planning to visit the United States and Canada during April to study traffic congestion problems in the larger cities of this country. Mr. McElroy has just completed a comprehensive report on traffic congestion in Manchester and desires to acquaint himself personally with the methods which have been evolved on this side of the water to handle similar conditions successfully. An outline of the Manchester congestion report is published in the London Letter on page 388 of this issue.

Mr. Charles M. Hatch, who has been appointed general manager of the Northwestern Pennsylvania Railway, Meadville, Pa., to succeed Mr. C. L. Murray, resigned, was formerly assistant to the president of the Northwestern Pennsylvania Railway. He was previously with the Erie Traction Company, which was purchased by the Northwestern Pennsylvania Railway on Nov. 4, 1912. He served with the Erie Traction Company from 1901 to 1905 as secretary and treasurer, and from 1905 to the time that the property was taken over by the Northwestern Pennsylvania Railway he was general manager of the company.

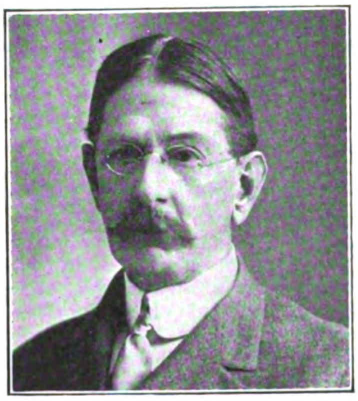
Mr. Whitfield Ford, chief dispatcher of the Morris County Traction Company, Morristown, N. J., has been appointed superintendent of the western division of the company, effective on March 1, 1913, to succeed Mr. C. O. Weidman, who has been appointed general manager of the company. Mr. Ford entered the service of the Morris County Traction Company in May, 1907, as a conductor, and served in that capacity for more than two years. He was promoted to be storekeeper and collector and later was made dispatcher. Previous to entering the service of the Morris County Traction Company he was connected with the Lewisburg, Milton & Watsontown Passenger Railway, Milton, Pa.

Mr. C. O. Weidman, who has been superintendent of the western division of the Morris County Traction Company, Morristown, N. J., has been appointed general manager of the company to succeed Mr. Joseph K. Choate, resigned, who, as noted elsewhere in this column, has been elected a director and vice-president of The J. G. White Management Corporation. Mr. Weidman was previously connected with the Otsego & Herkimer Railroad, which he served for fourteen years. For five years previous to accepting the position of superintendent of the western division of the Morris County Traction Company in January, 1913, he was superintendent of transportation of the Otsego & Herkimer Railroad.

Mr. J. W. Hulme has resigned as general foreman of inspection of the Hudson & Manhattan Railroad, New York, N. Y., and has become connected with the car construction department of the New York (N. Y.) Railways under Mr. J. S. Doyle. Mr. Hulme started his career in January, 1900, with the Western Electric Company testing motors and generators, and was sent by that company to the St. Louis Exposition to operate its exhibit. He resigned from the company to enter railway work as a wireman with the Metropolitan West Side Elevated Railway, Chicago, Ill. He worked in various departments of this company and resigned as foreman of inspection in 1909 to accept the position of general inspection foreman of construction for the Hudson & Manhattan Railroad. Subsequently he was made general foreman of inspection.

Mr. O. G. Schultz, secretary-treasurer of the Morris County Traction Company, Morristown, N. J., is to become the principal executive officer of the company as a result of the resignation of Mr. Joseph K. Choate. Mr. Schultz became connected with the Morris County Traction Company at the close of 1909 to represent the underwriters in controlling the expenditures in construction funds. Shortly thereafter he was elected secretary and treasurer of the company and directed the purchases, construction, securing of franchises and also controlled all expenditures. Since the spring of 1910 all the remaining municipal franchises have been secured and 25 miles of line have been constructed. After he was graduated from the Frieburg School of Mines Mr. Schultz became connected with a mining company at Georgetown. Subsequently he was with the Eddie & James Sampling Company, Leadville, for a short period, and afterward was with the Robert E. Lee Mining Company of the same place. On severing his connection with the Robert E. Lee Mining Company Mr. Schultz established himself as mining engineer and metallurgical expert, and continued in this work in Colorado until 1885, when he entered the bridge and structural iron business in Pittsburgh. In 1890 he was identified with the Schultz Bridge & Iron Company as treasurer and plant manager, and when this company was merged into the American Bridge Company in 1900 he was placed in charge of the Schultz branch as assistant manager. He was also manager of the Keystone branch of this company for a time. Later he took charge of the treasury department and became assistant treasurer of the American Bridge Company in charge of the middle division. He severed his connection with the American Bridge Company in 1904 to take up engineering work in Dutch Guiana, South America, in which he continued until 1907. From 1907 to 1909 he was engaged in special engineering work with headquarters at Pittsburgh. In 1909 he became connected with the Morris County Traction Company.

Mr. Joseph K. Choate, vice-president and general manager of the Morris County Traction Company, Morristown, N. J., has been elected a director and vice-president of The J. G. White Management Corporation, formed recently to take over the utility management activities of J. G. White & Company, Inc., New York, N. Y. These elections are effective March 1, 1913. Mr. Choate became connected with the Morris County Traction Company in October, 1912. He was previously general manager of the Otsego & Herkimer Railroad, Hartwick, N. Y. He was born in Salem, Mass., on Aug. 22, 1854. He attended school at Taunton, Mass., and prepared for college, but did not enter college until later in life, when he took a degree in the University of Colorado. Mr. Choate started his business career as a civil engineer, in which capacity he served the city of New York for some time. In 1881 he became connected with the Pennsylvania Railroad as supervisor of track of the New York division. He next became connected with the Erie Railroad and subsequently entered the service of the Union Pacific Railroad as assistant to the general manager. He then served as general manager of the Nevada Central road and afterward as superintendent of the Park division of the Union Pacific Railroad and general superintendent of all Colorado lines. He next spent several years in New York as a consulting engineer, and acting in an advisory capacity on matters of



J. K. Choate

railway operation he went to the Otsego & Herkimer Railroad, first as consulting engineer, and in 1907 he was made general manager of the company. Mr. Choate is a past-president of the New York State Electric Railway Association.

Mr. W. J. McCorkindale, vice-president and general manager of the Marquette County Gas & Electric Company, Ishpeming, Mich., has resigned to become connected with the C. H. Geist Company, Philadelphia, Pa., which controls the Wilmington (Del.) Gas Company and public utility properties in Atlantic City, N. J.; Roanoke, Va.; Nashville, Tenn.; Peoria, Ill.; Delray, Mich., and other cities. Mr. McCorkindale has been connected with the Marquette County Gas & Eectric Company, which includes the local railway at Ishpeming, more than six years. The property was in the hands of receivers when he became connected with it, and the work of rehabilitating and modernizing the plant has been carried out under his direction. He immediately became a factor in the civic life of the city and was elected Mayor of the city a few years ago by a majority larger than that which any other candidate for that office ever received.

A. W. Brady

Mr. Arthur W. Brady, president and general counsel of the Union Traction Company of Indiana, was elected president of the Central Electric Railway Association at the meeting in Indianapolis on Feb. 27 and Feb. 28. Mr. Brady was born in Muncie, Ind., in 1865. He entered the academic department of Yale University and was graduated in the class of 1887. In 1888 he entered the law school of the University of Michigan and was graduated in 1889. He began the practice of law in Muncie, Ind., immediately after graduation and remained there until 1902. During the early years of his practice he was elected Mayor of the city and held that office for four years. His first experience in electric railway work was as counsel for the Citizens' Street Railway, Muncie, which was subsequently acquired by the Indiana Traction Company of Indiana. He was also retained as counsel by the Muncie, Hartford & Fort Wayne Railway, now the Bluffton division of the Indiana Union Traction Company. When construction work was begun on the Indianapolis Northern Railway, which is now the Indianapolis-Noblesville division of the Union Traction Company, Mr. Brady was elected secretary of the new company. Shortly after the organization of the Union Traction Company in 1903 Mr. Brady was elected its vice-president and in 1904 he was elected president. Mr. Brady is a director of the Ohio Electric Railway and has been closely associated with the management of the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company, although he has never had any official connection with either of these companies. At the Columbus meeting in 1906 Mr. Brady was elected third vice-president of the American Street & Interurban Railway Association, in 1907 he was elected second vice-president, in 1908 he was advanced to the office of first vice-president, which he held for two years, and in 1910 he was elected president of the American Electric Railway Association.

OBITUARY

Albert E. Akins, first vice-president of the Cleveland, Southwestern & Columbus Traction Company, Cleveland, Ohio, for the last twelve years, is dead. Mr. Akins was among those who assisted in building the Cleveland-Berea Electric Railway, which later became part of the present Cleveland, Southwestern & Columbus Traction Company's system. This was in 1893. He was president of the Electric Depot Company and a director of the Union Savings & Loan Association, Cleveland. He was born in Royalton Township, Cuyahoga County, Ohio, on March 1, 1847, and was educated in the public schools and at Baldwin University.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Central Arkansas Railway & Light Corporation, Hot Springs, Ark.**—Chartered in Virginia by the Federal Light & Traction Company interests, presumably to take over the properties of the Hot Springs Street Railway and the Hot Springs Water Company. Capital stock, $10,500,000; common stock, $7,000,000; preferred stock, $3,500,000. Officers: William L. McKee, Brooklyn, N. Y., president; Louis C. Gerry, New York, treasurer; John B. Marsh, New York, secretary.

Laporte, Logansport & Southern Railroad, Laporte, Ind.—Articles of incorporation have been filed by this company to build an electric railway between Laporte, Bass Lake, Royal Center, Lafayette and Logansport. Surveys have been begun, and it is reported that an Eastern syndicate will finance the project. Capital stock, $100,000. Officers: Ora Boseman, president; Warren Travis, vice-president; Carl Lactz, secretary, and A. G. Tamlin, treasurer. [E. R. J., Dec. 14, '12.]

***Rockcastle Railroad, Mount Vernon, Ky.**—Application for a charter has been made in Kentucky by this company to build a 30-mile railway from McKee to Livingston. Capital stock, $10,000. Incorporators: W. Bond, Oakland, Md.; C. C. Williams, E. S. Albright, W. L. Richards, H. B. Furnish and A. W. Brown, Mount Vernon, and H. W. Bowman, Livingston.

***North Louisiana Electric Railway, Shreveport, La.**—Application for a charter has been made by this company in Louisiana to build a 100-mile electric railway from Shreveport to Monroe, via Homer. The old Clingman grade between Homer and Minden, 20 miles, is to be used for part of the line. Construction is expected to begin at both ends of this completed grade. The power plant is to be at Shreveport, where the headquarters will be established. Capital stock, $1,000,000. A. B. Blevins, Jefferson, Tex., president; A. Kinnebrew, Homer, La., vice-president, and G. H. Walker, Shreveport, secretary and treasurer.

Boston & Providence Interurban Electric Railroad, Boston, Mass.—Application for a charter has been made by this company in Rhode Island. This railway is planned to connect with the Boston & Providence Interurban Railway, a Massachusetts corporation, which will start from Boston and extend through Massachusetts, meeting the Rhode Island line in Cumberland. It will then extend through Central Falls and the Moshassuck Valley to Providence. Franchises will be asked in Woonsocket, Central Falls, Pawtucket, Providence, Cranston, Lincoln, North Providence and Johnston, R. I. Incorporators: Stuart Pratt, James F. Shaw, Charles A. Stone, Robert Winsor, Edwin S. Webster and E. J. B. Huntoon. [E. R. J., Jan. 18, '13.]

***Empire United Railways, Inc., Syracuse, N. Y.**—Incorporated in New York to take over the properties of the Rochester, Syracuse & Eastern Railroad, the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Electric Railroad. Capital stock, $11,600,000. Among the incorporators are Clifford D. Beebe, Hendrick S. Holden and Edward Joy.

***South Mills, Portsmouth & Elizabeth City Railroad, Elizabeth City, N. C.**—Application for a charter has been made in North Carolina to build an electric or steam railway from Elizabeth City, N. C., via South Mills, to Portsmouth, Va., about 50 miles. Capital stock, $100,000. Incorporators: J. F. Pace and O. L. Williams, Portsmouth; E. Anthony, H. A. Shannon, F. C. Harahan, G. F. Riggs and others. W. J. Halstead, South Mills, N. C., is counsel for the promoters

***Kansas-Oklahoma Traction Company, Nowata, Okla.**—Chartered in Oklahoma to build an interurban railway. Capital stock, $100,000. Incorporators: S. H. Siggins, Warren, and H. A. Siggins, Warren, Pa.; W. E. Ziegler, Coffeyville, Kan.; J. E. Campbell and E. B. Lawson, Nowata.

FRANCHISES

Birmingham, Ala.—The Birmingham Railway, Light & Power Company has asked the Council for a franchise to extend the North Birmingham line in Birmingham to Lewisburg, a distance of 2½ miles.

Little Rock, Ark.—The Little Rock, Pine Bluff & Eastern Traction Company has asked the Council for a fifty-year franchise to build its lines over that portion of the Pulaski County free bridge located in Little Rock and over certain streets in Little Rock.

Fresno, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has secured renewals of franchises in all of the county towns through which the line will pass.

Los Angeles, Cal.—The City Council has instructed the City Attorney to prepare notice of sale of a franchise for a line for Fifty-fourth Street to the west city limits of Los Angeles. The Los Angeles Railway plans to build this extension.

Rialto, Cal.—The Pacific Electric Railway has received a fifty-year franchise from the Board of Trustees to cross all streets on line of its right-of-way through Rialto. The company has asked the Council of Riverside for two franchises.

Dalton, Ga.—The Georgia Railway & Electric Company, Atlanta, has received a ninety-nine-year franchise from the Council in Dalton.

Belleville, Ill.—The Southern Traction Company of Illinois, East St., Louis, has received a franchise in Belleville.

Callaway, Ky.—The Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky., has secured from the Callaway Fiscal Court a franchise in Callaway County. The company will extend its division to Murray in the spring.

St. John, N. B.—The St. John Railway has asked the Council for a franchise to extend and double-track some of its lines in St. John.

Elizabeth, N. J.—The Council has been asked to grant a franchise to extend the line of the Elizabeth & Trenton Railroad through Elizabeth to join the South Broad Street line of the Public Service Railway in Elizabeth.

Cincinnati, Ohio.—The Cincinnati Traction Company has received a franchise from the Council to extend its Avondale line to Bond Hill.

Cleveland, Ohio.—The Cleveland & Youngstown Railroad, Columbus, has asked the County Commissioners for permission to extend its franchise in Cuyahoga County for twenty-five years. If the franchise is granted the company will build a new power house and make other improvements on its lines in Cleveland. This railway will connect Cleveland and Youngstown via Cuyahoga, Portage, Trumbull and Mahoning Counties. John L. Cannon is interested. [E. R. J., May 25, '12.]

Ashland, Ore.—The F. P. Minney Company, Oakland, has asked the Council for a franchise in Ashland. This company plans to build a line through the Rogue River Valley. [E. R. J., Feb. 8, '13.]

Newberg, Ore.—The Oregon Electric Railway has asked the Council for a year's extension of its franchise in Newberg.

Austin, Tex.—The San Antonio & Austin Interurban Railway, San Antonio, has received a fifty-year franchise from the Travis County Commissioners over the Travis County bridge over the Colorado River in Austin. This 80-mile line will connect Austin and San Antonio. Vories B. Brown, San Antonio, president. [E. R. J., Feb. 22, '13.]

***Denton, Tex.**—J. T. Witt and associates have received a franchise from the Council for an interurban line along the West Dallas Pike to Cement City.

Richmond, Va.—The Virginia Railway & Power Company has received a franchise over Franklin Street, Richmond.

Asotin, Wash.—F. L. Sturm, representing the Lewiston Electric Railway, has received a franchise from the county commissioners of Asotin County along the county roads between Asotin and Clarkston. This railway will connect Lewiston, Idaho, and Clarkston and Asotin, Wash. [E. R. J., Jan. 18, '13.]

TRACK AND ROADWAY

Lethbridge (Alta.) Municipal Tramway.—This company will build 4 miles of new track in Lethbridge during the year.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—This company has awarded a contract to the J. B. McCrary Company, Atlanta, for the entire electrification of the properties of the company, which operates a 11-mile gasoline railway from Fairburn to College Park. The company will purchase at once 11 miles of No. 00 feeder wire with suitable pole line construction, 11 miles of track bonds, and No. 0000 feeders.

Alton, Granite & St. Louis Traction Company, Alton, Ill.—Surveys are being made by this company for an extension from the College Avenue (Alton) terminus to the site of the proposed new asylum at Alton. This line will probably be extended to Bethalto and Fosterburg.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—Plans are being considered to have this company's line extended from Jerseyville to Fieldon and Hardin.

Chicago (Ill.) Railways.—This company plans to build 12 miles of city track in Chicago during the year.

Southern Illinois Railway & Power Company, Chicago, Ill.—This company expects to have its 16-mile line in operation in May. It will connect Eldorado, Wasson, Muddy, Raleigh, Leedford, Harrisburg, Dorrisville and Carrier Mills. The company's power plant and repair shops will be located on the Saline River about 2 miles from Harrisburg. The company will furnish power for lighting purposes and will operate seven cars. Officers: F. R. McMullen, 111 Monroe Street, Chicago, president; W. H. Schott, vice-president, general manager and purchasing agent; A. F. Lindley, secretary; W. H. Schott Company, Chicago, chief engineers. Headquarters: 111 Monroe Street, Chicago. [E. R. J., Sept. 7, '12.]

Egyptian Traction Company, Eldorado, Ill.—This company has filed notice of dissolution with the Secretary of State. [E. R. J., Nov. 16, '12.]

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—Plans are being considered by this company for an extension east from Geneva, Ind., to Celina, Ohio.

Rockland, South Thomaston & St. George Railway, Rockland, Maine.—This company will build between Thomaston and Weskeag River, a distance of 2 miles, during 1913.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company is asked to consider plans to build a crosstown line in St. Paul between Phalen Park and Como Park.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—It is stated that this company will place its St. Joseph branch in operation on April 1. The track has been completed.

St. Louis & Hall's Ferry Electric Railway, St. Louis, Mo.—This company is securing right-of-way and as yet has made no definite plans for the construction of its electric line between St. Louis, Florissant and St. Charles. Its repair shops will be located at Baden City. J. E. Greffet, 824 Chestnut Street, St. Louis, is interested. [E. R. J., Feb. 15, '13.]

Buffalo & Fort Erie Ferry & Railway Company, Buffalo, N. Y.—Plans are being made by this company to electrify its railway between Fort Erie Ferry and Fort Erie Beach and extend this line through to Bridgeburg and from Fort Erie Beach to Port Colborne, to connect with the lines of the Niagara, St. Catharines & Toronto Electric Railway, St. Catharines, Ont.

Buffalo & Depew Railway, Depew, N. Y.—During the next few weeks this company expects to purchase 10,000 new oak ties and 5000 rail bonds for renewal.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company has been asked to consider plans to build an extension from a point on the Glenwood line north to Armory Street and State Street, where a connection could be made with the State Street line and the Walnut Street line in Elmira.

Western New York & Pennsylvania Traction Company, Olean, N. Y.—The right-of-way has been obtained by this company for its 7-mile line from Olean to Hinsdale.

Southern Power Company, Charlotte, N. C.—This company plans to extend its line from Anderson to Atlanta in the near future.

North Carolina Public Service Company, Salisbury, N. C.—This company is rebuilding all of its line in Salisbury and 8 miles of new track are being laid.

Cincinnati (Ohio) Traction Company.—This company has placed in operation its new College Hill line in Cincinnati.

Toledo Railways & Light Company, Toledo, Ohio.—Plans are being considered by this company to build a 6-mile extension from Toledo Beach to Monroe, Mich.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont.—In addition to the extensions planned by this company in the northeast and southeast sections of Hamilton it will lay new rails on King Street and on Locke Street and Sherman Avenue, Hamilton.

Portland Railway, Light & Power Company, Portland, Ore.—Plans have been completed by this company for the electrification of the Mount Hood line between Montavallo and Gresham, a distance of 9 miles.

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—It is reported that this company has completed its line between Dravosburg and Duquesne and will soon place it in operation.

Pottstown & Phoenixville Railway, Philadelphia, Pa.—During the next two months this company plans to build 10 miles of new track and seven bridges.

Wyomissing Valley Railway, Reading, Pa.—Plans are being made to begin soon the construction of this double-track electric railway from Wyomissing to Hendleton, O. S. Geiger is interested. [E. R. J., Dec. 14, '12.]

Chambersburg & Shippensburg Railway, Shippensburg, Pa.—Preliminary arrangements are being made by this company on its 10-mile line between Chambersburg and Shippensburg. It will connect at Chambersburg with the Chambersburg, Greencastle & Waynesburg Railway. The company's repair shops will be at Chambersburg and it will purchase power for its present use. T. M. Mahon, Chambersburg, president. [E. R. J., Feb. 8, '13.]

Stroudsburg & Water Gap Street Railway, Stroudsburg, Pa.—It is reported that this company has begun work on its new line from Stroudsburg to North Water Gap to connect with the Analomink Paper Mill.

Warren & Jamestown Street Railway, Warren, Pa.—Plans are being made to build a 16-mile line between Sheffield and Kane.

Monongahela, Ellsworth & Washington Railway, Washington, Pa.—Grading will soon be begun by this company between Monongahela and Hazelkirk. James Bryant, Pittsburgh, engineer. [E. R. J., Sept. 28, '12.]

Hull (Que.) Electric Railway.—This company plans to build an extension to Connaught Park and the Jockey Club race track, to double-track ¾ mile and to build terminal facilities at Connaught Park.

Rhode Island Company, Providence, R. I.—This company has offered to build a line from Centredale through Greenville and Harmony to Chepachet and possibly to Pascoag, making a through route from Providence, if the people of the towns of Smithfield and Gloucester will guarantee to the company interest charges on the cost of construction, which is estimated at about $300,000.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has placed in operation its 3-mile extension from Knoxville to Vestal.

El Paso-Ysleta Interurban Railway, El Paso, Tex.—Work has been begun by this company on its 12-mile electric line from El Paso down the Rio Grande Valley to Ysleta. This is a Stone & Webster proposition. [E. R. J., Dec. 14, '12.]

Ogden (Utah) Rapid Transit Company.—This company will resume work in the spring on its 6-mile extension from Hermitage in Ogden Canyon to Huntsville. During the summer the company plans to build a 12-mile extension from Smithfield, its present terminus, to the Idaho line.

Utah Light & Railway Company, Salt Lake City, Utah.—This company has ordered 2000 tons of rails and other material. As soon as the weather permits the company will begin work on the extension of its Holliday line from the present terminal to the mouth of the Big Cottonwood Canyon, a distance of 5 miles. The company also plans to extend its Warm Springs line to Bountiful and other towns in Davis County.

Tacoma, Wash.—Mayor W. W. Seymour has announced that the City Council has decided to build a municipal electric railway across the Eleventh Street bridge at Sitcum Avenue in Tacoma. Bonds to furnish funds to build the line will be issued if the voters favor the issue at an election which will be held in the spring. No franchise will be granted to any company to operate over the city tracks, but any reasonable rental offer from any company will be accepted if it meets with the approval of the Council. [E. R. J., Feb. 22, '13.]

Fairmont, Clarksburg & Grafton Railway, Clarksburg, W. Va.—Right-of-way has been secured by this company from Grafton to Meadville, and work will soon be begun on this 30-mile line to connect Grafton, Meadville, Clarksburg, Fairmont and Bridgeport. Charles F. Sutherland, Morgantown, president. [E. R. J., July 6, '12.]

Monongahela Valley Traction Company, Fairmont, W. Va.—The Harrison county court has agreed to this company's proposition relative to the construction of a bridge across the river at Lumberport. The company plans to build a 2-mile extension to Lumberport.

Wheeling (W. Va.) Traction Company.—Plans are being considered by this company for an extension from Bellaire to Glencoe.

Gogebic & Iron Counties Railway & Light Company, Ashland, Wis.—A 2-mile line between Gile and Montreal, Wis., will be built by this company during 1913.

Badger Railway & Light Company, Milwaukee, Wis.—During 1913 this company plans to build a 22-mile line to connect Lake Geneva, Elkhorn and Whitewater.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being made by this company to extend its lines from the terminal at Wauwatosa to the county buildings.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Foundations are being laid by this company for a new depot in Owensmouth.

Central California Traction Company, San Francisco, Cal.—A new depot at Kettleman has been completed by this company and another is under way at Dayton.

Savannah (Ga.) Electric Company.—This company has closed its general offices on Broughton Street in Savannah and will open its new quarters at the southeast corner of Bay and Whitaker Streets. The new quarters comprise the general offices and the new substation.

Boston & Worcester Street Railway, Boston, Mass.—This company has opened a new freight terminal station at 529 Commercial Street, Boston.

North Carolina Public Service Company, Salisbury, N. C.—This company has awarded a contract to I. G. Lawrence, Durham, for the construction of a new station in Salisbury. The building will be of brick, 70 ft. x 130 ft., and will contain a carhouse, storehouse and workshop. The cost is estimated to be $12,000. The company will also build a new carhouse at once at its plant opposite the Southern passenger station in Salisbury. The structure will be 53 ft. x 32 ft. and of brick construction. The cost will be about $3,000.

Grand Forks (N. D.) Street Railway.—Within the next ten weeks this company plans to build a new carhouse in Grand Rapids with a capacity for twenty cars.

Hocking-Sunday Creek Traction Company, Nelson, Ohio.—This company's carhouses in Nelsonville were destroyed by fire on Feb. 13. The loss is estimated to be about $5,000.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—This company has purchased property in Painesville upon which it plans to build a new depot.

Oregon Electric Railway, Portland, Ore.—Plans are being made by this company to build a new one-story brick passenger depot in Eugene.

Portland, Eugene & Eastern Railway, Portland, Ore.—Plans are being made by this company to build a new interurban passenger station on Fourth Street, Portland. The structure will occupy a whole block and will be several stories high. This building will serve as the Portland home for all the Southern Pacific offices. It is estimated that the purchase of the ground and the erection of the station will involve an expenditure of about $1,500,000.

Philadelphia Rapid Transit Company, Philadelphia, Pa.—This company has agreed to lease from the Fairmount Park Commission, Philadelphia, a plot of ground at Forty-ninth Street and Parkside Avenue for terminal purposes, at a rental of $3,000 per year, for a period of ten years.

Pottstown & Phoenixville Railway, Philadelphia, Pa.—During the next two months this company plans to build a new carhouse.

Sioux Falls (S. D.) Traction Company.—Work has been begun by this company on the construction of a new carhouse and offices on North Main Avenue in Sioux Falls. The structure will be 66 ft. x 150 ft.

Pan Handle Traction Company, Wheeling, W. Va.—Plans are being made by this company to build a new carhouse in North Warwood.

POWER HOUSES AND SUBSTATIONS

San Joaquin Valley Electric Railway, Stockton, Cal.—Work will soon be begun by this company on power plant No. 4, to be located in Crane Valley, on the east side of Crane Valley Lake. With the opening of work on power plant No. 4 the company will have three plants in the course of construction. The Tule River plant will be completed the latter part of the year. The No. 2 plant is now being constructed and plants Nos. 1 and 3 are in operation.

Denver City (Col.) Tramway Company.—This company is building a new substation on Delaware Street in Denver City.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—This company expects to purchase a 200-kw to 300-kw converter for its power plant.

Springfield (Ill.) Consolidated Railway.—This company will soon build a storage station and an all-steel cooling tower at its power plant at Capital Avenue and Tenth Street in Springfield.

Indianapolis & Louisville Traction Company, Scottsburg, Ind.—This company's power house in Scottsburg was badly damaged by fire on Feb. 16.

Calais (Me.) Street Railway.—This company has completed its new power house in Calais and will soon place it in operation.

Worcester (Mass.) Consolidated Street Railway.—This company has ordered two 300-kw rotary converters to be placed in the Lancaster Street power house in Leominster.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—During the year this company expects to purchase one 500-kw turbine and three 250-hp boilers for its Marion power house.

Dayton Power & Light Company, Dayton, Ohio.—This company will install new substation equipment consisting of a 300-kw rotary converter, transformer and outgoing line equipment, switchboard, etc. The apparatus has been ordered from the General Electric Company.

Regina (Sask.) Municipal Railway.—During the next three months this company will build an extension to its power house and build a new power house in Regina. It expects to purchase one 1000-kw motor-generator set and one 400-kw steam-driven unit.

Rio Grande Valley Traction Company, El Paso, Tex.—This company plans to build a new substation at West Ysleta. C. W. Kellogg, El Paso, general manager.

Charlottesville & Albemarle Railway, Charlottesville, Va.—This company's power plant in Charlottesville was partly destroyed by an explosion on Feb. 14. The loss is estimated to be about $15,000.

Richmond & Henrico Railway, Richmond, Va.—Plans are being made by this company to build an addition to its power house in Richmond. The structure will be 106 ft. x 85 ft. and of brick and concrete construction. The company expects to install additional equipment.

Manufactures and Supplies

ROLLING STOCK

Phœnix (Ariz.) Railway will issue specifications shortly for several new cars.

Virginia Railway & Power Company, Norfolk, Va., is said to be figuring on ten new cars.

Shore Line Electric Railway, Saybrook, Conn., is reported to be in the market for six cars.

H. F. Hart, Webster, S. D., is asking for prices on equipment for a 50-mile line which he proposes to build.

Springfield (Ill.) Consolidated Railway expects to purchase seven 30-ft. double-truck city pay-as-you-enter cars.

New York (N. Y.) Railways has ordered forty-five storage battery cars from the American Car & Foundry Company.

Detroit (Mich.) United Railway has purchased fifty 23-ft. 1½-in. single-truck car bodies from the Cincinnati Car Company.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., has ordered three 56-ft. express cars from the Cincinnati Car Company.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga., is said to be considering the purchase of thirty double-truck cars, complete.

Cleveland (Ohio) Railway has ordered from the Orenstein-Arthur Koppel Company ten work cars for the transportation of construction materials.

Utica & Mohawk Valley Railway, Utica, N. Y., has ordered from the G. C. Kuhlman Car Company four interurban cars with trucks and twenty Brill 39-E trucks.

Oakland, Antioch & Eastern Railway, Oakland, Cal., has ordered four 56-ft. 8-in. combination passenger, smoking and baggage car bodies from the Cincinnati Car Company.

Michigan United Traction Company, Jackson, Mich., has ordered from the St. Louis Car Company twenty pay-as-you-enter arched-roof semi-steel cars for city service in Evansville, Ind., Saginaw, Mich., and Rockford, Ill.

Wilkes-Barre (Pa.) Railway has ordered from The J. G. Brill Company three 36-ft. 8-in. semi-convertible car bodies mounted on Brill 27-MCB-2X trucks and four 28-ft. semi-convertible car bodies mounted on Brill 39-E trucks.

Southern Traction Company, Dallas, Tex., has ordered from the American Car Company ten trail passenger cars, eight express cars, two work cars and forty-two sets of Brill 27-MCB trucks. The cars will be equipped with General Electric motors.

Iowa Railway & Light Company, Cedar Rapids, Ia., has ordered from the McGuire-Cummings Manufacturing Company two all-steel interurban cars, four double-truck cars and four single-truck cars for city service. General Electric equipment will be installed on these cars.

New York State Railways, Rochester, N. Y., is in the market for twenty-five cars for use on its Rochester division. The company has ordered ten cars from the Cincinnati Car Company for its Syracuse lines and four interurban cars from the G. C. Kuhlman Car Company for operation on its Utica division.

Montreal (Que.) Tramways has specified the following details for the 100 closed prepayment cars which are being built by the Canadian Car & Foundry Company:

Seating capacity	42	Axles	Can.
Weight (car body only),	19,000 lb.	Cables	Imperial
Bolster centers, length,	20 ft. 8 in.	Conduits and junction boxes,	C-H
Length of body	32 ft. 0 in.	Control	K-35
Length over vestibule,	45 ft. 6 in.	Curtain fixtures	National
Width over all	8 ft. 2 in.	Curtain material	Pantasote
Height, rail to sills	34 in.	Destination sign	E. S. S. Co.
Sill to trolley base	8 ft. 5 in.	Headlights	C-H
Body	composite	Motors	4-West. 337
Interior trim	cherry	Motors	Outside-hung
Headlining	Agasote	Sash fixtures	Edwards
Roof	arch	Seats	Cross and long.
Underframe	steel	Step treads	Mason
Air brakes	West.	Trolley base	Nuttal
		Trucks	Brill 27-GE-2
		Wheelguards	H-B

TRADE NOTES

E. C. Converse has resigned as a director of the Baldwin Locomotive Works, Philadelphia, Pa.

M-C-B Company, Chicago, Ill., announces that Erle C. Cowgill has resigned as secretary of the company to become general manager of a plantation company in Mississippi.

Cambria Steel Company, Johnstown, Pa., has appointed Harry B. Guy, for many years connected with the Carnegie Steel Company, assistant purchasing agent with headquarters in Johnstown.

Ottawa Car Company, Ottawa, Ont., has appointed W. K. Jeffrey its manager to succeed James Buchan, deceased. Mr. Jeffrey has been connected with the Ottawa Car Company for eight years.

Dossert & Company, New York, N. Y., announce that the Delta Star Electric Company, 617-631 West Jackson Boulevard, Chicago, Ill., have taken over the agency for Dossert connectors in Chicago and adjacent territory, including Milwaukee and the States of Illinois and Iowa.

Allis Chalmers Company's personal property was sold at auction on Feb. 27 for $4,000,000, James N. Wallace, John H. McClementy and Francis S. Bangs, of New York, representing a reorganization committee, being the only bidders. The sale included all raw material, accounts, orders, stocks, bonds and securities of all the company's plants.

Weir Frog Company, Cincinnati, Ohio, has increased its manufacturing floor space by about 16,000 sq. ft. This was done to take care of the heavy buying movement and new extensions of the railroads in its territory. The space for the storage of raw material has been nearly doubled to accommodate the demands which are made on the company for quicker shipment.

Baldwin Locomotive Works, Philadelphia, Pa., have made a preliminary statement for the year 1912 showing a total production of $28,924,000. The net earnings after the payment of bond interest were $3,698,000, from which dividends aggregating $1,800,000 were paid as follows: To the preferred stockholders $1,400,000, to common $400,000, leaving undivided profits of $1,898,000.

O. M. Edwards Company, Syracuse, N. Y., has been incorporated, with $1,000,000 common stock and $250,000 7 per cent preferred stock, to manufacture freight car equipments, including padlocks, valves, etc. The officers of the company are as follows: O. M. Edwards, president; W. A. Le Brun, first vice-president; E. W. Edwards, second vice-president and assistant manager; J. J. Edwards, secretary and treasurer.

McMeen & Miller, Chicago, Ill., has been incorporated to succeed the engineering firm of McMeen & Miller, which for the past ten years has existed as a partnership between Samuel G. McMeen and Kempster B. Miller. The personnel of the new firm includes Mr. McMeen and Mr. Miller, and, as a new member, Leigh S. Keith, who for several years has been managing engineer of the firm. The organization of the company has been increased so as to include an experienced staff of engineers fitted to handle not only the general work of a consulting engineering business but also the more specialized details of economical and efficient design and construction of steam or hydroelectric stations, high-tension transmission lines and overhead and underground distribution systems. Mr. McMeen, who is the senior member and vice-president of the new firm, is at present located at Columbus, Ohio, where he is devoting practically his entire attention to the affairs of E. W. Clark & Company, Philadelphia, Pa. He is president of the Columbus Railway & Light Company, one of the Clark properties, and has the executive management of all of the allied electric properties in Columbus. He also serves in an advisory capacity in the Clark properties throughout the country. Mr. Miller, who is president of McMeen & Miller, is a graduate of Cornell and for many years was identified, as engineer and manager, with the Kellogg Switchboard & Supply Company. He is perhaps best known as the author of "American Telephone Practice." Mr. Keith, the secretary and treasurer, is a graduate of the Massachusetts Institute of Technology and has been connected with the firm about four years, engaging in a wide variety of engineering work.

ADVERTISING LITERATURE

National Tube Company, Pittsburgh, Pa., is mailing a folder which discusses the merits of the Kewanee union.

H. M. Byllesby & Company, Chicago, Ill., has issued a Department Bulletin No. 1, which describes briefly the work of its department of examinations and reports.

Walker & Bennett Manufacturing Company, New York, N. Y., has issued a catalog which describes and illustrates four distinct types of car seats for steam and electric cars.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 130, which describes some of its products, including airoilene grease, airoilene oil, Chicago automatic oilers and the Little Giant grease machine.

Galion Iron Works Company, Galion, Ohio, has issued Catalog No. 16, which describes and illustrates its complete line of cast-iron and corrugated culvert pipe, road-grading machines, drags, rollers, scrapers, plows, tractors, crushers, scarifiers, etc.

Sanderson & Porter, New York, N. Y., have reprinted in booklet form an article from the *Canadian Engineer* entitled "The Jordan River Power Development." This is a description of the hydraulic, generating and transmission features of the Vancouver Island Power Company's plant.

Electric Service Supplies Company, Philadelphia, Pa., has issued its 1913 catalog on Garton-Daniels lightning arresters and other lightning protective apparatus. The catalog contains much information relative to lightning phenomena, installation of lightning arresters, grounding, distribution, inspection and other allied subjects. It describes and illustrates the complete line of Garton-Daniels lightning arresters, a new line of panelboard line arresters, high-voltage and low-voltage choke coils and disconnecting switches, grounding apparatus, etc. The last eight pages are given over to installation diagrams.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. A4086, which is devoted to the subject of type MR circuit breakers for railway service. Bulletin No. A4083 describes and illustrates US-13 roller-bearing trolley bases. Bulletin No. 4085 is devoted to a description of the company's battery-charging motor-generator sets for railway signaling. Bulletin No. A4070 illustrates and describes General Electric electrically operated remote control switch, type R, form C2, adapted for use wherever control from a central point is desired. It is made for both alternating and direct current. Bulletin No. A4081 is devoted to reversing motors for planers, slotters, etc. The publication contains various curves which show the advantage of direct drive over belt drive. Bulletin No. A4072 is devoted to the subject of Edison Mazda sign lamps.

J. G. White & Company, Inc., New York, N. Y., has prepared an illustrated booklet which calls public attention to the recent organization of The J. G. White Engineering Corporation and The J. G. White Management Corporation to assume the functions previously exercised by the engineering construction and management departments of the parent company. A general description of the scope of the various companies is presented in the booklet, and the illustrations reveal in graphic form the different phases of engineering work which the companies undertake. It is pointed out that during more than twenty years of successful accomplishment the American and foreign White companies have carried out important developments in the United States, Canada, Great Britain, South and Central America, Australia, Cuba, Porto Rico, the Philippine Islands, Holland, France, Italy and India.

NEW PUBLICATION

Hygiene for the Worker. By W. H. Tolman and A. W. Guthrie, American Book Company, New York, 1912. Cloth, 231 pages. Price, 50 cents.

The contents of this book cover a wider scope than the title would indicate, as the chapters on food and general hygiene are supplemented by data on fire and accident prevention as well as on first aid to the injured. Dr. Tolman, co-author of this book, is particularly well known for his work as director of the American Museum of Safety, which has given him exceptionally good opportunities to study the prevention of accidents to employees.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MARCH 8, 1913 No. 10

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office.............................1570 Old Colony Building
Philadelphia Office........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, *8000 copies are printed.*

RENAISSANCE OF THE DOUBLE-DECK CAR

A preliminary description of a double-deck car which is now being built for the Washington Railway & Electric Company is published elsewhere in this issue. It is the fourth car of the type to be ordered within the past eight months, and it would indicate that the double-deck principle is now arousing much less skepticism than has been the case during the past decade. The fact that double-deck cars were once tried in this country and found wanting does not necessarily mean that the present cars are to prove failures. Ten years or more ago little need existed for such types and neither the problem of physical design nor that of handling fare collections was understood. To-day the successful development of the small wheel, the low entrance and the prepayment principle have made the double-deck car a practical possibility, while the incentive always so necessary to success is supplied by the desperate need which exists in many communities for some means to halt the rapidly rising cost of operation.

THE LOW-CAR-STEP ORDER IN NEW YORK

The Public Service Commission's order lowering car-step heights in New York City, which is published elsewhere in this issue, is an action that has been expected for some time past. Little reason now exists for the imposition upon the public of excessively high steps, and as we have heretofore pointed out a reduction in height even on the cars in service to-day may be effected at a cost which is by no means prohibitive. Aside from the inclined floor, the use of the small car wheel and the small motor, while involving a very much greater initial expense than remodeling the platforms, has been shown to effect enough saving in weight and, consequently, in cost of energy to pay the interest charges on additional investment. The order of the commission establishing as a maximum a 15-in. height for car steps in Greater New York does not, however, necessarily involve any radical changes in design, although it is estimated that the cost of the change will amount approximately to $95 per car. It is to be hoped that while the companies are making the changes they will not content themselves with a reduction in height from 16 in., or in the worst reported case 17½ in., to the exact maximum of 15 in. Little additional expense would be involved by establishing the first step at an appreciably lower elevation with a consequent increase in the ease and rapidity with which passengers may board and alight from the cars.

PREPARING FOR ELECTRIFICATION OF STEAM ROADS

No event has happened more significant of the near approach of general steam railway electrification than the establishment of the Pennsylvania Railroad's correspondence school of electricity. Electrification of trunk lines has for a long time been one of those things that were "sure to come," but it has not as yet got much beyond terminal districts. The management of the Pennsylvania not only has its plans made for electrification of its line from New York to Washington, D. C.; it realizes that, in addition to the elementary needs arising out of the many present applications of electricity, it will soon be necessary for its trainmen and shopmen to be equipped for the operation of an electrified system. The men themselves have been so quick to see the point that within thirty days of the announcement that the school would be started 10,000 Pennsylvania employees, representing almost every department, have enrolled as electrical students. A brief account of the course of study to be followed is given elsewhere in this issue. It is extremely elementary, but if the average street and interurban electric railway employee were even so well educated as will be the men who pursue the Pennsylvania's course of correspondence study the life of electric railway officials would be an easier one. Is there not in this a suggestion worth the consideration of these officials? If it pays a steam railroad to educate its employees against the day of electrification, would it not be a good move for railways already electrically operated to carry their educational effort beyond the superficial and ill-grounded training that a motorman, for instance, receives when he is learning to take charge of a car? Something in this direction has been done by some roads, but not enough to enable us to say truthfully that the electric railways may not profit by the example set by their big brother of the steam lines.

MAINTENANCE ON THIRD AVENUE SYSTEM

The annual report of President Whitridge of the Third Avenue Railway, New York, covering the calendar year 1912 contains references to matters that are of general interest. A group of tables in the report details estimates of capital and some operating expense requirements for 1913. It appears from these that of the total estimated requirements of $1,596,653 $880,264 will be added to capital and $716,389 will be charged to operating expense account. The practice of showing these details is unusual. The estimated charge to capital account for 1913 is about 2.6 per cent of the investment in road, equipment, buildings, etc., as of the close of the last calendar year. The report shows that the system as a whole had gross earnings of $9,547,529. The operating ratio was 61.27 per cent. The proportions of gross expended for various purposes were as follows: operation of cars, 25.76 per cent; power supply, 7.81 per cent; injuries to persons and property, 4.94 per cent; general and miscellaneous expenses, 7.11 per cent; maintenance of way and structures, 9.17 per cent; maintenance of equipment, 6.47 per cent. While the maintenance expenditures which are charged in this way thus amounted to 15.64 per cent of gross, they do not show the total provision for upkeep of the property because there was a deduction from income on account of depreciation of $400,000. This additional amount is equal to 4.19 per cent of gross operating revenue and it makes the total expenditure and allowance for maintenance and depreciation 19.83 per cent of gross.

The actual outlay which was made for maintenance of way averages $2,759 per mile of track, but this does not include as large an expenditure for the replacement of rails as would have been made had it not been for the difficulties due to corrugation and a belief that replacement of this part of the property should proceed slowly until more is known about the cause of corrugation. The reservation of an amount to cover this and other possible accruing or accrued depreciation makes the operating ratio, including the provision for depreciation, 65.46 per cent.

VITALIZING INFLUENCE OF THE ELECTRIC RAILWAYS

Benefits of electric railway service in rural communities formerly without transportation facilities are well known to economists, but they will bear restating at times when comprehensive developments are being considered by the public authorities. One of the most thorough studies of the relation of electric railways to rural towns which have thus far appeared in print has lately been published by the State of Massachusetts under the title of Senate Document 300.

For several years a very large part of the western half of the State has been seeking legislation which will encourage the building of trolley lines through sections at present unprovided with transportation service, and in response to this demand a joint special committee of the Legislature has investigated the situation and embodied in the above publication its recommendations in favor of the desired development, which is proposed along lines of co-operation with the New York, New Haven & Hartford Railroad Company.

Apart from the interest of the problem of steam railroad and street railway relations, the bearing the proposed development has upon the industrial life of the sections concerned is of wide significance. Many of the rural communities seeking trolley service have become more and more decadent with the passing years instead of increasing in population and industrial activity. As the report of the committee points out, it is impossible to escape the conclusion that a large part of this economic deterioration is due to the absence of transportation facilities, since other communities with no greater natural advantages but which are provided with steam and trolley service have shown a healthy growth in population, land values and agricultural and industrial products. Electric express service, notably on the Berkshire system, has increased the production of farms, encouraged the growth of small factories and water powers, improved the living conditions in winter, opened the territory to summer residential uses and enabled the educational advantages of the larger centers to be reaped by pupils from remote districts who in many cases would otherwise be deprived of anything more than a country schooling.

Exactly the opposite experience is that of the communities without transportation facilities. In many such localities can be seen abandoned farms, unproductive forests, unused mill sites and shrinking populations. In many places it was shown to the committee that the cost of transportation to shipping points was more than the cost of production. Such occupations as the raising of potatoes, of cattle for dairy farming and of sheep have been practically abandoned for lack of transportation.

West of the Connecticut River eleven towns having an aggregate area of 325 sq. miles, without a mile of steam railroad or trolley in any one of them, possess no more modern facilities for the transportation of persons or merchandise either into or out of the communities than existed ninety years ago, before the introduction of railroads anywhere into Massachusetts. Their combined population has fallen in this period from 11,769 to 5377. In another similar section of 316 sq. miles eight towns without transportation facilities have decreased in population from 9588 to 4632 in the past ninety years. The population of the communities which are reached by the four principal railroad lines in the five western counties of the State increased during this period from 91,879 to 652,744, or 610 per cent; while in the same counties the population of the thirty-three towns still without railroad or street railway facilities has decreased from 30,847 to 14,143, or an average decrease of 54.1 per cent.

Evidence presented during the investigation of the trolley development problem showed that with electric railway facilities better milk would be marketed in many of the larger centers, teaming costs now prohibitive would be cut to nominal figures by electric express service, a high-school education would be available for many pupils who cannot meet the expense of boarding away from home during the school year, farm labor would be more easily secured in the towns, products locally wasted would in large measure be transported to the cities, and timber and water power now undeveloped would be utilized to the profit of their owners. Points 10 miles or 15 miles from the nearest railroad station would be brought in touch with the outside world and commerce ~~would~~ begin to thrive. The committee's report sets forth the vitalizing influence of local transportation in a manner which leaves little to be desired and its value as a contribution to the larger discussion of electric railway influences in country districts is apparent to every thoughtful reader.

INCREASING THE EFFICIENCY AND RELIABILITY OF OLD EQUIPMENT

Changes in the design of cars and equipment have been so rapid during the last few years that types which but a short time ago were considered the last word in design are now looked upon as obsolete. The problem of maintaining these cars is not confined alone to keeping them in good operating condition. The desire to effect economies in operation as well as to increase their safety and provide better entrance and exit facilities makes it necessary for operating engineers to consider improvements that will make such cars agree more nearly with the latest practice.

The demand for a reduction in car weight has been met willingly by the manufacturers. Many engineers have calculated that the saving in the cost of energy from such a reduction was equivalent to a sum varying from $10 to $2 per car per annum for every 100 lb. reduction. The saving in each case must depend, of course, not only on the cost of energy delivered at the car but also on the average mileage made by the cars and the character of the service, since the watt-hours per ton mile will vary with the schedule speed, number of stops per mile and length of time consumed in stops. One large city system whose surface cars last year made a mileage of over 50,000,000 miles has furnished the following figures: average miles per car per annum, 35,000; average cost per kilowatt-hour of energy at the car, 25 cents; average energy consumption, watt-hours per ton mile, 145; average schedule speed, 8.9 m.p.h.; average number of stops per mile, 6.8; average length of stops, 6.9 seconds. From the equation $(35,000 \times 0.145 \times 1.25 \text{ cents}) \div 20 = \$3.17$ per 100 lb., it is evident that this road pays $3.17 per 100 lb. per annum for carrying around the dead weight of a car. Whatever the actual cost may be to any road, such calculations as this have shown the saving that may be expected from weight reductions. Operating companies are therefore making every effort to reduce weights as much as possible and still make certain that such reductions will not increase the cost of inspection and maintenance.

Changes that would necessitate rebuilding of the car body are prohibited on account of the cost involved. A rearrangement of seating, however, could be undertaken on a maintenance basis with little increased cost over what would be required to maintain the original seats. Where it is desirable to increase the seating capacity much can be effected by using cross seats in the center of the car and longitudinal seats at the entrance and exits, an arrangement now very popular because passengers who are standing opposite the doors are thereby prevented from interfering seriously with those who are entering or departing. As an example of what may be accomplished in this direction let us consider a car with inside dimensions of 8 ft. x 30 ft. With longitudinal seats such a car would seat forty-two passengers and the space available for standing passengers would be 90 sq. ft. Such a car could be equipped with sixteen cross seats and two longitudinal seats at each end 5 ft. 4 in. long. With this combination forty-eight passengers could be seated, which is an increase of six over the longitudinal seating, and the space available for standing would be 72 sq. ft.

Trucks of relatively high maintenance cost can sometimes be replaced to advantage with a later type. For example, some recently constructed cars for use in city service with a center pin load of 14,000 lb. are equipped with trucks in which the ratio of complete truck weight to the center pin load is 0.35, whereas in the older types this ratio was as high as 0.45 to 0.5. Stated in another form, this means that a car with a center-pin load of 14,000 lb. now has a truck weighing 4900 lb. instead of 6650 lb., a saving in weight of 3500 lb. per car. At $3.17 per 100 lb. as the cost of energy consumed, such a reduction would mean a saving of $110.95 a year in the cost of energy alone, and the first cost of the truck frames could be saved in three years. Furthermore, the energy consumption of the motor equipment would be reduced somewhat by using a truck of ball-bearing, center-bearing type. Anti-friction bearings have also been considered as a means of reducing the energy consumption and tests have shown a reduction of from 18 per cent to 30 per cent in some cases.

Changes that can be made in existing motors or control to effect additional economies are limited. Indeed, such innovations as the addition of interpole fields or the application of field control involve a cost that is prohibitive, and at any rate the full advantage of such alterations would not be obtained unless the armature windings were replaced also. Changes like the following, however, will materially reduce the cost of maintenance for a reasonable expense; impregnation of field coils, slotting of commutators in conjunction with a high-grade carbon brush, installation of a modern design of brush holder, replacement of worn gear cases by a light-weight steel construction, changes in bearings and the method of lubricating them, and the rearrangement of motor leads to give less liability of short-circuits.

A careful study of operating conditions to determine if the gear ratio used is still the most suitable for the service is very desirable and one that will often prove of great advantage in reducing expenses by reducing energy consumption and lowering the temperature of the motors. It is noteworthy that enlightened engineers and manufacturing companies that have made a special study of this point have instituted a campaign against high-speed gearing. Roads that have made changes in their gearing to reduce their maximum speeds are realizing from 5 per cent to 12 per cent saving in energy. In considering the supersession of old motors, the advantages of two-motor equipments in place of four-motor equipments for city service have long been appreciated. Such a change, however, would necessitate going to a maximum traction type of truck or else connecting the two axles of a truck by side rods in order to make all wheels available for adhesion. The motors on a car equipped with four 40-hp motors would weigh about 11,200 lb., while two 80-hp modern motors would weigh but 6730 lb. A saving of 4470 lb. would be the result of the change. In addition to the economies that may be expected by changing equipment and construction, great economy in energy consumption is possible by correct operation of the equipment. Proper acceleration and braking rates should be maintained and particular attention given toward securing the maximum amount of coasting consistent with the service conditions.

Recent Improvements of the Boston Elevated System

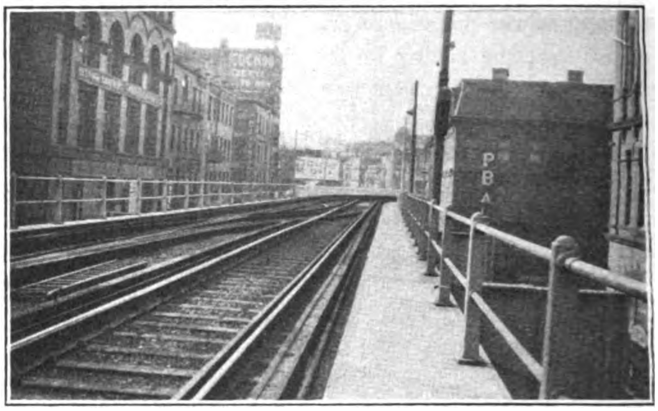
A Continuation of the Description of Recent Improvements by the Boston Elevated Railway Company, Including the New Office Building of the Seventh Surface Lines Division, the New Stadium Station, Additional Transportation Facilities at the North Station, Present Power Requirements and Other Features

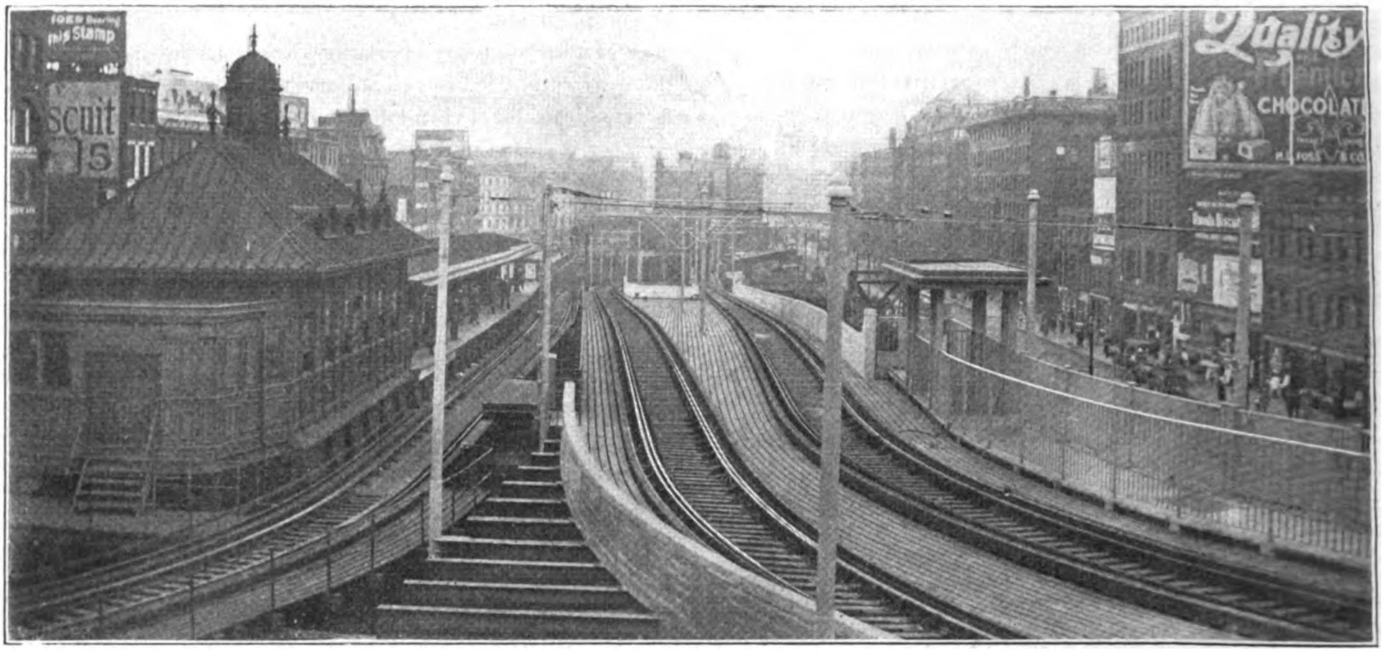
The Electric Railway Journal for March 1 contained an article bearing the same title as this which presented a description of further extensions of the rapid transit lines of Boston since the completion of the Cambridge subway, including particularly the improvements at the Sullivan Square terminal and the East Cambridge viaduct. The present article will complete this description of recent betterments.

IMPROVEMENTS AT NORTH STATION

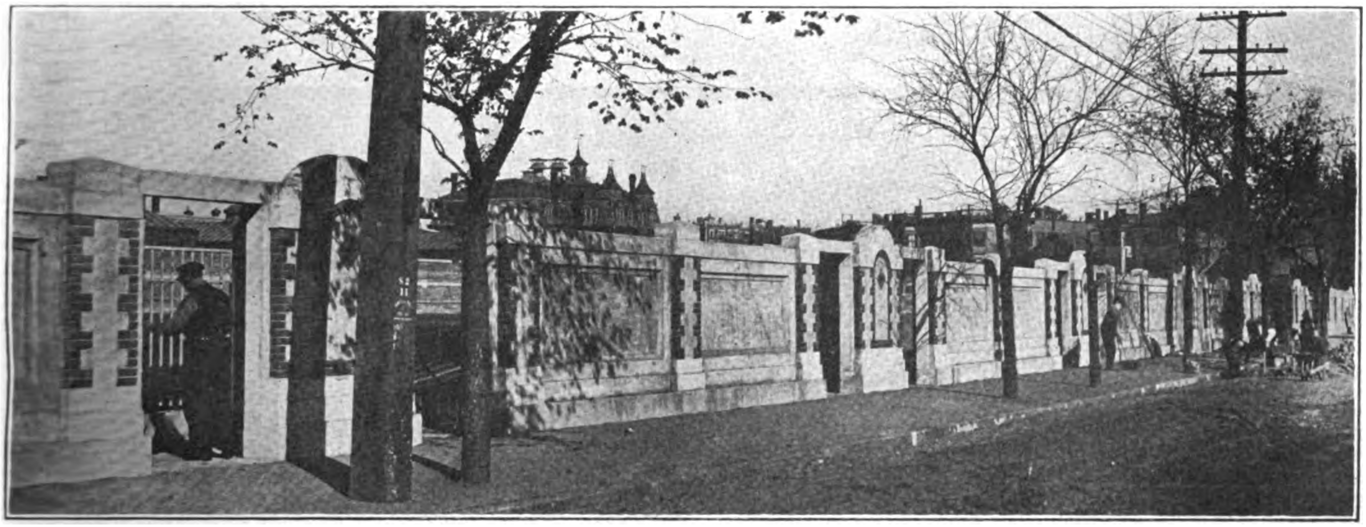
Closely associated with the opening of the East Cambridge extension are improved facilities placed in service at the same time at the North Station, which is now one of the most important transfer points on the system of rapid transit lines. This station now consists of three interconnected platform groups used in connection with the elevated train, viaduct and subway car service, with convenient exits and entrances to and from the street surface and the waiting room and midway of the North Station of the Boston & Maine Railroad. The newer portion of the station is included in the platforms and connections used by the Atlantic Avenue shuttle trains running between the two principal steam railroad terminals of the city and the viaduct cars. The station is now provided with platform accommodations about 410 ft. long on the north side of Causeway Street, these being used by the train and car service above mentioned. A spur track of the elevated lines terminates beside the easterly section, which is 200 ft. long and 12 ft. wide, the headway of the shuttle trains being sufficient to permit the use of one track without interference with traffic.

Short stairway connections are provided between the elevated train platform and the viaduct service platforms at the west, together with short connections with the North Station proper and the Washington Street tunnel and Sullivan Square trains. The viaduct service platforms are from 208 ft. to 238 ft. long and from 8 ft. to 16 ft. wide, located on opposite sides of the inward-bound and outward-bound tracks as shown in the accompanying drawing. They are connected with the midway or passenger concourse of the North Station proper by a gallery of reinforced concrete construction about 120 ft. long and 16 ft. wide, with stairways at each end to facilitate entrance and egress. The gallery passes over the carriage and taxicab stand of the station and is provided with direct stairway connections leading to the street at the head of an entrance lobby of semi-circular shape in which the ticket booths are placed. The design of the station provides for the utmost facility of interchange of traffic between the different services entering and leaving the


Boston Improvements—Elevated Extension for Viaduct Cars, Causeway Street

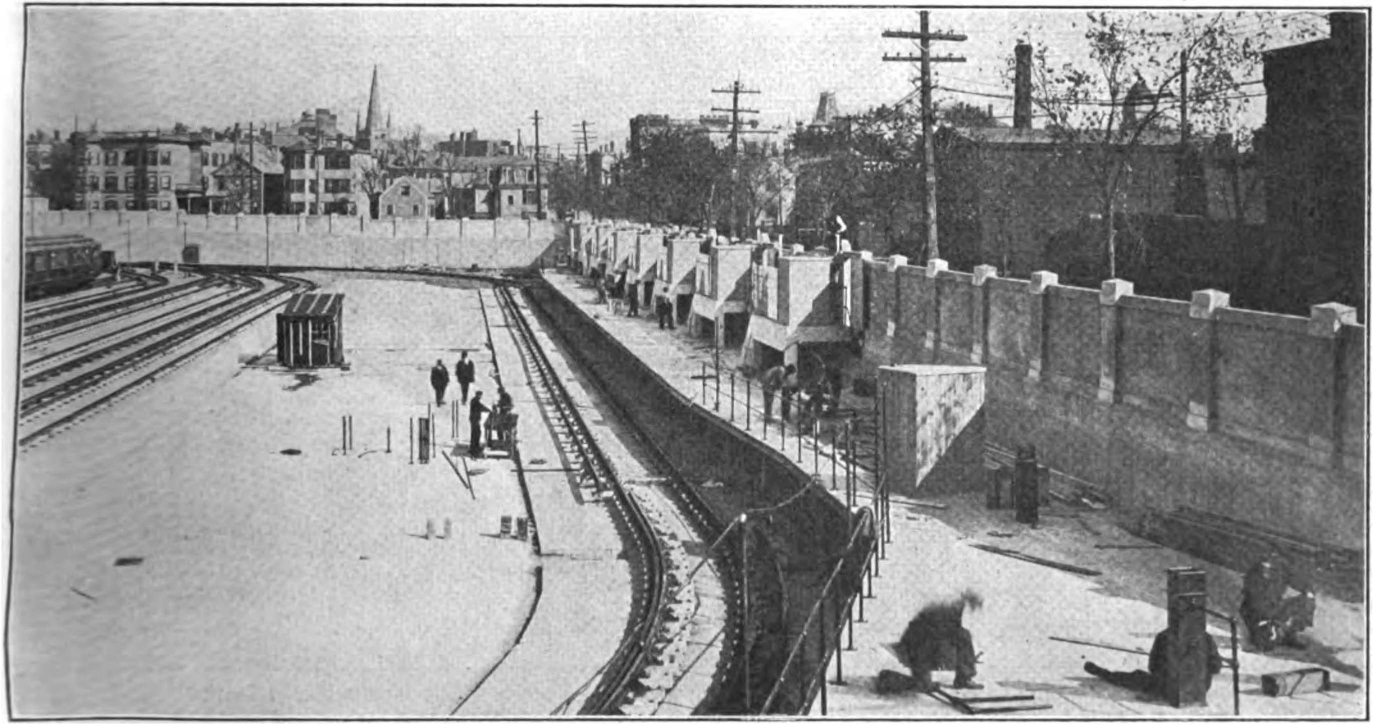

Boston Improvements—North Station Incline, Showing Southbound Tunnel Train Tracks and East Cambridge Viaduct Car, Northbound and Southbound Tracks and Foot Passage

premises, with ample protection of passengers against rain and snow. The short connections between the steam railroad terminal and the Boston Elevated station also permit cars to be taken to all parts of the system without breaking cover, and also without requiring travelers to cross the street surface, where the congestion of teaming and vehicular traffic is at times excessive.



Boston Improvements—Fence Outside the Stadium Station

The entrance to the station from the railroad concourse is equipped with two transparencies advertising the company's service, these being mounted at the top of iron standards about 15 ft. high and containing in each case four circuits of eleven 55-volt, 4-cp carbon incandescent lamps. Small tungsten lamps will be substituted soon for the carbon-filament units to reduce the amount of heat given off within the transparencies. The platform lighting is at present effected with carbon-filament incandescent lamps spaced from 8 ft. to 10 ft. apart over platform edges and from 16 ft. to 20 ft. apart at the rear. The lamps are usually mounted from 10 ft. to 12 ft. above the platform surface.

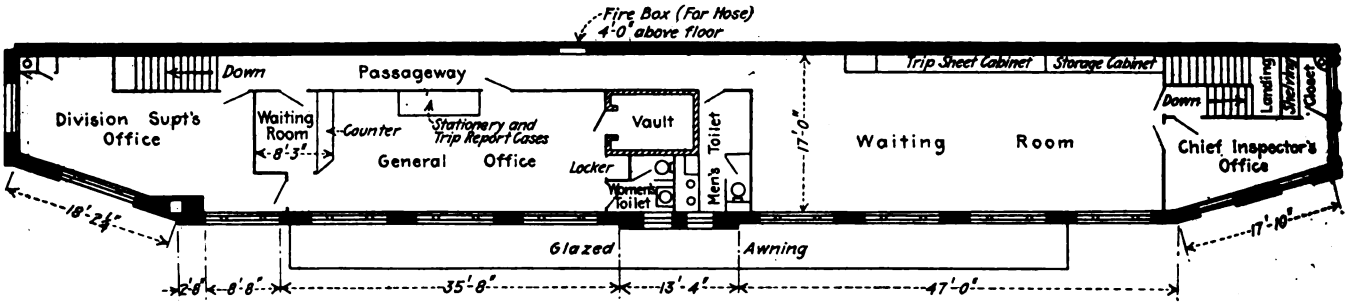


Boston Improvements—Stadium Station Nearing Completion

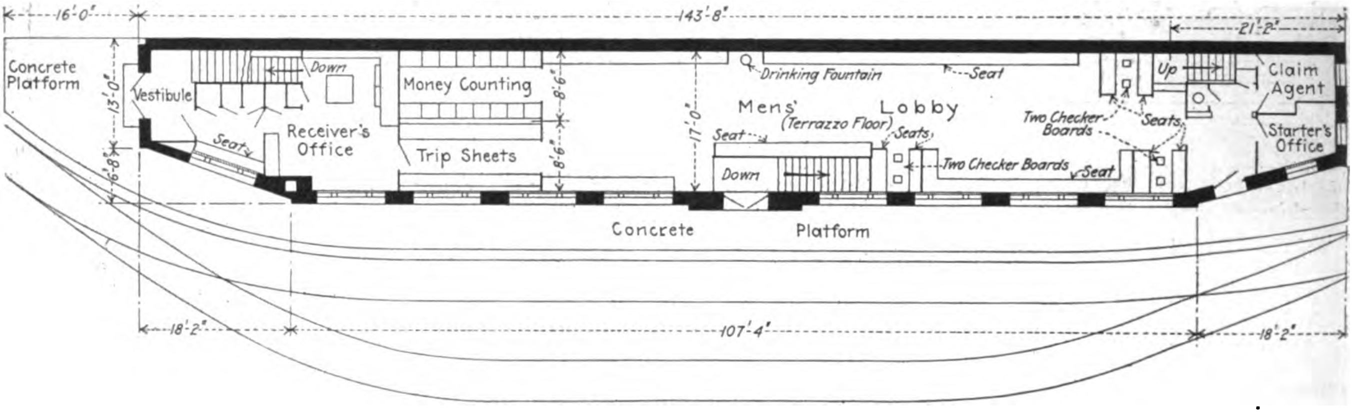
The transfer privileges at the North Station west and in the Tremont Street subway between viaduct cars, elevated trains and other subway cars provide for a bodily transfer from line to line without the use of checks. In case passengers wish to travel farther south than the subway cars run they are also enabled to change without expense to them at the Haymarket Square station of the Tremont Street subway, where passageways connect with the Union-Friend station of the Washington Street tunnel. The viaduct lines all include the Tremont Street subway, with connection at Park Street to substantially all parts of the system on the south and west.

THE STADIUM STATION

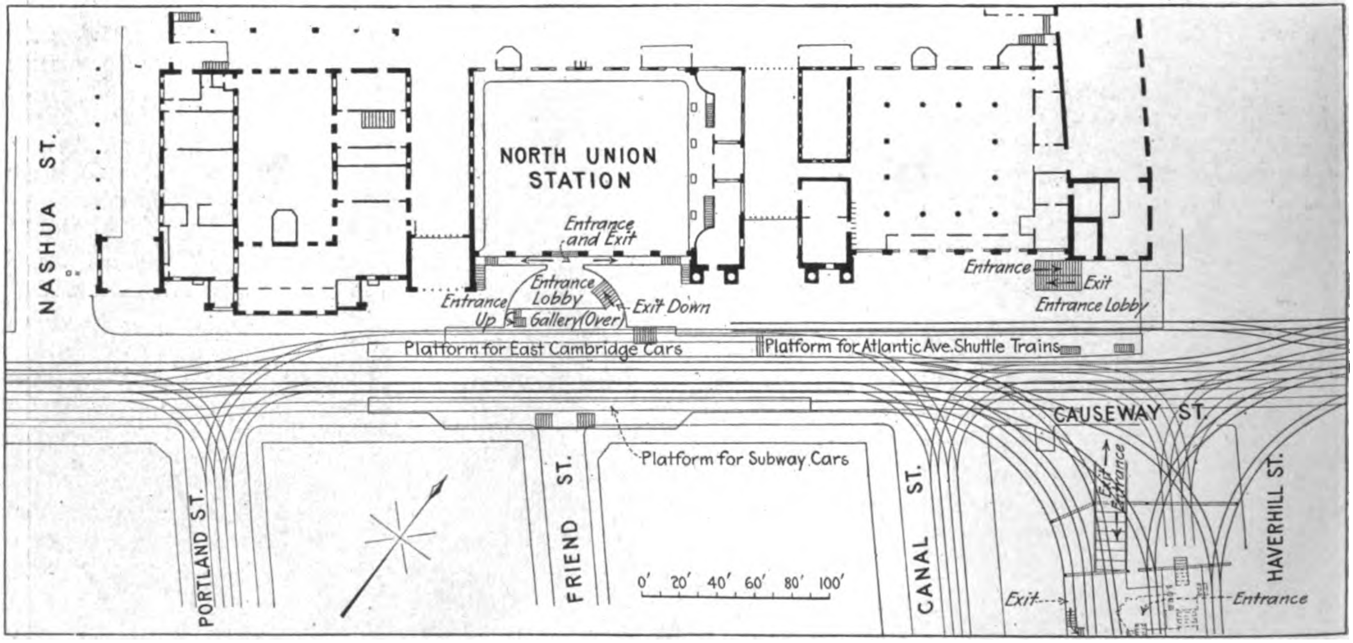
One of the most interesting improvements on the system is the new Stadium station, in Cambridge, which is utilized by the company in connection with the handling of traffic at times of football games or other athletic events of Harvard University conducted in the Stadium or upon Soldiers' Field. More than 35,000 spectators frequently attend a single game during the football season, and the handling of the extra traffic at such times has been a task of some difficulty on account of the extensive use which has had to be made of surface cars. With the opening of the Cambridge subway and the establishment of new carhouse facilities for its trains near Harvard Square, Cambridge, an opportunity was afforded for the building of a special station for occasional use only on the easterly side of the Eliot Square trainyard. The subway provides transit from Park Street, Boston, to the Stadium station in about ten minutes, compared with a former journey of about forty minutes by surface cars.


Fire Box (For Hose) 4'-0" above floor
Down
Passageway
Division Supt's Office
Waiting Room
8'-3"
Counter
A
Stationery and Trip Report Cases
General Office
Vault
Locker
Women's Toilet
Men's Toilet
17'-0"
Trip Sheet Cabinet
Storage Cabinet
Waiting Room
Down
Landing
Shelving
Closet
Chief Inspector's Office
18'-2½"
Glazed
Awning
17'-10"
2'-8"
8'-8"
35'-8"
13'-4"
47'-0"

Boston Improvements—Plan of Second Floor, Quarters of Division No. 7


16'-0"
143'-8"
21'-2"
Concrete Platform
13'-0"
Vestibule
Down
Receiver's Office
Seats
6'-8"
Money Counting
Trip Sheets
8'-6"
8'-6"
17'-0"
Drinking Fountain
Seat
Mens' Lobby
(Terrazzo Floor)
Seat
Seats
Down
Two Checker Boards
Seats
Two Checker Boards
Seat
Up
Claim Agent
Starter's Office
Concrete Platform
18'-2"
107'-4"
18'-2"

Boston Improvements—Plan of First Floor and Track Layout, Quarters of Division No. 7

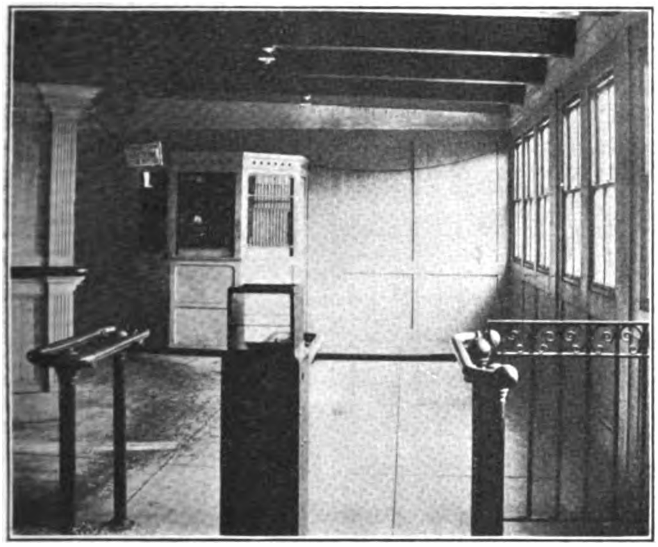

NASHUA ST.
NORTH UNION STATION
Entrance and Exit
Entrance
Entrance Lobby
Up
Gallery (Over)
Exit Down
Entrance
Exit
Entrance Lobby
Platform for East Cambridge Cars
Platform for Atlantic Ave. Shuttle Trains
CAUSEWAY ST.
Platform for Subway Cars
PORTLAND ST.
FRIEND ST.
CANAL ST.
HAVERHILL ST.
Exit
Entrance
Exit
Entrance
0' 20' 40' 60' 80' 100'

Boston Improvements—Plan of Causeway Street Station Adjacent to the North Union Station

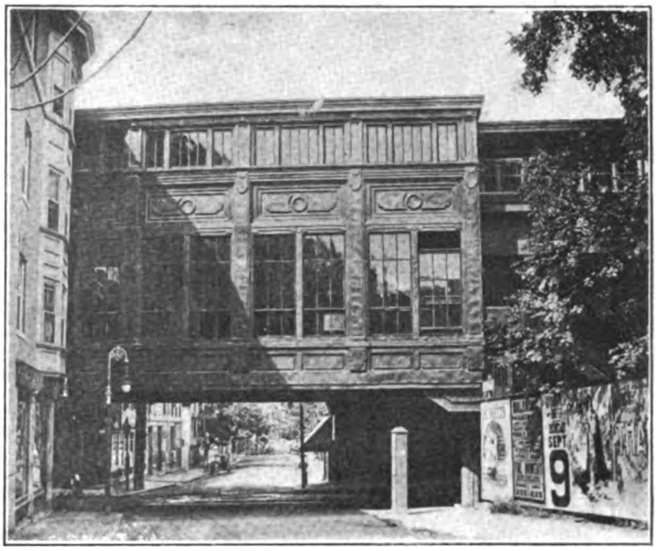
Trains are run through from Harvard Square to the Stadium station via a loop track extending around the southerly side of the Eliot Square shops to a reinforced concrete platform 350 ft. long and 15 ft. wide, provided with eight entrance and exit platforms and a ramp at the head of which a main entrance and exit are located. The platform level is equal to that of the car floors, or 3 ft. 11½ in. above the top of the rail. The street outside the platform is above the latter, so that the exits are arranged to open outward from landings 6 ft. wide and 17½ ft. long carried on concrete posts 4 ft. 6 in. above the unloading and loading platform. A reinforced concrete fence about 2000 ft. long and costing about $12,000 extends entirely around the yard and shops. The ticket offices are located at the head of the ramp and on the landings, and accommodations for twenty-four ticket sellers are available at the close of each game. The exits are used as entrances by the returning crowd. The exits are about 5 ft. wide and 7 ft. high, with the exception of the two main gates, which are about

7 ft. wide and 6½ ft. high each. Twelve ticket choppers are on duty when the station is open for inward passengers. Trains of four cars each are ordinarily operated in this service upon a minimum headway of one and three-quarter minutes and a platform man is stationed at each car door to facilitate prompt starting. The total operating force required to man the station consists of one starter, twelve platform men, twenty-four ticket sellers and twelve choppers, or a total of forty-nine employees.

During the recent football season about 26,000 passengers were handled at this station in forty-five minutes without mishap or confusion. A company telephone is provided for the use of the starter and train service is maintained for about one-half hour after the game begins and begun one-half hour before it closes. Two exits are provided at each landing and the main exits at the head of the ramp when added make a total opening of about 94 ft. through which the stream of passengers is subdivided. Temporary lighting is provided during the fall season by five-lamp clusters located above the ticket offices and near the entrances. The architectural features of the station were designed by Robert S. Peabody, consulting architect of the company, and the fence, which is about 7½ ft. high, with 2-ft. posts set at 12-ft. intervals and finished concrete panels between, accords in appearance with the walls standardized for general use around the university section of the city.



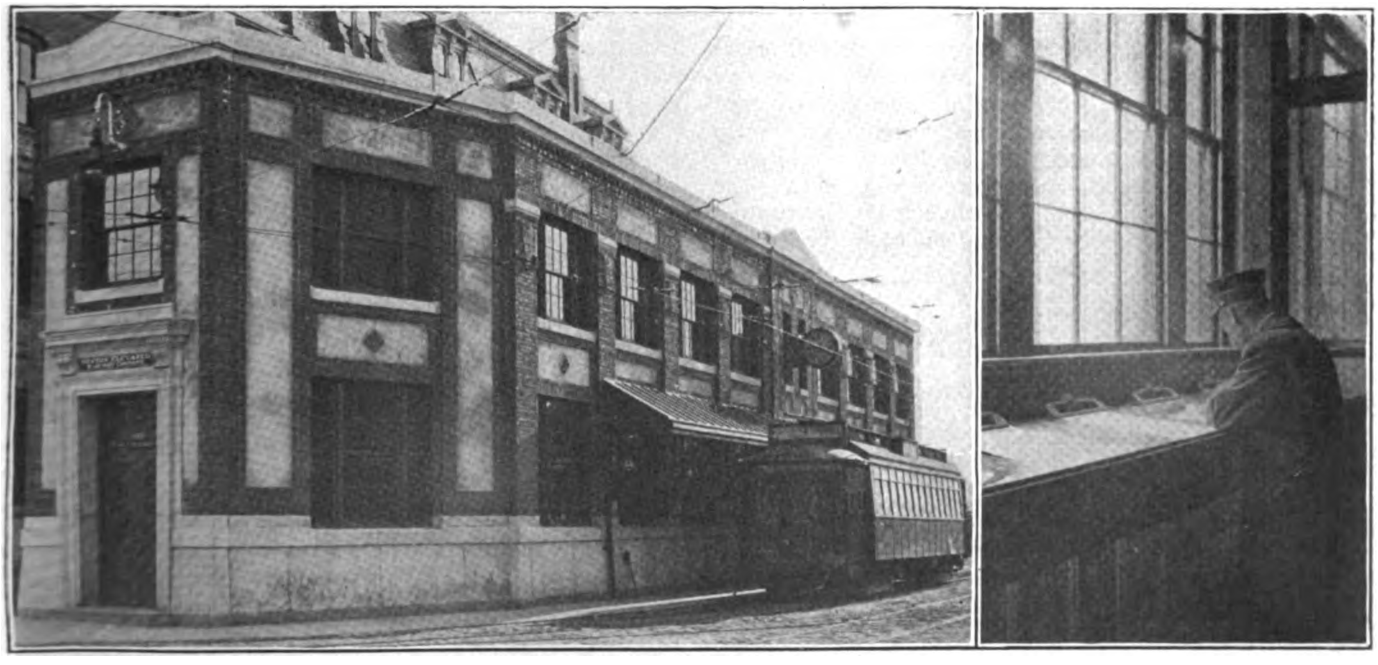
Boston Improvements—Ticket Lobby, North Station



Boston Improvements—Green Street Station

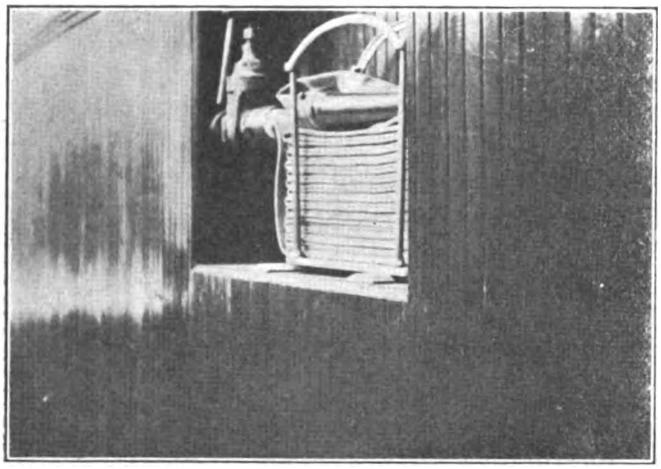
OFFICE OF THE SEVENTH DIVISION

The new headquarters building of the Seventh division, near Harvard Square, Cambridge, represents the company's latest practice and shows the possibilities of making effective use of an extremely limited space. The building occupies a narrow strip of land between the entrance to the Bennett Street yard of the surface line service and the Cambridge police headquarters. It is two stories in height, with a basement, and is about 144 ft. long by 20 ft. wide, of mill construction with brick walls and concrete trimmings. The first floor is devoted to a receiver's office, including a lost article division with accommodations for inquirers, a conductors' and motormen's lobby about 80 ft. long, and offices for the division claim agent and starter. An attractive feature of the lobby is a special counter



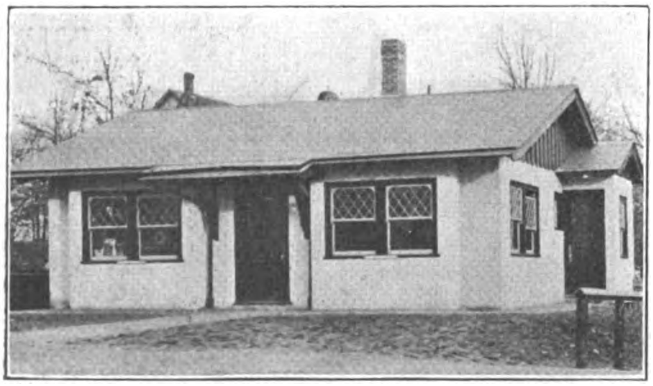
Boston Improvements—Quarters of Division 7 at Cambridge, and Trip Sheet Report Desk in the Lobby

for the making up of trip sheets, which has accommodations for sixteen conductors and spring clamps 16 in. long at the back of the counter, with a 2-in. air space behind to permit the folding backward of sheets when desirable. Opposite the trip sheet counter is a bank of sixteen 26-in. x 26-in. x 7-in. partitions carried 3 ft. 6 in. above the floor and used in the counting of money by conductors at the end of their day's work. Bulletin boards are attached to the wall at the side of the lobby carrying the usual timetables, rating lists, orders and service information, and on the side of the room there are also seats with six checkerboards for the use of the men. The basement is provided with a commodious locker room, a lavatory with ten individual wash basins of the detachable type and a room for the storage of transfers and office supplies. The transfer storage room is provided with a separate passage to the main floor and can be locked on the locker room side if desired.



Boston Improvements—Fire Hose and Receptacle in the Quarters of Division 7

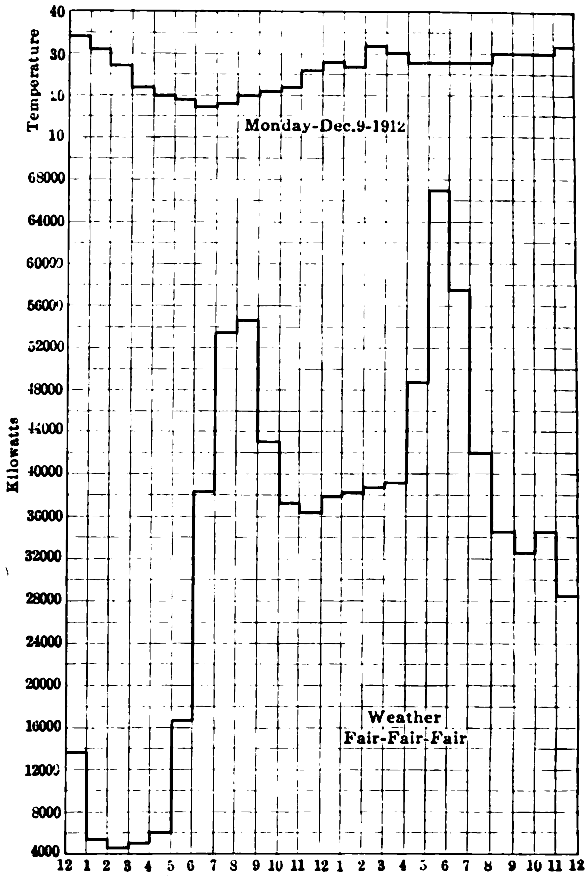
The second floor contains the office of the division superintendent, a small public waiting room, general offices of the division, quarters for the chief inspector and an assembly room seating about 100 men. In the last named place is located a wall cabinet 33 ft. long in which trip sheets extending back seven years are kept for reference, besides time sheets, stock and other office supplies. The routine business of the division, including the preparation of payrolls, correspondence, etc., is handled in the general office. The assembly room is provided with a buzzer controlled by the division superintendent to save time in summoning employees to the private office. The building is heated by hot water supplied from the company's adjacent Harvard power station. Outside the building a glazed canopy is provided at the side of the surface car tracks, and above is located a clock illuminated by ten 25-volt, 4-cp lamps wired in series with three 100-volt, 16-cp lamps.



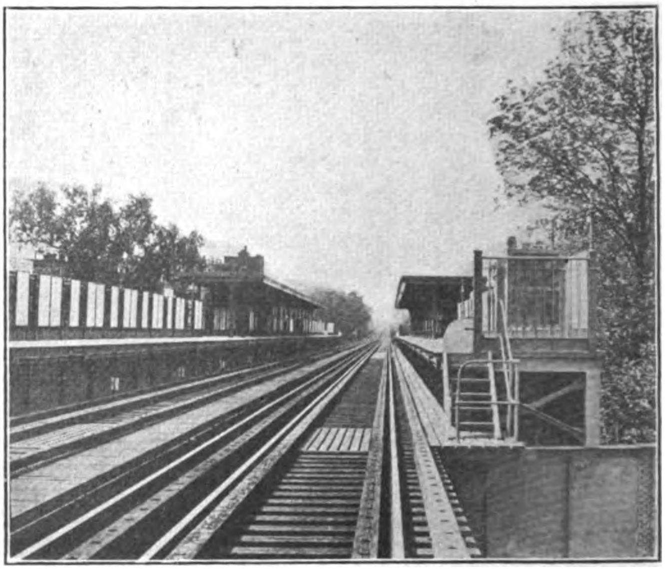
Boston Improvements—Latest Type of Waiting Station, Hyde Park District

GREEN STREET AND DOVER STREET ELEVATED STATIONS

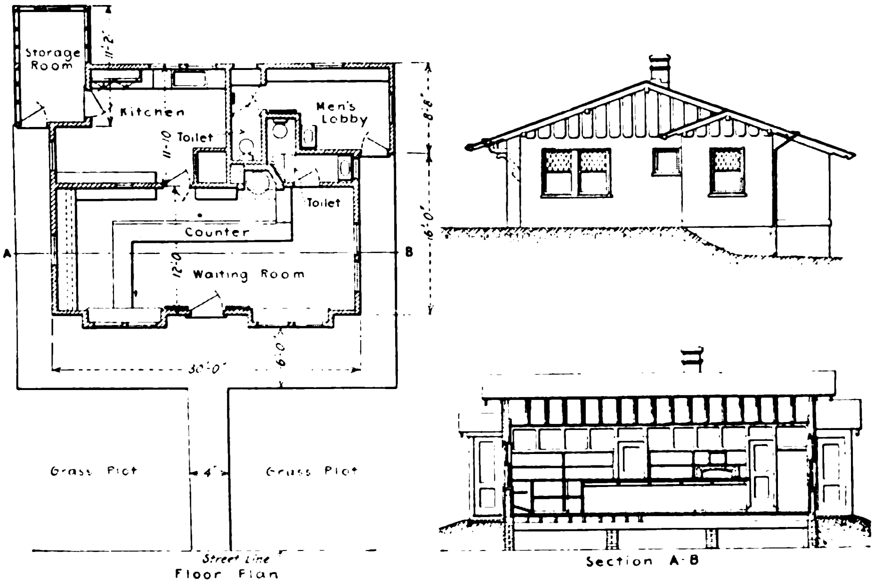
The transit facilities on the Forest Hills extension of the elevated lines have recently been augmented by the building of a new station at Green Street, Jamaica Plain, and in general arrangement and interior finish the station represents an advanced standard of design and construction. It consists of two side platforms of reinforced concrete construction, 365 ft. long and from 8 ft. to 12 ft. wide, for northbound and southbound traffic, and a station building including ticket offices and waiting room



Boston Improvements—Hourly Kilowatt Record



Boston Improvements—Green Street Station, Illustrating Latest Elevated Design accommodations, with entrances and exits on each side of Washington Street. The middle portion of each platform is covered. The interior of the station provides for the separation of inward-bound and outward-bound passengers as well as the convenient exit to the street of passengers arriving on trains who desire to continue their journeys on the surface. The inside finish is of golden-grained oak. The platform lighting is accomplished at present by two rows of 16-cp lamps in the covered section, one being located about 9 ft. above the edge and arranged with the lamps spaced 6 ft. apart and the other at the rear of the roof and eighteen in number in a distance of 160 ft. About half of each platform is covered. The station lighting, with the usual heater circuits in the ticket offices, is controlled by sixty-four snap switches mounted on slate panels in a closet opening off the ticket lobby. Turnstiles are used at the entrances and exits. The exposed portions of the platform are lighted by pairs of 16-cp lamps mounted on the posts supporting the fencing, twenty-four lamps being required on each side of the station for this service.

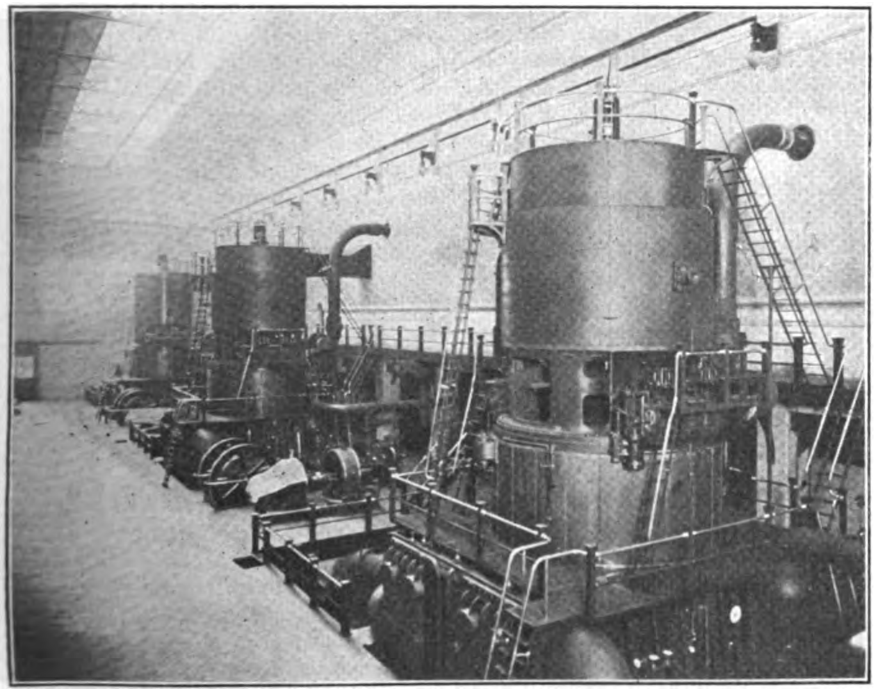


Boston Improvements—Details of a Waiting Room at West Roxbury in Hyde Park District

The company's Dover Street station has been reconstructed within the past few months and changed from an island-type station to one with outside platforms. It is now capable of handling eight-car trains, as are all the other stations on the elevated lines.

POWER ADDITIONS, CAR CHANGES, ETC.

The company has recently added a third 15,000-kva turbo-alternator to the equipment of its South Boston generating station, as illustrated in the accompanying halftone. This unit is a duplicate of the machines described in the issue of this journal of March 2, 1912, including its auxiliaries. No additional boilers had to be installed to meet the steam demands of the enlarged station, the existing plant being sufficient for this service. At present the company is operating seven rotary-converter substations and their capacity is 23,000 kw, besides which they operate the engine-driven plants known as Central, Lincoln, Charlestown, Harvard and Dorchester stations in the supply of energy to the urban service. The total generating capacity of the system is now about 80,000 kw. In the rush hours about 1600 surface cars are in service and about 220 cars of the elevated type, including the Cambridge subway. The accompanying load curve shows the combined output of the company's generating stations on Dec. 9, 1912, when a peak load of 66,870 kw was carried between 5 and 6 p. m. This is the largest output the company's records contain for a similar period, and on this date the system carried 942,487 revenue passengers and probably 1,300,000 total passengers, including free bodily transfers which can be estimated only by traffic counts.



Boston Improvements—Interior of South Boston Power Station

One of the most notable improvements on the system within the past two or three years is the increasing use of semi-convertible cars on lines where heavy traffic is carried long distances on schedules which to a considerable extent are in competition with the running time and service of the local steam railroads. The latest type of semi-convertible car used by the company seats fifty-two passengers, is propelled by a four-motor equipment and is of semi-steel construction, with an over-all length of 48 ft. 2½ in. It is operated on the prepayment plan, with folding steps and mechanically handled doors. There are nine cross seats, four longitudinal seats and an aisle 2 ft. 4 in. wide, providing ample accommodations for the longer-haul traffic. About 300 semi-convertible cars are now in service on the system, and their use has resulted in a noticeable reduction in running time between suburban points from 3 miles to 8 miles from the center of the city and the route terminals. The rolling stock of the company has been thoroughly described in previous issues, as well as the experiments which have been made along the line of articulated car design, the latter type having been illustrated in detail in the issue of Oct. 5, 1912.

In connection with the general improvement of the company's suburban service the accompanying halftone and drawings illustrate a waiting station recently completed in the Hyde Park district, where car crews are changed in connection with service between Hyde Park and the Forest Hills elevated terminal. The building is of cement and stucco finish, with a wooden frame, and is provided with a lobby for car service employees and a waiting room and lunch counter, with a kitchen and storage room used by the lessee of the concession.

OPINION AND ORDER ON NEW YORK CAR STEP

An opinion in part as follows has been rendered by Commissioner John E. Eustis, of the Public Service Commission of the First District of New York, as the result of the inquiry conducted into the question of the height of car steps in Greater New York:

"The hearing in this matter was taken up originally on account of complaints received from some of the women's clubs in regard to the high step necessary in entering many of the surface cars. Mr. Connette, at that time chief engineer of transportation for the commission, testified that the height of the steps varied anywhere from 12 in. to 20 in. Some of the highest steps were on the P. A. Y. E. cars of the Metropolitan Street Railway, being about 19 in. to the first step. Mr. Connette suggested that the space between the ground and the body of the car, which height was fixed on many of the cars by the size of the trucks, should be divided into three steps—from 15 in. for the first step to about 11 in. or 11½ in. for the last step.

"Since the inquiry was begun I have examined the operation of folding steps in many cities and found they were very popular. Shortly after this investigation was closed in September, 1911, two of the companies interested in this question, the Brooklyn Rapid Transit Company and the New York Railways, designed and had constructed a new type of car called the stepless car and these they put into operation some months ago and they have been working very satisfactorily for both companies. The New York Railways also designed a double-deck stepless car and has had this in use for several months. As a result of these experiments the Brooklyn Rapid Transit Company has ordered 100 new stepless cars and the New York Railways has ordered 175 stepless cars. It would seem that the introduction of this number of stepless cars would within a short time help substantially to settle questions of the height of car steps.

"The only question that seems difficult of solution at the present time is what is best to be done with the old equipment now on hand. The Second Avenue Railroad appeared to have no cars where the first step was higher than 15 in., and on all but ten of its cars the first step is 14 in. or less from the ground. All the cars of the Third Avenue Railway and its allied lines in Manhattan and the Bronx have folding steps, and these steps are less than 15 in. in height. The New York Railways has reported that it has 1050 closed cars on which the first steps are 15 in. or less, and one lot of 155 closed cars on which the first step varies from 15¾ in. to 16½ in. in height, and the company has decided to reconstruct these last so as to bring the height of the steps to 15 in. or less by the coming summer. The Brooklyn Rapid Transit Company reported at first that it had about 1000 cars on which the first steps varied from 15¼ in. to 16⅞ in. in height, but after its equipment department had made an examination of all its cars it reported that it found that these figures were taken before the cars were put into service and that the actual measurement of the height of the first step of all the present closed cars now in use was 15 in. or less except in the case of fifteen cars. It had also experimented on the cars in its shops as to the cost and manner of making the change to bring them down to the required height of 15 in. and reported the cost of doing this work to the satisfaction of the electrical engineer of the commission at $95 per car.

"The worst condition in regard to high steps was found in Queens Borough. The New York & Queens County Railway has fifty-nine cars in all, with steps varying from 16 in. to 16½ in. in height. The New York & Long Island Traction Company has twenty-two cars with the first steps varying from 16½ in. to 17½ in. The New York & Queens County Electric Railway has eighty-five cars on which the height of the first step varies from 15½ in. to 16½ in. The Long Island Electric Railway reported that all its cars had steps less than 15 in. in height. When the representatives of the companies in Queens which had cars with the first steps above the standard of 15 in. were asked if they could undertake to remodel the cars during the coming summer they expressed grave doubt, as they had no other equipment. They asked to be allowed at least two years to bring all of the equipment down to 15 in. or less. I think under the circumstances, operating as they do largely in country districts, the companies should have this request granted and should be required to reconstruct at least 50 per cent of their closed cars during the present year so that the height of the steps shall not be more than 15 in. It is more than likely that some of the cars that are reported as measuring 15½ in. for the first step may be found to be down to 15 in. or less as a result of the settling of the springs by constant use."

The commission issued an order which it concluded in part as follows, based on the recommendations made by the commissioner in his opinion:

"Ordered, that on or before Jan. 1, 1914, said New York & Queens County Railway, said New York & Long Island Traction Company and said Long Island Electric Railway shall so reconstruct at least 50 per cent of the closed cars to be operated by them that none of the car steps shall be over 15 in. in height, and that on or before Jan. 1, 1915, said last-mentioned companies shall so reconstruct the rest of said closed cars to be operated by them that none of the car steps shall be over 15 in. in height; and it is further

"Ordered, that on or before Jan. 1, 1914, said New York Railways, said Brooklyn Heights Railroad, said Brooklyn, Queens County & Suburban Railroad, said South Brooklyn Railway, said Nassau Electric Railroad and said Coney Island & Gravesend Railway shall so reconstruct the closed cars to be operated by them that none of the car steps shall be over 15 in. in height; and it is further

"Ordered, that this order shall take effect forthwith and shall remain in force until revoked or modified; and it is further

"Ordered, that within five days after service of a copy of this order upon them all of said companies above mentioned notify the commission whether this order is accepted and will be obeyed."

ELECTRIC RAILWAYS IN AUSTRIA

For the year ended Jan. 1, 1913, according to a report issued by the Elektrotechnische Verein, Vienna, Austria, had sixty-four electric railways, with a total length of line of 644.4 miles. There are nineteen standard-gage lines, totaling 365.4 miles, and 45 narrow-gage lines, totaling 279 miles. Three railways, totaling 44 miles, are operated with single phase and the remaining lines with direct current. Two of the latter use a trolley potential of 1000 volts or more.

The Maysville (Ky.) Street Railway has installed bath and toilet fixtures in its new carhouse for the use of its motormen and conductors. The bathroom is finished in tile and marble and is equipped with shower and tub baths, washstand, etc. An automatic hot-water heater is part of the equipment.

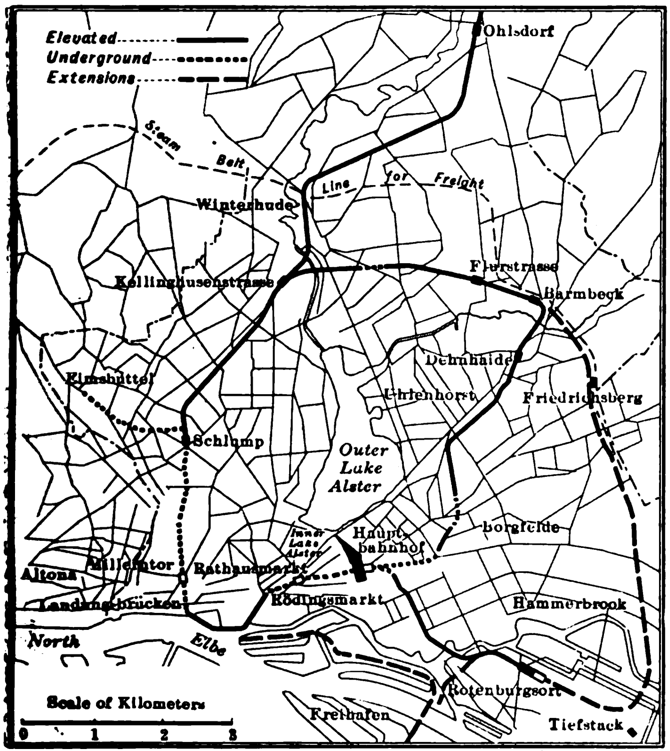
Hamburg Subway and Elevated Railway

A Description of the Route and the Character of Construction Adopted for the Way and Stations

The Electric Railway Journal for Oct. 30, 1910, contained a preliminary description of the Hamburg Subway & Elevated Railway, which was then under construction. The following article is the first of several which will describe the way construction, maintenance methods, power generation and transmission, rolling stock and traffic features of this system.

HISTORY OF THE PROJECT

As early as 1893 a rapid transit system was suggested for Hamburg. It was proposed that this should assume the form of a belt line around the Alster Lakes and that it should also be a part of the Prussian State Railroads System. This plan would have been in imitation of the Berlin Ringbahn. Even at this early date, however, it was pointed out that a steam road of strictly belt-line character would not give such good rapid transit as an electric railway which could pass under or along the streets of the city. In 1908 the Prussian State Railroads completed the well-known Hamburg-Blankenese-Ohlsdorf high-speed suburban line on the single-phase system, a road which is now carrying about 65,000,000 passengers a year. In the meantime, the State of Hamburg had determined to have an independent electrically operated system. To this end it made a construction contract in 1906 with the Siemens & Halske company and the Allgemeine company, acting as one corporation, whereby they were to build for the sum of 42,300,000 marks (approximately $10,300,000) the belt line and the three earliest extensions hereinafter detailed. The operating franchise granted under a later and separate contract to the same joint company is for a period of forty years. Under this second agreement the contractor organized a company with a capital stock of 15,000,000 marks ($3,675,000) to supply the operating equipment, the stationary parts of which, as noted in the following paragraph, will come into the possession of the State of Hamburg when the franchise expires.


Elevated
Underground
Extensions
Ohlsdorf
Steam Belt Line for Freight
Winterhude
Kellinghusenstrasse
Flurstrasse
Barmbeck
Dehnhaide
Uhlenhorst
Friedrichsberg
Eimsbüttel
Schlump
Outer Lake Alster
Inner Lake Alster
Hauptbahnhof
Borgfelde
Altona
Millerntor
Rathausmarkt
Landungsbrücken
Rödingsmarkt
Hammerbrook
North
Elbe
Rotenburgsort
Freihafen
Tiefstack
Scale of Kilometers
0
1
2
3

Electric Ry. Journal

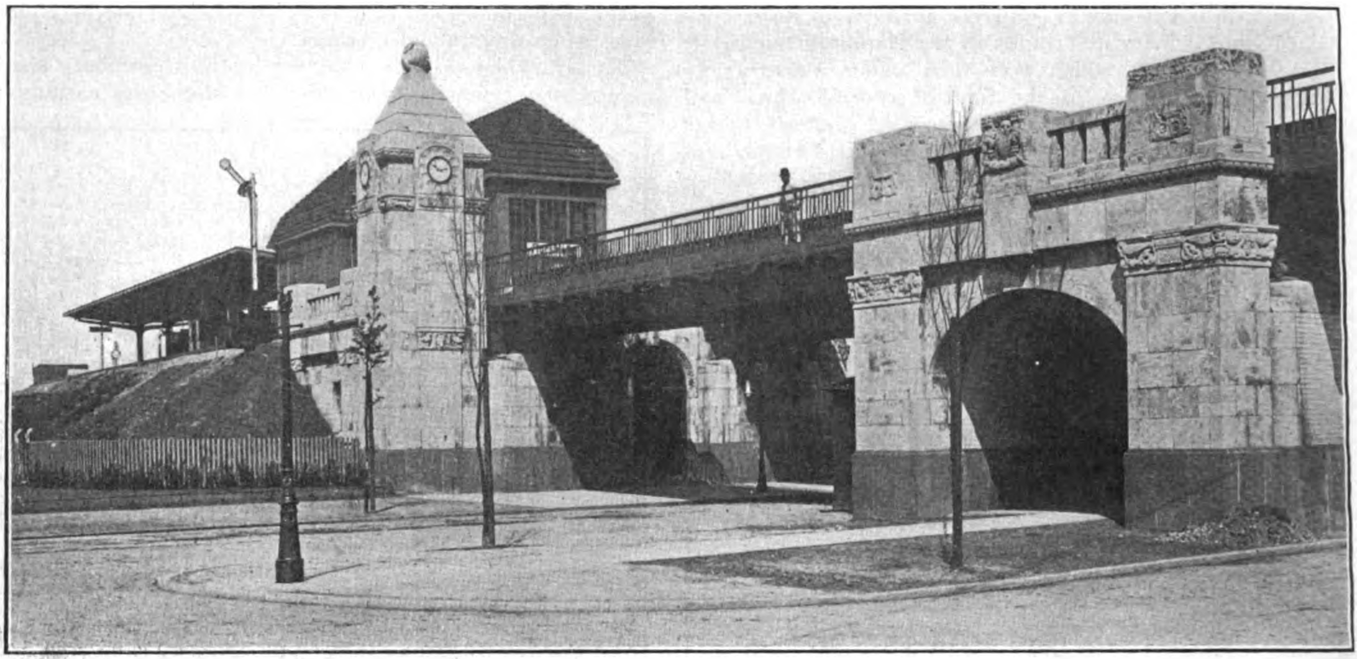
Hamburg Way—Present and Proposed Lines of the Hamburg Rapid Transit System

The franchise provides that the State of Hamburg shall receive the following proportions of the gross earnings: 1 pfennig from the sale of 10-pf. tickets, 3 pf. from 15-pf. tickets, 6 pf. from 20-pf. tickets, 9 pf. from 30-pf. tickets and 10 per cent from all season tickets. In addition to these proportions from gross earnings, the State is to receive one-third of the surplus which remains after a dividend of 5 per cent has been paid to the stockholders. At the end of the forty-year franchise all fixed property, hence exclusive of rolling stock, becomes the property of the State.

Hamburg Way—Ornamental Entrance to Hauptbahnhof Station

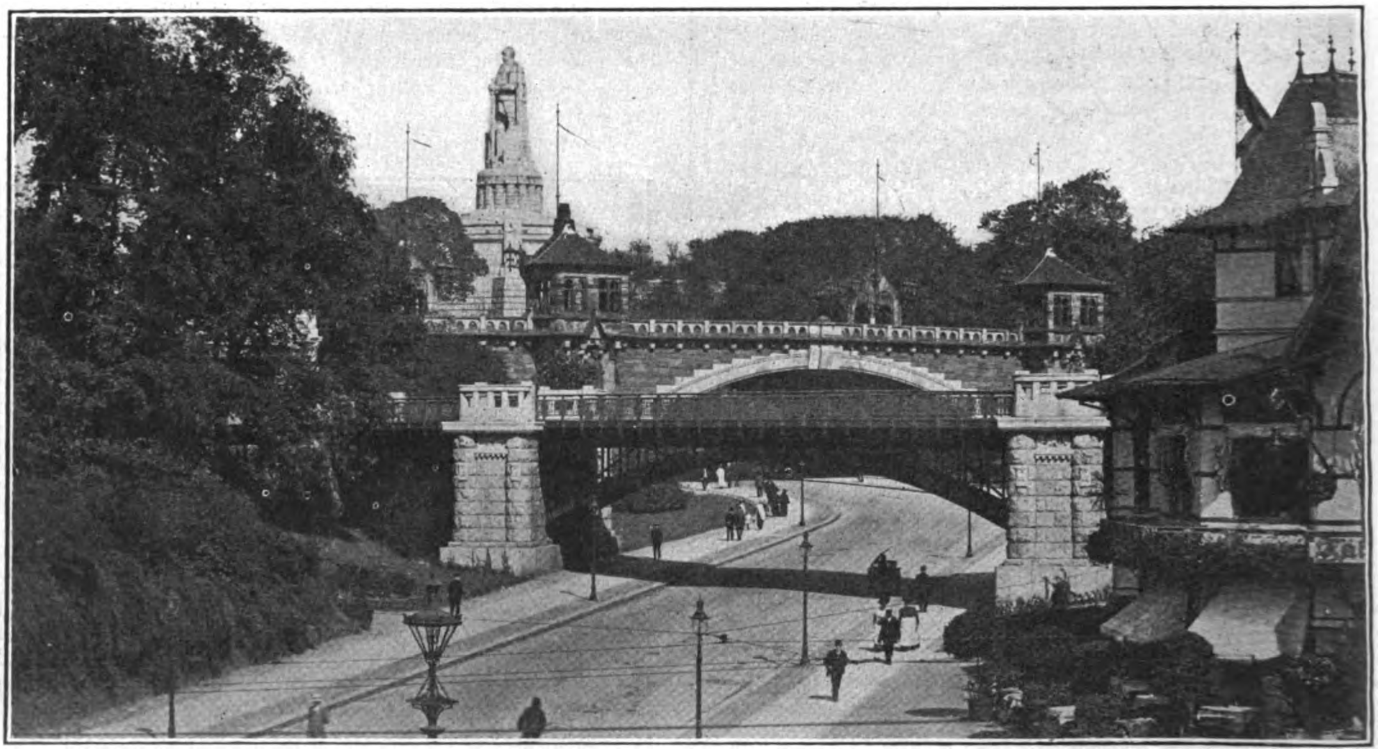
In order to carry out the provisions relating to the construction contract, a joint "Bauverwaltung" (construction management) was formed under W. Stein, now general manager Hamburg Subway & Elevated System. The several parts of the operating equipment were furnished as

Hamburg Way—Curve at Rödingsmarkt Station follows: power stations, feeder cables and collector rails, Allgemeine company; two substations, shops, safety devices, telephones and clock systems, Siemens & Halske company; rolling stock, both companies. The preliminary arrangements for these installations, the inspection of construction and the opening and operation of service were in the hands of the Bauverwaltung under the charge of Wilhelm Mattersdorff, now director of operation Hamburg Subway & Elevated System.

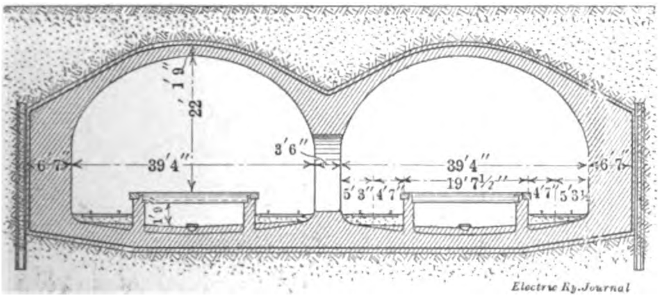

Hamburg Way—Station at Flurstrasse, Showing Street Crossing Treated as a Gateway to a Public Park

CHARACTER OF THE SYSTEM

Although Hamburg has long been a world-famous city because of its leading position as a port, its great reputation was out of proportion to its size until very recent times. In 1870 the population of Hamburg was only 285,000, in 1890 569,000, while to-day it is practically 1,000,000. This wonderful acceleration in growth could no longer be mastered by the combined facilities of the street railway system, which carries some 200,000,000 passengers a year, and the boat service on Lake Alster. The only solution lay in the inauguration of non-surface rapid transit.

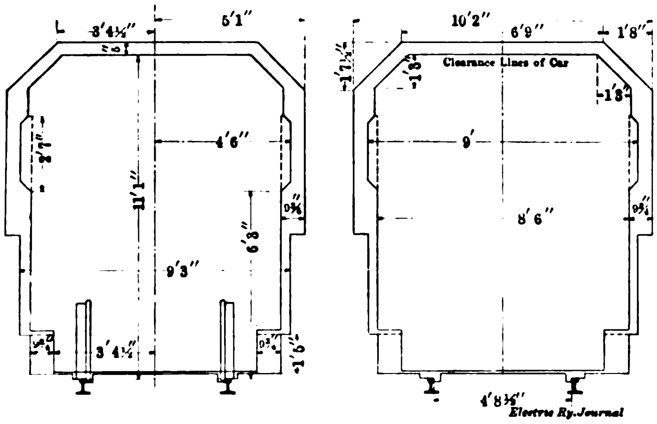

Hamburg Way—Crossing of Elevated Structure in a Public Park Near the Great Bismarck Monument

As shown in the accompanying map, the completed system will consist of the main line around Lake Alster, 10.85 miles long, and three branch lines totaling another 7.5 miles. The service on that portion of the main line between Rathausmarkt and Barmbeck, a distance of 4.03 miles, began March 1, 1913, with a total travel of 30,000. During the following May the ring was continued to Millerntor, which increased the daily travel to 45,000. On June 29, 1912, the last three stations through the "port" and remaining business section were closed, with the result that the daily traffic rose immediately to 90,000. Of the three branches, the one from Kellinghusenstrasse to Ohlsdorf, 3.1 miles long, and that from Schlump to Eimsbüttel, 1.6 miles long, are under construction and are planned for operation in 1914. The line from Hauptbahnhof (main railway station) in Hamburg to Rotenburgsort, 2 miles, is to be started later.

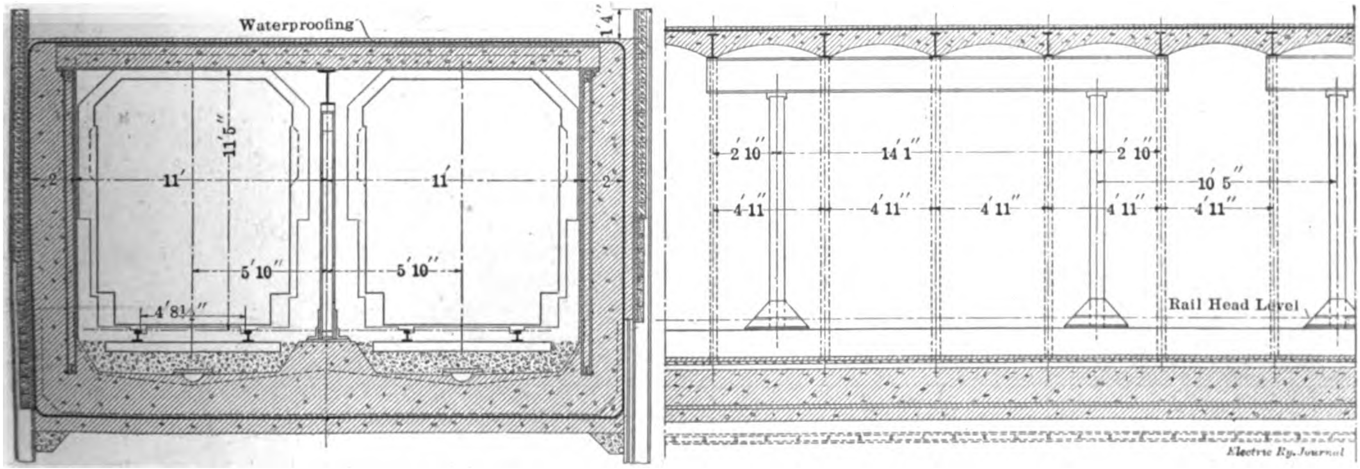

1'9"
22'
3'6"
6'7"
39'4"
39'4"
6'7"
5'3"
4'7"
19'7½"
4'7"
5'3½
1'0"
Electric Ry. Journal

Hamburg Way—Cross-Section of Arch-Roof Section

Despite its belt-line form on the map, the main line of the Hamburg system should not be confused with the belt railways of cities like Berlin and London, which have the double defect of wasteful car mileage to the operator and loss of time to most of the passengers. The main line of the Hamburg system really consists of two radial lines passing from the business section to the northern residential district along opposite shores of Lake Alster, but over which a belt line service is made possible by a cross connection 2.17 miles long, through a newly developed part of the city. In arranging a five-minute service, therefore, one-half of the trains run only between Kellinghusenstrasse and Barmbeck within the well-settled districts, leaving a ten-minute interval between the belt-line trains.


3'4½"
5'1"
4'6"
11'1"
9'3"
6'8"
9¾"
3'4½"
1'5"
10'2"
6'9"
1'8"
1'7½"
1'8"
Clearance Lines of Car
1'3"
9'
8'6"
9¾"
4'8½"
Electric Ry. Journal

Hamburg Way—Car Clearance Profiles

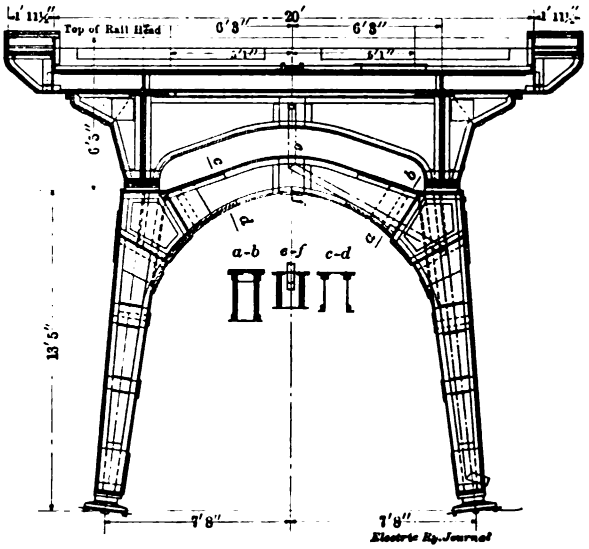

Waterproofing
1'4"
11'5"
2'
11'
11'
2'
5'10"
5'10"
4'8½"
2'10"
14'1"
2'10"
10'5"
4'11"
4'11"
4'11"
4'11"
4'11"
Rail Head Level
Electric Ry. Journal

Hamburg Way—Cross and Longitudinal Sections, Showing Construction of Subway in Districts with Ground Water

It is anticipated that for some years to come the capacity of the main line will be ample to permit the operation of through trains to the terminals of the branch lines, but it is believed that in years to come these branches will have to be treated either as shuttle lines or extended into Hamburg as independent systems. As a matter of fact, the State of Hamburg has already approved the early construction of a branch from Barmbeck to run northeast for a distance of 17.5 miles. An extension of the Ohlsdorf line is also planned as well as a connection with the southern bank of the Elbe River.

STATION SPACING AND WAY FEATURES

The main line has twenty-three stations spaced at an average of 2500 ft. The ten stations on the branches are somewhat farther apart, making the average spacing on the entire system 2700 ft. The right-of-way is double-tracked throughout except that one or two additional tracks are provided at junctions with branches, at turnback points and the like. Although part of the line is underground and part elevated, the change from one to the other is made on easy grades with the exception of the portion between Rathausmarkt and Rödingsmarkt stations, where a maximum grade of 4.9 per cent and a curve of 233 ft. radius are encountered on a piece of track about 600 ft. long. The principal physical data of the main line and branches follow:

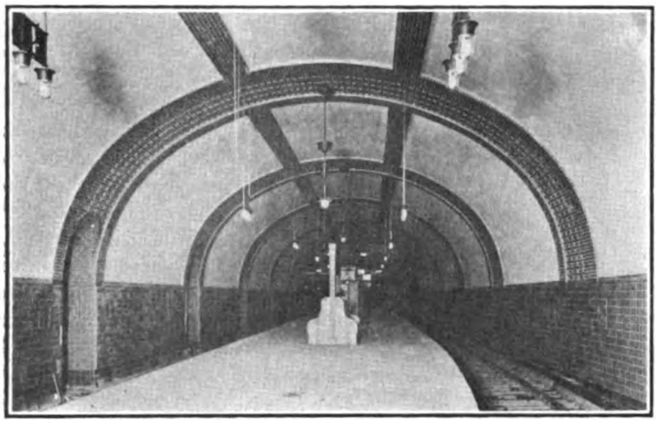

1'11½"
Top of Rail Head
20'
6'3"
6'3"
5'1"
5'1"
1'11½"
6'5"
a
b
c
d
a-b
e-f
c-d
13'5"
7'8"
7'8"
Electric Ry. Journal

Hamburg Way—Typical Rocker Bent Construction

Gage	4 ft. 8½ in.
Arch-roof tunnels	1,378 ft.
Flat-roof tunnels	24,020 ft.
Stone viaducts	5,215 ft.
Steel viaducts	13,482 ft.
Undercrossings (forty-three)	4,789 ft.
Bridges (fifteen)	2,414 ft.
Retaining walls and fills	37,162 ft.

Retaining walls and open cuts	5,248 ft.
Curves of minimum radius	233 ft.
Maximum grade	4.9 per cent
Width of streets carrying the elevated structure	98 ft. to 180 ft.

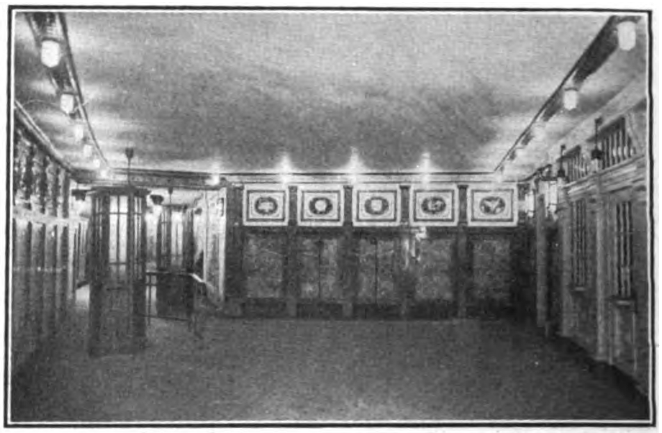
The clearance profiles which are shown in an accompanying drawing are about 12 in. wider and 6 in. higher than that of the Berlin subway. Another drawing shows one of the yoke-form rocker ("pendel") bents used for part of the steel viaducts. A third drawing presents sections of the flat-roof underground construction. The latter work, as illustrated in one of the halftones, consists of steel beams framed into both the concrete walls and roof, a row of steel columns between the tracks and a concrete floor for the rock ballast. Arches are used only where some extraordinary weight must be supported, as in the construction near the main steam railway station illustrated. All platforms are of reinforced concrete. The stations on the eastern division between Landungsbrücken and Dehnhaide have double outside platforms, but those in the less developed sections have single island platforms. However, the Hauptbahnhof (main steam railroad) station has four tracks with two island stations and walkways connecting to the tracks of the Prussian State Railways overhead. Near this point also the tunnel was enlarged to receive a substation. The rails are of the Haarman type, weighing 60 lb. per yard, and are laid on creosoted ties and rock ballast at intervals of about 2 ft.



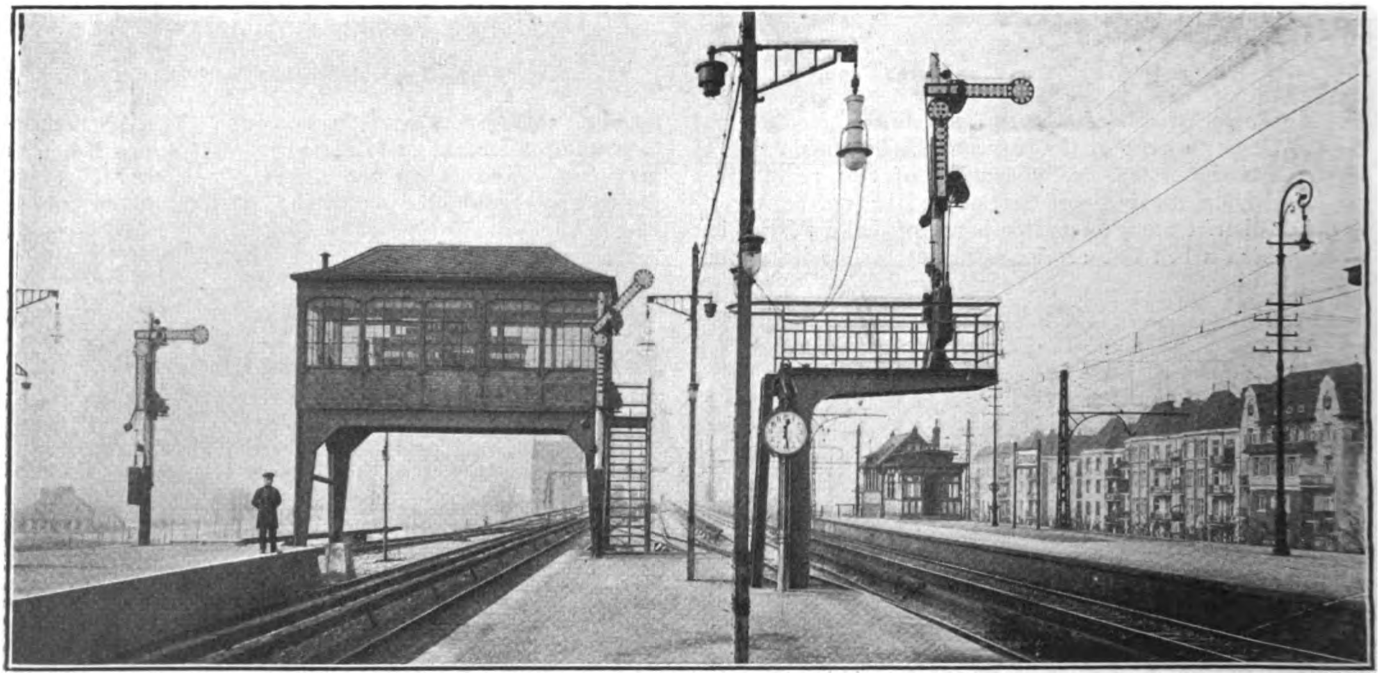
Hamburg Way—Arch with Niches at Hauptbahnhof Station

STATION DECORATIONS

The interior and exterior treatment of all stations, whether on the subway or elevated sections, is of highly artistic character. Perhaps the most costly decoration is that of the interior at Rathausmarkt, reproduced in an accompanying illustration, where the walls have been covered with panels of green and yellow marble surmounted by ornamental plaques and other decorations of majolica ware made at the noted potteries of the German Emperor. The view of this station shows three ticket offices at the right and two booths at the platform entrance and exit aisles where the passengers' tickets are punched or taken up as the case may be. Another interior of somewhat different type is that of the island platform at the Hauptbahnhof station, where wall niches have been provided in harmonious continuation of the bands of tiling which extend along the arches. A beautiful stone and metal stairway to this station is presented in another illustration. All street crossings were designed with the view of being as handsome as the conditions permitted, but the viaduct over Flurstrasse, shown on page 416, was made particularly impressive in order to have it serve as a gateway to a new public park. Still another view shows how well the elevated structure has been made to enhance rather than to detract from the beauty of the park section adjacent to the great Bismarck monument. A feature which con-



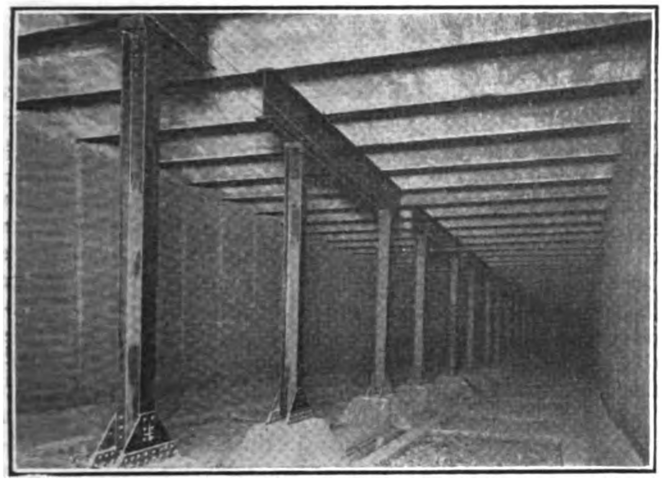
Hamburg Way—Ticket Office at Rathausmarkt Station



Hamburg Way—Platform, Track and Signal Layout at Barmbeck

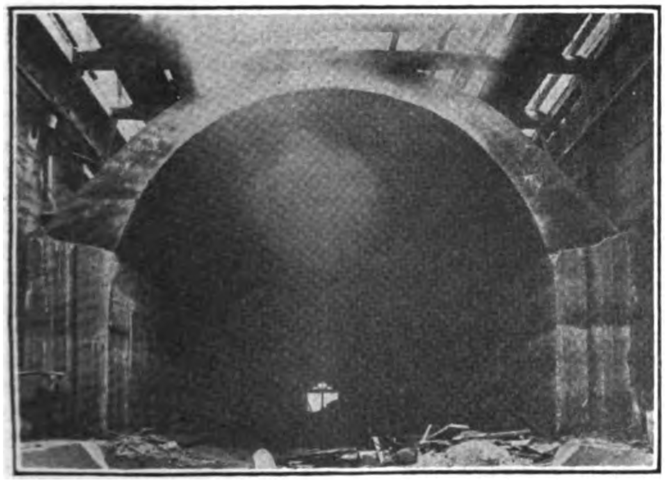
tributes to maintaining the neat appearance of all stations is the use of washable enameled shields for all station names, warning notices and the like.

An illustration on page 418 shows part of the station at Barmbeck where four tracks have been installed. The track layout at this station was of prime importance as it is here that one-half of the trains are turned back to the city and also where cars are switched to the carhouse and shops. The inner tracks are continued partly to switch trains back to the city and partly to give a two-track route to the carhouse and shops. At the right of this illustration will be noted the catenary construction of the Hamburg-Blankenese-Ohlsdorf single-phase railway. The same illustration also shows some semaphores of the Hamburg semi-automatic signal system.



Hamburg Way—Steel and Concrete Flat-Roof Section

The general construction of this signal system is the same as that used on all steam lines of the Prussian State Railways. The principle is semi-automatic. Within one block section only one train is permitted so that only one signal can be moved if the train has passed a rail contact behind the following signal. For the purpose of adapting this system to high-speed railways and very dense traffic, the Siemens & Halske company made the apparatus semi-automatic. All that the authorized station operator does is to push a button, whereupon he can leave the apparatus because the other movements are perfectly automatic. These operations do not require more time than a standard automatic system, while they embody the additional advantage that the signals are under the permanent control of specially instructed platform men. No track trips are used for stopping trains.



Hamburg Way—Arched Subway Entrance

OPERATING METHODS OF THE BUREAU OF SAFETY OF THE MIDDLE WEST UTILITIES COMPANY

In an item published in the ELECTRIC RAILWAY JOURNAL of March 1, 1913, brief mention was made regarding the plans and purposes of the bureau of safety which has been organized by the Middle West Utilities Company to act in an advisory capacity relative to its various subsidiaries. The work of this bureau is described in the following paragraphs:

Previous to the organization of the safety bureau the Middle West Utilities Company decided to handle its own fire and liability insurance under a trust agreement. Liability and fire insurance agreements have been entered into between the trustees and the subsidiary companies, and for the present the assessments against each are approximately the same as the premiums paid to independent companies handling the same classes of insurance. The trustees of this fund are Samuel Insull, president of the Middle West Utilities Company; Martin J. Insull, vice-president, and Edward P. Russell, one of the directors of the company.

The bureau of safety is independent of the Middle West Utilities Company and merely acts as a corps of experts in an advisory capacity to the different properties. Its purpose is to reduce as much as possible fire hazard and recommend safer operating methods, as well as safety appliances, in each of the plants. In other words, it acts as a board of insurance underwriters, the business of which is to conserve the insurance field. The trust fund accumulating from assessments will be deposited at interest, and as the fund grows the interest will be paid to the different subsidiaries in proportion to their assessments, or the assessments will be reduced from time to time so that the amount of money on hand in the trust will be only sufficient to carry the insurance. The trustees will issue participating certificates in lieu of a policy.

At the present time complete sets of forms and instructions have been issued by the bureau. One on fire hazards and fire protection states in detail the causes of fire, both physical and electrical, and contains a list of ordinary precautions to prevent the starting of fires. It also calls attention to precautions to take against the spreading of fires due to exterior or interior exposures and in conclusion states: "In making suggestions for the reduction of fire hazard, it has not been the intention to suggest any radical changes in building and equipment, because it is believed that in general such changes are unnecessary."

The reports include five different forms, one a monthly report on the condition of the property as regards fire hazard, three on different classes of accidents and a surgeon's report. The purpose of the monthly report of the foreman of the property is to keep the bureau advised as to the precautions being taken to reduce fire hazard, and at the same time it will have a moral effect on the foreman of each property in that he will not care repeatedly to report fire hazards for which precautions could be taken.

The three accident reports include one to supply the bureau with information relative to the cause of accidents to persons other than employees caused by operation of a property other than a railway; another, a report of an accident to an employee which will identify the employee injured as well as advise the bureau of the seriousness of his injury, and a third report for use in case of injury growing out of the operation of a railway, giving information as to the identity of the person injured and the description of the accident and names of witnesses.

The bureau of safety is in charge of Charles B. Scott, manager. Alexander Shane is in charge of the railway safety department, and another safety expert will have charge of a corps of inspectors familiar with lighting plant operation. The third department will include a number of inspectors whose business it will be to make recommendations with a view to reducing fire hazard in all plants.

Meeting of the New York Electric Railway Association

An Account of the Proceedings at the Quarterly Meeting Held at Lake George, N. Y., March 6-7—Abstracts Are Presented of Papers on Power Distribution, Trailer Operation, Interurban Railways vs. City Railway, and the Claim Agent's Work—The Discussions of the Question Box and an Account of the Informal Dinner, as Telegraphed, Are Also Included.

THE SUCCESSFUL CLAIM AGENT

BY W. H. HYLAND, CLAIM AGENT FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD COMPANY

The chief duties of the claim agent in days gone by were to secure a release from the injured as quickly and as cheaply as possible. The slogan in the claim department was "Get the release no matter how."

To-day all agree that this practice was not only at fault for the loss to the railroad company of the public's good will but it also made the name "claim agent" a thing to be winked at. The claim agent to-day must not only satisfy his employer but he must likewise satisfy that portion of the public with whom he is brought in contact.

QUALIFICATIONS OF THE SUCCESSFUL CLAIM AGENT

If I were asked what qualities were most essential to the successful adjustment of damage claims, I should say, arranging them in the order of their importance, courage, kindness, confidence, earnestness, patience and tact, and to these qualities I would add a pleasing personality.

I know there are many who will take exception to the great number of essentials required of the successful claim agent, but who can deny that it does not require courage to enter the home of one who has been fatally injured in a collision on your road and around whose bed the weeping family is gathered? This is a situation which every claim agent must meet some time during his career and is one that will not only test his talents but will bring the thought home to him that it requires courage to be full of faith when things look dark and unsurmountable.

The successful claim agent should be kind because it is not only a mark of wisdom but all the world needs it. He should have confidence in himself, in his employer and in his proposition. He cannot hope to inspire confidence in others if he does not possess it himself. In matters pertaining to business he should be earnest, but earnestness should not be confounded with seriousness. A man may smile or even laugh and still be earnest; but he must be ardent in spirit and speech. It is this quality that gives to everything he says a convincing ring. He should be patient and tactful, always aggressive, yet biding his time in which to do the best work and get the best results. He should have a pleasing personality, that indefinable something that makes the presence of one person welcome and the presence of another unwelcome. He should have a knowledge of negligence law sufficient in case of accident to decide at once whether or not there is any liability on the part of his company.

WORK OF THE CLAIM AGENT

Now that we have enumerated all the qualifications apparently necessary for the success of the claim agent, let us proceed to discuss the actual work for which he is prepared.

The successful claim agent will never be absent from his office without leaving word where he can be located. He will traverse the property of his company frequently. He will keep a close watch on all highway crossings and observe if buildings or other structures which would in any way prevent a clear view of approaching cars are being erected near such crossings. He will observe if crossovers have been placed near sharp or dangerous curves, and he will bring these and all other like matters which have a bearing upon accidents to the attention of his superior officer, having in mind that nothing is so easy as to be wise after an occurrence. I do not wish to maintain that the claim agent is the only man connected with a railroad corporation that observes conditions, but from the very nature of his work and training he will observe conditions that a busy man in the operating department might fail to observe. He will be familiar with the timetables, the operations of trains and understand the rules which govern them. He will attend all smokers and entertainments given for the enjoyment of men in the train service, for there he will become acquainted with the men and have excellent opportunity in the practice of that mutual respect which is one of the essential conditions of a good organization.

When serious accidents occur, like derailments and collisions, wherein several passengers have been injured, the claim agent should be called with the wrecking crew. Upon reaching the scene of the accident, he will take charge of his portion of the work, which consists of securing conveyances and doctors and assisting passengers in general to reach their respective destinations. In this he will spare no expense for courtesies extended by railroad companies at such a time are not only appreciated but are scarcely ever forgotten by the traveling public. It is usually possible at this time to take the release of passengers for minor injuries and damaged wearing apparel, but under no circumstances will the claim agent at this time attempt to settle claims where serious injury has been sustained. The more serious cases should, if possible, be sent to a hospital. Doctors will usually assist the claim agent in this respect for the reason that the patient receives better care at the hospital and it is a more convenient place for the physician to attend the patient. The claim agent desires the patient to be sent to a hospital for two reasons: first, it is possible for him to keep in touch with the patient at all times, and second, the discipline of the hospital will keep out that class of curious people who know just how much money the injured person should receive and who are sure to offer their advice in the matter. If any are fatally injured, he will call the ambulance and on their death will notify the coroner, and also the relatives of the deceased, telling them where the body may be found, ascertaining as soon as possible the name of the undertaker employed, and where it is the policy of his company to pay funeral expenses whether there is liability or not on its part, he will request the undertaker so to notify the relatives.

The policy of a railroad company to pay funeral expenses in all cases is a good one, I believe. It makes it easier for the claim agent to get in communication with the relatives of the deceased soon after the funeral, and where there is no liability on the part of the company a release can usually be secured by the payment of the funeral expenses. It is also wise, from another viewpoint, to pay funeral expenses. Where a release cannot be secured and a complaint is served in an action, the railroad company in its answer to such complaint can set up as a partial defence the payment of funeral expenses. This allows the attorney for the railroad company the opportunity, in summing up the case before the jury, to mention the fact that although the railroad company was not at fault for the accident, yet it did pay the funeral expenses and it therefore had done its full duty to the relatives. On the other hand, if the company has not paid the funeral expenses and a question of fact is developed during the progress of the trial, the jury, regardless of whether or not the company is to blame, will give the relatives some substantial verdict.

Unfortunately the claim agent can have no code of rules or fixed lines to guide him in his work of adjusting claims. It is like whipping a child who has disobeyed. If you strike the child one blow too many or too little, you have done injury and your effort to do good is lost. So it is in the adjustment of claims; to pay too much or too little is to lose that good which should follow the adjustment of all claims. The successful claim agent strives in each and every case to drive a fair, square bargain, always taking into consideration the seriousness of the injury, pain, suffering and probable loss of time, and always allowing something for the inconvenience caused the family.

After having secured the release, the successful claim agent will not grab his hat and hurry out of the house, but he will remain for a few moments, engage the family in conversation and make them feel that the relations established between them and his company are not at an end but that they shall continue. If the claim agent will do this, the money spent in adjusting such claim will have been well spent and will bear much fruit.

The successful claim agent above all things must be truthful in fact and his conduct toward that portion of the public with whom he comes in contact should be such that his reputation for truthfulness is maintained. He should not lose sight of the fact that a great portion of the public are daily riders upon the cars of his company and that they want to know not only the policy of his company but also the whys and wherefores.

The successful claim agent, therefore, should have a fair knowledge of the workings of the different departments and be prepared to answer intelligently the hundred and one questions that he is sure to be asked by the public during his travels about a city.

Finally, the successful claim agent is a man who has the confidence and respect of his company's attorneys. Their office door, where he may enter and receive advice and consolation, is always open to him. In many respects he is like a tree which results from good seed planted in good ground. The tree must be well cared for, and if it is to bear more fruit year after year, it must be trimmed now and then, but never with an axe.

SOME POWER DISTRIBUTION PROBLEMS

BY H. J. CHILDS, ENGINEER POWER DISTRIBUTION UNITED TRACTION COMPANY

The particular power distribution problems that I propose to discuss are some that have been met with on the United Traction Company system recently, and I will endeavor to show how solutions of these problems were found.

The feeder system of Albany previous to rearrangement was carried overhead on a pole line running through the principal streets and connecting the two sources of power, a modern rotary converter station and a small auxiliary d. c. steam station, situated at opposite ends of the city. The city was divided into ten sections, fed from branch feeders run out from the main feeder lines.

REDISTRIBUTION OF CITY FEEDERS

An ordinance passed by the city required the placing of the feeders underground within a restricted district, with the exception of one cable on each street occupied by a car line. This district was in the business center of the city, and it was so located relative to the rotary converter station from which power is normally taken that a part of the feeders for all the sections had to be run around overhead or placed underground.

The first plan, to run all feeders overhead around the restricted district, was found objectionable, and laying the conduit lines over the same route as the pole lines required the running of one conduit line through a network of pipes at so many points that it was also abandoned. In the plans as finally carried out the main conduit line was run through near the edge of the restricted district on one side, and this district was partly fed by means of the one overhead feeder allowed, the rest of the supply being furnished by means of a conduit line through the main street. Taps were taken direct from the underground cable and carried up inside the tubular steel poles, and by means of a porcelain pothead, which also serves as a cut-out, to the feeder span. This plan gave the shortest route to the heavy load points and also the advantage of having the main feeder above and near the heavy load center, so that outlying points were not so much affected by the heavy load point drop.

The problem in laying the conduit line consisted in finding sufficient unoccupied space to construct the duct line and manholes. Our map was made up from the most reliable sources of information, but it did not show all that was found when the trench was opened; for instance, very few house drains could be located without digging for them. A series of test holes the width of the trench, and just long enough to give working space, was dug about 150 ft. apart over a route that appeared from the map to be open, and from these the route for the line was laid out. It was found necessary to shelve manholes in some cases to get any headroom. On one street it was necessary to shift the tracks to get space enough to lay the conduit line, but as this track was being relaid the additional expense was not very great.

The size of the cables was determined by a series of readings taken at the rotary converter station, about 650 amp maximum being allowed per 1,000,000 circ. mil. Allowance was made for growth, the limit for this being the limit of the pocketbook.

As larger and more cars were added and routes changed it was necessary to rearrange the sections and to divide the load according to the size of the feeders in the main line from the rotary converter station to the beginning of the conduit, which was not reinforced, and also to bring the feeders of the outlying sections to the nearest point of the heavy load on that section. The overhead feeders that were taken down were used in rearranging outlying sections.

The necessity of having all feeders of a section connected together where a section is fed from two different points was shown when by running 2000 ft. of overhead cable and connecting together two feeders of a section fed in this manner 1.4 volts per 100 amp decrease in drop was obtained at one point and 2.9 volts per 100 amp at the outlying end of the section. Another section that was fed from both ends showed a decrease of 3.6 volts drop per 100 amp of load after connecting the ends together. These values were obtained after the main feeders were connected through the conduit, and show only the increase due to connecting the feeders together.

In adjusting the load on different sections by changing the location of section insulators, we had to consider the liability of tying up all car lines that run for a short distance on the same section due to failure of power on one section. At one point three different car lines travel for several blocks over the same tracks, and it was necessary to feed this territory from a section that fed a line running to the city limits, a distance of several miles from the emergency station. As the feeder for another section runs through this territory, the feeder taps were connected to both sections by means of knife switches, and the section insulators bridged with No. 0000 wire connected through a knife switch, so as to provide a means of feeding from the neighboring section in case of a failure to the section on which it is normally carried.

LAYING A SUBMARINE CABLE

The Rensselaer section on the opposite side of the Hudson River was fed over a drawbridge, submarine cables being laid around the draw only. This bridge is located at the opposite end of the city from the rotary converter station. In order to get a direct route to feed this section, it was necessary to lay submarine cables all the way across the river at a point about 1½ miles nearer the rotary converter station. In order to lay cables in navigable waterways it is necessary to obtain permission from the United States government. The first permit obtained called for a minimum depth of 20 ft. below mean low water between bulkhead lines, but this was finally reduced to 18 ft. As the depth of water at this crossing varies from 2 ft. to 12 ft., it was necessary to dig a trench by means of a dredge.

The hardest problem in dredging is the disposal of material at a low cost. As the only available dumping place was 45 miles down the river and about 7000 cu. yd. of material had to be disposed of, permission was obtained from the government to dump the material back in the trench. In order to do this the trench was dug for a distance of about 100 ft. to give the dredge space to turn around in. Then the reels of cables were set up on a small scow attached to the side of the dredge. Upon this the ends of the cable were drawn up on the bank to a terminal pole of the overhead feeder line to which they were to be connected, and the cables were dropped in the trench which had been dug. The dredge then proceeded to dig out the trench ahead, and the cables fed out as the dredge advanced, the material dredged being dumped in a bottom-dumping scow, and when filled towed back over the trench and held with anchors until dumped in the trench on the cables.

It was necessary to have the cables on a separate scow so as to make them independent of the movements of the dredge. This proved to be a wise plan, as the trench ran into a sand bank and it was found the dredge could not make and hold the 18-ft. depth required, so it was necessary to go over the trench the second time, the cable scow being cut loose and anchored for the first cut. By the plan of dumping back in the trench it was found necessary to make only two tows, instead of about twelve which would have been otherwise required. As these tows cost $100 each, quite a saving was effected.

After the cables were laid in the trench between the bulkhead lines, the ends on the Rensselaer side were carried up on the bank and buried in a trench, a covering of boards being placed over them and the cable ends carried into a manhole. In this manhole they were connected to the underground cables running under steam railroad tracks. This underground construction was decided on because the requirements of the steam railroad company for an overhead crossing were so exceedingly strict.

ELIMINATING POLES, MAINTENANCE PROBLEMS, ETC.

In replacing a pole line on the principal street on account of a "city beautiful" movement, it was planned to do away with poles so far as possible by obtaining permission to attach the span wire to an eye-bolt in the buildings suitable for the purpose. This plan met with the approval of all but two of the building owners, and in several instances we actually were asked to attach wire to buildings which we did not consider safe for this purpose. As the new poles were tubular steel and not as heavy as the lattice poles which were holding a long curve at one point, the tubular steel poles were reinforced by filling them with a 1-2-5 mixture of concrete and old tie rods, the concrete being mixed soft and carefully tamped in the pole.

In solving the problems of trolley wearing at the ears we are trying out a scheme of using a 9-in. ear first, then replacing it when worn by a 12-in. ear and substituting for this a 15-in. ear in turn. As this plan has been in force only about seven months no definite data of saving can be shown as yet.

Plans have been started further to improve the system by moving the rotary converter station to a point near the load center and so doing away with the losses in 6500 ft. of the feeder system.

When the underground ordinance was passed it was considered a burden, but subsequent developments show that it has been a great benefit. The entire distribution system has been dressed up, while the better voltages obtained enable more and better-lighted cars to be run and kept on schedule, thus eliminating much complaint.

OPERATION OF TRAILERS IN CONNECTION WITH PEAK LOAD CITY SERVICE

BY GEORGE L. RADCLIFFE, GENERAL MANAGER THE CLEVELAND RAILWAY

The operation of trail cars is not a new experience for us in Cleveland. Nor, do I imagine, is it new to many of you who are here to-day. I wish only briefly to point out the changes made in equipment since the trail car last was in general use.

With adequate motors and improved tracks, its operation is no longer hazardous; its application to traffic problems is definite and easy. No more a makeshift but specially designed to meet certain conditions, it is in every way a worthy running mate for the modern motor car. The first modern trailer operated on the system of the Cleveland Railway Company was placed in service Sept. 16, 1912. One hundred are now on our lines and a second hundred will shortly be added. The operating features of this equipment necessitates a brief description of the car itself.

The extreme length is 49 ft., and there is no platform or vestibule at either end. A continuous longitudinal seat completely encircling the interior gives a maximum seating capacity of seventy-two and leaves a very large area for standing passengers.

The cars are mounted on Brill No. 67-F trucks, with 22-in. wheels, bringing the floor of the trailer close to the ground and making entrance to the car easy. It is but one step from the ground into the car—15 in.—and a second step of the same height to the car floor proper.

There are two doors in the center of the car, one for entrance, the other for exit. The fare box is placed opposite the post which separates the doors. The conductor's position at the box is facing the rear so that an aisle is open between the fare box stand and the devil-strip side of the car. The stand supporting the fare box has a small shelf for change, on which is mounted a set of push buttons to govern the doors. Each door is opened and closed by compressed air electrically controlled by the conductor through the push buttons. The opening and closing of the doors flashes signals to the motorman by an electric contact, which should make trailer operation much safer than when he is entirely dependent on the signal bell.

The trailer is pulled by a 38-ft. motor car, equipped with four 40-hp motors of the Westinghouse 307-F type. The train is equipped with Westinghouse semi-automatic brakes and is coupled with the Tomlinson automatic air coupler. The couplers, while not yet entirely perfect, are a great improvement over the couplers in general use on the old-type train. Cars equipped with the modern automatic air coupler can be coupled much more quickly and with much less danger to the employee than formerly, while the application of air brakes to both cars reduces very largely the danger of accidents through the heavier equipment. These two features, we believe, with the electric signal device, give the requisite safety both to employees and the public.

When these trailers were first put in operation it was decided that we should use them only during the rush hour, morning and evening, and that trains would be left coupled so that it would not be necessary to switch, couple and uncouple them several times each day. This method of operation is still pursued and at present the motor cars are

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

laid up during the greater part of the twenty-four hours. Upon the arrival of the next hundred trailers, however, it will be necessary for us to uncouple the trains in order to have the use of the motors during the day.

The first, and probably the greatest, advantage in operating trailers is in the cost of equipment. It will readily be seen that the elimination of motors and other electrical equipment from the car greatly reduces the cost of the equipment necessary to move rush-hour traffic, and the investment in idle equipment is smaller in proportion.

A second advantage is the carrying capacity of the trailer. In our case it is about twice that of the motor car. Seating seventy-two, while the motor car seats but thiry-eight, the arrangement of seats noted earlier in this paper gives the trailer a standing area even larger in proportion than the similar area in the motor car. Thus, while the seating capacity of one of our trains is 110 passengers, we have carried over 350 passengers on a rush-hour trip, and it is not unusual to find 200 passengers on one trailer.

Another advantage is the reduction in operating costs made possible. The heavy extra loads just mentioned require the addition of only one man to a crew to handle, the trailer being in charge of one conductor and the train manned by the regular crew.

All the cars on the system of the Cleveland Railway are equipped with fare boxes and most of them are operated on the pay-enter plan. When the trailers were adopted it was intended to operate them also as pay-enter cars, but on account of the single-entrance and no-platform features it was found that loading took too much time and the method was changed so as to utilize the rear half of the trail car as a loading platform. Passengers boarding the trailer pay their fare as they go past the fare box to the front end of the car, or, if they go to the rear of the car, they do not pay their fare until leaving the car. In this manner about half of each load pays fare on the pay-enter plan and the other half on the pay-leave plan. This method has proved very satisfactory and little confusion resulted from the change in method even when first put into effect.

We did experience a great deal of trouble for a time on account of the slowness of trains in getting over the line when mixed with single cars. It developed, however, that the slowness of operation was due rather to the inexperience of the platform men than to the number of passengers carried on the trains, and after six months' operation, we find that the amount of time necessary to operate a train over a given line is but little more than the amount required for a single car on the same line. The difference is so small in comparison to the amount of money saved in equipment and in the number of trainmen worked as to be negligible.

In making up our schedules we arrange all runs so that both motormen and conductors can act as conductors on trailers during the rush hours. This, of course, requires fewer men to operate our schedules with any given number of cars than would be required if each car must be operated by two men. We find, also, that our runs can be arranged to better advantage by this method.

The train signal system between conductors and motormen is giving us some little trouble, trains being delayed for signals and slow in getting away from stops. Under our rules, even though a motorman receives his bell signal from the conductor he should not start his car until he receives the signal light in the vestibule, indicating that all doors on the train are closed. Our present equipment being overtaxed in the rush hours, it often happens that passengers, attempting to crowd their way into cars already filled, stand in the doorways and prevent doors from closing. The conductor, busy at the fare box, is unable to get to the door to get the passengers off the step. So it has been necessary to station inspectors at some points to clear the steps so that doors may be closed and the train properly started. We believe that this trouble would entirely disappear if we were operating sufficient cars to take care of the traffic and to prevent passengers gathering in such large numbers.

The distribution of equipment, ever important, is especially vital to the success of trailer operation. We have not yet been able to work this out to the best advantage because of the mixing of single cars with trains, already referred to, but are hopeful that with the second hundred trailers a better adjustment can be made.

Little trouble has been given us at switches on account of operating trailers. Some motormen in their endeavor to keep their trains on time accelerate their motors too quickly when passing over switches, not waiting until the rear truck of the trailer has cleared the switch before they attain the maximum speed of their motors.

The operation of trailers in connection with peak-load city service depends entirely upon the peculiar local condition of the particular city service to which the trailer is to be adapted, and I have thought best to give you merely our experience without attempting the broad application of that experience. But I would say this much—as a personal opinion—I feel that the trail car is suitable only for peak loads, and they must be real peaks. A four-minute headway is the minimum which I consider warrants trailer operation.

THE INTERURBAN RAILWAY VERSUS THE CITY RAILWAY

BY JAMES M'PHILLIPS, ATTORNEY HUDSON VALLEY RAILWAY

In the analysis of this proposition, naturally, the conclusions reached by us are largely derived from our experiences with the properties with which we are connected and from observations of the conditions obtaining on the lines of the properties immediately adjoining.

The Hudson Valley Railway Company operates 113 miles of railroad, exclusive of traction rights over the lines of the Schenectady Railway Company and the United Traction Company. This route takes us through twenty-one towns, eleven villages and one city. The city of Glens Falls, the general office of the company, has a total mileage of 7.34, so it is apparent that over 90 per cent of the railway of the Hudson Valley Company is interurban. Outside of the city of Glens Falls and some of the villages, its system is entirely single-track. Cars are moved in accordance with timetables prepared at least semi-annually and under the direct control of a telephone dispatching system.

The operation of a city service has problems which are not encountered when the cars of the railway company are operated over its own private right-of-way. The routes of the city service are entirely through streets, avenues and highways. Cars follow one another at frequent intervals but are often interrupted by the vehicular traffic at one point or another; by collisions with teams or pedestrians which necessitate delay and the expenditure of some time, the extent depending upon the seriousness of the accident, either in assisting to remove the obstruction from the track or in caring for the injured and securing the names of the persons in the vicinity who witnessed the occurrence.

There are also many petty annoyances to contend with which come from people who are oftentimes successful business men and most economical in the management of their own affairs, but at the moment a rumor is started, no matter by whom, that an insufficient number of cars is being operated to meet the wants of the traveling public, or that some other fancied wrong exists, are quick, even eager, to declare it a fact.

The necessity for the re-setting of poles, the repairing of a low joint, the cutting out of a piece of broken rail or the repairing of a bond in a paved street brings many senseless complaints from abutting property owners and inquiries why the street in front of their property is being torn up. The answer is always given, although it takes time and patience.

On the interurban lines we are confronted with complaints about the insufficiency of cars and the improper heating of those operated, springing from sources founded upon the same plane of reasoning as those affecting the city service, and these have to be dealt with in a generally similar manner.

There are, however, factors in this operation which need more constant attention and care on the part of the management than are required in the city service. The high speed at which the cars are operated necessitates the perfection of track and rolling stock, as nearly as may be, for should a car traveling at this speed be derailed the injury to passengers, if not loss of life, as well as the damage to property, would be great. The necessity for a full corps of experienced men who are familiar with high-speed operation, and with the dispatching order system where the line operated is single-track, to answer a call to man the regular trains or take an extra or special car to any part of the system is always present. These are matters which I feel are continually in the mind of the interurban manager.

With our company one of the most important matters in the operation of its interurban lines is the question of keeping cars on schedule time. This is attended to so carefully that in the event of an interurban car breaking down on any of the lines from a terminal the crew immediately notifies the dispatcher and he arranges to send an extra to the terminal point to take the place of the regular car, so that the only persons inconvenienced are those in the crippled car or those along that car's route.

The employees of our company take particular pride in reaching terminal points according to schedule, and it is a matter of general satisfaction to the patrons living along our system that our trains are to be depended upon, barring unavoidable accidents and delays.

Of course, the question of schedule time carries with it problems more difficult than that of merely providing an additional car. The power must be ready at all times when called upon for a heavy load, and it may be of interest to know that from July 15, 1909, up to a few days ago the longest delay to the cars on our system from the cause of failure of power was less than fifteen minutes. A few days ago, however, during one of the worst sleet storms that ever visited this part of the country, we underwent a shut-down of fifty minutes on account of trees coming in contact with the high-tension lines; but at no time was the entire system out of commission, as by our auxiliary plants, where direct-current machines are constantly in operation, several sections of the road were kept running.

For years our company operated large double-truck open cars on its interurban service, but on account of the numerous accidents to passengers and the annoyance and inconvenience of transferring equipment during stormy weather, all through service for the past three summers has been operated with closed cars.

During the first summer after the change a considerable decrease in the earnings was noticed, as the people had been educated to use the open cars, but the second summer all objection was practically waived, and now there rarely is a complaint from that source, while the earnings per car mile are as great as with the open cars. We still use the open cars for city traffic and excursions on the interurban lines, and we are called upon several times during the summer to transport at one time from 300 to 700 children belonging to Sunday schools and other organizations. But these open cars are not operated at high speed.

I have endeavored to give but a brief synopsis covering my subject, and in conclusion I beg leave to say that, in my judgment, the relative percentage of trouble caused by complaints in the operation of an interurban as compared with a city railway is altogether in favor of the interurban line. The number of complaints received at our general office concerning the operation of the interurban cars is in the ratio of about one to ten received from the city line.

THURSDAY EVENING SESSION

(*By Telegraph*)

An informal dinner, held on Thursday night, was generally attended by the visiting delegates. During the dinner music was furnished by an orchestra and impromptu choruses were sung by the diners. Two solos rendered by W. H. Hyland were greatly appreciated. After the dinner President Collins read letters of regret from members of the association who were unable to attend and then introduced C. S. Sims, vice-president Delaware & Hudson Company, as the first speaker. Mr. Sims spoke upon the operations of American steam railways as compared with those of Europe, summarizing his remarks in the statement that American railways had one-fifth of the capitalization of English railways, handled double the business, charged one-third of the rates, paid double the wages and yet were supported by only one-seventh as dense a population per mile. He commended the electric railways for making a profit on passenger business out of 5-cent fares whereas steam railroads lost money at a rate of 2 cents per mile.

The second speaker, Rolin B. Sanford, district attorney of Albany County, said that old-time managers, in answer to complaints, would promise much and perform little, but that the modern manager made a policy of reasoning with the public, explaining just how much he could do and then doing it. He did not believe that the majority of the public was unreasonable. For instance, the people of Albany naturally wanted a 5-cent fare but would be willing to pay more if it was demonstrated that better service demanded an increase.

The third speaker was Chairman Frank W. Stevens of the Public Service Commission of the Second District, New York State, who spoke about the duties of public service commissioners and their mutual responsibility to both the public and the corporations. Fairness, he said, did not mean giving one party half of its demands, but instead, consisted in listening to arguments of both sides and then making decisions irrespective of who the parties were. The ideal of a public service commissioner at all times should be to promote better feeling between the people and the public service corporations. Past evils, he said, were due largely to misconceptions and misunderstanding, and conditions had greatly improved since 1907 when the New York Public Service Commission came into being. He was proud to say that of 135 employees of the commission not one had been appointed for political reasons. Since there would soon be three new commissioners, he asked the railways to give them every possible aid and consideration. If the railways felt that they were not being treated justly, they should protest as vigorously as the public against bad railway service and good results were certain to follow eventually.

Mr. Sims then proposed a rising toast to Chairman Stevens for his honesty, fixity of purpose, enduring energy and absolute fairness, and, in response, a splendid ovation was given by the delegates to Mr. Stevens.

J. S. Kennedy, secretary of the Public Service Commission of the Second District, New York State, said that when he left the service of the State he would long cherish recollections of his pleasant intercourse with the electric railway men of his district. The New York Electric Railway Association, he said, should embrace every railway and railway employee in the State. By so acting together they could best secure that publicity which would place them in the proper position before the public.

President Collins then expressed his deep regret over the anticipated retirement of Messrs. Stevens and Kennedy and presented the following resolution, which was unanimously adopted:

"The officers and members of the Electric Railway Association, assembled in quarterly session at the Fort William Henry Hotel, Lake George, N. Y., March 6 and 7, 1913, unanimously express their sincere regrets at the anticipated retirement of the Hon. Frank W. Stevens from the Public Service Commission, Second District, State of New York.

"We commend the courtly dignity of Chairman Stevens and his able grasp of the complex subjects brought before the commission. We appreciate his broad-minded and impartial views upon all matters wherein the public welfare is involved. We extend to Mr. Stevens our best wishes and our hope that a rich reward will be his during his future active career.

"The officers and members of the New York Electric Railway Association, assembled in quarterly session at the Fort William Henry Hotel, Lake George, N. Y., March 6 and 7, 1913, also unanimously express their sincere regret at the retirement of Mr. John S. Kennedy, secretary, from the Public Service Commission, Second District, State of New York.

"We gratefully acknowledge the many courtesies extended to us by Mr. Kennedy and sincerely appreciate his cheerful co-operation throughout our business intercourse in shaping and stimulating our efforts to greater achievements for the good of the traveling public. We congratulate ourselves that a spirit of harmony has always prevailed in our relation each to the other, made possible by his wisdom and rare executive ability. We extend to Mr. Kennedy our thanks and the sincere wish that success may attend his future efforts and that prosperity may always be by his side."

In response to these resolutions Chairman Stevens bade an affecting farewell to the association. He said that it had been five years and eights months since he had entered office with the single thought to do the best he could, and that that was all he had done. After another hearty ovation to Messrs. Stevens and Kennedy the meeting adjourned.

FRIDAY'S SESSION

(By Telegraph)

The meeting was called to order by President Collins on Friday morning at 10 o'clock. The first paper to be read was that of James McPhillips, attorney Hudson Valley Railway, entitled "The Interurban Railway versus the City Railway." This paper is published elsewhere in this issue.

H. J. Childs, engineer power distribution United Traction Company, then read a paper entitled "Some Power Distribution Problems," which appears elsewhere. In the discussion J. P. Barnes, Syracuse, asked whether the Albany underground cable was specially insulated or was of the plain weather-proof type, Mr. Childs replying that covering for the cable was of lead and paper. Mr. Townsend, Albany Southern Railway, stated that he had installed submarine armored cable in the bottom of a river and that after seven years of service it had given no trouble. Signs of electrolysis of the armor had been noticed, but this was stopped by connecting the ground wires to the rails. B. Penoyer, Schenectady, said that he understood that the United Traction Company was using clinch ears and he doubted whether successive substitution of larger ears would be practicable with this type.

A paper entitled "The Successful Claim Agent" was then presented by William H. Hyland, Gloversville, N. Y. This is abstracted elsewhere in this issue. In the discussion which followed the claim agents present at the meeting expressed general agreement with the author's ideas. Mr. Townsend suggested that the association should have a man go over a railroad for evidence of things which might lead to accidents, both in equipment and in the work of employees. He suggested the use of moving pictures of accidents as exhibits in electric railway parks. Mr. Hyland thought children should receive special training with regard to protecting themselves against accidents and that the training should begin in the kindergarten. He added that the Legislature should make accident-prevention instruction by public school teachers compulsory.

In a general discussion as to whether claims should be paid by check or cash it appeared that most of the claim agents believed that the moral effect of spreading out bills before the claimant was bad. The discussion also revealed that the amounts of cash which claim agents had available for immediate use varied from $75 to $500.

The last paper upon the program was entitled "Operation of Trailers in Connection with Peak Load City Service," by George L. Radcliffe, Cleveland, Ohio. This is published in abstract on another page. Upon its completion the discussion of the question box was opened.

The first question was in regard to the attitude of the delegates toward standard instructions for governing the operation of workmen in the inspection and maintenance of equipment. W. G. Gove, Brooklyn, said that standard practices had been installed on the Brooklyn Rapid Transit System despite the fact that there were seventeen shops with from 1200 to 2000 men employed. He believed in circular letters and bulletins and in furnishing ample drawings. His department was, he said, completing a book of standard shop rules and instructions. Publicity and conferences had succeeded so well in changing the habits of the older employees that the average length of service of shop foremen and superintendents was more than fourteen years. John Sibbald, Gloversville, said that he believed standard instructions were equally desirable for small railways as it was becoming more difficult to obtain good all-around shopmen. J. P. Barnes, Syracuse, said he had checked the work of car inspectors by keeping records of men who had last inspected crippled cars. He had then posted the car numbers alongside of the numbers of other cars which were inspected daily by other men, thus showing the relative efficiency of the inspectors.

The second question, whether timekeeping should be done by the auditing department or by the department involved, produced a general discussion. W. H. Elder, Albany, thought that the accounting department should do this work. Individual time slips properly approved by the foreman and master mechanic should, he said, be used even with time clocks. Complaints of errors in pay checks had been greatly lessened since the operating department had been relieved of the responsibility for timekeeping. F. E. Belleville, Schenectady, said that he used both methods, the operating department keeping its own time while the transportation department sent its sheets to the accounting department for making up the pay-roll. Mr. Gove favored having the auditing department do the timekeeping. A pay-roll department was best for a large system.

The third question, regarding the relative merits of concrete and composition floors for cars as compared with wooden floors, was then placed before the meeting. John Sibbald, Gloversville, said that uneven wear could be easily taken care of with the composition floor, but that dust from worn floors would settle on plush seats. Neither composition nor linoleum needed painting as often as wood. Mr. Gove favored composition floors as installed in the new Brooklyn center-entrance cars for hygienic reasons. Mr. Barnes mentioned the possibilities of the interlocking tile floor costing about $1.15 per square foot. He cited a case in which this type had shown no wear after six years' service although located in the aisle between car seats.

In answer to the fourth question, regarding the best kind of joint for use in paved streets by a small railway which could not afford riveted or welded joints, Mr. Penoyer believed that the bolted joint was the best under the circumstances. It had been used successfully in Schenectady for four years. A drilled rail and punched plates were used, the holes being of the same diameter but not reamed. A 1⅛-in. machined bolt with square head and hex-nut was used and a reasonably tight fit was thus obtained. F. A. Bagg, Gloversville, N. Y., used rails drilled 1/16 in. less than the size to which the bolt plates were punched. The holes were then reamed and machined bolts driven in.

The original plan called for a bolt 1/32 in. larger than the hole, but as this was found too hard to drive the difference in size was later changed to 1/64 in.

Mr. Penoyer said that although he was conducting the use of the construction as described he was giving up the use of splice bars for continuous plates.

In answer to the fifth question, as to whether any injurious results occurred to the rail or equipment when the rail was rigidly supported on concrete foundations, Mr. Penoyer said that 75 per cent of the track in Schenectady was laid on 6-in. concrete foundations. Some of this had been installed since 1901. The only corrugation was found at the bottom of a grade where there was no concrete. He favored crushed stone for locations where concrete could not be permitted to set for a period of at least ten days.

The sixth question placed before the association was a query whether there was any good preservative treatment for wooden ties other than creosoting. Mr. Bagg referred the members to a paper presented before the American Railway Engineering Association on the subject. Mr. Townsend had dug out good kyanized ties after fifteen years and had laid them again for a suburban line. Mr. Penoyer had been using creosoted ties exclusively for all interurban renewals and for paved streets with crushed-stone ballast. He used 10 lb. of dead oil per cubic foot with a penetration of 1½ in.

In answer to the seventh question, regarding the desirability of replies through the press to public complaints or criticisms, J. F. Hamilton, Albany, did not believe in replying to every criticism, but thought it wise to call in newspaper men, explain fully the reasons for making changes and then ask them to publish statements that the company would gladly hear objections to the proposed plans. He had little difficulty in satisfying complainants that the company was anxious to route its cars so as to serve the convenience of the greatest possible number of the riding public.

R. M. Colt, Gloversville, brought up the point that newspapers wanted early publication of all stories and that this led to inaccuracies when the information was obtained from outsiders. It was important to have local newspapers understand that they could confirm rumors by telephoning to the company.

In meeting the questions on the method of making charges for the carriage of newspapers and on methods of payment for the service there was a general agreement that the use of pasters was satisfactory and that straight charges should be made both for advertising by the paper and for transportation by the railway company.

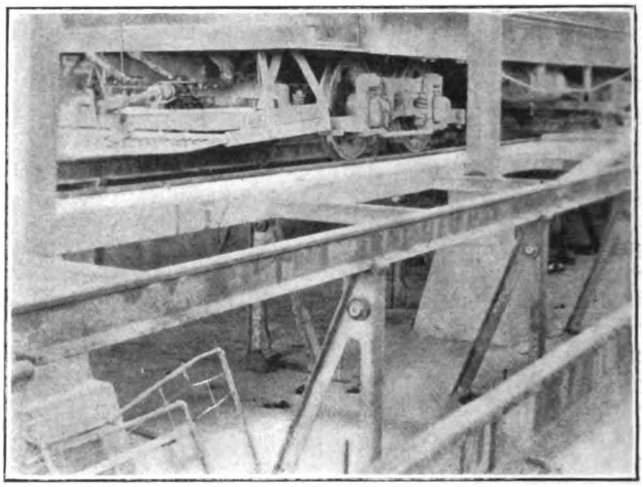
In answer to the question regarding the desirability of contracts with hotels and mercantile concerns for calling the names of their places of business by street car conductors, C. E. Holmes, Albany, said that he found that this led to trouble where only one of several hotels on a street was called. R. M. Colt, Gloversville, however, said that he thought the scheme was a good revenue producer where it did not interfere with traffic. He said that his company had received $277 a year from one store.

The meeting then adjourned.

An American consul reports that a city in Italy has been making investigations relative to the construction of an electric tramway, 28 miles long. The estimates, amounting to $521,100, were recently submitted to the investigating committee by the engineer appointed to make a report on the project. The equipment needed will include rails, overhead material, telephone line, passenger, freight and baggage cars, power plant, machinery, etc. Interested persons should communicate with the person named in the report and correspondence should be in Italian. Further information can be obtained by addressing No. 10,033, Bureau of Manufactures, Washington, D. C.

IMPROVING THE LIGHTING OF A CARHOUSE PIT

For electric railway shops and carhouse employees obliged to spend a large amount of time working in pits on the under sides of rolling stock the question of adequate lighting is an important one. In many shops where cars are regularly inspected and repaired an attempt is made to get along with portable 16-cp lamps wired simply with flexible cord from some distant outlet. In a new carhouse of the El Paso Electric Railway at El Paso, Tex., the pit lighting has been provided by the installation of outlets on the steel framing which supports the tracks, as shown in the photograph, as the space under the rails is unusually clear. Four lamps are thus provided in each so-called pit bay, and in special cases portable units may be used as freely as the fixed lamps. The betterment of the lighting facilities is an important factor in the speed and accuracy with which the work of car repairs and inspection can be handled.



Improved Lighting Arrangement of Pit at El Paso

REVENUES AND EXPENSES OF STEAM RAILROADS

The Bureau of Railway Economics has just issued Bulletin No. 44, which gives a summary of the revenues and expenses of the steam railroads in the United States during the year 1912. The figures are compiled from the monthly reports from railroads to the Interstate Commerce Commission and apply to the railways having total operating revenues in excess of $1,000,000. These lines operate 220,058 miles, 90 per cent of the steam railroad mileage of the United States.

The results for the year 1912 are shown in the accompanying table:

	Amount per Mile of Line, 1912	Percentages of Total Operating Revenues
Total operating revenues	$13,287	100.
Freight	9,241	69.5
Passenger	2,980	22.4
Other transportation	924	7.0
Non-transportation	142	1.1
Total operating expenses	9,139	68.7
Maintenance of way and structures	1,700	12.8
Maintenance of equipment	2,131	16.0
Traffic	272	2.0
Transportation	4,715	35.5
General	320	2.4
Net operating revenue	4,148	31.3
Outside operations—net revenue	7	....
Taxes	545	....
Operating income	3,609	....

The total operating revenues for 1912 amounted to approximately $2,924,000,000, an increase over the previous year of 6.3 per cent. Increases in both revenue and operating expenses occur in all cases for the railroads as a whole, but of the three groups into which the railroads are divided the Southern group showed a decrease in operating revenue, owing to the fact that the increased operating expenses overbalanced the total increase in operating revenues.

GASOLINE SURFACE CARS IN INDIA

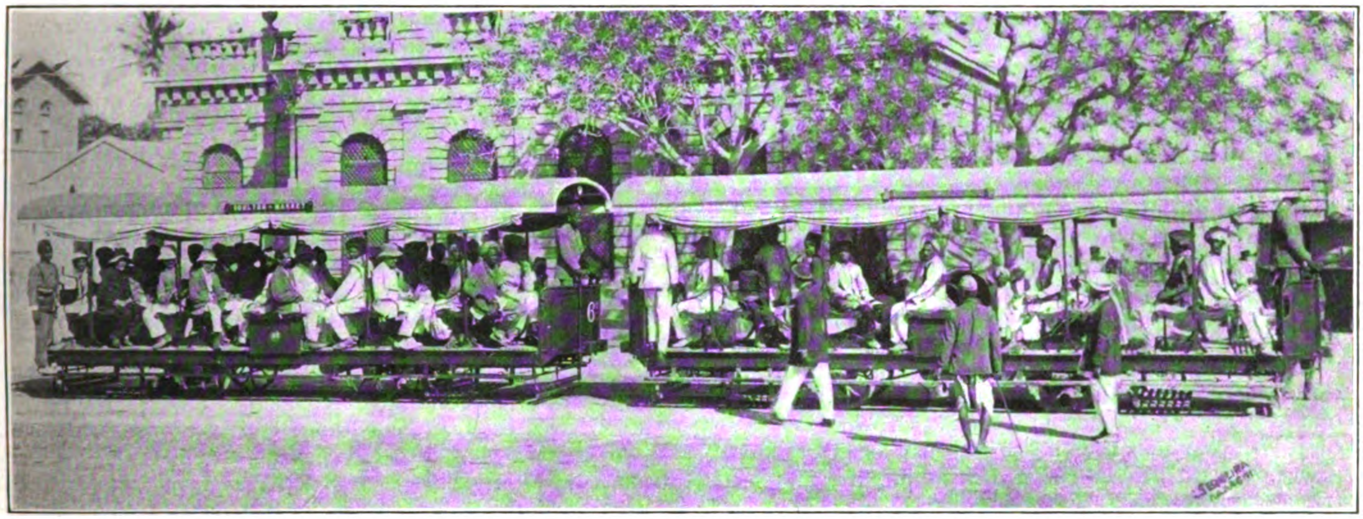
One year ago the surface railways in Karachi, India, completed the replacement of their horse-drawn cars with a novel form of gasoline motor car. The change of power had been going on since the year 1909, when the first experimental equipment of the new type was placed in service.

The car, as shown in the accompanying halftone, has been reduced to the simplest possible form. The motor is placed underneath a permanent seat in the center of the car and is connected by a chain drive to one of the axles. Hand brakes are used and the entire construction of the car is made as simple and as light as possible, the roof being of the canopy type supported by iron stanchions. The engine is controlled from the ends of the car by a simple arrangement of rods and levers which operate the clutch and the throttle. The levers are located just back of the dashboards. The motor is set at right angles to the center line of the car so that no necessity for beveled gearing exists, and in consequence the cars are reported to run with very little noise.

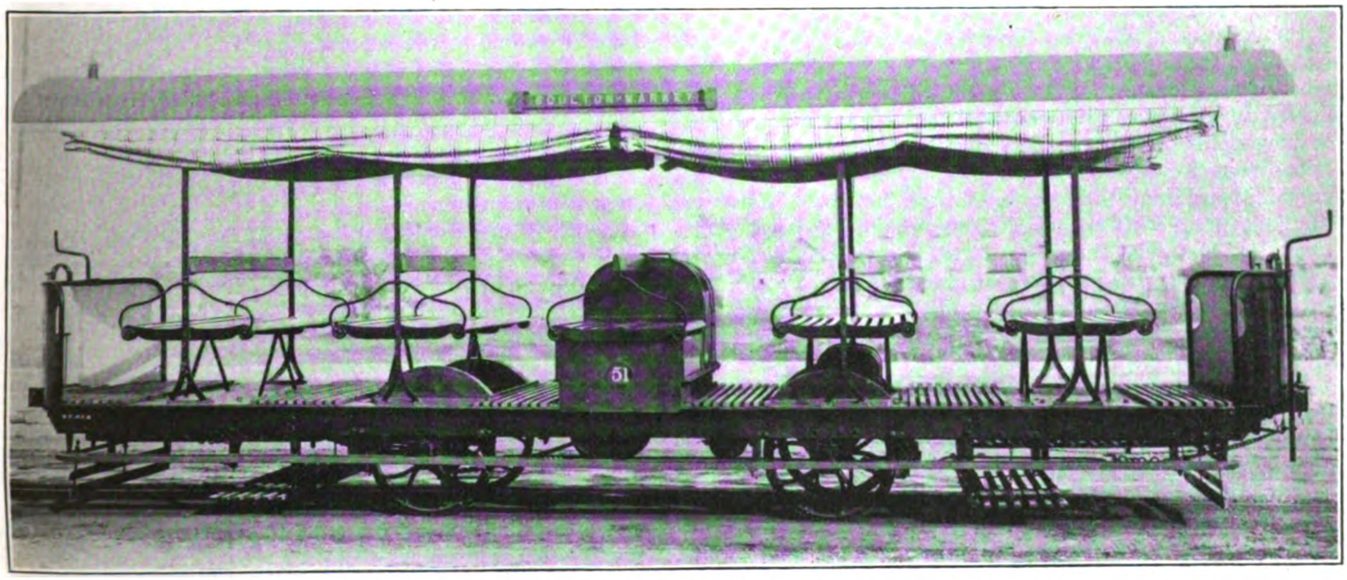
The report of the East India Tramways Company covering its lines in Karachi states that the new motor cars, which seat forty-six passengers, are operated at an average cost of only 3 cents per car mile for power, repairs and maintenance, while the horse cars previously in use, which seated only thirty passengers, used to cost slightly over 6 cents per car mile. The same report states that the introduction of gasoline cars has produced a material increase in traffic, largely on account of their popularity with the natives and their ability to provide a much more speedy and regular service. In view of this the directors at present are contemplating extensions for the development of the outlying districts of Karachi amounting to some 3 miles of new line.

It is reported that the new cars run about as fast and as quietly as the average electric surface car, and on account of the location of the motor in the center of the car, where it is fully supported by springs, the vibration customary with the gasoline engine drive is largely eliminated. The simplicity of operation has permitted the company to utilize the natives who formerly drove the horse cars as motormen for the new motor cars. The installation at Karachi includes thirty motor cars, of which all have been in operation during the past year, and it is reported that the street railways of Baroda, India, are soon to be equipped with cars of the same type owing to their successful introduction in the former city.

Karachi is one of the principal seaports of India. It has a population of more than 100,000 and has been largely rebuilt and greatly improved.



Gasoline Motor Cars in India—View of Cars in Service, Showing Native Motormen and Conductors



Gasoline Motor Cars in India—Type of Car Used Exclusively on Street Railways of Karachi

INAUGURAL CONFERENCE OF THE SOCIETY FOR ELECTRICAL DEVELOPMENT

The conference which the Society for Electrical Development, Inc., held in the United Engineering Societies Building, New York, on March 4 and 5 was the first tangible result presented to the electrical industry at large of a vast amount of detail work that had been performed by the committee which was appointed by representatives of the central stations, manufacturers, jobbers, contractors and dealers at the meeting held by these interests at Association Island, New York, on Sept. 3, 1912, to create an organization to carry on a co-operative electrical movement throughout the United States.

About 175 were present when President Henry L. Doherty called the conference to order at 10 a.m. on March 4.

Mr. Doherty made a few remarks to explain the reasons for holding the conference. First, he said, the organizers of the society had been anxious to get the movement actually under way as soon as possible, and, secondly, it had been thought that a much broader line of ideas would be developed at a meeting open to the entire electrical fraternity than would have been the case had the society simply presented its own plans. Had the latter method been followed, the industry at large would probably have given more attention to merely improving the details of the society's plans than to developing valuable ideas for carrying on the work. Mr. Doherty then said that while only a short time had elapsed since the society had been organized, a keen interest had been shown in it in all parts of the country, as in all branches of the industry.

James M. Wakeman, general manager of the society, then spoke on the "Aims of the Society."

The society, he said, was the result of thought, money, time and effort on the part of hard-headed business men and it was expected to be a potent factor for increasing the demand for electrical energy, supplies and apparatus. He pointed out that a great deal more could be accomplished by joining forces than by individual effort. Co-operative, constructive work was now needed, he felt, in the commercial side of the electrical industry, which had reached a stage of successful production.

SOME METHODS FOR SECURING PUBLICITY

Publicity of a kind that would induce the public to realize the advantages and economies of electrical energy was what is needed, he thought. Some of the methods he suggested for securing this were: advertising on a large scale in magazines and newspapers and having articles of electrical news value written by well-known men whose names would insure that these articles shall be read; supplying the daily press with electrical news; exhibiting moving pictures of electrical interest; having the technical press analyze the business practices of successful electrical manufacturing concerns, contractors and supply dealers; educating farmers, architects and others in the great merits of electrical service.

For the last purpose a traveling force could be maintained by the society, while a corps of trained solicitors could also be maintained and placed at the service of small companies, at a small charge, for special campaigns.

In conclusion, Mr. Wakeman stated that the society had received the indorsement of many of the national electrical associations, manufacturers and the technical press, and that its far-reaching connections could make it the greatest "booster" ever known.

THE NEWS VALUE OF ELECTRICITY

Frank H. Gale, of the General Electric Company, then read a paper on "The News Value of Electricity," in which he said that news should be written and treated from the standpoint of the reading public, not from that of the advertising writer. Only items of real, legitimate news value, of interest and benefit to the public, should be furnished to newspapers.

Of this material, the part that was of a technical nature did not appeal to the general public, but was useful to the technical press. On the other hand, there was always much in which the general public would take an interest. Real news and press-agent matter must be kept entirely separate.

Public-service corporations had long since found out that frankness and publicity pay. Where officers of such companies had been close-mouthed and loath to talk to representatives of the local press, the reporters had often turned in unfavorable items pertaining to the central-station companies for lack of other news. Central-station managers should keep in touch with the newspaper men in their territory and encourage them to visit their offices.

Mr. Doherty stated that nowadays newspapers realized that press-agent work had been greatly overdone and the newspaper tendency is to reject business items. He thought that the newspapers should point out to business men where they should draw the line. He felt that there were hundreds of untold items concerning the electrical industry that were far better than those appearing in the daily press.

C. G. Durfee, of the Rochester (N. Y.) Railway & Light Company, said that it was not difficult to get newspapers to publish items if approached in the proper way. In explanation, he told how difficult it had been in Rochester a few years ago to get any electrical news in the local papers, and how after R. M. Searle, vice-president of the company, had told each employee that he might say anything whatsoever to reporters concerning the company's affairs, provided he always told the truth, conditions had been vastly improved.

In this way every person in the organization had been made an intermediary between the company and the local press, and the only restraint placed on any man was the proviso that he should always tell the truth.

Mr. Durfee said that as a result of this policy Rochester papers had few editions in which a good legitimate piece of electrical news could not be found, and the effect of this had been the growth of much better relations between the company and the public, and the company and the newspapers, all of which, he stated, probably was more beneficial to the company than its paid advertising in the newspapers.

All of those in the company were in accord with the reporters, and the latter visited the higher officials each day and made at least one visit per week in all the departments.

Oftentimes, Mr. Durfee said, the name of the man who gave the story to the reporter appeared in print, and some discussion had taken place at meetings of department heads as to whether this was desirable. It had been decided, he said in conclusion, that the articles would lose much of their news value if the name of the person was omitted. This added the personal, or human-interest, feature to the item.

L. W. Sammis said that, speaking from twenty-five years' experience on New York papers as a reporter and editor and also an advertiser, he knew of no trouble in getting items in the daily press whenever they had real news value. He recommended being with the newspapers and seeing that what was sent to them was in a concise form with something of interest in it.

James H. McGraw, president McGraw Publishing Company, said that news items written along the line suggested by Mr. Gale would be real news and would be welcomed as such by the papers. There was no mystery of any kind concerning publicity matter; it was a straightforward, definite matter nowadays. The man who did not give intelligent thought to the matter was the one who did not understand the language in which publicity items should be treated. What had been done in Rochester—convincing the newspapers that the public-service company there was telling the truth to them at all times—could be done everywhere, in every town and city, and if that policy was followed, the industry need have no fear of the daily press.

D. T. Pierce, McGraw Publishing Company, stated that in many years of experience as a newspaper man he had found that corporation heads often lost sight of the vast amount of benefit which their corporations could receive from proper publicity work at the right time. He told of a railroad company which had followed this method, sending information to its station agents from its publicity office and letting the agents give local reporters the news items. This had made the station agents a factor in the local news. He told something of the vast amount of matter that came into a daily newspaper office and was rejected. For this reason care must be taken to get something of special interest in a news story in order to make it acceptable.

Following this a series of papers were read upon various topics, including "Electricity and the Architect," "The Dissemination of News," "Efficiency in Local Advertising," "The Sales End," "Merchandising Co-operation" and "An Electrical Advertising Campaign." The papers provoked interesting discussions, the entire program extending over two days, including a night session on Tuesday.

ELECTRIFICATION OF STEAM RAILROADS

During this session W. J. Clark, of the General Electric Company, stated that he wished to call attention to one thing that had not been mentioned, one of the greatest features in the electrical industry of the present day, namely the electric railway load. This, he said, was rapidly coming closer to the central stations.

In spite of the debt which the latter now owed to Samuel Insull for his work in developing that type of load, the present load, Mr. Clark said, was nothing compared to the one they would receive from steam railroads in the next few years, with continuance of the present rate at which electrification of such great systems was being completed. The electric railway load was now, he said, one of the biggest in the central-station industry.

At the conclusion of the sessions it was announced that the executive committee would begin on March 6 to digest all that had been proposed and discussed at the conference.

On Wednesday evening a banquet was held at Delmonico's, T. C. Martin presiding as toastmaster. A number of speeches were made by representatives of the daily press and the electrical manufacturers. On behalf of the technical press, Hugh M. Wilson, vice-president McGraw Publishing Company, said that the society had under way a scheme to educate the public, but that it must not forget that a good teacher must be well taught. The technical press could be of great assistance. In a large measure, electrical papers must become not less technical but more commercial, for whatever else they do they must represent the spirit of the times, and this spirit showed the constantly increasing predominance of the commercial element. He asked for the confidence of the commercial side of the industry and for knowledge of what the commercial side of the industry was thinking and doing.

Following brief remarks by Mr. Wiley, of the *New York Times*, President Tait of the National Electric Light Association voiced on behalf of his organization hearty approval and support of the society and its plans and said that he hoped to be able in some way to convey to the N. E. L. A. members some part of the enthusiasm which had characterized this week's meetings.

Concluding the speaking, Mr. Doherty said, in part: "I believe in my business, I believe in the corporations, and I believe that we occupy a position of importance in bringing prosperity and comfort to others. In working to develop electricity, we are working toward a higher and better civilization. Consolidations formed for good reasons and honestly conducted are bound to result in public good, but these consolidations are now under fire, and we are told that they are a menace to the people. I believe we have now hit upon a plan to get the benefits of co-operation, a plan that can harm no one and must bring good to every man in the electrical business. It may be that the example we are setting here will mark the introduction of a new method for advancing supremacy, not only in the electrical but other industries. German industrial progress is due to the policy of business encouragement, not discouragement. Here we have antagonism and discouragement, and I fear the story of our future may not be as pleasant as the story of recent German industrial advance. To do what we can to correct this situation is one of the many important duties of this society."

LONG RUN OF STORAGE BATTERY CAR

A run of 310 miles from New York to Boston via the Hudson River and Boston & Albany routes was successfully made on March 6 by a new Beach-Edison storage battery car. The trip was particularly interesting in that it demonstrated to representatives of steam roads for which the run was made that this type of self-propelled car can maintain high average speeds for distances considerably in excess of 100 miles. The car with which the trip was made will be delivered to the Boston & Albany Railroad at Boston, where it will be operated in suburban service.

Ralph H. Beach, of the Federal Storage Battery Car Company, acted as host. Among his guests were the following: E. J. Wright, general superintendent; C. F. Smith, general superintendent of passenger transportation; L. F. Vosburgh, general passenger agent; G. H. Wilson, superintendent of the electric division; C. K. Broadhead, trainmaster of the electric division; E. B. Katté, chief engineer of electric traction, all of the New York Central Railroad; the following representatives of the Federal Storage Battery Car Company: R. A. Bachman, J. P. Warren, M. E. Harby, E. J. Ross, Jr., and A. H. Dirk; also H. S. Baldwin, G. W. Remington and J. C. Clendennen, of the General Electric Company. The car was run by George R. Blodgett, electrician of the Federal Storage Battery Car Company, and was, of course, piloted over the various steam road divisions by full train crews.

The route followed was interesting in that it offered a long run at practically level grade, climbing a high range and considerable curved track. The car left the Grand Central Station, New York, at 9 a. m. and proceeded to Hudson, N. Y., on the main line of the New York Central. From Hudson to Chatham the car was operated over a branch line of the Boston & Albany and from Chatham to Boston over the main line of the same road.

The car which made this run is 50 ft. long over all, 12 ft. 6 in. high and 8 ft. 11 in. wide. It conforms to M. C. B. equipment interchange specifications and weighs complete with load 34.6 tons. Seats for forty passengers are provided in the main compartments and for ten passengers in the baggage compartment. On the trial run the car carried a combined live and artificial load equivalent to the weight of eighty-four passengers.

The electrical equipment of the car includes four 20-hp. 220-volt Diehl motors and two sets of 230 cells, each of Edison A-8-H storage battery, delivering current to the motors at approximately 240 volts.

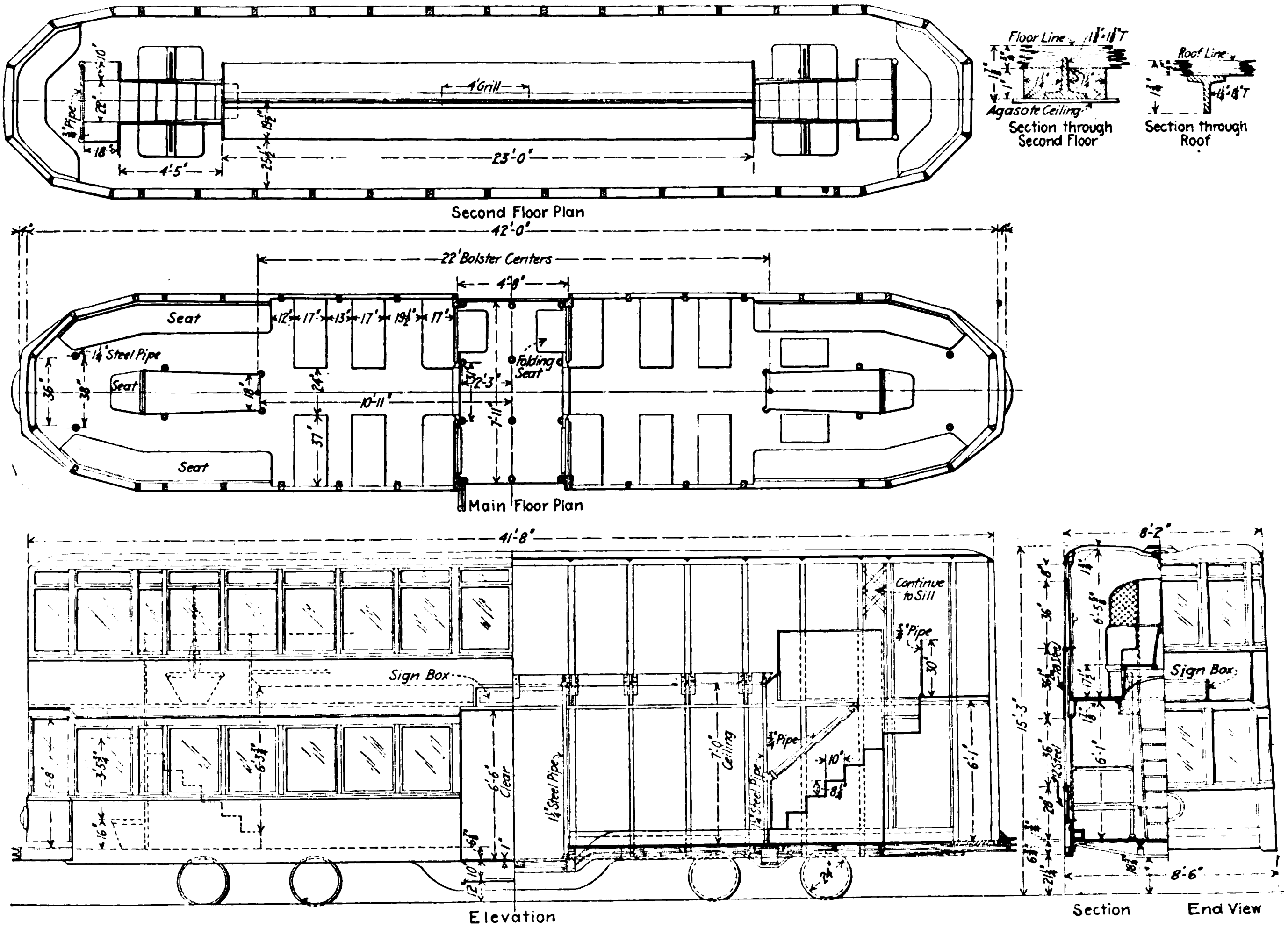
The batteries were fully charged when the car left New York, and the run of 114 miles to Hudson was made at an average schedule speed of 35 m.p.h. On arrival at Hudson the car climbed 1½ miles of 2 per cent grade before recharging. The energy consumption for the level run of 114 miles over the main line of the New York Central was 37½ watts per ton mile. Through the courtesy of the Albany & Southern Railroad the battery was recharged from that company's third rail and then the run toward Boston was continued. The car arrived at Springfield, Mass., 98 miles distant from Hudson, with about one-third of the full charge left in the batteries, and this after having climbed the Berkshire Hills to an elevation of 1450 ft. and negotiated many grades, including one continuous up-grade of 1 per cent for 8 miles.

The battery received a short boosting charge at Springfield while the party had dinner. The remainder of the run, 98 miles, to Boston was covered without event.

DOUBLE-DECK CAR FOR WASHINGTON

The Washington Railway & Electric Company now has in course of construction by the Southern Car Company a double-deck car combining several of the features of the two designs brought out last summer and in addition embodying several radically new features, most prominent among which is the girder construction of the whole side of the car from side sill to eaves. A center entrance is used and the stairways to the upper deck are at the ends of the car. The height is reduced by the use of 24-in. wheels with small motors to suit.

The car is being built for experimental purposes and it is to be used in different classes of service in the city of Washington to give it a thorough trial. It is being tried with the idea of getting more carrying capacity per unit and per mile of track, as there are some portions of the city where the tracks are very congested during certain hours of the day. The company believes that double-deck cars may improve the existing conditions, and if its use is found practicable under the local conditions more cars of the type will be purchased.



Floor Line
1½"×1½"T
Agasote Ceiling
Section through Second Floor
Roof Line
1½"×1½"T
Section through Roof
1"Grill
23'-0"
4'-5"
25½"
19½"
22"
10"
18"
Pipe
Second Floor Plan
42'-0"
22' Bolster Centers
4'8"
Seat
12"
17"
13"
17"
19½"
17"
1¼" Steel Pipe
36"
38"
Seat
18"
24"
10'-11"
2'-3"
Folding Seat
7'-11"
37"
Seat
Main Floor Plan
41'-8"
Continue to Sill
¾" Pipe
30"
Sign Box
6'-6" Clear
1¼" Steel Pipe
7'-0" Ceiling
¾" Pipe
10"
8½"
6'-1"
5'-8"
3'-5¾"
6'-3¾"
16"
1"
12"
10"
24"
Elevation
8'-2"
15'-3"
6'-5"
36"
17½"
Sign Box
6'-1"
28"
21½"
6½"
18½"
8'-6"
Section
End View

Washington Double-Deck Car—Plans, Sections and Elevations

The design is somewhat along the general lines of the company's center-entrance cars, which were described in the Electric Railway Journal of April 27, 1912, page 687. Two stairways will lead from the center of each end of the car to the second floor. These stairways will be constructed with a platform two steps below the floor level and at that point will turn to the right and the left for the final rise up to the second-floor level.

The car will seat 100 passengers, fifty seats being provided on each of the two floors. On the first floor the seats will be transverse except for a short distance near the ends alongside of the stairways where longitudinal seats will be installed. The seats on the second floor will be set longitudinally back to back. On each side of the stair wells transverse seats, each seating one person, will be provided, so that all of the available space of the upper deck will be used for seats.

The car will be 42 ft. over all and have a width over sills of 8 ft. 6 in. The extreme height will be 15 ft. 3 in. and the first floor will have a clear standing height of 6 ft. 1 in. Access to the car will be effected through a wide center-entrance doorway for which folding doors will be provided. These doors will be operated manually and fold up into two sections at each side of the opening. The floor at the center of the car will be depressed to form a well and this will permit the use of very low steps to the ground level. As shown in the accompanying line cut, space for the motorman will be provided in front of the stairway and no separate cab will be installed for him.

The electric equipment will consist of General Electric No. 236 motors, of which four will be provided. These are of a special design and have a capacity of 32 hp each. They will be mounted on specially designed trucks of the inside-hung type, all wheels being 24 in. in diameter.

The most radically new feature of the construction is that the sheathing for both the upper and lower decks will be made of steel plate. At the ends of the car, in the position which would ordinarily be taken by the corner posts of a standard car, there will be used latticed steel columns rigidly framed into the steel sheathing of both decks and connected also to the plate at the eaves. This construction permits the whole side of the car from side sill to roof to assist, by its action as a girder, in supporting the weight of the car and its load.

MIDWINTER CONVENTION, A. I. E. E.

The midwinter convention of the American Institute of Electrical Engineers at New York, Feb. 26 to 28, was essentially a working convention, forty-five papers in all being presented and discussed during the eight busy sessions, which closed with a reception and dance at the Hotel Astor Friday evening. Proposed modifications of the present Institute Standardization Rules were presented before the sessions, for comment and suggestions before adoption in the rules.

TEMPERATURE AND ELECTRICAL INSULATION

Representing the sub-committee on revision of rules relating to temperature and electrical insulation, B. G. Lamme, co-author with Dr. Steinmetz of the sub-committee's report on temperature and electrical insulation, presented an abstract of the paper pointing out the unusual character of such an inquiry, merging the best scientific judgment of two rival engineering organizations.

The report of the sub-committee recommends that 90 deg. C. shall be the ultimate temperature limit for class A insulation, suggesting also that 100 deg. C. be considered as the maximum permissible for insulation where long life is a requirement. It further recommends 40 deg. as the limiting temperature for the cooling medium or room and 25 deg. as the reference air temperature. With class B insulations 125 deg. C. is taken as the limit and 150 deg. as the maximum permissible in the insulation. From 80 deg. to 85 deg. rise is here allowable. In making final decisions on the temperature-rise question, the ultimate temperature attained is recommended as the basis, rather than the rise itself.

METHOD OF RATING ELECTRICAL APPARATUS

A sub-committee on methods of rating apparatus reported urging more accurate and international ratings of electrical equipment. The committee strongly recommended rating in "kva" instead of "kw," as specially desirable in the case of generators, transformers, synchronous condensers, etc., while urging the double "hp-kw" rating for motors. In place of the present inexact "intermittent ratings" a set of six A. I. E. E. standards, with appropriate name-plates, was suggested.

After an extended discussion invitations were extended to the National Electric Light Association, the American Electric Railway Association and the Association of Edison Illuminating Companies to contribute, within thirty days, expressions of opinion concerning the proposed ratings.

TEMPERATURE MEASUREMENTS IN ROTATING MACHINES

In discussing the features of standard test methods the indefiniteness of certain of the present Standardization Rules was pointed out. This resulted in measurements of iron and copper temperatures, instead of insulation temperature, although it was the latter, of course, that was of importance.

In discussing methods of obtaining room temperatures and internal temperatures in generators and motors, the use of standard putty coverings for thermometer bulbs was recommended. Experiments showed that such a form of covering would indicate higher temperatures than coverings of cotton waste, felt, wool, etc., besides being convenient to handle and of such compact form that the covering did not impede natural circulation over a large area of the surface under examination. Resistance measurements to determine internal temperatures often disagreed widely, the cold reading usually being the principal source of error. Such resistance methods should be limited to revolving parts, for they became particularly erroneous applied to stators, etc. For room temperature readings a metal cylinder inclosing the thermometer bulb was recommended. The actual method of determination, however, should depend on the kind of ventilation used.

In the consideration of the effect of different factors upon temperature rise it was stated that a general tendency was noted toward higher rise at the cold-room temperature, but the inconsistency of other results made an accurate rule or statement inadvisable. However, from the curves and data presented in the paper, it was concluded that the present correction rule was wrong and should be corrected. The tests revealed the difficulty of formulating a rule to include all types of machines or even all parts of the same machine. Ultimate temperature reached was of greater importance than the rise noted, although further tests were desirable to fix a general statement to apply to temperature corrections.

Other tests which were reported showed that within commercial limits the temperature rise was independent of air temperature, provided nearby objects were at air temperature. In conclusion it was recommended that, contrary to the provision specified by the Standardization Rules, no correction be made for variation in air temperatures within the usual testing limits.

CURRENT RATING OF ELECTRIC CABLES

It was pointed out that the rating of an electric cable depended entirely upon its allowable heating, and this in turn was limited more by the external conditions than by particular features of the cable itself.

If carrying capacities of various cables were based on the time necessary for the cable to reach 90 per cent of its final temperature, it would require 50 per cent longer to attain 97 per cent of final temperature and 50 per cent less time to attain 68 per cent of final temperature. For nearly all conditions the carrying capacity of stranded cables varied as the 1.3 power of the diameter of the equivalent solid section.

Another paper pointed out that the carrying capacity of a cable may be computed with fair accuracy from observed data on the thermal resistivity of the insulation and the surface. In experiments the following heat-transmission values (in degrees Centigrade per watt per inch cube) had been found: rubber and cotton braid cover, 250; varnished cambric and cotton braid, 400; varnished cambric, lead-covered cables, 300. For surface resistivities (degrees Centigrade per watt per square inch): painted-steel braided armor, 100; cotton covering, 120; lead, ordinary, 190; lead, dull black, 140. Results showed that the effect on carrying capacity of surface resistance was much greater in general than the internal thermal resistance of the insulation. The surface losses thus became of great importance in determining cable-carrying capacities.

In the discussion E. D. Edmonston reported some effects observed in cable burn-outs at Baltimore where succeeding break-downs in adjacent cables at the same point were caused by globules of water distilled from the paper insulation at the time of the first break-down. He expressed hope that a more uniform set of cable specifications might be formulated through agreement of manufacturers and users.

H. M. Hobart declared his opinion that fog-laden or moist air offers a practical means of reducing the air volume to be circulated for cooling certain electrical machinery. There were, however, several practical details and problems which must be understood and solved before the use of moist air could be successful.

W. A. Durgin referred to the successful use of temperature or exploring coils on generators of from 5000 to 20,000 kw rating in Chicago. Close record was kept of internal temperatures and advance warning was given of clogging of the slots, indicating when cleaning was necessary.

Mr. L. W. Chubb reported that while nickel was an excellent material for temperature coils from the standpoint of its temperature coefficient, specific resistance, etc., it had the objectionable property of changing its electrical resistance when magnetized. One such exploring coil showed 2 per cent rise in resistance when the turbine field was excited.

THE "MYRIAWATT" AS A UNIT OF BOILER POWER

H. G. Stott opened Thursday morning's session with a discussion of the proposed use of the "myriawatt" and the "myriawatt-hour" as ratings of boiler power and performance. The speaker pointed out that the criticism to which this proposed unit had been subject was in general due to a misconception. At the present time the units of boiler power were not only arbitrary but based on many different definitions, including evaporation, heating surface, quantity of steam delivered, etc. The intention, he said, was not to introduce a new unit, but simply to add a multiple prefix to the familiar unit of power, thus making a convenient measure of the proper order of magnitude, corresponding in application to the kilowatt.

Dr. Steinmetz called attention to the heterogeneous and incompatible units employed in modern power-plant nomenclature, and the difficulty of making calculations or conversions through the various systems of units employed.

BRUSH FRICTION AND CONTACT LOSSES

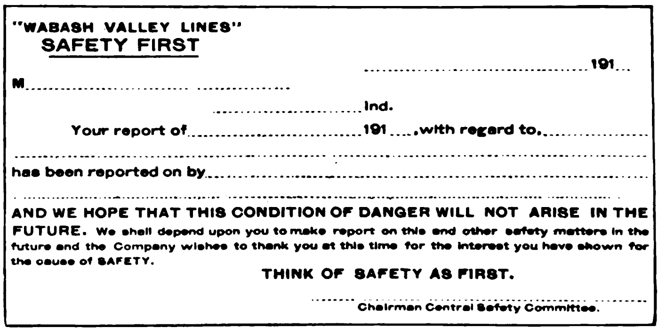
H. T. Erben and A. H. Freeman called attention to the present insufficiency of A. I. E. E. rules on brush-loss determinations. These losses included both sliding friction and brush-contact drop, but the quantities involved were often too small for ordinary means of measurement. The variation in power required to drive the commutator at different temperatures was reported to be negligible.

Great variations were reported in brush-loss tests, even when made on slip-rings or special commutators, and such tests as usually carried out were virtually worthless for practical use. There was difficulty in separating actual brush loss from commutation loss. In parts of the brush current densities were found of three times the apparent average density. If local currents be eliminated by using narrower brushes, resistance leads or interpoles, higher average densities were permissible. Brush resistance decreased with increasing current, although at present no way of calculating or measuring the actual loss at the brushes was known.

SAFETY CAMPAIGN ON THE "WABASH VALLEY LINES"

The Fort Wayne & Northern Indiana Traction Company is putting forth an effort along various lines to make its city and interurban lines among the safest in the country. Safety committees have been organized covering the various divisions of the system. These division committees are located at Fort Wayne, one for the city lines and one for sections of the interurban divisions entering Fort Wayne, one at Boyd Park, one at Logansport and one at Lafayette. Each committee consists of a superintendent, as chairman, with representatives from the shops, power houses, section gangs, line gangs, dispatchers, station agents and trainmen. Matters relating to safety are reported on a form described later, and all employees are invited to make such reports. These reports as well as unsafe conditions which are brought in other ways to the attention of the committee are considered at the regular monthly meetings. A central safety committee, composed of all departmental heads and division chairmen, determines upon the general policy of the entire campaign.

The safety report slips above referred to and illustrated herewith are distributed so that any employee can notify the chairman of his commiteee of defects along the line. These blanks are so padded that each blank is made out in duplicate by means of a carbon paper. One slip is sent to the chairman of the central safety committee at Fort Wayne and the other to the local authority in charge of the defect reported. The latter, which is printed on yellow paper, is returned to the chairman of the central safety committee by the official whose duty it is to correct the defect, after the repair or recommendation has been made. This duplicate is then attached to the original blank in the office of the chairman of the central safety committee so that that official always has before him a file of the defects which have been reported and have not been repaired, as well as of those which have been reported and have been repaired. After the duplicate blank has been returned to the chairman of the central safety committee with the statement that the defect has been corrected, a card is sent to the person making the original report of the defect. The blank used for this purpose is shown in the second engraving. This plan has been very successful.



"WABASH VALLEY LINES"
SAFETY FIRST

..................................191...

M.............................. ....

..............................Ind.

Your report of..............................191.....,with regard to,..................

....

has been reported on by..

....

AND WE HOPE THAT THIS CONDITION OF DANGER WILL NOT ARISE IN THE FUTURE. We shall depend upon you to make report on this and other safety matters in the future and the Company wishes to thank you at this time for the interest you have shown for the cause of SAFETY.

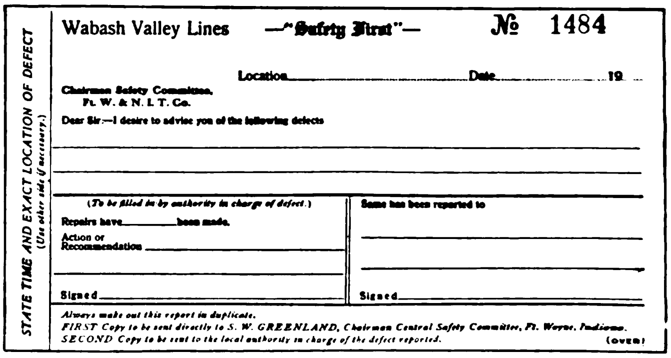
THINK OF SAFETY AS FIRST.

....
Chairman Central Safety Committee.

Card Acknowledging Defect Report, Sent After Defect Has Been Remedied

The company is now holding a series of safety "rallies" to which the employees of the company and their families are invited. At these rallies an address is made on the subject of safety by an outside speaker brought in especially for the purpose. The first rally of this kind was held at Fort Wayne last month and was addressed by E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railroad. The second meeting was held at Logansport with Charles B. Scott, formerly assistant to the general manager of the Louisville & Northern Railway & Lighting Company, as speaker. In addition to the address special music has been provided for each occasion. A third rally has been arranged for the Western division of the line at Lafayette, Ind. An effort has been made in each case to get the families of the employees into these meetings, and to do this special cars have been operated over the interurban lines for this purpose. The speaker delivers two talks at these rallies, one in the morning for the night men and one in the evening for the day men.

Another plan followed by the safety committee is the adoption of a "safety first" emblem and various mottoes relating to this subject. Some of these follow: "Attend a Safety Meeting and Get Acquainted," "Think of Safety First," "Start To-day to Save Life and Limb," "We Have Been Reporting to the Doctors—Let's Try the Safety Committees," "Get the Safety Habit—Set the Safety Example." These mottoes are also stamped on the service mail and envelopes so as to give wide publicity to them.



STATE TIME AND EXACT LOCATION OF DEFECT
(Use other side if necessary.)

Wabash Valley Lines —"Safety First"— № 1484

Location________________Date__________19__

Chairman Safety Committee,
Ft. W. & N. I. T. Co.

Dear Sir:—I desire to advise you of the following defects

(To be filled in by authority in charge of defect.)

Repairs have_______been made.

Action or Recommendation ________________

Signed________________

Same has been reported to

Signed________________

Always make out this report in duplicate.
FIRST Copy to be sent directly to S. W. GREENLAND, Chairman Central Safety Committee, Ft. Wayne, Indiana.
SECOND Copy to be sent to the local authority in charge of the defect reported. (over)

Defect Slip, Filled Out by Employee and Sent to Chairman of Safety Committee

The chairman of the safety committee is S. W. Greenland, assistant to the general manager of the company. He is assisted by R. R. Ritchie, the supervisor of safety.

News of Electric Railways

New York Subway Operating Contracts Approved

The Public Service Commission of the First District of New York, on March 4, 1913, approved the contracts with the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company for the operation of the dual subway system, but did not act on the certificates for third-tracking the lines of the Manhattan Elevated Railway, which is operated under a lease by the Interborough Rapid Transit Company. The agreements are now before the Board of Estimate, and it is expected that they will be acted upon by that body within a few days. A difference of opinion has arisen between George J. Gould, president of the Manhattan Elevated Railway, representing stockholders of that company, and the officers of the Interborough Rapid Transit Company in regard to the certificates for third-tracking the lines of that company, and following a meeting of the directors of the Manhattan Elevated Railway on March 4, 1913, Edward T. Jeffrey, who presided, issued a statement to the effect that "while the company has no desire to interfere with the development of rapid transit, the contractual relations between the two companies must be determined on a fair and equitable basis." In March, 1908, the Public Service Commission approved the so-called tri-borough rapid transit system. In May, 1908, construction was ordered on the Fourth Avenue rapid transit line in Brooklyn. This work was subsequently postponed, only to be resumed later. In November, 1909, the constitutional amendment was adopted exempting dock and water bonds from the debt limit of the city so that additional credit could be secured for subway construction. In January, 1910, the Legislature enacted a law making available $120,000,000 for subway construction. In October, 1910, the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company refused to bid on the tri-borough contracts. In June, 1911, the dual system plan was adopted in original form and construction was begun by the city on the Broadway-Lexington Avenue line. In May, 1912, the dual system operating agreements were submitted by the joint committee of the Public Service Commission and the Board of Estimate and Apportionment. A summary of the terms of the operating contracts as approved by the commission on March 4, 1913, follows:

The contract with the Interborough Rapid Transit Company provides that the city shall construct the new lines allotted to the Interborough company, and that the company shall contribute not less than $58,000,000 (or one-half the total) toward the cost of construction, and not less than $22,000,000 toward the cost of equipment. The company is to get a lease of all lines for operation, including the present subway and the new lines, for a term of forty-nine years from Jan. 1, 1917, the date set for the beginning of operation, and the lease is to expire at midnight on Dec. 31, 1965. Provision is made for temporary operation of parts of the system as soon as completed. The city reserves the right to take over any or all of the lines at any time after ten years and terminate the contract. The company is to supply all the equipment, and in the event of recapture the city is to pay for the equipment.

Arbitration is provided for in case difficulties arise between the city and the company. Each side is to name one arbitrator and the third is to be named by the Chief Judge of the Court of Appeals, or in his failure to act, by any of the associate judges of the Court of Appeals in order of seniority, or in their failure to act by the president of the Chamber of Commerce.

Provisions are made for securing to the city the necessary control over expenditures by the company in the construction, equipment, maintenance and operation of the lines. This control is provided because "the city's returns from its investment in the railroad and its exercise of its right to take over the railroad as provided in the lease will be affected by the amount of the lessee's expenditures." Supervision by the commission is agreed to and the company is required to provide facilities for such inspections as the commission may wish to make.

As to equipment, the contract requires that the company shall provide it at its own expense and, when accepted by the commission, title to it shall vest in the city. The company is permitted to improve, reconstruct or change its power houses if necessary to provide adequate power for the operation of the road.

The city leases the railroads and equipment to the company for operation in connection with the existing subway for a single fare. The lease under Contract No. 1 of the existing subway, which expires Oct. 27, 1954, and the lease under Contract No 2, which expires May 1, 1943, are modified and extended until midnight of Dec. 31, 1965, so that all leases may expire together. Receipts from all lines are to be pooled and at the end of each quarter certain specified deductions are to be made. The operating terms were referred to at length in the Electric Railway Journal of June 17, 1911, page 1070. Temporary operation to be on the same terms as are provided for the operation of extensions.

Free transfers are to be given as required and approved by the commission at common or connecting points. The company may carry freight, mail and express matter, provided that it does not interfere with the passenger service.

Provision is made for the temporary equipment and operation of the Steinway Tunnel pending its reconstruction and completion. and for the giving of free transfers at Forty-second Street and Park Avenue between the Steinway Tunnel and the subway. Temporary equipment may be of single cars, as approved by the commission, and the cost is to be included as part of the cost of equipment under the contract.

The operating contract with the Brooklyn Rapid Transit interests is made between the Public Service Commission, acting for the city, and the New York Municipal Railway Corporation, a company formed for the purpose of operating those parts of the dual system allotted to the Brooklyn company as well as the existing elevated lines of the Brooklyn Rapid Transit. It provides that the city shall construct the new lines of rapid transit railroad, and that the company shall contribute not less than $13,500,000 toward the cost of construction, together with whatever sum is necessary to construct the physical connection at Canal Street between the Fourth Avenue subway and the proposed Broadway subway. The company also agrees to provide the money necessary for the reconstruction of its elevated lines and for all equipment.

The Brooklyn elevated lines which are made a part of the system are: the Broadway line, the Fulton Street line, the Myrtle Avenue line, the Lexington Avenue line, the Fifth Avenue line, the Brighton Beach line, the Canarsie line and the Sea Beach line. The city leases the new lines to be constructed by it and those already constructed, together with the equipment, to the company for operation in connection with the existing railroads for a term of forty-nine years, beginning on Jan. 1, 1917, and expiring at midnight on Dec. 31, 1965. The city reserves the right to take over any line after ten years of operation.

The city agrees to give to the company trackage rights over a part of the system to be constructed under the contract between the city and the Interborough Rapid Transit Company, namely, the Queens line to Astoria and Corona. The terms and conditions for the use of these lines "shall be reasonable and may be agreed upon between the commission, the lessee and the Interborough Rapid Transit Company." Failure to agree upon reasonable terms may bring about arbitration or a settlement by the courts. Such use of the tracks is limited to one-half the capacity of the lines.

Free transfers are to be given as required by the commission at common or connecting points so as to afford a continuous trip in the same general direction for a single fare. The company agrees to exchange transfers at Eighty-sixth Street, Brooklyn, between the new system and the existing surface railway now operating on Third Avenue and Fifth Avenue between Eighty-sixth Street and Fort Hamilton. The company also will endeavor to secure authority for the extension of such surface railroads to a point near Eighty-sixth Street and Fourth Avenue where a more convenient point of transfer can be installed. The company also agrees to undertake to make arrangements with the Hudson & Manhattan Railroad for free transfers at Thirty-fourth Street, Manhattan, to and from the Grand Central Station.

The fare is limited to 5 cents, provided that the company may continue to charge 10 cents for the fare to Coney Island and other points where such 10-cent fare is now allowed "until the time when trains are operated for continuous trips over wholly connected portions of the railroad (including both the Culver line and subdivision 8 of the Broadway-Fourth Avenue line) from the Municipal Building, Manhattan, to the points at or near Coney Island at which the construction of the railroad shall be suspended."

Findings and Recommendations of the Pujo Committee

The Pujo committee's report and two bills embodying its recommendations were presented in the National House of Representatives on Feb. 28. The recommendations of a majority of the Pujo committee as regards clearing house associations cover incorporation and regulation, examination of members, the issuance of clearing house certificates, the regulation of rates for collecting out-of-town checks, the regulation of rates of discount and of interest on deposits. As regards the New York Stock Exchange, the recommendations cover conditions precedent to the use of the mails, the telegraph and the telephone. As regards the concentration of control of mony and credit the recommendations cover the consolidation of banks, interlocking bank directors or directorates, interlocking stock holdings among banks, voting trusts in banks, cumulative voting, reform of railroad reorganization, etc. The sections in regard to the concentration of control of money and credit which relate to the railroads and railroad reorganizations follow:

"The method of reorganizing insolvent railroads should be reformed by adopting in substance the system provided by the companies act of Great Britain, whereby, briefly stated, the plan and procedure on reorganization are placed under the direction and control of the courts, the receiver is elected by the votes of those interested in the property, no sale is involved and a single shareholder can defeat an unjust plan.

"The Interstate Commerce Commission should be empowered, subject to review by the courts, to supervise and review plans for the reorganization of interstate railroads and the issue of securities thereunder.

"The security issues generally of interstate railroads should be placed under the supervision and control of the Interstate Commerce Commission.

"It should also be required that in the disposition of such issues competitive bids, public or private, be invited."

The committee has defined the so-called money trust as follows:

"An established and well-defined identity and community of interest between a few leaders of finance which has been created and is held together through stock holdings, interlocking directorates and other forms of domination over banks, trust companies, railroads, public service and industrial corporations, and which has resulted in a vast and growing concentration and control of money and credit in the hands of a comparatively few men."

In this connection it adds, however, that the so-called money trust has not proved to be "a combination or arrangement created and existing pursuant to a definite agreement between designated persons with the avowed and accomplished object of concentrating unto themselves the control of money and credit."

Proposal of City to Cincinnati Company

The proposition of the city of Cincinnati for the adjustment of street railway matters was submitted to the Cincinnati Traction Company and the Cincinnati Street Railway on Feb. 25 by City Solicitor Alfred Bettman. Two of the principal conditions are that the company shall surrender its fifty-year franchise and accept an indeterminate permit from the city and that it shall divide all profits above 6 per cent upon an appraised value of the property with the city. Other conditions are the privilege to the city of purchasing the property, control of service and the virtual supervision of operations. The proposition provides for the lease and operation of the proposed loop line to be constructed by the city. This offer was made as a result of a conference between Mayor Hunt and City Solicitor Bettman on the one side and Governor Cox and Representative Bigelow on the other. The Governor and Representative Bigelow were consulted because a bill is now pending in the Legislature which would revoke all franchises which were drawn for more than twenty-five years and also because certain legislation will be needed to allow the city to construct the loop line and give it the privilege of building on some portions of the state canal lands in an open cut.

Representative Bigelow has expressed his disapproval of portions of this proposition. He claims they do not agree with the conditions settled upon at the conference mentioned. W. Kesley Schoepf, president of the Cincinnati Traction Company, said on Feb. 26 that the proposition contains several clauses which are not acceptable to the company.

Decision in Detroit Franchise Case

According to a decree entered by the Michigan Supreme Court on Feb. 28, 1913, the responsibility for ordering the vacation of Fort Street on which the franchise of the Detroit United Railway has expired is placed with the Detroit Council. Immediately following the decision of the Supreme Court on Oct. 12, 1912, to the effect that the company was a trespasser on Fort Street, attorneys for both the city and the company prepared decrees. The one entered by the court is practically the decree proposed by the company. By its terms the company must cease operating on Fort Street within ten days after the Council has so ordered. Attorneys for the city hoped that the decree would contain an order commanding the company to cease operation on that thoroughfare ten days from the date of entry, and their proposed decree was so formulated. F. W. Brooks, general manager of the company, was quoted as follows:

"The management of the Detroit United Railway has no criticism or comment to make concerning the decision of the Supreme Court. No official notification of the decision has been received at this office, but when it comes the order of the court will be obeyed."

Mayor Marx and members of the City Council of Detroit, Mich., have been investigating the advisability of establishing a municipal motor bus line for the accommodation of West End people. The Mayor states that if the Detroit United Railway will build a crosstown line on Junction Avenue, the bus line will not be necessary.

Ross W. Harris, Madison, Wis., has conferred with the Mayor in regard to street railway matters and has agreed to put into writing his proposals for a study of traffic conditions in Detroit similar to that which he carried out recently in Cincinnati, Ohio.

Rapid Transit Measures for Philadelphia

A number of measures have been drafted at the instance of Mayor Blankenburg of Philadelphia for introduction into the Legislature at Harrisburg which it is believed will benefit the city materially in handling its transit situation and make possible the building of subways and elevated lines. One of the measures is so drawn as to authorize the city to construct or lease subway and elevated roads with broad powers of eminent domain within and without the city limits. In another of the proposed laws, the assessed value of taxables for personal property tax would become part of the basis of assessments on which the city's borrowing capacity is computed and would therefore increase such borrowing capacity at this time by about $40,000,000, while the city's revenues would be increased at the same time annually by more than $650,000. Another bill provides for the creation of a department of city transit by amendment to the Bullitt bill. The department of city transit would be in the charge of a director to be appointed in the same manner as the directors of other city departments, and the head of the department of city transit would be empowered to appoint an assistant director and such officers, clerks, engineers and other employees as were found necessary. The act also provides an appropriation by Councils of the fund necessary for the maintenance and operation of the department. Director Cook of the department of public safety is reported to have said:

"While Transit Commissioner A. Merritt Taylor has been absent during a part of the time while these bills were under consideration they follow out in essential details his ideas, and to him belongs a very large share of the credit for the plan."

Railroad Starts Electrical Correspondence School

A free course of correspondence study in electrical engineering and associated subjects has been inaugurated by the Pennsylvania Railroad under the supervision of J. C. Johnson, superintendent of telegraphs. Although the plan was announced only a little more than a month ago, the school already has more than 10,000 students enrolled.

The course of study will consist of a series of instruction papers in pamphlet form, each covering a different field and including elementary work on direct-current and alternating-current circuit and apparatus; mathematics, mechanical and geometrical drawing; magnetism and its application to electric generators, motors, measuring instruments, telegraph, telephone, signal, lighting, traction and general electrical equipment; every-day troubles developing in each type of apparatus, and methods of locating and correcting them.

Besides providing a means for the education of its employees in existing applications of electricity, it is understood that the company has adopted this method to train the largest possible number of its men for the duties that will devolve upon them when electric traction is substituted for steam locomotive haulage. Students are invited to ask questions, and a course of supplementary reading of textbooks and periodicals is recommended.

The first textbook in the educational course is elementary arithmetic, followed by pamphlets on primary cells and direct current. Fourteen of these pamphlets, concluding with electric traction and power plant design and apparatus, will complete the course.

New Steel Bridge at New London

Engineers of the New York, New Haven & Hartford Railroad are completing the plans for the new steel bridge over the Thames River at New London, Conn. The plans call for a four-track bridge, consisting of two double-track parallel spans. The height of the bridge above the bottom of the channel will be 140 ft. There are to be five fixed spans, four of which will be of 195 ft. each and one of 245 ft., and also one draw span having a clear channel of 150 ft. It is estimated that, including certain sections of the approaches, the total cost will be about $4,000,000. The present structure was offered to New London for highway purposes, but this offer was refused. It was subsequently offered to the State of Connecticut as a feature of its highway program, and a bill has been introduced in the Connecticut Legislature providing for the acceptance of this offer. The only reservation made by the New York, New Haven & Hartford Railroad is that the company may have permission to run an electric railway over the old bridge should it be deemed advisable.

License Fee Increase Proposed in Harrisburg.—An ordinance has been introduced in the City Council of Harrisburg, Pa., to increase the annual license fee charged the Valley Railways from $500 to $1,500.

Tacoma Votes to Build Municipal Line.—The City Council of Tacoma, Wash., has voted to build a municipal electric railway from Eleventh and A Streets over the new Eleventh Street bridge and the tide flats to the city limits at Sitkum Avenue.

Study of Transit Needs in Montreal.—The comptrollers of the city of Montreal have been requested to study the question of the city constructing a system of underground tramways. The report of the committee of the Aldermen on reducing the number of street car stops in Montreal has been sent to the comptrollers. John P. Fox has begun an investigation of street railway problems in Montreal for the city.

Buffalo Improvements Illustrated.—The Buffalo *Times*, which issues with its Sunday edition an illustrated supplement, published on Feb. 23, 1913, an exterior view of the new Fillmore Street substation of the International Railway and a view showing a portion of the interior of the new Broadway substation of the company. Underneath the pictures appeared the caption, "Improvements Being Made in the Equipment of the Buffalo Street Car System."

Rehabilitation Work at Toledo.—The annual meetings of the subsidiary companies of the Toledo Traction, Light & Power Company, Toledo, Ohio, have been further postponed. At a meeting of the officials of the city and the officers of the company recently it was announced that $1,000,000 will be spent in improvements. A resolution has been adopted by the City Council asking that one of the lines be completely equipped with pay-as-you-enter cars.

Ordinance Based on Recommendations of St. Louis Commission.—An ordinance has been introduced in the Council of St. Louis, Mo., to require the United Railways to expend about $2,000,000 in additions and improvements. The ordinance is based on the recommendation of the Public Service Commission of St. Louis that the United Railways purchase 165 motor cars at $6,500 each, 165 trail cars at $3,500 each, and spend $150,000 in the construction of extra loops.

Mayor Blankenburg Agrees to Car Trust Plan.—Mayor Blankenburg of Philadelphia, Pa., has signed the ordinance authorizing the Philadelphia (Pa.) Rapid Transit Company to issue car-trust certificates to the amount of $4,200,000 and in the future to make additional issues, provided that such issues shall not exceed 80 per cent of the cost of the cars. The authorization of the issuance of the car-trust certificates by both branches of Councils of Philadelphia and by the stockholders of the Union Traction Company, Philadelphia, was referred to in the ELECTRIC RAILWAY JOURNAL of March 1, 1913, page 389.

Get-Together Dinner in New York.—The second annual beefsteak dinner and reunion of the car equipment departments of the Interborough Rapid Transit Company and the New York Railways was held recently at Healy's. Messrs. Fuhrer, Delaney, Dougan and other officials of the company attended. Among the representatives of the different supply companies were numbered Messrs. Scott, Carter and Moore, of the General Electric Company; Shepard and Keller, of the Westinghouse Company; Hall, of the Yale & Towne Manufacturing Company; King, of the Sterling Varnish Company, and others too numerous to mention.

Additional Block Signal Protection on Illinois Traction System.—As a part of the construction schedule for 1913, the Illinois Traction System will block solidly the territory between Springfield and St. Louis during the coming summer. The total distance is approximately 100 miles, 35 of which were protected in 1911. To fill in the gaps will require approximately 60 miles of additional protected track. The type of signal used in the original installation was the Union Switch & Signal Company's style B with home and distant signals protecting each siding. The new arrangement of signals and type of apparatus will be practically identical with that row in service.

Committee on Dispatching Appointed by Wisconsin Association.—The Wisconsin Electrical Association has appointed a committee on train dispatching. The purpose of the committee is to recommend to the Railroad Commission of Wisconsin a uniform system of train dispatching practicable for all of the interurban electric railways of the State. Following are the members of the committee: E. W. Hammett, chairman, superintendent of the railway department of the Sheboygan Railway & Electric Company; John St. John, assistant general manager of the Milwaukee Northern Railway, and A. E. Pierce, assistant general manager of the Chippewa Valley Railway, Light & Power Company.

Plans for Extension of San Francisco Municipal Line to Exposition.—The Board of Supervisors of San Francisco, Cal., has adopted a resolution requesting the Board of Public Works to submit a preliminary plan with approximate estimate of cost of an adequate municipal street railway system to the site of the Panama-Pacific Exposition. The board was urged to complete its preliminary report as soon as possible and to advise the supervisors in regard to the time that will probably be required to build and equip such lines as may be embraced in the plans suggested. A resolution calling upon the United Railroads to put into immediate service 100 additional cars has been referred to the public utilities committee for investigation and report.

Plans of Stone & Webster in the Pacific Northwest.—Stone & Webster, Boston, Mass., have under consideration the construction of an electric railway from Bellingham to Lynden with a possible extension to Vancouver, B. C., and the construction of power plants to develop between 100,000 hp and 200,000 hp on the sites purchased recently from the Skagit Power Company. Jacob Furth, president of the Puget Sound Traction, Light & Power Company, Seattle, Wash., is quoted as follows: "We are now surveying and measuring the streams and investigating. From the knowledge we have already gathered the prospects are bright for the ultimate completion of a plant on those sites that will give us from 100,000 hp to 200,000 hp. and everyone knows what the development of so much power will mean to the surrounding country and cities. Such projects move slowly, of necessity. We began building our White River power plant over two years ago and it is not finished yet. There is much to do before we can begin construction on this big Skagit plant."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

Representative Ryan has introduced into the Legislature a bill to limit to ten hours per day employment of conductors or motormen on street cars and interurban lines. Senator Cornwell has introduced Senate Bill No. 169, which is a substitute for his first bill to require all interurban railways to provide toilet facilities and drinking water on all cars. The revised bill provides that not only the Railroad and Warehouse Commission but any public prosecutor may prosecute those who violate the provisions of the act as amended.

MASSACHUSETTS

A hearing was held before the committee on street railways on Feb. 27 upon the bill to authorize street railways to purchase the whole or part of connecting lines in other states. Bentley W. Warren, counsel for the Massachusetts Street Railway Association, appeared in support of the measure. There was no opposition. Charles F. Baker, for the Fitchburg & Leominster Street Railway, appeared in support of the bill to authorize street railways to fund indebtedness to an amount equal to but not exceeding twice the value of their capital stock. He explained that the bill is designed to relieve companies from carrying short-term notes, which is highly expensive, but necessary under the present law limiting the bonded indebtedness to the same amount as the capital stock.

The Boston Transit Commission has issued a report regarding the construction of a subway for train service extending from Andrew Square, Dorchester, to Codman Square, a distance of about 2.8 miles, in accordance with a resolve of the last Legislature directing the board to compare routes between the above points. The commission recommends a route via Upham's Corner, and the estimated cost of construction of the line is $6,300,000, exclusive of land damages.

MICHIGAN

The Verdier home rule bill was passed by the Senate on Feb. 27, but it was held for further consideration in the committee on city corporations of the House. The supporters of municipal ownership in Detroit urged haste so that they may prepare amendments to the city charter in time for a vote at the regular April election. The bill has been amended so that ordinances proposing a revision of parts of the city charter may lie on the table fifteen instead of thirty days before the election. Another amendment increases the amount of bonds that a city may issue from 1 to 2 per cent of the assessed valuation of the city. That will give Detroit an opportunity to issue $10,000,000 of bonds instead of half that amount, as provided in the original draft. An amendment was appended increasing from 5 per cent to 10 per cent the number of electors voting for Mayor at the last election who must sign the initiatory petitions.

MINNESOTA

The Nolan public utility bill, which has been passed by the House, was recommended on Feb. 20, 1913, for passage in the Senate by the committee on corporations other than municipal, with an amendment exempting telephone companies. This bill does not provide for a public utilities commission, but delegates to all cities and towns the power to regulate the rates of public utility corporations, telephone companies being excepted.

MISSOURI

The Senate has passed the public utilities bill by a vote of 26 to 5, and the measure is now before the Governor for his signature. The bill is an administration measure and provides for the creation of a commission to have supervision over the activities of all the public service corporations which operate in the State.

NEW YORK

Senator Thomas O'Keefe, of Oyster Bay, has introduced a bill to place the counties of Nassau and Suffolk under the jurisdiction of the Public Service Commission for the First District instead of the Commission for the Second District. The bill also provides that the number of commissioners in the First District (New York City) shall be six instead of five and that the additional member shall be a resident of either Nassau or Suffolk County.

On Jan. 25, 1913, the judiciary committee of the Assembly voted to report favorably Assemblyman Goldberg's bill, patterned after the Kansas "blue sky" law and designed to regulate all investment companies.

OHIO

A hearing on the bill to repeal the law requiring consents of property owners abutting any proposed street railway was held before the committee on cities of the House on Feb. 20. City Solicitor Bettman of Cincinnati, City Solicitor David Jenkins of Youngstown, Mayor Newton D. Baker of Cleveland, Secretary Walter Draper of the Cincinnati Traction Company and others spoke in favor of the bill. There was no opposition. The bill was approved later by the committee.

Representative Walter G. Alger has introduced a bill giving the commissioners of Stark County authority to bring suits for the termination of franchises of electric railways where the date of expiration is not given. A bill has been introduced by Representative Vollmer, of Cuyahoga County, which makes it unlawful for an employer to discriminate against union or non-union men. Employers are forbidden to keep a record of employees' qualifications for the purpose of giving information to other employers as to their worth.

The Kilrain bill requires street railways to furnish seats for conductors on duty in pay-as-you-enter cars. Representative Black has introduced a bill which permits any interurban railway which seeks to connect two municipalities to secure an entrance to either or both of such municipalities. At present a company must have 10 miles of track laid before it can do this. Representative Louis Capelle has offered two bills which seek to establish the principle that proof of injury of any passenger or employee of a steam railroad or electric railway should be *prima facie* evidence of lack of reasonable skill or care on the part of the company's servants.

The Green workmen's compulsory compensation bill has been passed by both branches of the Legislature. It provides that all individuals, firms or corporations employing five or more persons regularly shall contribute to the State fund or make provisions to compensate their employees directly or through a mutual organization made up of a number of employers. Liability companies proper are practically barred from doing this class of business. The act goes into effect on Jan. 1, 1914.

A bill has been introduced which provides that electric railways shall carry all policemen and firemen free. Representative Plumb, of Delaware County, has introduced a bill in the House which will give the Columbus, Urbana & Western Traction Company the right-of-way over the grounds of the Girls' Industrial School, near Delaware. A bill to permit municipalities to levy special assessments on street railways to pay for street improvements has been introduced by Representative Williams.

PENNSYLVANIA

The hearing before the judiciary committee of the House on the public utility bills was originally scheduled for Jan. 26, but a postponement was voted. Requests for information covering the bills have been so numerous that authority has been granted for printing 500 additional copies of each bill. It is expected that it will take ten days to dispose of this bill. It is believed that the committee will recommend a bill combining features of the Republican, the Democratic and the administration measures and that the bill so recommended will pass both branches without material changes. Should this prove to be the case, Governor Tener will probably sign the measure as he is pledged to a public utility law.

One of the eleven bills introduced in the House at the request of Mayor Magee of Pittsburgh empowers that city to construct and operate electric railways within the corporate limits of the city. The Clark bill providing a commission form of government for third-class cities like Harrisburg has been reported affirmatively from the Senate committee with an amendment providing that public service corporation franchises may be granted by the commissioners on condition that a certain period elapse before said grant becomes operative, during which a referendum petition bearing the signatures of 15 per cent of the electors may be filed. The bill as originally presented prohibited the granting of franchises without a referendum vote. The general appropriation bill has been introduced in the House. It carries $42,662,343. The State Railroad Commission requests $194,000.

WASHINGTON

House Bill No. 255, before the Senate and House irrigation and arid land committees, has caused a great deal of comment throughout the State of Washington. The measure provides that waters or streams in the State necessary for irrigation cannot be used for the generation of electric power to be sold to other states. The primary object of the measure is to prevent the Northwest Electric Company from proceeding with its operations on the Klickitat River in Klickitat County. This company is damming the stream and erecting power houses and expending several millions of dollars.

WISCONSIN

Further railroad commission legislation is provided for in a bill to punish for failure to comply with the order of the commission. A bill to require street railways to pay for street pavements between the rails of their tracks and 1 ft. on the outside thereof has been introduced in the House. Another measure provides for reasonable wages and salaries to employees of public utilities. A measure providing that cities of the first class may extend water mains on public highways or tunnel under steam and electric railway crossings and another authorizing cities to sell tracks for street railways laid by cities and along bridges and viaducts within such cities have been introduced in the Legislature.

PROGRAM OF ASSOCIATION MEETING

American Society of Mechanical Engineers

The railway committee of the American Society of Mechanical Engineers has arranged for the discussion of the subject of steel passenger car design in its various phases at a meeting to be held in the Engineering Societies Building, New York, N. Y., on the evening of April 8. Various phases of the subject will be discussed as follows: "Problem of Steel Car Design," "Suspension of Steel Cars," "Truck for Steel Passenger Cars," "Provision for Electric Lighting in Steel Cars," "Provision for Electrical Equipment on Steel Motor Cars," "Special Ends for Steel Passenger Cars," "Draft Gears for Steel Passenger Cars," "Cast-Steel Double-Body Bolster and End Frames for Steel Cars," "Superstructure of Steel Cars," "Roof Structure for Steel Cars," "Interior Steel Finish for Steel Passenger Cars," "Corrosion and Protection of Steel Passenger Cars," "Air Brakes and Heavy Steel Passenger Cars and Special Pressed-Steel Shapes for Steel Cars." The chairman of the railway committee is E. B. Katte, chief engineer of electric traction of the New York Central & Hudson River Railroad.

Financial and Corporate

Stock and Money Markets

March 5, 1913.

Trading on the New York Stock Exchange was more active to-day than yesterday, and the upward movement of the market was resumed. Nearly all of the important railroads and industrials advanced from 1 point to more than 2 points, while a number of the specialties made even greater gains. For the most part comment on the new Cabinet was favorable, and little or no concern was felt over the tone of the President's inaugural address. Call money became still easier to-day. Rates in the money market were: Call, 2¾@3½ per cent, with the last loan at 2¾ per cent; sixty and ninety days, 4½@4¾ per cent; four months, 4¾ per cent; five and six months, 4½@4¾ per cent.

In the Philadelphia market to-day only a light demand was evident on the Exchange, and trading continued on a small scale.

In the Chicago market to-day a strong tone was shown generally throughout the entire list. Bonds were steady.

The tone which the market took to-day in Boston was considered distinctly better, but the market was narrow.

Prices were steady on the Baltimore Exchange to-day, but the trading continued dull.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 26.	Mar. 5.
American Brake Shoe & Foundry (common)	90½	90½
American Brake Shoe & Foundry (preferred)	130½	131¼
American Cities Company (common)	47½	47½
American Cities Company (preferred)	75¾	76½
American Light & Traction Company (common)	3[illegible]	380
American Light & Traction Company (preferred)	100	107
American Railways Company	40	39¾
Aurora, Elgin & Chicago Railroad (common)	43	44
Aurora, Elgin & Chicago Railroad (preferred)	85¾	86½
Boston Elevated Railway	108	108½
Boston Suburban Electric Companies (common)	7⅛	7½
Boston Suburban Electric Companies (preferred)	65	65
Boston & Worcester Electric Companies (common)	5½	6
Boston & Worcester Electrc Companies (preferred)	43	40
Brooklyn Rapid Transit Company	88¼	90⅝
Capital Traction Company, Washington	122⅝	120
Chicago City Railways	150	150
Chicago Elevated Railways (common)	30	30
Chicago Elevated Railways (preferred)	91	91
Chicago Railways, ptcptg., ctf. 1	92	90
Chicago Railways, ptcptg., ctf. 2	23¼	24
Chicago Railways, ptcptg., ctf. 3	6½	6½
Chicago Railways, ptcptg., ctf. 4	3½	3½
Cincinnati Street Railway	111	111
Cleveland Southwestern & Columbus Ry. (common)	6	*6
Cleveland Southwestern & Columbus Ry. (preferred)	30	*30
Cleveland Railway	103½	103¼
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69	69
Columbus Railway (preferred)	88½	88½
Denver & Northwestern Railway	117	117
Detroit United Railway	76	85
General Electric Company	137½	139
Georgia Railway & Electric Company (common)	a123	122
Georgia Railway & Electric Company (preferred)	83½	84
Interborough Metropolitan Company (common)	17	18
Interborough Metropolitan Company (preferred)	57½	61⅛
International Traction Company (common)	42	42
International Traction Company (preferred)	95	95
Kansas City Railway & Light Company (common)	20	20
Kansas City Railway & Light Company (preferred)	38	38
Lake Shore Electric Railway (common)	6½	6½
Lake Shore Electric Railway (1st preferred)	91	91
Lake Shore Electric Railway (2d preferred)	25½	25½
Manhattan Railway	132½	131
Massachusetts Electric Companies (common)	16½	16⅞
Massachusetts Electric Companies (preferred)	76	75½
Milwaukee Electric Railway & Light Co. (preferred)	102	102
Norfolk Railway & Light Company	*26	*26
North American Company	77½	79
Northern Ohio Light & Traction Company (common)	80	75
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	45	46
Philadelphia Company, Pittsburgh (preferred)	40½	41
Philadelphia Rapid Transit Company	25	25⅝
Portland Railway, Light & Power Company	67	67
Public Service Corporation	115	115
Third Avenue Railway, New York	35⅛	37½
Toledo Railways & Light Company	2¼	2½
Twin City Rapid Transit Co., Minneapolis (common)	104½	106
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	23¼	*23¼
United Rys. Inv. Company (common)	24	27½
United Rys. Inv. Company (preferred)	49½	51⅞
Virginia Railway & Power Company (common)	55½	54
Virginia Railway & Power Company (preferred)	92½	92½
Washington Ry. & Electric Company (common)	84¼	84
Washington Ry. & Electric Company (preferred)	87⅞	88¼
West End Street Railway, Boston (common)	77	78
West End Street Railway, Boston (preferred)	97	*97
Westinghouse Elec. & Mfg. Company	69½	70½
Westinghouse Elec. & Mfg. Company (1st preferred)	115	118

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*Last sale. a Asked.

ANNUAL REPORT

Cleveland Railway

The gross income of the Cleveland Railway in the calendar year 1912 amounted to $6,679,773. Expenses of maintenance and operation were $4,935,574, taxes were $366,591 and interest was $1,416,543, a total of $6,718,708. This left a deficit of $38,935. The increase in passenger revenue as compared with the preceding year was 4.59 per cent and in gross income it was 3.99 per cent. The increase in the number of fares was 7.45 per cent and in the total transfers 16.51 per cent. Passenger car miles were 28,864,296, or 3.64 per cent greater than in the preceding year.

The statement of income account for 1912, as based on the ordinance allowance and on actual disbursements, shows the following:

	Based on Disbursements		Based on Ordinance Allowance	
	Amount	Cents per Car Mile	Amount	Cents per Car Mile
Operating revenue	$6,648,756	22.84	$6,648,755	22.84
Actual expenses	4,935,574	16.96		
Expense allowances			4,786,220	16.44
Net earnings from operation	$1,713,182	5.88	$1,862.535	6.40
Miscellaneous income	31.016	.11	31,017	.11
Gross income, less disburse. or allow.	$1,744,198	5.99	$1,893,552	6.51
Taxes	366,591	1.26	366,591	1.26
Net income	$1,377,607	4.73	$1,526,961	5.25
Interest	1,416,542	4.87	1,416,543	4.87
Deficit	$38,935	.14		
Surplus			$110,418	.38

John J. Stanley, the president, says in the report in part:

"The total cost of operation per revenue car mile, including maintenance charges, operating expenses, taxes and interest, was 23.09 cents; the gross income per car mile was 22.95 cents, a deficit of 0.14 cent.

"The maintenance and operating expenses of the year were 16.96 cents per car mile; the ordinance allowances were 16.44 cents per car mile, a difference of about half a cent.

"Maintenance and operating expenses exceeded the ordinance allowances of the year by $149,353.

"In January, 1912, the company asked the City Council to increase the allowances one-half cent per car mile, but the request was refused. Another application will be presented to the Council.

"The rate of fare throughout the year was 3 cents within the city limits. In 1911 the rate was 3 cents in the last seven months of the year and 3 cents plus 1 cent for a transfer in the first five months.

"The average fare in 1911, including suburban fares, was 3.247 cents; in 1912 3.18 cents.

"The City Street Railroad Commissioner has been active throughout the year in connection with plans for lessening the cost of operation, or improving the service without a corresponding increase in expenses, and for certain improvements in the way of extensions of track, principally for crosstown lines and additional loops down-town and at various points near factories on several of the company's lines. By the amendments of the Tayler franchise, adopted by the Council in 1911 and accepted by the company, the city obtained the right to propose extensions, betterments and permanent improvements, and the company obligated itself to construct or otherwise acquire such improvements. These in 1912 have consisted mainly of additional trail-cars, a few additional motor equipments and the extensions of track and construction of loops just mentioned.

"The principal efforts of the Commissioner to decrease the cost of operation per car mile have been in the direction of

"1. Eliminating car stops, in order that cars may be operated between the down-town loops and the outer termini of the lines in shorter time.

"2. Restoring trail-car operation.

"3. Re-arranging the down-town loops, in order to relieve congestion in and near the Public Square.

"4. Cutting the two through lines, Woodland-Lorain and Scovill-West Twenty-fifth, at the Public Square. This change does not lessen the number of cars on the down-town loops, but it has increased the number of transfers, and will increase the earnings if the fare is raised to the next rate provided for by the franchise, viz., 3 cents cash fare, 1 cent transfer, no rebate.

"In the Tayler franchise the city reserves the entire control of the service to be furnished by the company, including the right to determine the character of the cars. Under this provision it directed the purchase of 100 large trail-cars of a new design, of which 95 have been put in service mornings and evenings. Under direction of the city we have contracted since the close of the year for 100 additional trailers of substantially the same type and 51 additional motor cars with electrical equipments.

"Recognizing the city's right to propose betterments and to prescribe schedules, routes and the character of cars to be used, your directors and officers have complied with all the demands of the Council and the Commissioner in these respects. The relations of the company with the city have, therefore, been harmonious during the entire year.

"These changes in methods of operation, which have undoubtedly lessened the cost per car mile and per passenger, could not have been made without the consent and co-operation of the city.

"The federal census of 1910 showed that the population of Cleveland had increased 47 per cent in the decade between 1900 and that year, or about 4 per cent per year compounded. The best statistics available indicate that this rate of growth has continued since 1910, if indeed the percentage in the last two years has not been larger. The business of the company, measured not in dollars but in the number of fares collected, has more than kept pace with this growth, and is one of the best indications of the growth. And Cleveland's principal suburbs are growing faster than Cleveland itself.

"The increase in service over 1911, measured in car miles, making allowance for increase in the size of cars, has not kept pace either with the increase in fares or the growth of the city and its suburbs, having been but 3.64 per cent, while the number of fares increased 7.45 per cent and the number of rides 9.56 per cent.

"The number of rides per car mile in 1911 was 9.409, in 1912 9.946.

"These figures indicate that the service ought to be improved. The cars that have been ordered will, when delivred to the company, enable us materially to better it.

"To operate the additional cars more power had to be provided. Early in 1912 the company, after long and careful negotiations, in which the City Street Railroad Commissioner participated, and in which he had the advice of some of the best engineers in the country, a contract was made with the Cleveland Electric Illuminating Company for the purchase of power, your officers and the Commissioner believing that it would be more economical to purchase current than to erect and equip additional generating plants. Power-plant expenses in 1913 will show an increase over 1912 because they will include in the amounts paid to the illuminating company what would be paid by the railway company in interest on additional investment if it should construct its own power plants, and no interest has heretofore been included in operating expense accounts.

"To enable the illuminating company to deliver its current to us we agreed to build and equip four substations.

"In February, 1912, we agreed with the North Randall Railway Company to operate an electric railroad to be built by that company from the terminus of our Broadway line on Miles Avenue to the North Randall race track and fair grounds. The line is about 3½ miles in length and was opened for operation July 29, 1912. The contract provides that we are to operate our own cars over it, and the North Randall Railway Company agrees to guarantee us against loss and has given us a bond with sufficient surety to carry out this agreement. This company is to receive, as a part of the cost of operation, 6 per cent upon the value of all property necessary for the operation of the railroad. No loss can come, therefore, to you under this contract. After payment of all expenses, including interest, the surplus earnings, if any, are to be equally divided between the two companies.

"The earnings of the new road to Jan. 1 amounted to $5,179, or 21.42 cents per car mile.

"On Dec. 14 the Council of Cleveland passed an ordinance giving the company the right to transport freight within the city limits in interurban cars, and to charge the interurban companies for such transportation 25 cents per car mile, a sum somewhat in excess of the company's other earnings. The company is to have the right to fix the compensation in the last fifteen years of its Cleveland franchise or any renewal of it. No freight has yet been carried under this grant. The franchise was passed at the urgent request of the merchants of the city. Some objection is made to the company doing a freight business, and it may be that a referendum election on the ordinance will be demanded.

"The company has erected in all of its car yards, except its Denison Avenue yard and its Holmden Avenue yard, both of which will probably be abandoned within a short time, standpipes equipped with monitor nozzles so distributed that two strong streams of water may be turned upon any car in the yard to extinguish or hold in check any fire that may start. It has equipped with automatic sprinklers buildings not previously so protected.

"The result of these improvements has been to reduce rates of insurance and insure greater safety to the company's rolling stock. Its equipment is not adequate for the service demanded by the community, and it cannot afford to lose any of it by fire.

"In July the directors authorized the sale to the stockholders of additional capital stock at par to an amount equal to 20 per cent of the $15,074,600 then outstanding. Substantially all this stock was taken by the stockholders and has been paid for.

"Proceeds of the sale of this stock have been used to pay for betterments and to take up a floating indebtedness of $407,000. After the betterments authorized have been completed and paid for about $1,400,000 was left to be applied to the payment of the Cleveland Electric Railway Company's bonds maturing on March 1. To pay the rest of these bonds and the cost of cars, motors and other betterments to be provided in 1913, your directors, instead of selling additional bonds of the issue of March 1, 1911, authorized another offer of stock, at par and interest."

Extensions of track aggregating 1.52 miles were built in 1912. Tracks aggregating 14.42 miles were renewed.

The balance in the interest fund on Dec. 31, 1912, was $484,283, or $15,717 less than the amount placed in the fund originally under the provisions of the Tayler ordinance. In 1910 and 1912 profits—that is to say, earnings in excess of allowances, taxes and interest—were added to the fund, as follows: In 1910, $75,994; in 1912, $110,418. In 1911 there was a loss after provision for allowances, taxes and interest of $202,129. This makes the net loss for the three years $15,717.

The expenditures for betterments in 1912 amounted to $961,341.

A statement of the maintenance and operating reserves follows:

	Amounts	Cents per Car Mile
Maintenance Reserve:		
Allowance	$1,438,662	4.94
Expenses	1,387,427	4.77
Surplus	$51,235	.17
Operating Reserves:		
Allowance	$3,347,558	11.50
Expenses	3,548,147	12.19
Deficit	$200,589	.69
Maintenance and Operating Reserves:		
Allowances	$4,786,220	16,44
Expenses	4,935,574	16.96
Deficit	$149,354	.52
Operating deficit	$200,589	.69
Maintenance surplus	51,235	.17
Net deficit for year	$149,354	.52

A statement showing the cost and income in 1912 per car mile, per fare and per ride follows:

	Cents		
	Per Car Mile	Per Fare	Per Ride
Maintenance expenses	4.77	.6823	.483
Operating expenses	12.19	1.7448	1.236
Taxes	1.26	.1803	.128
Interest on funded and floating debt	1.76	.2515	.178
Interest on capital stock	3.11	.4451	.315
Total cost of operation	23.09	3.3040	2.340
Gross income	22.95	3.2849	2.327
Deficit	.14	.0191	.013

San Francisco Note Plan Defended

Thornwell Mullally, assistant to the president of the United Railroads of San Francisco, has issued a statement explaining in detail the position of the company in connection with its plan for the issue of notes. As stated in the issue of this paper for Feb. 22, 1913, the Railroad Commission of California denied the application of the company for approval of the issue of notes. Mr. Mullally said in part in his statement:

"It is true that the company reduced its common capital stock. The company, on account of the terrible disaster of the earthquake and fire in 1906, had suffered a reduction in the value of its properties. As a result of this the company, in December, 1908, voluntarily reduced its capitalization $1,200,000, which represented a part of the actual losses suffered from the earthquake and fire.

"If capital stock is carried on the balance sheet under the head of 'liabilities,' a reduction of the stock would reduce those 'liabilities' in a corresponding amount and would increase the profit and loss surplus in a corresponding amount. This is the natural and proper result. Such an increase in the profit and loss surplus would not be false. It would be consequent upon the reduction of the capitalization. It would be actual and real and a false surplus would not thereby be set up.

"Of course, 'if' out of a false surplus a dividend is paid it is improper and illegal. The commission merely states a supposititious case. It does not here and could not correctly state that dividends have been paid out of a false surplus. The conditional statement has no application to the case in point, because the United Railroads has not set up any such false surplus and therefore it has not and could not have paid the dividend out of it. As a matter of fact the dividend was paid out of net surplus earnings.

"The practice of the applicant in regard to the system of bookkeeping under which its entries concerning sinking funds are made was installed by the certified public accountants, Haskins & Sells, and is one adopted by the leading certified public accountants generally throughout this country. If the auditor of the commission has a different method of bookkeeping in this particular, and if it is better than the one insisted upon by Haskins & Sells, all that the commission has been able to say regarding it is that the reserve for the sinking fund 'may have been used for purposes foreign to the sinking fund.' They have not stated that this reserve was so used, and they could not correctly so state, because it has not been. These sinking fund securities were lying in the safe deposit vaults and the commission was requested to look and see.

"The property went through the depletion due to earthquake, fire and strikes. This was followed by a panic throughout the country. In spite of the heavy losses suffered by the company to its tracks and property and to the city generally, which was reflected in the business of the company, it got back in 1911 to an earning basis as of 1906, and in 1912 made an increase in earnings of about 7 per cent over 1906. The earnings of the property reached in October, 1912, the highest point ever reached in its history. The physical condition of the property is better than it has ever been before.

"If, as stated, this company has made additions, betterments and improvements since 1902 amounting to about $11,000,000, rehabilitated itself and reconstructed a large portion of its roads, shops, buildings, machinery, etc.; if it has met its notes continuously for ten years; if it has paid during that time all its obligations; if it has complied with the terms and provisions of the sinking funds; if since 1902 it has issued and sold to the public only $6,760,000 of bonds; if it has retired $3,055,000 of bonds—then, with the prosperous future which seems before it and the city in which it operates, there can be no doubt of the ability of this company to meet its obligations as they mature."

Alexandria (La.) Electric Railways.—The Southern Traction & Power Company has taken over the property of the Alexandria Electric Railways.

American Cities Company, New York, N. Y.—At the annual meeting of the stockholders of the American Cities Company W. H. Freeman, Hugh McCloskey, James Michell and R. L. Montgomery were elected directors, to succeed

Lynn H. Dinkins, G. L. Edwards, William von Phul and Fernand Lapeyre.

Bowling Green (Ky.) Railway.—A petition has been filed in the Warren County Court at Bowling Green asking for a receiver for the Bowling Green Railway.

California Railway & Power Company, San Francisco, Cal.—An initial dividend of 1¾ per cent has been declared on the $3,000,000 of prior preference stock of the California Railway & Power Company, payable on April 1, 1913, to holders of record of March 22, 1913.

Cities Service Company, New York, N. Y.—The boards of directors of the Cities Service Company, the Consolidated Cities Light, Power & Traction Company and the Utilities Improvement Company have approved a plan for the acquirement of additional properties and exchange of the securities of the underlying companies. Henry L. Doherty & Company, organizers and managers of the three corporations, state that under the rearrangement of properties and by the taking over of the new properties the net earnings of the Cities Service Company will be increased from $1,113,732 for the year ended Dec. 31, 1912, to a basis of $1,757,798 for the year ended on that date, and the amount earned on the common stock increased from slightly over 9 per cent to over 12 per cent even on the larger capitalization under the new plan. The net earnings of the Consolidated Cities Light, Power & Traction Company, which were $308,238 for the year ended May 31, 1912, will be increased to a basis of $715,232, with an earning power for the stock outstanding of 5.61 per cent as compared with a little more than 2.16 per cent. Net earnings of the Utilities Improvement Company, which were $1,083,000 for the year ended Dec. 31, 1912, are increased to a basis of $1,720,400, which will give 5.18 per cent on the outstanding common stock. The rate of earnings on the common stock of the Cities Service Company is thus increased 33 per cent; earnings for stock of the Consolidated Cities Light, Power & Traction Company are increased 160 per cent, and earnings for the common stock of the Utilities Improvement Company are increased 7.2 per cent.

Columbus, Delaware & Marion Railway, Marion, Ohio.—Dr. W. H. Netherland, of the Bank of South Louisville, Louisville, Ky., has submitted to the protective committee of stockholders in the Columbus, Delaware & Marion Railway a plan looking toward reorganization of the company. The members of the committee considering Dr. Netherland's plan are Judge Robert Worth Bingham, Louisville; Samuel Castleman, Louisville, and A. E. McBee, New York City.

Columbus, Marion & Bucyrus Railway, Bucyrus, Ohio.—Judge Babst at Marion, in the foreclosure suit brought by the Troy Trust Company, Troy, N. Y., as successor trustee, has ordered the sale of the property of the company by William Maloney as special master.

Columbus Railway & Light Company, Columbus, Ohio.—A hearing was held on Feb. 28, 1912, before the Public Service Commission of Ohio on the application of the Columbus Railway & Light Company for permission to consolidate the railway and lighting interests at Columbus as the Columbus Railway, Light & Power Company. S. G. McMeen, president of the company, explained that the consolidation is desired in order that the railway and lighting service may be continued at existing rates and that such extensions and improvements may be made as are needed. The railway and lighting plants operating separately cannot give the most economical service. This was realized some years ago, but the only means available then for operating these plants as a unit was the leasing plan. This had proved costly. At present it was necessary to keep nine complete sets of accounts and the system was too cumbersome. With the plants consolidated much of the clerical work could be eliminated. Attorney W. A. Henry, representing the stockholders of the Columbus Light, Heat & Power Company, said that the holders of the preferred stock of that company should receive Series A 6 per cent preferred stock of the Columbus Railway, Light & Power Company in exchange for their present preferred stock holdings, the same as is proposed for the holders of the preferred stock of the Columbus Edison Company, instead of 80 per cent of Series A preferred and 20 per cent of Series B 5 per cent preferred.

Gardner, Westminster & Fitchburg Street Railway, Gardner, Mass.—The Railroad Commission of Massachusetts has approved the consolidation of the Athol & Orange Street Railway and the Gardner, Westminster & Fitchburg Street Railway. The commissioners also approved an issue of 1850 shares of capital stock of a par value of $100 by the Athol & Orange Street Railway, to be exchanged share for share for the capital stock of the Gardner, Westminster & Fitchburg Street Railway.

International Traction Company, Buffalo, N. Y.—Notice has been issued to holders of the 6 per cent collateral debentures of the Buffalo Railway that on April 1, 1913, the International Railway, formed by consolidation of the Buffalo Railway and other companies, will redeem all of the debentures issued under the trust agreement with the Metropolitan Trust Company, New York, under date of April 1, 1897.

Kankakee & Urbana Traction Company, Urbana, Ill.—A meeting of the stockholders of the Kankakee & Urbana Traction Company will be held to vote to increase the capital stock of the company from $200,000 to $500,000.

Massachusetts Electric Companies, Boston, Mass.—At a special meeting of the stockholders of the Massachusetts Electric Companies, held on March 4, 1913, it was voted to authorize the trustees to sell and dispose of all the preferred shares of the Bay State Street Railway which they may acquire during the current year, upon such terms and for such purposes as they may deem expedient. The stockholders further authorized the trustees to issue gold coupon notes of the Massachusetts Electric Companies to an aggregate amount not exceeding at the par value $3,500,000, payable at such time or times and bearing such rate of interest as they may decide.

Mexico, Santa Fé and Perry Traction Company, Mexico, Mo.—Judge Barnett at Montgomery City, Mo., has postponed the hearing on the motion for the appointment of a receiver for the Mexico, Santa Fé & Perry Traction Company until the regular term of the Audrain County Court in March.

Ogden (Utah) Rapid Transit Company.—Royal Eccles has been elected a director of the Ogden Rapid Transit Company to succeed the late David Eccles, his father, who was president and a director of the company.

Omaha, Lincoln & Beatrice Railway, Omaha, Neb.—The Nebraska State Railway Commission has approved the application of the Omaha, Lincoln & Beatrice Railway for permission to issue $2,250,000 of bonds and $850,000 of stock. Accompanying the petition by the company to the commission there was a copy of a proposal from the Northern Construction Company, Detroit, Mich., to complete the railway through from Omaha to Lincoln. The Lincoln terminals of the Omaha, Lincoln & Beatrice Railway and the line eastward into Bethany Heights, a suburb, have been in operation for some time.

Peoria (Ill.) Railway Terminal Company.—The property of the Peoria Railway Terminal Company has been taken over by the two proprietary companies, the Chicago & Alton Railroad and the Chicago, Rock Island & Pacific Railroad. B. A. Worthington, president of the Chicago & Alton Railroad, has succeeded W. T. Irwin as president of the Peoria Railway Terminal Company, and A. C. Ridgeway, vice-president of the Chicago, Rock Island & Pacific Railroad, has been elected vice-president of the Peoria Railway Terminal Company in charge of operation. Officials of the two proprietary companies will become officers of the Peoria Railway Terminal Company in alternate years.

Plymouth & Sandwich Street Railway, Plymouth, Mass.—The Plymouth & Sandwich Street Railway has petitioned the Railroad Commission for authority to issue 3400 shares of additional capital stock, consisting of 2000 shares of 6 per cent cumulative preferred and 1000 shares of common, of a par value of $100. The proceeds are to be used to pay floating indebtedness.

St. John (N. B.) Railway.—John R. Graham, president of the Bangor Railway & Electric Company, Bangor, Maine, and Henry W. Cushman, president of the Merrill Trust Company, Bangor, are said to have offered to purchase the stock of the St. John Railway at $150 a share. The company has outstanding $800,000 of stock.

Tampa (Fla.) Electric Company.—The Tampa Electric Company has increased its capital stock from $1,870,000 to $2,244,000.

Toledo & Chicago Interurban Railway, Kendallville, Ind.—The Supreme Court has authorized the sale of the Toledo & Chicago Interurban Railway under a petition submitted by James D. Mortimer, receiver. The upset selling price has been fixed at $550,000. The date for the sale has not been determined. The property of the Toledo & Chicago Interurban Railway has been in the hands of a receiver since February, 1908.

Trenton, Philadelphia & Bristol Street Railway, Philadelphia, Pa.—The Trenton, Philadelphia & Bristol Street Railway has filed a certificate of increase in the capital stock of the company from $358,000 to $750,000.

Virginia Railway & Power Company, Richmond, Va.—A semi-annual dividend of 1½ per cent has been declared on the $11,950,500 of common stock of the Virginia Railway & Power Company, payable on April 10, 1913, to holders of record of March 20, 1913. This payment compares with 1 per cent paid semi-annually from October, 1911, the date of the initial payment, to October, 1912, inclusive.

Washington (D. C.) Utilities Company.—It is reported that the Washington Utilities Company has arranged to take over the property of the Washington & Great Falls Railway, which is now under construction.

Dividends Declared

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1¼ per cent.

California Railway & Power Company, San Francisco, Cal., 1¾ per cent, prior preferred.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

Houghton County Traction Company, Houghton, Mich., 3 per cent, preferred; 2½ per cent, common.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

Terre Haute Traction & Light Company, Terre Haute, Ind., 3 per cent, preferred.

Virginia Railway & Power Company, Richmond, Va., 1½ per cent, common.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
AURORA, ELGIN & CHICAGO RAILROAD, CHICAGO, ILL.					
1m., Jan., '13	$140,578	*$90,967	$49,611	$32,065	$17,547
1 " " '12	125,717	*85,446	40,270	31,970	8,300
7 " " '13	1,191,064	*685,613	505,451	224,531	280,920
7 " " '12	1,108,662	*637,378	471,284	221,126	250,158
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.					
1m., Dec., '12	$61,540	$31,275	$30,164	$19,388	$10,776
1 " " '11	56,627	32,927	23,699	17,176	6,523
6 " " '12	392,635	215,799	176,836	109,884	66,952
6 " " '11	369,782	211,365	158,417	105,024	53,393
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.					
1m., Jan., '13	$125,887	$61,549	$64,318	$45,217	$19,401
1 " " '12	102,522	54,019	48,504	39,486	9,018
12 " " '13	1,564,855	663,427	901,429	510,916	390,513
12 " " '12	1,372,497	602,655	769,842	463,231	206,611
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1m., Jan., '13	$209,389	$122,535	$86,853	$43,825	$43,029
1 " " '12	237,466	142,250	95,215	55,021	40,195
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Jan., '13	$690,510	$375,757	$314,753	$148,575	$166,178
1 " " '12	635,509	364,934	270,574	140,079	130,495
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.					
1m., Dec., '12	$424,422	$196,223	$228,099	$123,166	$104,933
1 " " '11	406,995	207,548	199,446	116,106	83,340
6 " " '12	2,488,442	1,207,977	1,280,464	741,792	538,672
6 " " '11	2,316,939	1,230,130	1,138,789	707,986	430,603

*Includes taxes.

Traffic and Transportation

Plan for Public Service Corporation Employees to Become Stockholders

The Public Service Corporation of New Jersey, Newark, N. J., has devised a plan in conjunction with the Fidelity Trust Company, Newark, by which the employees of both companies may become stockholders of the former. The method that has been devised, which makes it possible for the employees to purchase stock on the easiest possible terms, it set forth in the following communication addressed by President Thomas McCarter to the officers and the employees of the Public Service Corporation and its subsidiary companies, including the Public Service Railway:

"The corporation, acting with the Fidelity Trust Company, has purchased 5300 shares of the capital stock of the corporation, a portion of which will be offered to employees of the Fidelity Trust Company and its allied banking institutions, and the balance the corporation now offers to its officers and employees and those of the corporations in which it is interested at $115 per share, subject to the following conditions:

"First. All subscriptions shall be made upon the express condition that the decision of the welfare committee of the corporation shall, at all times, be final with respect to rights or interests of such officers and employees subscribing for said stock, or any question relating to the same.

"Second. All subscriptions shall be for not less than one nor more than 100 shares. Subscriptions will be accepted with the understanding that there may be allotted to the subscriber all or any part of his subscription, as the welfare committee may determine. Preference will be given to small subscriptions in making allotments.

"Third. Subscribers shall pay on or before April 1, 1913, $5 for each share allotted. The corporation has arranged with the Fidelity Trust Company to loan to purchasers the balance of $110 per share, on the purchaser's note, with interest at the rate of 5 per cent. A stock certificate will be issued to the purchaser on or about April 1 and deposited with the Fidelity Trust Company as collateral for such loan.

"Fourth. Purchasers shall pay the treasurer of the corporation, on or before the last day of each month, an amount equal to $1.50 for each share purchased and shall authorize the treasurer to deduct same from his or her wages if not paid by such date. Said payment or deduction of $1.50 per month shall be paid by said treasurer to the Fidelity Trust Company on account of principal and to pay monthly interest. On this basis the loan will be paid in full in eighty-seven and a fraction months and certificate returned to the purchaser. As each purchaser becomes at once a stockholder, dividends after April 1, 1913, will be paid to the purchaser, and at the present rate of 6 per cent the dividend will equal every third month the amount paid for that month.

"Fifth. As officers and employees are permitted to purchase stock on the above easy terms, and as the purpose of the corporation is to benefit only those directly interested in the upbuilding and prosperity of the corporation, purchasers will enter into an agreement authorizing the corporation, or its agent, in the event of the purchaser's failure to make payments for any one month, or of purchaser's death, resignation or discharge, to sell or repurchase stock so bought at the price of $115 per share. In such case the corporation will pay the balance due on shareholder's loan and the surplus to the shareholder; or, if deceased, to shareholder's legal representatives. In the event of purchaser's death, however, the right to repurchase given the corporation shall not be exercised within the sixty days next ensuing during which period purchaser's legal representatives shall have the right to pay the balance due on the loan and take up the stock.

"This offer to officers and employees is made by the corporation in the belief that it will prove beneficial to its business to have such employees become shareholders, and that many will desire to avail themselves of an opportunity to become shareholders under conditions which are not financially burdensome. This offer seems to present a certain means of saving and an investment which it is believed will become more profitable, beneficial and gratifying as the years go by.

"Subscriptions will close on March 22, 1913, and allotments will be made immediately thereafter, allowing subscribers time to make initial payments and sign necessary papers before April 1."

Safety Campaign in Brooklyn

The Brooklyn (N. Y.) Rapid Transit Company has entered into an arrangement with the American Museum of Safety for a six months' campaign in the public schools of Brooklyn on the subject of safety in the streets of the borough, and on March 3, 1913, the first presentations of safety facts were made in two of the elementary schools. This instruction will be extended from school to school as rapidly as the time of the two lecturers who are employed will allow until the entire borough is covered. It is estimated that in the four months which remain before the closing of the schools for the summer vacation most of the territory can be gone over. It is planned to continue the work in the vacation schools during the summer.

The basis of the campaign is furnished by the daily talks to the school children. These are followed up by the distribution of pamphlets, which the children are encouraged to take home and discuss with their parents. The talks themselves are illustrated by models which enable the lecturers to point out in a graphic way the correct and incorrect methods of boarding and alighting from cars, and by other models on the basis of which practical instruction can be given as to the handling of live wires and similar dangerous objects which may, through accident, be encountered in the public streets.

In connection with the lectures and distribution of literature the Museum of Safety is distributing safety buttons to children, these buttons having an attractive design of a green railroad lantern on a red ground, and thus carrying out the color scheme of the safety movement—green for safety and red for danger. A detailed study of operating mishaps of all kinds for two years past which the Brooklyn Rapid Transit Company has been making shows that in only approximately 17 per cent of the total cases where any kind of an operating mishap has been reported has there been an element of responsibility chargeable to the company or its employees. Legal responsibility has been found to exist in even a smaller percentage of cases. A beginning toward greater safety is made with the work among school children. Extensions are planned in a number of other directions.

Decision in Favor of the Illinois Traction System

The Interstate Commerce Commission has decided in favor of the Illinois Traction System the case of the St. Louis, Springfield & Peoria Railroad and the Peoria, Bloomington & Champaign Traction Company against the Peoria & Pekin Union Railway. The St. Louis, Springfield & Peoria Railroad and the Peoria, Bloomington & Champaign Traction Company operate interurban electric railways working under a common management with other electric railways, all known as the Illinois Traction System. In their complaint they alleged in substance that they have terminal facilities in Peoria for handling passengers and freight transported in interstate commerce; that the defendant refused to enter into arrangements whereby there may be an exchange of freight traffic from one to the other moving to and from interstate points from and to Peoria; that the defendant interchanges traffic between its lines and all steam railroads which enter Peoria; that in East Peoria, a point across the Illinois River from Peoria, complainants have yards and team tracks and that the defendant refused to make a switch connection whereby interstate traffic could be exchanged. They asked an interchange of traffic with the Peoria & Pekin Union Railway by the establishment of through routes. The defendant, the Peoria & Pekin Union Railway, is essentially a terminal company and at Peoria furnishes all terminal facilities and services in connection therewith to nine steam railroads and partial facilities and services to the other two steam railroads which reach the city. It asserted the right to refuse absolutely the use of its terminals and facilities to complainants under Section 3 of the act, but was willing to permit their use upon the same terms and conditions accepted by the lines which are without any terminals and facilities in Peoria. The commission concluded its opinion in part as follows:

"The commission finds that these terms are prohibitive for the services actually sought by complainants and that the defendant, in effect, endeavors to compel them to pay for services which they do not desire and of which they can make no use. If the defendant receives fair compensation for the service which the complainants desire it to perform, there can be no question of the confiscation of property, as alleged by defendant. The terminal properties of carriers, like all other parts of their property, are devoted to the public use and must be treated exactly as all other parts of the property of common carriers are treated in carrying out the spirit and letter of regulatory statutes. Defendant is not asked to 'give' the use of its terminal properties, or any part of them, to any other carrier. It is asked to perform a service upon resonable and just terms. The performance of such a service is the very reason of its existence. If the contention of defendant to the effect that its terminal properties are absolutely subject to its determining will were to be upheld, every community in this country would to that extent be absolutely at the mercy of those who control the existing terminals. Terminal properties are devoted to the public use of the whole of the communities in which they have been created. They are not a pre-empted domain against which the public can assert no rights and upon which it may impose no duties. If such a doctrine were to be accepted, every growing community would find it impossible to accept and encourage the service of carriers still to be created at reasonably convenient points within their respective boundaries.

"The commission is of the opinion that it is the duty of the defendant to perform for the complainants those services which they desire it to perform and no others, and to be paid for such as it performs and for no others; and that the complainants are entitled to through routes on interstate traffic passing through Peoria to points on their lines, and from interstate points to industries on the lines of defendant in Peoria, and from such industries to interstate points reached by complainants."

New Transfer Proposed for Worcester.—The Worcester (Mass.) Consolidated Street Railway has under consideration the adoption of a new form of transfer for use on its lines in Worcester.

Vote on Franchise Extension in Shreveport.—The authorization of the extension of the franchise of the Shreveport (La.) Traction Company until Sept. 22, 1954, will be submitted to a vote of the people at an election to be held on April 1.

New Offices for Morris County Traction Company.—The Morris County Traction Company, Morristown, N. J., has announced that on April 1, 1913, it will remove its general offices from Park and Market Streets, Morristown, N. J., to the second floor of the Parker Building in Park Place, Morristown.

Multiple-Unit Train Operation on Detroit United Railway.—The Detroit (Mich.) United Railway will start multiple-unit train operation between Jackson, Mich., and Detroit in the near future. At present this line is served by single cars. Multiple-unit service was started some time ago on the line between Port Huron and Detroit.

Accident at Bridge Terminal in New York.—A number of persons were injured slightly on March 2, 1913, when a three-car train of the Broadway elevated line of the Brooklyn (N. Y.) Rapid Transit Company crashed into the bumper at the terminal of the Williamsburgh Bridge in Manhattan. The lights in the train were extinguished by the accident, a panic ensued among the passengers, and the police were called to restore order. The terminal is underground.

Fare Case in New Jersey.—A hearing was held before the Board of Public Utility Commissioners of New Jersey recently in Newark in the case of the city of Long Branch against the Monmouth County Electric Company, Red Bank, in regard to the fare over the company's line, which is operated between Rumson, Oceanic, Fair Haven, Red Bank, Eatontown, Shrewsbury, and Long Branch. A reduction in fare to 5 cents is desired between Long Branch and Eatontown. The commission has ordered each side to submit briefs.

Liberal Transfer Concession in New York.—Chairman McCall of the Public Service Commission of the First District of New York announced on March 3 that Theodore P. Shonts, president of the Interborough Rapid Transit Company and the New York Railways, has made an informal agreement whereby residents of Staten Island will be permitted to transfer to the surface lines and reach points uptown in Manhattan for 5 cents, the price now charged for the ferry trip. These transfers will be issued for use at the Battery in going to or coming from Staten Island. Of the 5-cent fare the city will get 2 cents and the company 3 cents. Under the proposed arrangements the city will be in effect reducing the fare to 2 cents. While the terms of the transfer agreement will not be included in the subway contracts, the plan is a concession to Richmond Borough by the Interborough Rapid Transit Company.

"Car Full" Signs Tried at Boston.—In order to investigate the possibilities of improving the distribution of passengers and of insuring a more regular movement of cars, the Boston (Mass.) Elevated Railway has equipped thirty-five cars operating inward from Clarendon Hills station, Somerville, to the Boston business district by the East Cambridge Viaduct with "car full" signs. The signs are carried on the cars on two hooks in the vestibule at the right of the motorman and are displayed upon order of traffic inspectors. Each carries the words "Car Full" in white letters on a black background about 18 in. long and 9 in. wide, the signs being of metal and distributed one per car. When not in use the blank side is turned outward. The signs are used, on an average, on six to eight trips in the morning rush hours only, the headway on the line being two minutes at this period of the day. With so short a headway if a car is delayed it tends to become more and more crowded, which results in bunching. When the "Car Full" sign is in use the car does not stop to receive passengers, but makes the usual stops to discharge its load.

Review by Courts of New York Commutation Case.—The following statement was made public by the New York Central & Hudson River Railroad on Feb. 27, 1913, following the securing of a writ of certiorari by it for a review by the court of the order of the Public Service Commission of the Second District of New York requiring the company to readjust its commutation fares out of New York as referred to in the ELECTRIC RAILWAY JOURNAL of Feb. 15, 1913, page 309: "We do not intend to discontinue the sale of commutation tickets. The Public Service Commission, Second District, recently issued an order directing that certain of our commutation fares in our New York suburban territory be reduced to the fares which were in effect prior to July 1, 1910. Pending a decision as to the basis of the fares that should apply, we found it necessary to hold off the sale of commutation tickets for the month of March, until a writ of certiorari could be obtained from the court. The commutation tickets in our suburban zone for March will go on sale on Feb. 28. The tickets will be sold at the fares at present in effect, and pending the final disposal of the courts all passengers purchasing these tickets within the territory affected will receive a card, which, if the court of last resort shall decide the proceedings against this company, will have a redemption value of the difference between the price paid for the ticket and the price at which it was ordered to be sold by the Public Service Commission." An order has also been signed by Supreme Court Justice Alden Chester in Albany granting to the New York, New Haven & Hartford Railroad a writ of certiorari to review in the Appellate Division at Albany the determination of the Public Service Commission of the Second District in the commutation rate cases, and staying the commission from any proceeding to enforce its orders. The order provides that the railroad shall issue rebate slips so that in the event of a final determination against it the slips shall be redeemable for the amount of excess fare charged by the company on and after March 1, 1913.

Personal Mention

Mr. J. E. Gardner has been appointed electrical engineer of the Chicago, Burlington & Quincy Railroad, with headquarters at Chicago, Ill., vice Mr. H. A. Gardiner, resigned.

Mr. H. B. Sawyer, treasurer of the Stone & Webster Management Association, Boston, Mass., has been elected director of the Commonwealth Trust Company, Boston, Mass.

Mr. M. S. Browning has been elected president of the Ogden (Utah) Rapid Transit Company, to succeed the late David Eccles. Mr. Browning was formerly vice-president of the company.

Mr. R. N. Hamlin, who has been chief train dispatcher for the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, for some time, will become general superintendent of the company.

Mr. R. Morrison, Jr., for several years secretary and treasurer of the Michigan United Railway, Lansing, Mich., has been elected vice-president and secretary of the Lincoln (Neb.) Traction Company.

Mr. Joseph M. Burns has been appointed electrical engineer of the Morris County Traction Company, Morristown, N. J., in charge of power plants, transmission lines and overhead construction generally.

Mr. Martin J. Bogardus, formerly with the Otsego & Herkimer Railroad, Hartwick, N. Y., has been appointed master mechanic of the Morris County Traction Company, Morristown, N. J., in charge of all cars and equipment.

Mr. Daniel Riddle, Cincinnati, has been appointed superintendent of motive power of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, to succeed Mr. Charles Kilgour, whose resignation was recently announced.

Mr. Wilbur C. Fisk, who has been vice-president and general manager of the Hudson & Manhattan Railroad, New York, N. Y., was elected president of the company on March 6, 1913, to succeed Mr. William G. McAdoo, who has become Secretary of the Treasury under President Wilson.

Mr. John H. Marble, of California, has been nominated by President Wilson for appointment to the Interstate Commerce Commission to succeed Mr. Franklin K. Lane, who has been appointed Secretary of the Interior. Mr. Marble has for some time been secretary of the Interstate Commerce Commission.

Mr. J. M. Bramlette has been appointed general manager of the Lincoln (Neb.) Traction Company. Mr. Bramlette is well known in the electric railway field, having served as general manager of the Michigan United Railway, the East St. Louis & Suburban Railway and other important properties in the Middle West.

Mr. Edward Hamprecht, who has been chief clerk in the office of Mr. Charles J. Laney, traffic manager of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, has been appointed general freight and passenger agent of the company, following the resignation of Mr. Laney, who, as previously noted in the ELECTRIC RAILWAY JOURNAL, has become connected with the Cleveland, Southwestern & Columbus Railway.

Mr. Edgar E. Clark, of Iowa, has been nominated by President Wilson for appointment to the Interstate Commerce Commission. This is a reappointment for Mr. Clark. He was named by ex-President Taft to succeed himself on the commission, but the Democratic Senate held up the nomination. The Senate has now confirmed the nomination of Mr. Clark and he has been made chairman of the commission to succeed Mr. Lane.

Mr. James D. Fraser, secretary-treasurer of the Ottawa (Ont.) Electric Railway, has been elected a director of the company to succeed Senator Cox, resigned. Mr. Fraser has been connected with street railway work in Ottawa for the last thirty years. He was general manager of the Ottawa City Passenger Railway, and when the Ottawa Electric Railway took over that company in 1891 he was elected secretary-treasurer, in which capacity he has since served continuously.

Mr. Franklin Knight Lane, who has been appointed Secretary of the Interior by President Wilson, was chairman of the Interstate Commerce Commission. He is a lawyer and was born in Prince Edward Island July 15, 1864. He was graduated from the University of California in 1886. He began the practice of law at San Francisco in 1889 and was corporation counsel of San Francisco from 1897 to 1902. He was candidate for Governor of California in 1902 and got the party vote of the Legislature of California for United States Senator in 1903.

Mr. Clarence P. King, president of the Washington Railway & Electric Company, Washington, D. C., was presented recently with a bound volume containing an engrossed set of resolutions thanking him for the benefits that have accrued to the employees of the transportation department of the company since his connection with it. The presentation was made by Mr. W. F. Dement, assistant superintendent of transportation of the company, at a "get-together" meeting of the employees in the club rooms of the employees' relief association. Mr. J. T. Moffet, superintendent of transportation, addressed the men who were present at the meeting on the subject of handling crowds, having particular reference to the inauguration. Mr. F. J. Whitehead, manager of the claim department, spoke about the duties of trainmen before and after an accident.

Mr. Clinton L. Bardo, assistant to the general manager of the Lehigh Valley Railroad at South Bethlehem, Pa., and formerly superintendent of the electric division of the New York Central & Hudson River Railroad at New York, has been appointed general manager of the New York, New Haven & Hartford Railroad, with headquarters at New Haven, Conn., to succeed Mr. B. R. Pollock, resigned. Mr. Bardo was born at Montgomery, Pa., on Oct. 24, 1867, and began his railway career as an extra operator with the Pennsylvania Railroad. In November, 1904, he became freight trainmaster of the New York division of the New York, New Haven & Hartford Railroad, and from December, 1905, to June, 1907, he was assistant superintendent of the same division. From June, 1907, until April, 1911, he was superintendent of the Grand Central Station and the electric division of the New York Central & Hudson River Railroad.

Mr. William G. McAdoo, president of the Hudson & Manhattan Railroad, operating between New York and New Jersey under the Hudson River, has been named by President Wilson as Secretary of the Treasury. Mr. McAdoo was born near Marietta, Ga., on Oct. 31, 1863. He left the university at which he was studying at the end of his junior year. He took a place as clerk in the United States Circuit Court, studying law in his spare hours. He was admitted to the bar at Chattanooga, Tenn., when he was twenty-one. In 1892, when he was twenty-nine years old, he began the practice of law in New York, and four years later he formed a partnership with Mr. William McAdoo, former Police Commissioner of New York. Ten years after coming to New York Mr. McAdoo launched the enterprise of burrowing under the Hudson River to link the cities of the Jersey shore to the shopping districts of Manhattan. Mr. McAdoo's rule of business has always been "The public be pleased."

Mr. Frank H. Brown, superintendent of the Pawtucket and Woonsocket lines of the Rhode Island Company, Providence, R. I., has been placed in entire charge of the northern division of the Rhode Island Company, which includes the Pawtucket and Woonsocket lines and the North Main Street carhouse in Providence. He will be in full charge north of Providence. Mr. Brown is to have control of hiring motormen, conductors, starters, etc. He was appointed superintendent of the Pawtucket lines on Oct. 1, 1906, and was made superintendent of the Woonsocket Street Railway on Feb. 1, 1908. The new order virtually means a division of the operating systems of the company into two sections, northern and southern. Mr. Brown is to have charge of the northern section and Mr. R. R. Anderson, superintendent of transportation, is to have charge of the southern section. Heretofore this work has been under the jurisdiction of Mr. Anderson, and the change has been made in order to relieve Mr. Anderson of a portion of his work and responsibilities.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS.

Mobile & Baldwin County Railroad, Mobile, Ala.—Chartered in Alabama to build an interurban railway between Mobile and Pensacola; also between Mobile and Bay Minette. Capital stock, $50,000. Officers: W. B. Miller, Chicago, president; M. H. Miller, Mobile, vice-president, and John P. Lowell, Mobile, secretary. [E. R. J., Jan. 25, '13.]

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—Chartered in Florida to build a 55-mile electric railway between Jacksonville and St. Augustine and a 16-mile branch from Jacksonville to Diego and Pablo Beach. Capital stock, $2,000,000. A. W. Corbett, president, and Thomas R. Osmond, general manager. [E. R. J., Feb. 15, '13.]

***Livermore & Augusta Street Railway, Augusta, Maine.**—Application for a charter has been made by this company in Maine to build an electric railway to connect East Livermore, Fayette, Mount Vernon, Readfield, Winthrop, Manchester and Augusta. Capital stock, $250,000. Incorporators: Charles P. Hatch, Portland; Reuel J. Noyes, Elmer E. Newbert and Leon O. Tebbetts, Augusta; E. E. Peacock, Nelson T. Gordon and B. E. Leighton, Readfield; William G. Hunton, Cherryfield.

***St. Louis, Afton & Sunset Railway, Afton, Mo.**—Application for a charter has been made by this company in Missouri to build a 10-mile railway from Afton to Sunset Inn and Fenton, via Sappington. The line will parallel the Gravos Road. This project is said to be a continuation of the line of the St. Louis, Grant Park & Lakewood Electric Railroad. Capital stock, $300,000. Incorporators: Victor J. Miller, John M. Storm, J. L. Boehl, James Arbuckle and C. A. Bodwell.

Peninsula Railway, Wilmington, N. C.—Application for a charter has been made by this company in North Carolina to build a line from Wilmington to Ocean Beach and the mouth of Cape Fear River. Capital stock, $100,000. Incorporators: Iredell Meares, George F. Meares, William A. Williams and William H. Green.

***Oklahoma Northern Railroad, Vinita, Okla.**—Chartered in Oklahoma to build an electric or steam railway from Vinita to Nowata, Okla., and Coffeyville, Kan. Capital stock, authorized, $50,000. Incorporators: A. King, H. L. Steen and G. D. Meiklejohn, Omaha, Neb.; W. F. Snodgrass and J. W. Tolliver, Centralia, Okla.

FRANCHISES

Birmingham, Ala.—The Birmingham Railway, Light & Power Company will be granted the Twenty-first Street franchise if that company is willing to let the Kelly company or any other company which might later operate cars here use the track that is already down and the track that is to be laid. The company has asked the Council for a franchise to build a line to Lewisburg.

Bay City, Cal.—The Pacific Electric Railway has asked the Supervisors of Orange County for an extension of its Alamitos-Long Beach line to and through Bay City. This will give a direct line to Long Beach along the coast.

Richmond, Cal.—The San Francisco-Oakland Terminal Railways has received a certificate of public convenience and necessity to exercise franchise rights to operate an electric railroad along Standard Avenue and on a private right-of-way in Richmond.

South San Francisco, Cal.—The South San Francisco Railroad & Power Company has asked the Board of Trustees for a franchise in South San Francisco.

***St. Petersburg, Fla.**—Noel A. Mitchell, St. Petersburg, has received a franchise for a gasoline railway on the island of Passagrille.

Evanston, Ill.—The County Traction Company, Chicago, has received a ninety-day franchise from the Council in Evanston.

Terre Haute, Ind.—The Springfield & Central Illinois Traction Company has asked the Board of Public Works for a franchise to build an interurban line on Walnut Street. The company proposes to build a bridge across the Wabash River at Walnut Street and to build a station at Ninth and Walnut Streets in Terre Haute.

Vincennes, Ind.—The Vincennes North & South Traction Company has asked the Council for a franchise in Vincennes. This company plans to build a line to connect Vincennes and Indianapolis via Bicknell, Sullivan, Clay City, Linton, Cataract, Eminence and Mooresville. B. M. Willoughby, Vincennes, president. [E. R. J., May 11, '12.]

Wichita, Kan.—The Arkansas Valley Interurban Railway has asked the county commissioners of Harvey County for an extension in that county from the Newton terminus to Bethel College. Franchises secured from Newton and the county give the company a right-of-way in Main Street.

Rome, N. Y.—The New York State Railways has asked the Common Council for a franchise in East Dominick Street and West Dominick Street in Rome.

Cleveland, Ohio.—The Cleveland Railway has asked the approval of the City Council for the construction of a crosstown line on East Seventy-ninth Street.

Columbus, Ohio.—The Fifth Avenue Railway & Light Company has asked the Council for a franchise to build a crosstown line from Arlington east on Fifth Avenue to East Columbus.

Henryetta, Okla.—C. H. Kellogg has asked the Council for a franchise in Henryetta.

Ashland, Ore.—The E. P. Minney Company, Oakland, has received a franchise from the Council in Ashland. [E. R. J., March 1, '13.]

Portland, Ore.—The Portland Railway, Light & Power Company has received a franchise from the Council over approximately 18 miles of streets in Portland.

Koppel, Pa.—The Pittsburgh, Harmony, Butler & New Castle Railway has asked the Council for a franchise for a right-of-way through Koppel.

Shippensburg, Pa.—The Chambersburg & Shippensburg Railway has received a franchise from the Council in Shippensburg. This line will connect Chambersburg, Erd Bridge Park and Shippensburg. T. M. Mahon, president. [E. R. J., Feb. 8, '13.]

Cranston, R. I.—The Rhode Island Company will ask the Council for a new franchise in Cranston.

Dallas, Tex.—E. P. Turner and associates have received a franchise from the Council in Dallas. This is part of a plan to build an electric railway between Denton and Gainesville.

TRACK AND ROADWAY.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Work will soon be begun by this company on an extension from the end of the North Birmingham line to Lewisburg.

Montgomery Light & Traction Company, Montgomery, Ala.—This company announces that it will extend its line into Wetumpka if a bridge is built across the Tallapoosa River and the right-of-way given to cross it.

Pacific Electric Railway, Los Angeles, Cal.—This company has been asked to consider plans to double-track its line between Huntington Beach and Balboa.

Modesto & Empire Traction Company, Modesto, Cal.—A 20-mile line between Modesto and Newman will be built by this company during the year.

St. John's Electric Company, St. Augustine, Fla.—Work has been begun by this company on the extension from South Beach south about 1 mile.

Tampa (Fla.) Electric Company.—About 3 miles of city track will be built in Tampa by this company during the year.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—This company announces that a project to extend its Carpentersville line to Crystal Lake, and eventually to Woodstock, is being considered.

***Jacksonville, Ill.**—Fred Amrhein, New Berlin; A. P. Gunnett, Gardner, and John W. Boston, Jacksonville, have been appointed a committee to investigate the feasibility of forming a new corporation to take over the properties of the Springfield & Jacksonville Electric Railway, for which grading has been done.

Chicago & Joliet Electric Railway, Joliet, Ill.—Plans are being made by this company to double-track its line on Jefferson, Chicago and South Chicago Streets and Eastern Avenue, to rebuild track on Center, Collins and West Park Streets and build new track on Washington Street in Joliet.

***French Lick Springs, Ind.**—McPherson Sheppard, Boston, Mass., representing capitalists of Pittsburgh, Pa., recently made a thorough inspection of the country between New Albany, Paoli and French Lick Springs, Ind., covering a considerable distance, and it is understood that a survey for an electric railway line from New Albany to French Lick will be made shortly.

Laporte, Logansport & Southern Railroad, Laporte, Ind.—This company will soon ask for bids for the construction and equipment of an electric railway from Laporte to Logansport. Warren W. Travis, vice-president. [E. R. J., March 1, '13.]

Louisville & Northern Railway & Lighting Company, New Albany, Ind.—The New Albany Board of Public Works, New Albany, is considering a proposition whereby this company is to lay T-rails instead of girder rails in the reconstruction of its line on Market Street between Thirteenth Street and Vincennes Street in New Albany.

Union Traction Company of Indiana, New Castle, Ind.—The contractors working on the extension between New Castle and Muncie announce that the new branch will be in operation by July 1.

***Rochester, Ind.**—Steps have been taken to build an electric line from Rochester to Akron, a distance of 10 miles. A subsidy will be asked from Henry township to pay for the right-of-way and an additional subsidy will be asked from Rochester to pay for the rails. Douglas Head & Company are the contractors for the work on the Rochester-Akron line.

Iowa City (Ia.) Electric Railway.—About 5 miles of new track will be built by this company during 1913. J. O. Schulze, president.

Kentucky Utilities Company, Lexington, Ky.—This company is planning to construct an extensive interurban railway system operated out of Winchester, Ky., and connecting with Richmond, Mount Sterling and a number of other cities.

Paducah (Ky.) Traction Company.—Plans are being made by this company to relay some of its lines in Paducah with new and heavier rails.

New Orleans Railway & Light Company, New Orleans, La.—Plans are being made by this company to make extensive improvements to its Villere lines between Canal Avenue and St. James Avenue in New Orleans.

North Louisiana Electric Railway, Shreveport, La.—Preliminary surveys are being made by this company on its line from Shreveport to Monroe, via Minden, Ruston and Homer. A. B. Blevins, Jefferson, president. [E. R. J., March 1, '13.]

Towson & Cockeysville Electric Railway, Towson, Md.—About 4 miles of new track will be built by this company during the year.

Ironwood & Bessemer Railway, Ironwood, Mich.—This company will build 3 miles of new track during the year.

Kansas City, Lawrence & Topeka Electric Railroad, Kansas City, Mo.—During 1913 this company plans to build 25 miles of new track between Zarah, De Soto, Endora and Lawrence.

Jersey Central Traction Company, Keyport, N. J.—During the year this company plans to build 8 miles of new track from Long Branch to Red Bank.

Geneva & Auburn Railway, Seneca Falls, N. Y.—During 1913 this company plans to build 12 miles of new track between Seneca Falls, Cayuga and Auburn.

Durham (N. C.) Traction Company.—Plans are being considered by this company for a 12-mile line from Durham to Chapel Hill, N. C.

Cleveland (Ohio) Railway.—During 1913 this company plans to build 7 miles of new track.

Columbus, Urbana & Western Electric Railway, Columbus, Ohio.—Bids will be asked by this company to build a line from Fishinger's Bridge, near the Scioto River storage dam, to the Girls' Industrial School near Delaware, Ohio.

Toledo & Indiana Railway, Toledo, Ohio.—Plans are being made to extend this railway from Bryan to Montpelier, a distance of 10 miles, where it will connect with the St. Joseph Valley Traction Company's line now practically completed to the state line between Ohio and Indiana. This would make a complete through route between Toledo and Chicago.

Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.—Surveys are being made by this company for an extension from its present terminal, 7 miles south of Monroe, through to Detroit.

Toledo & Western Railroad, Toledo, Ohio.—Plans are being considered by this company to build a line from Pioneer to meet the line of the St. Joseph Valley Traction Company at Angola.

Youngstown & Southern Railway, Youngstown, Ohio.—This company announces that it will make extensive improvements between Youngstown and Southern Park.

Oklahoma, Kansas & Missouri Interurban Railway, Miami, Okla.—This company plans to build 2 miles of new track from North Miami to Blue Mound during 1913.

Cushing & Oil Field Electric Railway, Perry, Okla.—This company has been organized to build an electric railway in Perry. The company has asked the City Council of Perry for a franchise. Among those interested are John B. Queen, Perry; Charles Reed, Coyle, and J. R. Hadley, Cushing.

Medford, Ore.—Work has been begun on the line between Medford and Ashland by the F. P. Minney Company, Oakland. [E. R. J., March 1, '13.]

Oregon Electric Railway, Portland, Ore.—During 1913 this company plans to build a 30-mile extension between Tualitin and McMinnville, Ore., and a 6-mile freight cut-off between Orenco and Helvetia, Ore.

Imperial Traction Company, Ottawa, Ont.—This company has asked the House of Commons for permission to build an extension from Smithville to Bridgeburg and from Hamilton to Toronto.

Humber Valley Railway, Toronto, Ont.—This company has received the approval of the Ontario Railway Board to build a doube-track railway through the Humber Valley from Lambton to the mouth of the Humber River and along the shore to Sunnyside.

Westside Electric Street Railway, Charleroi, Pa.—This company will build 9 miles of new track from Charleroi to Ellsworth during 1913.

Slate Belt Electric Street Railway, Pen Argyl, Pa.—This company will build 1 mile of new track from Wind Gap to Saylers Lake during the year.

Reading (Pa.) Transit Company.—Plans are being made by this company to lay new track on North Ninth and North Tenth Streets in Reading.

Sioux Falls & Southern Minnesota Traction Company, Sioux Falls, S. D.—Right-of-way has been secured and construction has been begun by this company on its line between Albert Lea and Sioux Falls. W. H. Knight is interested. [E. R. J., Nov. 30, '12.]

Nashville-Gallatin Railway, Nashville, Tenn.—Plans are being made for an extension of the new line of this railway into Kentucky, terminating at Glasgow for the present, and it is believed that Louisville, Ky., will be the ultimate terminus of the division. An extension out of Nashville into Gallatin is now in course of construction.

Bryan & College Interurban Railway, Bryan, Tex.—Arrangements are being made by this company to build an extension from Stone City to the Brazos River.

***St. John & Quebec Railway, Quebec, Que.**—Surveys have been begun by this company for an electric line from Washburn across northern Maine to the Canadian border.

Rhode Island Company, Providence, R. I.—Two acts have been introduced in the House authorizing the towns of Gloucester and Smithfield respectively to make contracts with this company guaranteeing certain payments for the construction and operation of an electric railway. Surveys have been made by this company for the construction of its proposed 12-mile extension from Centerdale to Chepachet.

Texas Traction Company, Dallas, Tex.—Plans are being considered by this company to build an extension to St. Vincent's Sanitarium.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—This company has about 20 miles of the location work finished. Vories B. Brown, San Antonio, president. [E. R. J., Feb. 22, '13.]

San Antonio (Tex.) Traction Company.—This company plans to build 2 miles of new track during 1913.

Ogden (Utah) Rapid Transit Company.—This company plans to extend its line to Logan in the near future.

Walla Walla Valley Railway, Walla Walla, Wash.—During 1913 this company plans to build 5 miles of new track between State Line and Vincent, Ore.

Elkins (W. Va.) Electric Railway.—During the year this company plans to build about 7 miles of new track between Roaring Creek Junction and Belington, W. Va.

Monongahela Valley Traction Company, Fairmont, W. Va.—Plans are being made by this company to make an important change in the route of the Clarksburg and Weston line so as to have the Clarksburg terminal of the line at the interurban station.

***Beloit, Wis.**—It is reported that representatives of Indianapolis capitalists are considering the construction of an electric railway between Beloit and Delavan. No names are yet given.

SHOPS AND BUILDINGS

Edmonton (Alta.) Radial Railway.—During the next three months this company plans to build an addition to its north side carhouses and will build a new carhouse on the south side.

Georgia Railway & Electric Railway, Atlanta, Ga.—This company has purchased land in Atlanta on which it plans to build a new carhouse in the near future.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Bids are being asked by this company to build a new freight depot in Logansport. The structure will be one-story, 30 ft. x 138 ft., and of brick construction.

Paducah (Ky.) Traction Company.—Plans are being made by this company to double the capacity of its present carhouse.

Detroit (Mich.) United Railway.—This company will remove the carhouse of the Pontiac division from Birmingham to Pontiac.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—During the year this company plans to build a new freight house in Grand Rapids. The structure will be 40 ft. x 150 ft. The company will also build a new passenger and freight station at Spring Lake.

Minneapolis (Minn.) Street Railway.—Plans are being made by this company to purchase property on Twenty-fifth Avenue north between Washington Avenue and Second Street in Minneapolis on which to build a carhouse.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company plans to build a new station in Minneapolis. It will be located on two square blocks between Twenty-fourth Avenue and Twenty-sixth Avenue and will accommodate 200 cars.

Piedmont Traction Company, Charlotte, N. C.—Plans are being made by this company to construct a modern four-story building on the corner of West First Street and South Church Street in Charlotte.

Scioto Valley Traction Company, Columbus, Ohio.—During the year this company expects to build a new passenger and freight terminal at Columbus.

Regina (Sask.) Municipal Railway.—During the next three months this company plans to build an extension to its carhouse. The addition will be 200 ft. x 80 ft.

Greenville, Spartanburg & Anderson Railroad, Greenville, S. C.—Plans are being made by this company to build new passenger station, freight terminal, etc., in Spartanburg.

Texas City (Tex.) Street Railway.—Material has been ordered by this company for its new carhouse. The structure will be 40 ft. x 90 ft. and of corrugated-iron construction.

Puget Sound Electric Railway, Tacoma, Wash.—This company plans to build a new waiting station at Stone Way and Weslake Avenue in Seattle.

Ohio Valley Electric Railway, Huntington, W. Va.—Contracts will soon be awarded by this company to build a terminal station in Huntington. The structure will be eight stories, of steel and reinforced concrete construction, "L" shape, 60 ft. x 160 ft. x 30 ft. It will contain general offices, waiting rooms, etc.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Victoria, B. C.—A new substation with a capacity of 2000 kw will soon be built by this company. It expects to purchase one motor-generator set and a transformer.

Alton, Granite & St. Louis Traction Company, Alton, Ill.—Plans are being made by this company to build a new power house in Alton.

Southern Illinois Railway & Power Company, Harrisburg, Ill.—This company will install two 1250-kva Curtis turbo-generator units with a 35-kw turbo-driven exciter and 50-kw motor-generator set, two 300-kw motor-generator sets, three 250-kw water-cooled transformers and switchboard apparatus for its power station and substation. This apparatus has been ordered from the General Electric Company.

United Water, Light & Traction Company, Somerset, Ky.—Plans are being made by this company to build a new power plant in Somerset. Frank Barker is in charge of the arrangements.

Manhattan Bridge Three-Cent Line, Brooklyn, N. Y.—This company will add to its substation equipment a 500-kw rotary converter, three 165-kva air-blast transformers, 6000 cu. ft. blower set and switchboard. The apparatus has been ordered from the General Electric Company.

Tidewater Power Company, Wilmington, N. C.—This company plans to build soon a new brick substation at Winter Park. The company expects to purchase a 500-kw rotary and transformer for its Wrightsville Beach substation.

Oregon Electric Railway, Portland, Ore.—This company has ordered from the General Electric Company a new 500-kw 33-cycle 1200-volt rotary-converter to be installed in one of its substations.

Portland Railway, Light & Power Company, Portland, Ore.—Work has been begun by this company for its new power station, office, waiting room and substation in Vancouver, Wash. The steam plant will have a battery of three boilers and will use either oil or sawdust for fuel. The office and waiting room will be two stories high, 50 ft. x 26 ft., and will be located at the corner of First Street and Washington Street.

Citizens' Traction Company, Oil City, Pa.—This company expects to remodel its power house, paint and carpenter shops in Oil City. It plans to install a 1500-kw turbine together with coal and ash-handling apparatus at its West End power house, Oil City, and a 300-kw rotary converter at the Franklin substation.

Southern Traction Company, Dallas, Tex.—Plans are being made by this company to build new substations at Waxahachie, Hillsboro, Corsicana, Ennis and Lisbon.

Texas Traction Company, Dallas, Tex.—This company has awarded a contract for one 425-hp B. & W. boiler to be installed at its power house at McKinney, together with a type L Green stoker for same. It expects to purchase coal and ash-handling machinery to take care of five such boilers.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—During the year this company plans to purchase two 1000-kw motor-generator sets for its power house.

Manufactures and Supplies

ROLLING STOCK

Public Service Railway, Newark, N. J., is building twenty cars in its own shops.

Ocean City (N. J.) Electric Railroad is reported to be in the market for six cars.

Union Electric Company, Dubuque, Ia., is figuring on six 40-ft. double-truck prepayment cars.

Durango Railway & Realty Company, Durango, Col., expects to purchase two double-truck open cars.

Norwich & Westerly Traction Company, Norwich, Conn., anticipates purchasing additional cars, trucks and motors.

Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., is reported to be in the market for one city and one interurban car.

Northern Illinois Electric Railway, Chicago, Ill., expects to purchase twelve box cars and possibly two double-truck interurban cars.

Atchison, Topeka & Santa Fé Railway, Chicago, Ill., has ordered two gas-electric motor cars from the General Electric Company.

Massachusetts Northern Railways, Greenfield, Mass., has ordered ten double-truck open cars from the Wason Manufacturing Company.

Manhattan City & Interurban Railway, Manhattan, Kan., will probably purchase two single-truck motor cars and ten light double-truck trailer or open cars.

United Railways, St. Louis, Mo., has been recommended by the Public Utilities Commission of St. Louis to purchase 165 motor cars and 165 trail cars at a cost of $1,650,000.

Southwestern Traction & Power Company, New Iberia, La., has ordered from the American Car Company one 40-ft. 5-in. passenger and baggage car mounted on Brill 27 MCB trucks.

Virginia Railway & Power Company, Richmond, Va., noted in the ELECTRIC RAILWAY JOURNAL of March 1, 1913, as figuring on several new cars, is in the market for twenty cars for city operation. The plans and specifications for this equipment have not yet been completed.

Jacksonville (Fla.) Traction Company has specified the following details for the ten double-truck single-end closed prepayment cars which are being built by the St. Louis Car Company:

Seating capacity	40
Bolster centers, length,	22 ft. 2 in.
Length of body,	29 ft. 6½ in.
Length over buffer,	41 ft. 0 in.
Width over sheathing,	8 ft. 4 in.
Width over all	8 ft. 8 in.
Height, rail to sills	32⅞ in.
Sill to trolley base,	8 ft. 6⅞ in.
Body	composite
Interior trim	mahogany
Roof	plain arch
Underframe	steel
Bumpers,	6 in. 8 lb. channel
Car trimmings	bronze
Couplers	Hovey
Curtain fixtures	Cur. S. Co.
Curtain material	Pantasote
Destination signs	Hunter
Gongs	Wall
Hand brakes	Peacock
Headlight	Neal
Motors	outside-hung
Sash fixtures	Edwards
Seats	H-W
Step treads	Mason
Trolley retrievers	Knutson
Ventilators,	S. & W. Vacuum

Dallas (Tex.) Consolidated Street Railway, reported in the ELECTRIC RAILWAY JOURNAL of Feb. 15, 1913, as having ordered ten closed prepayment cars from the St. Louis Car Company, has included the following details in the specifications for this equipment:

Seating capacity	38
Bolster centers, length,	19 ft. 2 in.
Length of body	26 ft. 6 in.
Length over vestibule,	39 ft. 6 in.
Length over all	8 ft. 4 in.
Height, rails to sills	32⅜ in.
Sill to trolley base,	8 ft. 6⅞ in.
Body	metal
Curtain material	Cur. S. Co.
Destination signs	Hunter
Gongs	Wall
Hand brakes	St. L.
Heaters	Consol.
Headlights	C-H
Motors	GE-203
Paint	S-W
Registers	Inter.
Sanders	St. L.
Sash fixtures	Edwards

Interior trim	mahogany	Seats	St. L.
Headlining	Agasote	Step treads	Mason
Roof	arch	Trolley catchers	Keystone
Underframe	semi-steel	Trolley base	Wilson
Air brakes	West.	Varnish	Flood & Conklin
Car trimmings	St. L.	Ventilators	St. L.
Couplers	St. L.	Wheelguards	H-B
Curtain fixtures	Cur. S. Co.		

TRADE NOTES

Baldwin Locomotive Works, Philadelphia, Pa., have elected James W. Bayard a director to succeed E. C. Converse, who resigned recently.

B. J. Coghlin Company, Ltd., Montreal, Quebec, has moved its offices into the new buildings which it has erected next to its factory on Ontario Street, East Montreal.

Pittsburgh Roller Bearing Company, Pittsburgh, Pa., has been chartered in West Virginia with an authorized capital stock of $3,500,000 to manufacture roller bearings and other machinery.

Woodmansee, Davidson & Sessions, Chicago, Ill., announce the retirement of E. O. Sessions on March 1 as a member of the firm. Mr. Sessions has not yet announced his plans for the future.

New Castle Steel & Iron Company, New Castle, Pa., has formally taken over the plant and the property of the New Castle Forge & Bolt Company and will remodel the property for the manufacture of steel cars and steel car specialties, mainly the latter.

Abrasive Material Company, Bridesburg, Pa., has opened its own branch store at 566 West Randolph Street, Chicago, Ill., under the management of C. W. Blakeslee. The company has just completed a plant at Bridesburg, where it has purchased a large tract of land.

International Register Company, Chicago, Ill., has completed and is now occupying its new factory building at 15 South Throop Street, Chicago. The company has three times its former floor space and has added a brass foundry so that its plant now includes all processes of manufacture.

New Haven Trolley Supply Company, New Haven, Conn., has been incorporated with a capital stock of $10,000 to engage in the trolley supply business. The officers of the company are: Arthur C. Stowe, president; Howard C. Webb, vice-president; Samuel P. Huntington, secretary and treasurer.

Drake Railway Automotrice Company, Chicago, Ill., has acquired the going automotrice business of the Société Anonyme Westinghouse, Paris and Havre, the territory of which comprises Holland, Belgium, Luxemburg, France, Switzerland, Spain, Portugal, their colonies and protectorates. The negotiations were conducted by Francis E. Drake, president of the company, who is now in Paris.

Electric Railway Improvement Company, Philadelphia, Pa., has received orders for cars from the following companies since the first of the year: Jacksonville (Fla.) Traction Company, Metropolitan West Side Elevated Railway, Chicago, Ill.; Knoxville Railway & Light Company, Knoxville, Tenn.; Phoenix (Ariz.) Railway, Pacific Electric Railway, Los Angeles, Cal.; Omaha & Council Bluffs Street Railway, Omaha, Neb.

Railway Steel Spring Company, New York, N. Y., reports gross earnings for the year ended Dec. 31, 1912, as $9,041,079, compared with $6,160,496 for the previous year. The surplus for the year after deducting all charges, including dividends on the preferred stock, was $778,078, compared with $39,798. The company earned 5.77 per cent on its $13,500,000 common stock, after charging off $350,086 for depreciation as against 0.3 per cent earned on the same stock in the preceding year.

Transmission Engineering Company, Pittsburgh, Pa., has been organized to do special transmission line work. It is affiliated with the Railway & Industrial Engineering Company, manufacturer of the Burke horn-gap apparatus, and is making a specialty of outdoor steel substations and special work for terminal towers, station outlets, railroad crossings and similar requirements. The officers are H. L. Patterson, president; G. N. Lemmon, vice-president, and general manager; B. W. Kerr, secretary and treasurer; A. W. Burke, consulting engineer.

General Electric Company, Schenectady, N. Y., has recently received the following orders for railway motors: Michigan United Traction Company, Jackson, Mich., ten GE-210 70-hp two-motor equipments; Oregon Electric Railway, Portland, Ore., six GE-222 100-hp, 600-1200-volt four-motor equipments and six trail car equipments; Southern Illinois Railway & Power Company, Harrisburg, Ill., four GE-205 100-hp four-motor equipments, an express car equipment and four extra air-brake equipments with CP-27 compressors; Detroit (Mich.) United Railway, 125 GE-203 50-hp two-motor equipments; Salt Lake & Ogden Railway, Salt Lake City, Utah, two GE-205 100-hp four-motor equipments and two extra GE-205 motors; Bay State Street Railway, Boston, Mass., three GE-205 50-hp four-motor equipments; Springfield (Mass.) Street Railway, four GE-80 40-hp four-motor equipments; Milwaukee Electric Railway Light Company, Milwaukee, Wis., two GE-205 75-hp motors with type M multiple-unit control; Galveston (Tex.) Electric Company, ten GE-200 38-hp two-motor equipments.

ADVERTISING LITERATURE

Busch-Sulzer Brothers-Diesel Engine Company, St. Louis, Mo., has issued an eight-page booklet, which contains the results of an exhaustive test of a 225-hp Diesel engine built by the company for the Hugo Ice & Light Company, Hugo, Okla.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 126, which is devoted to a description of compression riveters, and Bulletin No. 129, which describes and illustrates hose, hose couplings and hose clamp tools.

The J. G. Brill Company, Philadelphia, Pa., has issued *Brill Magazine* for February, 1913, which contains an illustrated biography of Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y. Among the featured articles are the following: "More Semi-Convertible Cars for the Northern Ohio Traction & Light Company," "Passenger and Baggage Cars for Nashville-Gallatin Interurban Railway," "Additional 'Washington' Center-Entrance City & Interurban Cars," "Fifty 'California' Cars for Los Angeles," "New Cars for Laurel, Miss."

NEW PUBLICATIONS

Book of Standards. National Tube Company, Pittsburgh, Pa. Flexible leather, 1913 edition, 559 pages, 4 in. x 6½ in. Price, $2.

This successor to the 1902 handbook of the National Tube Company is a splendid addition to engineering reference books both in contents and mechanical make-up. Its primary purpose is to present a remarkable array of information on tubular products as gathered by nearly four years of experiment and research, but it also includes many valuable tables covering the conversion of metric dimensions, etc., to English equivalents and vice versa, besides a conversion chart for length, weights and temperatures. A unique feature is a glossary of definitions and abbreviations used in the pipe and fitting trade. Not the least appreciated feature of this book will be the use of Canterbury Bible paper, which makes it a real pocket book, despite its 559 pages.

Essentials of Electricity. By W. H. Timbee. New York: John Wiley & Sons. 1913. 271 pages. Cloth. Price, $1.25.

This work, as indicated by the title is especially suitable for students of electricity who wish to enter or advance themselves in one of the electrical trades. It explains the underlying facts and laws of good electrical practice which electrical workers must understand, but does not include extended descriptions of the mechanical processes of the electric trades. Only such material has been included as is absolutely essential to the object in view. The author is exceptionally concise and has introduced at the end of each chapter a summary of the material contained in it. A series of problems covering the work of each chapter is also included. These should prove of exceptional value to the home student if he is earnest enough to work them out conscientiously.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MARCH 15, 1913 No. 11

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office.............................1570 Old Colony Building
Philadelphia Office........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 9500 *copies are printed*

CONTENTS.

Stock for Employees.. 449
Value of Valuation 449
The Maintenance Issue.. 449
Need for Testing Apparatus....................................... 450
The Side-Rod Type of Locomotive.................................. 450
Scope of Scientific Management................................... 451
Maintenance of the Pennsylvania Railroad Electric Locomotives.... 452
Cars for Flood Service... 461
Educational Experiment in Rochester.............................. 461
Track Maintenance and Reconstruction in San Francisco............ 462
Shops and Carhouse of the Hamburg Rapid Transit System........... 468
Line Inspection and Repair in Utica, N. Y........................ 474
Standardization on the Michigan United Traction.................. 475
Asphalt Car at Kansas City, Mo................................... 479
Maintenance of Electrical Equipment of Cars in Brooklyn.......... 480
Scientific Design of Carhouses and Shops......................... 490
Block Signals Ordered by Indiana Lines........................... 496
Convention Location Committee Visits Washington.................. 496
Fond du Lac Avenue Carhouse at Milwaukee......................... 497
Block Signal Maintenance Notes on Illinois Traction System....... 501
Coasting Rules in Denver... 501
Experiences with Concrete Poles by the New York State Railways.. 502
Feeding Street Intersections..................................... 504
Meeting of the Keystone Railway Club............................. 505
Annual Meeting of the Illinois Electric Railways Association..... 508
Union Traction Company Shop Notes................................ 510
Sand Cushion Support for Cross Ties.............................. 511
Rattan Broom Filling Machine at Milwaukee........................ 513
Shop Notes from Omaha.. 513
Concrete Paving Between Tracks in Birmingham, Ala................ 514
News of Electric Railways.. 515
Financial and Corporate.. 520
Traffic and Transportation....................................... 525
Personal Mention... 526
Construction News.. 527
Manufactures and Supplies.. 530

STOCK FOR EMPLOYEES

The announcement of a plan under which the employees of the Public Service Corporation of New Jersey may purchase the company's stock by instalment payments is particularly interesting because it represents a further expansion of a policy already embodied by this company in the most comprehensive welfare system thus far established by any public utility. By arranging through a trust company for the purchase of the stock in instalments of $1.50 monthly and for carrying the amounts owing at 5 per cent interest, the corporation has at once made it possible and provided an incentive for every employee to save something, however little; to make a good investment of this saving, and to become a sharer in the profits of the organization of which he is a part. That the welfare committee of the corporation is made the final arbiter in all matters concerning stock purchases, and that preference is to be given to small subscriptions, indicates the spirit in which the plan is to be put into operation. Other details of this plan, as outlined in our last issue, recommend it as an admirable means of making employees profit sharers, while at the same time avoiding the drawbacks and complications of profit-sharing schemes.

THE VALUE OF VALUATION

Our steam railway brethren, interstate electric roads, telephone, telegraph and express properties are to be valued. The valuation law signed by President Taft instructs the Interstate Commerce Commission to ascertain the original cost to date, cost of reproduction new, cost of reproduction less depreciation, and "all other elements of value." This is a large order, and it is more than likely that the radicals who have demanded this valuation, undertaking to prove that the railroads are over-capitalized, will, after it is all over, be greatly disappointed with the results. The undertaking will cost a lot of money and nobody will be much better off when it is finished. An appropriation of $500,000 was to be made to start the work, but this was lost in the shuffle at the end of the session. Before the valuation is completed, a tentative schedule prepared by the commission, accepted or disputed by the carriers, and in the latter event taken into the courts, as provided for in the bill, an army of men will have put in several years' work, and it is estimated that something like $6,000,000 will have been expended by the government and the carriers. The results will not justify this expenditure of time and money, but let us hope that the mania for valuation will have been satisfied.

THE MAINTENANCE ISSUE

The annual maintenance issue of the Electric Railway Journal appears this year almost a month earlier than has previously been the case. It is believed, however, that this change in date corresponds more closely to the season when plans for maintenance and new construction are most active. For geographical scope the present issue is striking, its contributions ranging from Hamburg to San Francisco. What is of more practical interest to the reader, however, is the fact that the articles taken together relate to car and way maintenance on every one of the great divisions of electric railroading, namely, the electrified steam line as represented by the Pennsylvania Railroad; the high-speed interurban line, by the Michigan United Traction Company; urban and suburban rapid transit, by the Hamburg Elevated & Underground

System, and city transit, by San Francisco, Brooklyn, Norfolk and Milwaukee. The Pennsylvania article will be of particular interest to those steam railroad men who will soon be called upon to operate electrical equipment. The Brooklyn article is devoted particularly to electrical practice in car maintenance and shows what can be done to bring old motors and control up to the standards of efficiency and reliability set by later designs. The maintenance of cars for various classes of service or the structures for housing them are described in all of the longer articles except that on San Francisco, which is devoted exclusively to way department matters. The article on the Norfolk maintenance buildings is of exceptional interest because of the authors' clear demonstration of the factors which must be considered in the scientific design of railway buildings and their analysis of the costs of methods and materials. In addition, shorter articles appear on the manufacture of concrete poles and on feeding overhead lines at street intersections.

THE NEED FOR TESTING APPARATUS

No maker of machinery who values his good name would ship his product to the customer before it had been tried out in the shop. Even when it is impracticable to assemble the machinery at home the same end is attained by having it put together and started on the buyer's premises by one of the manufacturer's experts. Such preliminary tests are particularly desirable in electrical equipment, for it is not easy to detect visually such mischief breeders as crossed wires, loose binding posts, punctured insulation and undersized conductors.

The mechanical substitution of a new part for an old one is not a proper repair until the work is supplemented by a test which proves that the new assemblage of parts, like Kipling's ship, has found itself. This thought is suggested by the practices of those companies which believe that the only necessary test requirement is to wait until the repaired equipment is returned to the car for regular service. This is hardly the best policy, for the cost of one service breakdown with its inevitable derangement of schedules and dissatisfaction of patrons more than offsets the price of a modest testing outfit. Even if trouble is detected by a short run near the shops, the labor and time spent putting in and taking out defective motors and the like have been wasted.

It would be well if more companies were to follow in this respect the practice of the Brooklyn Rapid Transit Company, as described elsewhere in this issue. The field-testing and breaker calibration outfits are more or less orthodox, but the armature apparatus is somewhat unusual in that it is designed to subject the armatures on a stand to the same currents that they would have to carry on the cars. Still more unusual are the jumper line tests, which prevent abraded wires from returning to service, and the checking of heater coils to eliminate confusion in assemblage and waste in electrical energy. The Brooklyn company has other and more comprehensive testing equipments, but only these have been named because their use is within the means of many companies of moderate size.

Much spare material was used in manufacturing all of these equipments. In some of them only the meter constituted a cost item of any importance. The heater-testing equipment cost but $20 and the jumper outfit $30. Where few cars are handled the mountings could readily be arranged to use the same millivolt meter and ammeter with different sets. It should also be noted that these small but important tests do not require the services of expert electricians.

THE SIDE-ROD TYPE OF LOCOMOTIVE

Much written comment has been published on the shortcomings of the side-rod type of electric locomotive owing to the supposed difficulty in maintaining the jack-shaft bearings, but it is evident from the present experience of the Pennsylvania Railroad, as outlined elsewhere in this issue, that the objections have been much exaggerated. It is obvious that when this type of engine was first brought out not only the repair men but the mechanical officials could not have understood without experience what points were likely to cause trouble. Prominent among these was the vital necessity of keeping the lost motion out of the jack-shaft bearings, where it was found that a wear of 1/16 in. was enough to cause a damaging pound.

Now that the necessary experience has been gained with these engines, all of the former troubles have disappeared, and it is quite possible that the same statement will apply to the various types of jack-shaft locomotives in Europe, in which similar difficulties have been reported. There remains, however, much to be done in the line of refinement in design. It is, in fact, admitted that the arrangement of jack-shaft bearing now used on the locomotive is still in process of development. Even now a new design is in the course of preparation which, if it proves satisfactory in practice, will be made standard.

Prominent among the requirements are some means for vertical adjustment of the bearing and a general increase in flexibility. With the present arrangement no opportunity exists for correcting slight mistakes in the location of the housing, in the length of the motor rods or in the finished size of the brass itself, and any one of these errors will cause binding and heating.

For the same reason it is essential not only to cool running but also to smooth running for all cranks to be exactly in quarter. It is not possible, as is the case with the steam locomotive, to have one side of the engine slightly in advance of the other, for both sides are connected with close-fitting bushed rods at three points, the motor shaft, the jack shaft and the axle on the first pair of drivers. The operation of quartering with this type of engine is something which cannot be trusted to the ordinary methods of steam locomotive machinists.

Another opportunity for improvement exists in the means used for lubricating the jack-shaft journal. The problem is complicated by the fact that practically all of the wear on the brass occurs at the bottom, yet if the customary oil cellar and saturated waste are to be used, the brass has to be cut away at this point to let the waste touch the journal. It is also necessary to provide some means for reaching into the cellar to pack the waste properly. Owing to the fact that the cellar in this case is subject to the enormous thrusts from the cranks of the 2000-hp motor, it is evident that a design which combines accessibility to the lubricant with sufficient strength is a problem of some magnitude.

It is perhaps unfortunate that the novelty of the design directed so much attention to the Pennsylvania locomotives before experience had provided a satisfactory solution of the problems surrounding their operation, for the early difficulties subjected them to a great deal of entirely unmerited criticism, notwithstanding the advantages which the type offers in the shape of a high center of gravity, reasonable cost and extreme simplicity.

THE SCOPE OF SCIENTIFIC MANAGEMENT

The discussion upon the report of the sub-committee appointed by the American Society of Mechanical Engineers to investigate the present state of the art of industrial, or "scientific," management, which is abstracted in the current issue of the journal of the society, is probably the most enlightening piece of literature that has yet been published upon that widely discussed subject. Primarily the printed discussion establishes most clearly the wide divergence in the opinions and aims of the different schools which have developed among those who are popularly termed efficiency engineers. Pointed objection was taken in some instances to the implied tendency of the sub-committee to consider that the field of scientific management was covered when the efforts of the individual workman were directed in such minute detail as to produce the maximum possible output consistent with his physical wellbeing.

The series of objections to this limitation of the art may be somewhat surprising as they controvert what is probably the popular impression. For the layman scientific management and the Taylor system are often synonymous terms. Indeed, to many minds the term "efficiency engineer" brings, unfortunately, a picture of labor difficulties, upheavals in organization and even sweeping changes in personnel.

One of the contributors to the discussion points out that to be reasonably complete the science of management must cover not only the direction of the operation of a plant but also the direction of the planning and construction of the plant itself, together with the direction of the purchase of supplies and the direction of the marketing of the product. The issue appears to be well taken. It is difficult for the uninitiated to avoid the conclusion that those engineers who have devoted their entire energy to methods of increasing the individual output through exhaustive time studies, elaborate instruction cards and special methods of remunerating labor have picked out the hardest part of the whole problem as well as the one which is least susceptible to satisfactory solution. There is, in fact, hardly a plant in the country in which any experienced visitor cannot with good reason find something to criticise, not because the "pace" is too slow, but on account of inefficient, improperly placed tools and badly arranged buildings. It is not even extraordinary to find the most obvious errors in the "direction of the planning of the plant" in shops where herculean efforts are being devoted to the establishment of wage systems involving the utmost degree of refinement and of complexity. One case in point is an electric railway repair shop where the existence of a somewhat spectacular but reasonably successful premium plan for wage payments was found by a disinterested outsider to have distracted attention from the fact that the small capacity of the wheel press necessitated removing wheels and gears separately and thus involved extra hands and many cracked wheel hubs.

It cannot be denied that vast opportunities for economy exist in increased outputs. The "classic case of Schmidt," one of the first subjects of motion study, who was enabled to handle a really incredible weight of pig iron every day by working in exact accordance with a minutely detailed program covering his every movement as well as his resting periods, is a magnificent example of efficiency as well as of human, or inhuman, tractability. Yet it has never been clear to many people why Schmidt and his co-workers should not have been replaced, as is mentioned in the discussion, by a locomotive crane with a lifting magnet on the boom.

As Tracy Lyon, another contributor, expresses it: "If tools are put in the best operative condition and are so arranged as to minimize the movement of material, if provision is made for material in definite and sufficient quantities, if small tools and other necessities are on hand before the commencement of a piece of work, the result will certainly be to the benefit of the employer and the employee. Any plan of wage payment, whether bonus, piece or day work, can be used without interfering with the principles of scientific management, provided there is a clear understanding that the employers are willing to pay liberally for a fair day's work."

"Some of the systems," he adds, "may have been handicapped by the effort to convey instructions to the workmen in too elaborate a manner." This has been a prevalent suspicion which now finds justification in the remark of H. H. Vaughn: "We believe that we should not have any more system in our work than we can get along with nicely. We would rather have too little system than too much in the operation of the shop."

One of the features of the discussion was a statement by David Van Alstyne that any system of management which could not be made acceptable to organized labor was doomed to failure. This opinion is distinctly interesting, for it is difficult to see how any system of scientific management which includes within its scope the necessity for greatly increased effort from individual workmen could ever be made acceptable to trades unions. Specialization is admittedly the slogan of every such system. It would, in fact, be ridiculous to spend time and money in training a man to perform one task with machine-like precision and then set him at totally different work. Carried to a logical conclusion, this strikes at the very foundation of the trades union. For if time must be devoted to teaching an operator the exact motions required for every job, it might be better spent on some immigrant gifted with a broad back and a narrow forehead than on a mechanic whose mind is already occupied with the knowledge which, right or wrong, he considers as his trade. Wherever work can be done by common labor with the assistance of elaborate supervision the skilled artisan will certainly be eliminated, to the ultimate detriment of trades unionism, and who can believe that organized labor is not fully cognizant of this fact?

Maintenance of the Pennsylvania Railroad Electric Locomotives

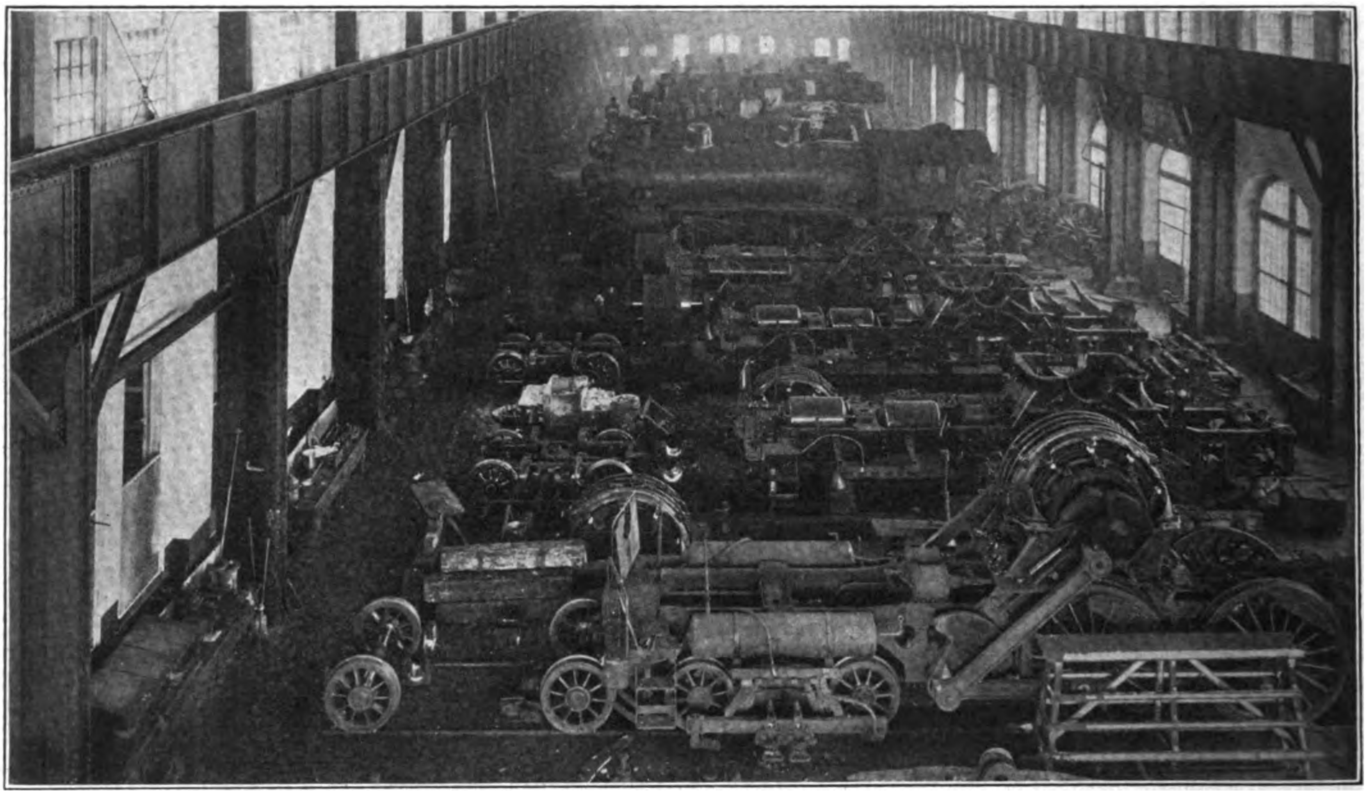
A Description of the Methods Used in the Inspection and Repair of the Side-Rod Type of Locomotive Equipped with Jack Shafts—Operating Results and Maintenance Costs Are Included, Together with an Account of the Development of the Design of the Jack-Shaft Bearing

At the time of the construction of the locomotives which operate over the electrified zone of the Pennsylvania Railroad at its New York terminal it was determined, by elaborate tests with different types of locomotives running over track equipped with recording devices, that a high center of gravity would gain more than enough in easy riding qualities and in reduction of damage to the track to outweigh the advantage of simplicity afforded by mounting the motors directly upon the axles. In consequence the motors were located upon the frames, well above the wheels, physical connection to the drivers being effected by means of rods.

This arrangement brought the center of gravity up to the approximate level of the cab floor. The arrangement not only eliminated the necessity for gears, but also permitted the engine itself to be designed along lines similar in practically every respect to the steam locomotive, with which the repair-shop forces of the railroad were naturally thoroughly familiar.

Each of these locomotives is made up of two similar units, and each unit or half locomotive receives a number of
own, the whole locomotive having a "run number," an
gement which permits, if necessary, the interchange
ent units. The use of double units was adopted
as considered that two motors of 2000 hp each
rable to one motor of 4000 hp; because, in
ne motor could be cut out, leaving the
vice and also because the weight on the drivers necessary to develop the large tractive efforts required too long a wheelbase for a single unit. Experience has shown that in case of breakdowns the serviceable unit is generally able to handle the train to the terminal without delay.

The locomotives are operated in passenger and switching service in the tunnels serving the New York City terminal of the Pennsylvania Railroad. On the east the line extends to the Sunnyside yard, a large storage space for passenger car equipment. On the west the line extends across the New Jersey salt meadows to Manhattan Transfer, a point near the town of Harrison, where steam locomotives are substituted for the electric engines on through passenger trains. The length of the run across the Meadows is approximately 6 miles, in the North River tunnel about 3 miles, in the East River tunnel about 3 miles and to the Sunnyside yard about 1 mile. Between the Pennsylvania Terminal and Manhattan Transfer the runs are made at high speed. Through the East River tunnel and in switching service in the Sunnyside yard, however, the service is naturally slow and the loads heavy. Many sharp curves exist on this portion of the line, and in consequence the engines which are used in this service are subject to what may well be considered extremely hard conditions. The tunnels are built with grades of approximately 1.5 per cent in order to dip under the two rivers which bound New York City, the maximum grade being one of 1.93 per cent, on the section west of the terminal.

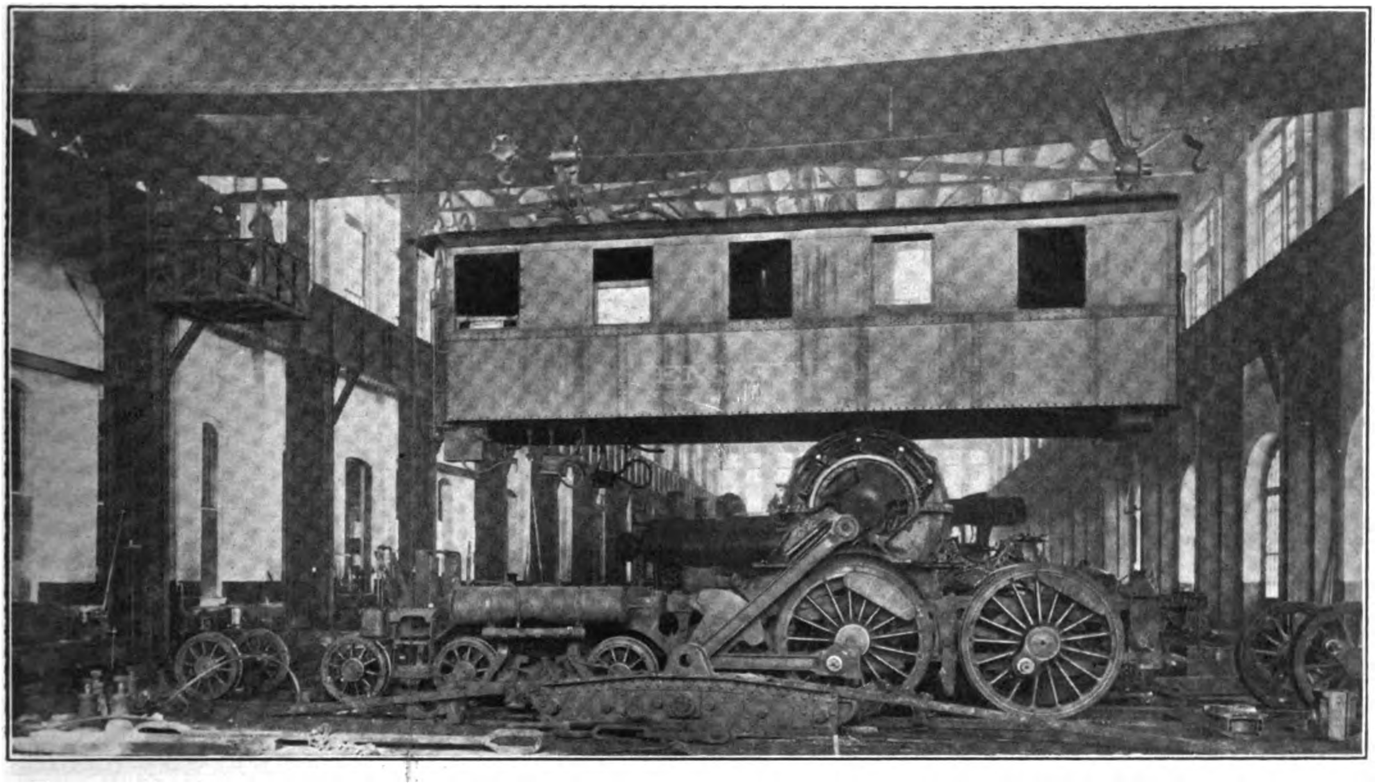


Pennsylvania Locomotives—View of Erecting Floor at Meadows Shop, Showing Electric and Steam Locomotives Undergoing Repairs

Altogether there are thirty-three locomotives in service. The first two locomotives constructed differ in some details from the later designs, notably in not having the jack-shaft tie casting, which forms the upper half of the jack-shaft boxes, directly connected to the motor frames and also in the diameter of the driving wheels and in the arrangement of driving rods.

The next twenty-two engines to be furnished were all alike and have been in service for approximately two and one-half years. The remaining nine engines were placed in service about eighteen months ago. These differ only in minor details from their predecessors, one of the most important differences being in the design of the jack-shaft box cap and brass. All of the locomotives, however, are the same in arrangement and have similar general dimensions.

Twenty-five out of the thirty-three locomotives are continually in service, the remaining engines being put in service on such occasions as extra travel demands their use. The average monthly mileage of all engines in service is 3000, the passenger engines which handle through trains between the terminals and Manhattan Transfer being double-crewed and covering about 4500 miles per month.



Pennsylvania Locomotives—View of Crane in Meadows Shop Lifting Cab from a Unit.

GENERAL DESIGN

As before mentioned, each unit or half locomotive is complete in itself. It has a chassis which includes the running gear, the frames and the motors, and mounted upon the frames is the cab, which incloses the control apparatus and can be removed complete. The connection between the motor and the wheels is made through a jack shaft set between the bogie truck and the first pair of drivers, the "motor rods" which connect the motor and jack shaft being set at an angle of a little less than 45 deg. One of these motor rods is connected on each side of the motor, and the two motor cranks are set at 90 deg. from each other with the left side in advance, so that a continuous torque is transmitted to the jack shafts. The motor rods are connected to the cranks on the jack shafts at the outer end of the crank pins, and inside of the motor rods are "main rods" extending horizontally to the crank pins on the first pair of drivers. The motor rods are bushed at both ends, but the main rods are made up with a bushing at one end and a keyed brass at the other. The side rods connecting the two pairs of drivers are located on the crank pins outside of the main rod. These rods are bushed at both ends.

The truck at the front end of each unit is of the four-wheel type standard on the Pennsylvania for heavy passenger locomotives. Two pairs of 72-in. drivers support the rear end of the unit, the motor being carried on the frames about 5 in. behind the center of the first pair. The driving boxes are fitted with shoes, wedges and binders exactly as in steam locomotives, and the bar frames, equalized springs and foundation brake rigging make the major part of the chassis quite similar to the running gear of the steam engine. The air compressor is motor-driven through gears and rests upon the floor of the cab in the space at the rear of the main motor.

The cab is supported on the frame at four points. It is self-contained and can be lifted off completely, taking with it the control apparatus, the resistance, the compressor, the cab fittings and wiring and the electric steam heater, electricity being used to produce steam for heating passenger coaches.

The jack shaft is carried in a housing which is placed between the upper and lower members of the locomotive frame. At this point the frame is made up with jaws having a binder below them, just as would be the case were the jack shaft replaced by a pair of drivers. To absorb the thrust and pull between the motor and the jack shaft, the jack-shaft housing is made of a single casting extending across between the frames, and this casting is extended diagonally up toward the motor, the motor frame being extended diagonally down to meet it. The two castings are bolted together where they meet, and thus form a rigid connection of invariable length between the motor and the jack shaft.

The shoes for collecting current from the third-rail running alongside of the track are carried on the bogie truck equalizers and are interconnected through fuses which consist of strap copper 1½ in. wide with a ¾-in. hole punched in the center to localize the heating in case excessive currents are taken by the motor. The No. 1 end of the locomotive is fused at 6000 amp, the No. 2 end at 4500 amp, the difference being due to the fact that the No. 1 fuses carry current with motors in series and in parallel, while those in the No. 2 end carry current only while motors are in parallel.

INSPECTION

The inspection which is given to the Pennsylvania electric locomotive differs materially from that followed in ordinary steam locomotive practice. The engines, not having boilers to require care, are stored where convenient and are taken into the engine house only at such times as they need minor repairs. For this reason special arrangements are made for frequent inspection of the running gear, as the requirements for operating the large number of trains through the New York terminal without delay demand the absolute elimination of engine failures. Each machine is inspected below the cab at least once each day by inspectors who devote their entire time to this purpose. One inspector is located at Manhattan Transfer, and he makes his inspections from ground level. The absence of link motion and eccentrics provides a surprising amount of room under every part of the locomotive except at the bogie trucks, and this permits reasonably complete inspection without a pit. In the Sunnyside yard at the other end of the line a single inspection pit is provided, and another inspector works at this point, the pit permitting him to make complete inspection of both running gear and bogie trucks on such engines as do not reach Manhattan Transfer.

PENNSYLVANIA RAILROAD COMPANY, MANHATTAN DIVISION.
Electric Locomotive Detentions in Minutes During 1912.

Month	ELECTRICAL				MECHANICAL		Total, All Causes	Mileage	Miles per Minute Detention
	Fuses	Master Control	Motor Control	Misc. Electrical	Misc. Mechanical	Brakes			
January....	..	2	...	...	...	..	2	84,422	42,211
February..	..	5	6	5	...	..	16	78,100	4,881
March.....	..	3	...	...	...	..	3	82,573	27,524
April......	..	2	...	...	...	..	2	78,886	39,443
May.......	..	2	...	...	...	..	2	80,880	40,440
June......	..	5	...	...	...	2	7	80,013	11,430
July.......	...	...	...	...	...	..	......	84,283	......
August....	..	...	2	...	4	..	6	85,486	14,248
September.	..	...	5	...	4	2	11	83,950	7,632
October...	..	...	...	...	4	7	11	85,305	7,755
November.	..	...	6	...	...	..	6	84,473	14,079
December..	..	...	...	...	...	..	......	86,221	......
Total....	..	19	19	5	12	11	66	994,592	15,070

EXPLANATION OF DELAYS.

Master Control:
2 minutes. "J" switch not operating owing to oil on armature.
2 minutes. Grease on master controller drum.
2 minutes. Broken control battery plate.
3 minutes. Loose master controller finger.
2 minutes. "J" switch sticking; motors not operating in parallel.
1 minute. Bent finger on No. 2 controller plug.
4 minutes. Master controller finger loose.
3 minutes. Bridge relay finger not making contact; small piece of waste found under same.

Motor Control:
6 minutes. Circuit-breaker not resetting owing to glycerine in dash pot gumming, account cold weather.
6 minutes. Due to motorman not using power in proper manner and blowing breaker by notching up too rapidly.
2 minutes. Broken strap connection.
5 minutes. R-5 resistance strap breaking No. 2 motor.

Miscellaneous Electrical:
5 minutes. Shoe cable burning off.

Miscellaneous Mechanical:
8 minutes. Latch on engine coupler opening when starting.
4 minutes. Motor crank disk striking cover (stopped to examine same.).

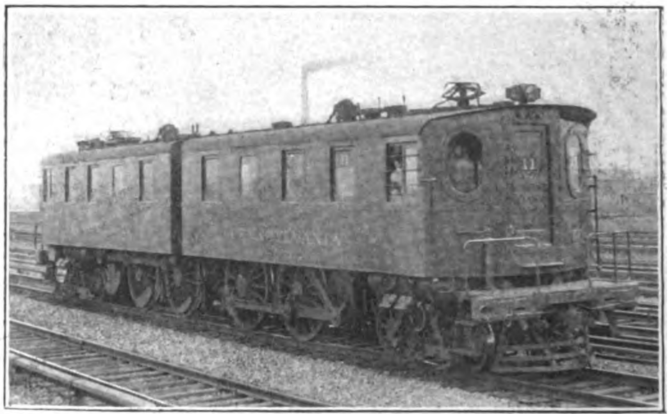
Brakes:
2 minutes. Brakes failed to release promptly.
4 minutes. Defective air hose.
5 minutes. Loose finger on pilot governor of air compressor.

The inspection of the apparatus inside of the cab, which includes examination of the motor, air compressor and controller, is done entirely by the engine men, who also go over the running gear on their own initiative. The work of inspection consists in examination of brakeshoes, heads, hangers, pins and rods for missing cottars, or interferences, and an inspection of frame and binder bolts, truck hangers, springs, spring hangers and crank pins. The bolts holding the jack-shaft bearings in place are a very important item, as any lost motion at this point results in a serious pound. Worn bushings and brasses are reported by the engineers to the engine-house foreman. No repairs are made on the road, the engines being brought into the engine house for all work. The result of the careful inspection is a surprisingly small number of delays, as shown by the accompanying table of locomotive detentions for the year 1912.

LIGHT REPAIRS

Light repairs are made at the engine house in the Sunnyside yard. The building has two tracks devoted to work on electric locomotives, and these hold four complete engines, or eight units out of the sixty-six which are available for service. This track space has been found to be more than enough for the requirements of the line, and it is seldom that more than two engines at a time are held in the house.

No work is done at the engine house which requires removal of the cab from the chassis or which requires raising the frames off the wheels. A drop pit is provided for wheel repairs and for use in case a hot driving box necessitates dropping one pair of drivers. This is, however, hardly ever used for this purpose on account of the freedom of the engines from trouble of this kind. A traveling electric crane of 25 tons capacity is installed to serve the repair tracks, but this is also used for repairs to the multiple-unit motor cars, which are used on the electrified zone of the Pennsylvania Railroad and which receive light repairs in the engine house. Pits between the rails are of course installed for the full length of both tracks.



Pennsylvania Locomotives—General View of Double Unit

The live third-rails are not carried into the engine house on account of the danger to the repair men. The electric locomotives are, however, shifted in and out of the house under their own power by plugging a long insulated flexible cable into the bus line receptacles on the engines and thus connecting them to the live circuit. This cable is connected through a heavy single-knife switch incased in a wooden box to the 600-volt feeders in the yard, and the other end is provided with a recessed plug so that no danger exists for employees who make connections when the engines are being moved. Danger signs are always put upon exposed third-rail shoes before power is supplied to an engine in the shop for the purpose of pumping up air or making tests of any kind.

Air-brake repairs, renewal of third-rail shoes and minor electrical renewals and replacements form a considerable portion of work done at this point. The heavier jobs, which come more seldom, consist mainly in closing rod brasses, renewing worn rod bushings, closing or renewing jack-shaft bearings, and the like.

Motor rods are bushed after 1/16 in. of wear has taken place, or in general after 75,000 miles have been run. Main rod brasses require reducing about twice a year, or on a mileage basis at intervals of approximately 20,000 miles. All rod brasses and bushings are left 1/64 in. large when applied, as no direct reciprocating motion takes place anywhere on the locomotive and on account of the gradual application of all forces lost motion is taken up without severe shock. Wedges are set up as required by the inspectors, but they never require lining down between shoppings.

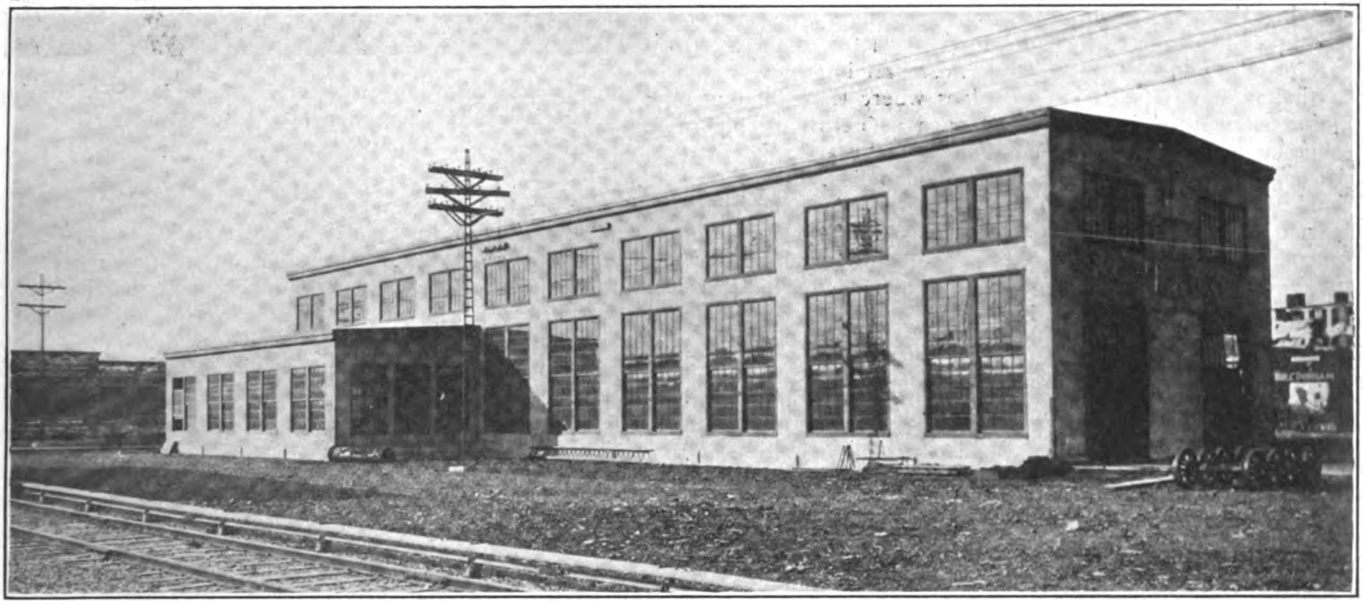
The accompanying list shows a number of the principal items of repair work or renewal which were handled at the engine house during the past year.

Partial List of Repairs and Renewals Made at Sunnyside Engine House During 1912

Arc chute sides replaced	585
Arcing tips renewed	168
Switch contacts renewed	236
Main motor brushes replaced	67
Compressor brushes replaced	234
Contact shoes renewed	617
Main rod brasses reduced	26
Jack-shaft brasses closed or reduced	489
Jack-shaft brasses renewed	14
Motor bearings renewed	4

JACK-SHAFT BEARINGS

The jack-shaft bearing is naturally the most interesting feature of the engine, as it is the only item entering into the construction which is not covered by the past experience of repair men on either steam or electric railways. The brass is made up much like a split bushing, as it is turned in cylindrical form both outside and inside with a collar on the outside of each end. It is split along the horizontal center line, the split being made with a shoulder and the two halves fitted together. The brass itself is inclosed in a steel box casting, which in turn is split horizontally slightly above the center line of the jack shaft and is held together by vertical bolts. As before mentioned, the casting forming the top half of the box, or housing, extends up to the motor frame and bolts thereto so that when the two parts of the housing are bolted together the jack shaft is held rigidly at a fixed distance from the motor shaft.



Pennsylvania Locomotives—Engine House in Sunnyside Yards

The necessity for this construction was, however, found to exist only after the first two locomotives were built, the original design calling for jack-shaft boxes bolted separately to the frames, as shown in the accompanying illustration of one of the two original locomotives.

In these earliest engines, as well as in the twenty-two locomotives which followed them, the jack-shaft bearing brasses were turned cylindrical inside and out, split in two halves and fitted carefully onto wedge-shaped keys which held the two halves firmly together and in line, and which prevented the brass from turning as a whole. It was the original intention to treat these brasses just the same as motor-bearing boxes, and when they were worn they were to be removed and replaced with complete new brasses. This plan proved to be unsatisfactory for three chief reasons, the first being that even a slight wear in the brass, if not taken up, caused a serious pound, the second being that on account of the exposure to dust and the shifting strains imposed upon it the brass wore more rapidly than was expected, and the third being that all of the wear was found to occur straight downward or on the bottom part of the bearing.

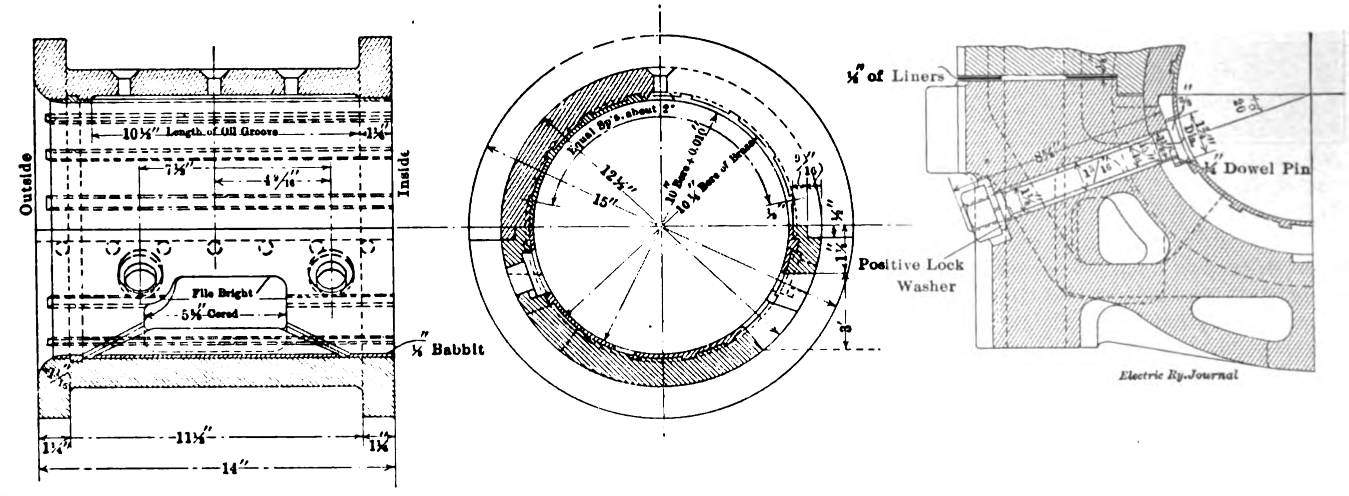
During the early operation of the engines, and before experience had shown that not more than 1/16 in. lost motion could be permitted in the jack-shaft brasses, trouble was encountered from this source, and the result was that the jack-shaft drive was subjected to very general condemnation. As the necessity for promptly taking up wear became apparent, however, the trouble largely disappeared, and in the nine engines built about one year after the others the design of the brass was changed to make the work of adjustment easier. The changes consisted in eliminating the wedge-shaped keys and simply splitting the brass along the center line, the two halves meeting along flat surfaces, although, as mentioned above, the joint was left with a recess along the inside of the upper half of the brass, possibly with the idea of keeping the two halves in alignment. This construction is shown in the accompanying illustration of a jack-shaft brass.

The statement that practically all wear on the jack-shaft bearings takes place in a vertical plane is admittedly hard to accept. Nevertheless, examination of a number of the brasses demonstrates it to be a fact, and this is confirmed by the experience of those officials directly engaged in maintaining the locomotives. Two reasons may be put forward to account for this paradox. One is that the weight of the jack shaft, while by no means comparable with the shifting forces which are applied to the jack-shaft bearing when starting a train, does exercise a constant tendency toward keeping the jack shaft at the bottom of the bearing. When the torque is not great it certainly reduces the horizontal and upward forces acting upon the shaft and adds to those which press the shaft down. An analysis shows that these forces are constantly moving throughout a revolution but that they do not change direction uniformly, shifting irregularly from one point to another, so that the constant force exerted by the weight of the shaft is certain to be effective even if it is not of very great intensity.

The other reason for localization of wear at the bottom of the bearings is that the brasses were originally designed for bottom lubrication, and a considerable portion of the bottom half of the brass is cut away to expose the oiled waste and permit it to rub against the jack-shaft journal. This naturally increases the unit bearing pressure at the bottom of the bearing and tends to localize the wear there.

In the new type of bearing, since the keys have been eliminated, the brass requires some form of dowel to keep it from working in the box and wearing enough to cause a pound between the brass and the box. In consequence four bolts are run through the lower half of the brass and extended through the box to the outside so that they hold the bottom half of the brass firmly in place and incapable of moving in its seat. These bolts are made with round, flat heads, countersunk in the brass so that there is no possibility of the jack shaft touching them. The nuts are held in place by lock washers.

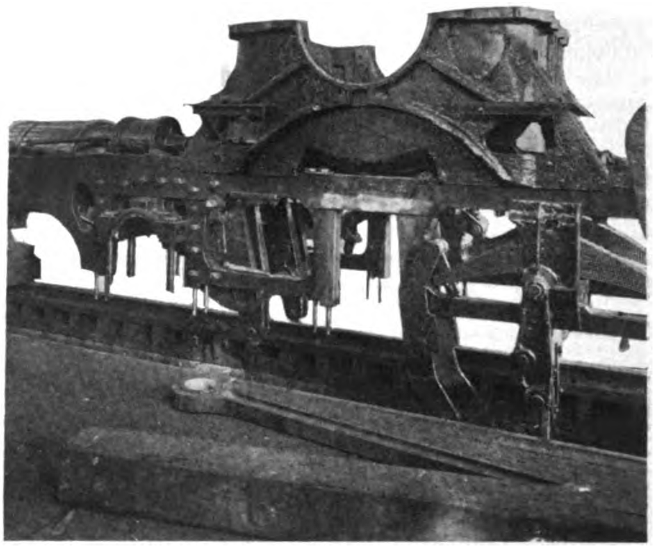
Between the upper and lower parts of the jack-shaft box horseshoe-shaped iron liners are introduced so that these may be removed and the box closed by loosening but without the necessity for removing the four bolts which hold the two parts of the box together. When the brass is first put up the two halves are left 1-32 in. open so that the brass may be closed that much by merely removing liners between the two parts of the box. When the brass has been closed until the two halves of the brass are pressed solidly together the lower half is removed and a shallow cut is taken off the edges where the two halves join, leaving the brass 1-32 in. open as before. This is kept up until the white metal lining of the brass is worn through, at which time a new brass is applied. The upper half of the brass is not permanently fastened to the upper part of the box, so that it can rotate as much as the slight opening between the two halves of the brass permits. There is, however, ample opportunity for introducing bolts to fasten the upper half-brass in place, and on one engine this has been done. No objections to this plan have been discovered, and if it is decided that it is necessary later on, all upper half-brasses may be bolted to the box casting, thus permitting a practically unlimited opening between the two half-brasses and avoiding any necessity for taking cuts off the lower half as the bearing is closed to take up wear.



Pennsylvania Locomotives—Present Type of Jack-Shaft Brass and Method of Bolting the Lower Half in Place to Prevent Turning in the Housing

Since the motor rods are bushed in both ends and are in consequence of fixed length the distance between centers of motor and jack shaft has to be kept constant, and it is likely that some method of vertical adjustment for the jack-shaft brass to provide for the change in position of its center, due to repeated closings, will be introduced in the near future. The box, as before mentioned, is maintained at a fixed distance from the motor, owing to the fact that the casting for the former is bolted solidly against the motor frame, and no opportunity exists for lining down the brass in the box on account of the cylindrical form of the brass.

Lubrication of the jack-shaft bearing was originally effected by oil-soaked waste in the hollow lower part of the jack-shaft box, or housing. This was formed into a receptacle containing a separate compartment for waste and also a larger reservoir for oil which was refilled every 3000 miles. With the new design of brass, however, the reservoir is reduced in size and 5 gills of oil is put into it every twenty-four hours. The lower half of the jack-shaft brass has large openings cut in it, as shown in the accompanying cut, and through these holes the waste extends to lubricate the journal. Packing plates are provided on the sides of the oil cellar so that the waste can be examined or changed as needed.

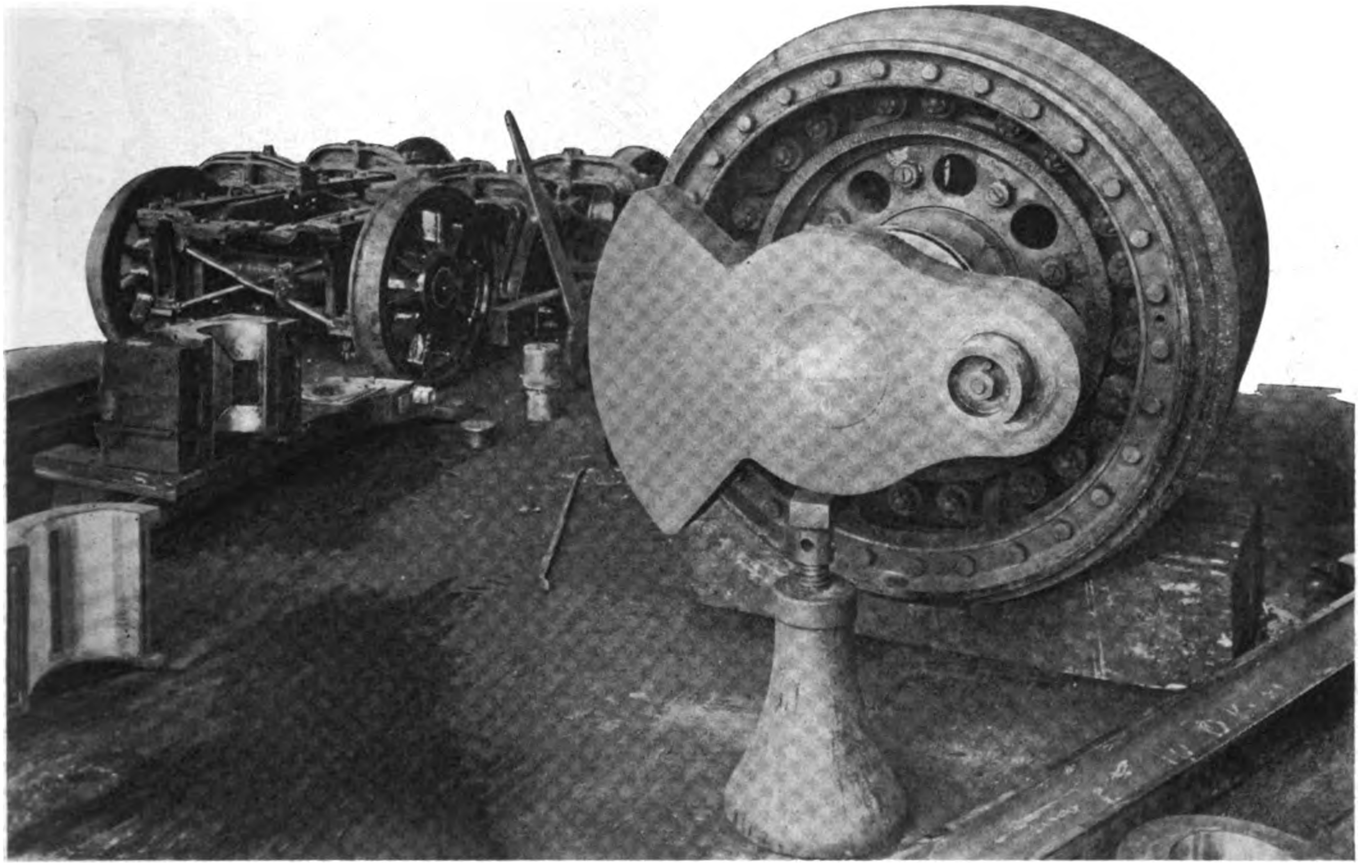


Pennsylvania Locomotives—Early Method of Mounting Jack-Shaft Housing Separate from Motor, Now Superseded

Exception may be taken in some quarters to the fact that the upper half of the brass is not firmly fastened in the box, even though the opportunity for movement in the box is limited to 1-16 in., on account of the practice of leaving the halves only 1-32 in. open, and it may be held that the halves should always be set "brass and brass." It is, of course, true that the omission of bolts or some other form of dowel affords an opportunity for the upper half of the brass to work slightly. On the other hand, closing the box by removal of a liner can be done in half an hour, while taking down the lower half of the box, taking a cut off the brass and replacing it requires about five hours' work, so that keeping the two halves "brass and brass" at all times would involve a vast amount of labor.

In any event, the weight of the jack shaft, together with the load imposed by the rods and their counterbalances, which are mounted on the jack shaft, making a total of about 6,000 lb., tends to make the greater portion of the pressure come on the lower half of the brass. In consequence the tendency of the upper half of the brass to turn is much reduced.

While the upper half of the brass can be fastened into place with bolts, just as in the case of the lower half, the fact that successful operation has been experienced without doing this shows that it is by no means absolutely necessary. There is, however, a point which has arisen in connection with the present practice of taking cuts off the lower half-brass. This is that, as the brasses are lined with white metal, a brass which has been reduced several times to take up wear in the lining and which is then relined with the standard thickness of white metal will, when placed on the journal, be left open by the total amount of all reductions.



Pennsylvania Locomotives—Motor Armature and Standard Bogie Truck—Upper Half of Jack-Shaft Brass and Lower Part of Housing or Cap, with Brass in Place, at Left

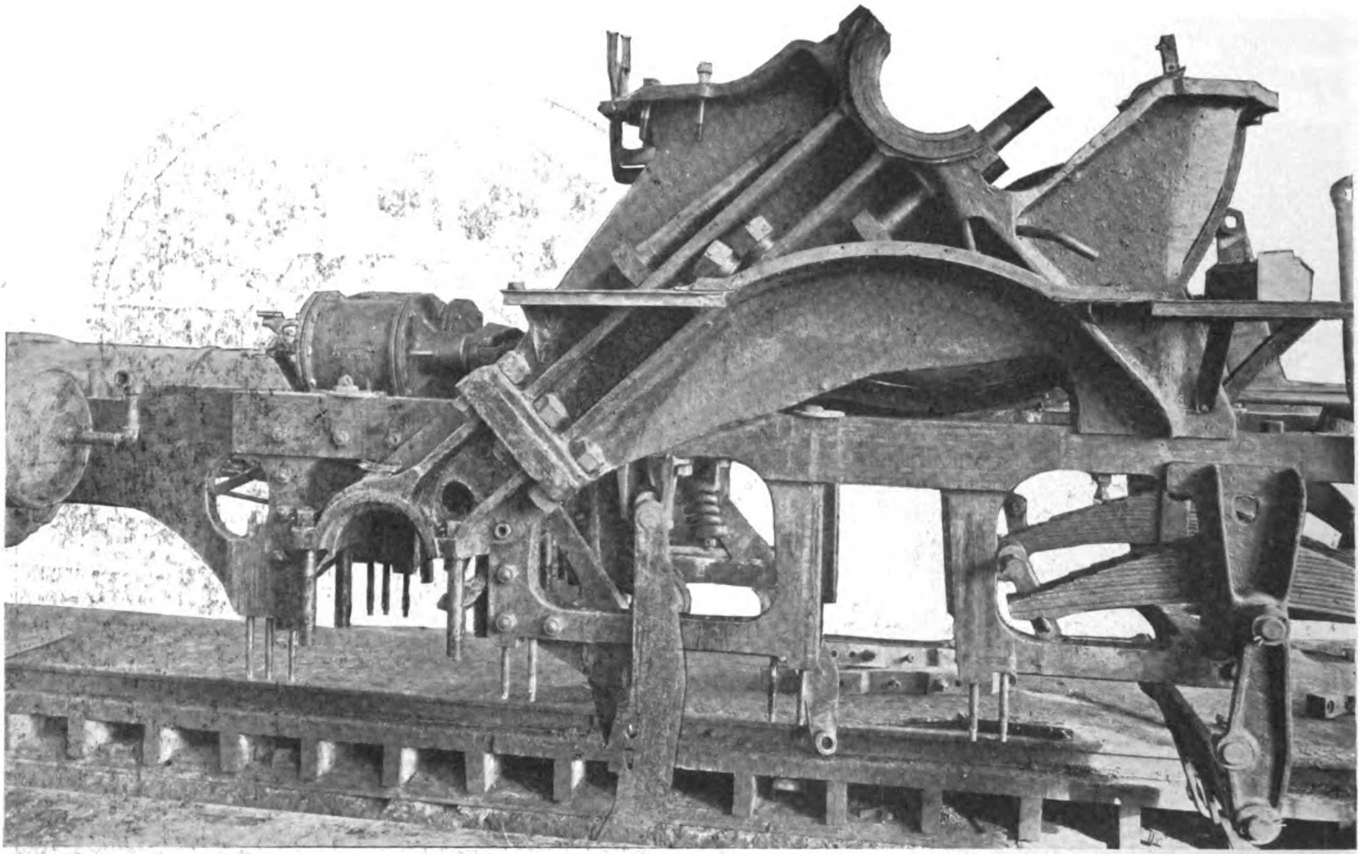
The white metal lining which is applied over the interior surface of the brass consists of ⅛ in. of No. 14 Westinghouse alloy, a high tin babbitt. This is applied after the whole surface of the brass has been tinned to avoid its loosening. In addition, the babbitt is held in place by grooves cut in the surface of the brass at intervals of about 2 in. all around the bearing. The metal is exceedingly tough and can even be heated enough to run at one point in the bearing without throwing the remainder out of place.

The lost motion in the jack-shaft bearings has been found to be a serious cause of trouble if it is allowed to go beyond reasonable limits. A play of 1-16 in. between shaft and brass is the absolute maximum, because when this point is reached the wear rapidly increases on account of the pounding out of the babbitt. Brasses are tested for wear at each inspection by means of a pinch bar, with the fulcrum resting on a screw jack under the jack shaft. The leverage thus established enables two men, by jouncing their weight at the end of the bar, to raise and lower the jack shaft and thus feel any lost motion in the brass with certainty. This method, while it may appear somewhat crude, has been demonstrated to be thoroughly satisfactory, the inspectors acquiring a great deal of skill in estimating the extent of lost motion after a very little practice.

The work of taking up wear by loosening the lower part of the box, removing a liner and then pulling the lower part of the box into place again takes two machinists only about half an hour, the cap being held in place by four 2¼-in. bolts. The intervals at which this job is done are variable, locomotives running anywhere between 2,000 and 7,000 miles before it is necessary. Three thousand miles is given as a fair average for the distance which can be run before wear is thus taken up. All four brasses on a locomotive or double unit do not, however, wear evenly, so that only one brass on an engine may require closing at an inspection. Based on the number of brasses closed during 1912 and the average number of engines in service, the average would be 6000 miles per bearing, not per locomotive, between closings. This would give a mileage of 1500 per engine if only one brass was closed at a time, but as the engines almost invariably have more than one brass closed, about twice the latter mileage is made. The engines are not brought in for this purpose between the regular inspections made on a 3000-mile basis.

The removal of the lower half of the jack-shaft brass involves setting up a screw jack under the jack shaft to take the weight off the bearings and then dropping the lower parts of the boxes. The lower half of the brass is then removed from the cap and the desired cut taken off. This job can be done by two machinists in about five hours.

When the babbitt lining of the brass has become worn so much that it has to be renewed it becomes necessary to remove both halves of the brass from the box. Brasses are, however, made in jigs to conform to an exact standard, so that it is not necessary to spend any time babbitting an old brass in order to replace it in the box from which it was originally taken. After removing the worn brass the new brass is spotted and scraped carefully by hand to make a fit on the jack-shaft journal, put in place in the jack-shaft box and the whole bolted in position. In spotting the brasses on the jack-shaft journal they are brought to a good straight fit all over, except that for about 1 in. on each side they are eased off slightly, in a way similar to that in which a rod brass is eased off on the quarters. This job complete, including the time required to fit the brass on the jack-shaft bearing, takes two machinists about ten hours. For this work it is of course necessary to lower the jack shaft enough so that the upper half of the brass can be removed from its place in the housing, and in order to do so it is necessary to take off the main rods and the motor rods. The motor rods require for their removal that a section of the cab flooring be taken up, together with the casing which goes over the motor cranks.



Pennsylvania Locomotives—View Showing Present Standard Design of Jack-Shaft Housing Bolted Direct to Frame of Motor

The motor crank casing is made of light sheet metal, as it is installed only for the purpose of protecting anyone in the cab from being caught by the cranks while the engine is in motion, and the removable section of the cab flooring is held in place by bolts, so that it can be easily removed whenever necessity arises for taking off either one of the motor rods.

All of the work requiring either supporting or dropping of the jack shaft is effected by using a screw jack with yoke on top, such as is used for dropping driving wheels. The operations are, however, very much simplified by ready accessibility of all of the parts under the locomotive cab.

The babbitt lining is used because, thus far, it has been found to give the most satisfactory bearing surface for the purpose. It naturally makes the process of fitting the brass to the journal very much easier, and in addition it obviates much of the necessity for extra refinement in the fitting. While the wear on the babbitt is more rapid than would be the case if a plain brass was used, the lining permits an engine to go into service immediately after a refitting of the bearing without the necessity for nursing it in any way. New babbitt can of course be applied much more easily to the jack-shaft bearings than to driving-box brasses, and in case the babbitt should be become hot enough to be thrown out of a brass no damage to the jack-shaft journal is necessarily involved, as practically all the strain on the brass is removed when the power is shut off from the motor. Hence the jack-shaft bearing would not stand as much chance of being scored or otherwise damaged as a driving brass would in case it was lined with babbitt and became hot. Ordinarily brasses are re-babbitted after 40,000 miles of service, which is in general accomplished in about thirteen months.

HEAVY REPAIRS

Heavy repairs to the locomotive are given at intervals varying between 40,000 and 60,000 miles, depending largely on tire wear. All of this work is done at the Meadows shop, a repair plant near Jersey City, which is equipped with heavy cranes so that the engines may be completely stripped without difficulty. At these shops repairs are also made upon steam locomotives on the New Jersey division of the Pennsylvania Railroad.

Turning driving wheel tires is the main feature of heavy repair work. All of the engines run around heavy curves in the Sunnyside yards and, comparatively speaking, do very little running on tangents. If anything, the tire wear is slightly less than would take place on steam locomotives in the same service. It has been found, however, that the rear wheels of both units of each complete electric locomotive tend to grind their flanges somewhat more than the forward ones. Within the last year a number of the units have been equipped with flange lubricators which spray hot asphaltum oil upon the wheel flanges, and this has been found to decrease the flange wear very materially. The cost of this flange lubrication is approximately 56 cents per 1000 miles. About 40,000 miles is considered an average year's service, so that the locomotives are shopped at intervals of from twelve to eighteen months.

The armatures will, of course, have to be rebanded from time to time as the motors become older, probably at intervals of about three years, as the core bands will eventually become weakened by rust and also tend to become loose, owing to the combined action of armature shrinkage and stretching of the band wire. Tin strips have been placed beneath the core bands in accordance with the latest practice adopted by motor manufacturers as well as by high-speed electric railways. This was generally carried out during the latter part of 1911.

An item of repairs which involves the shopping of the locomotives is the necessity for re-painting the cabs. This is quite a considerable item of expense on account of the high finish which is required, as the locomotives are used largely in passenger service and are very much in evidence. In accordance with the rules common on electric railways, a touching up and varnishing is given to the locomotive annually, and it is expected that the old paint will be completely cleaned off and new coats applied every third year.

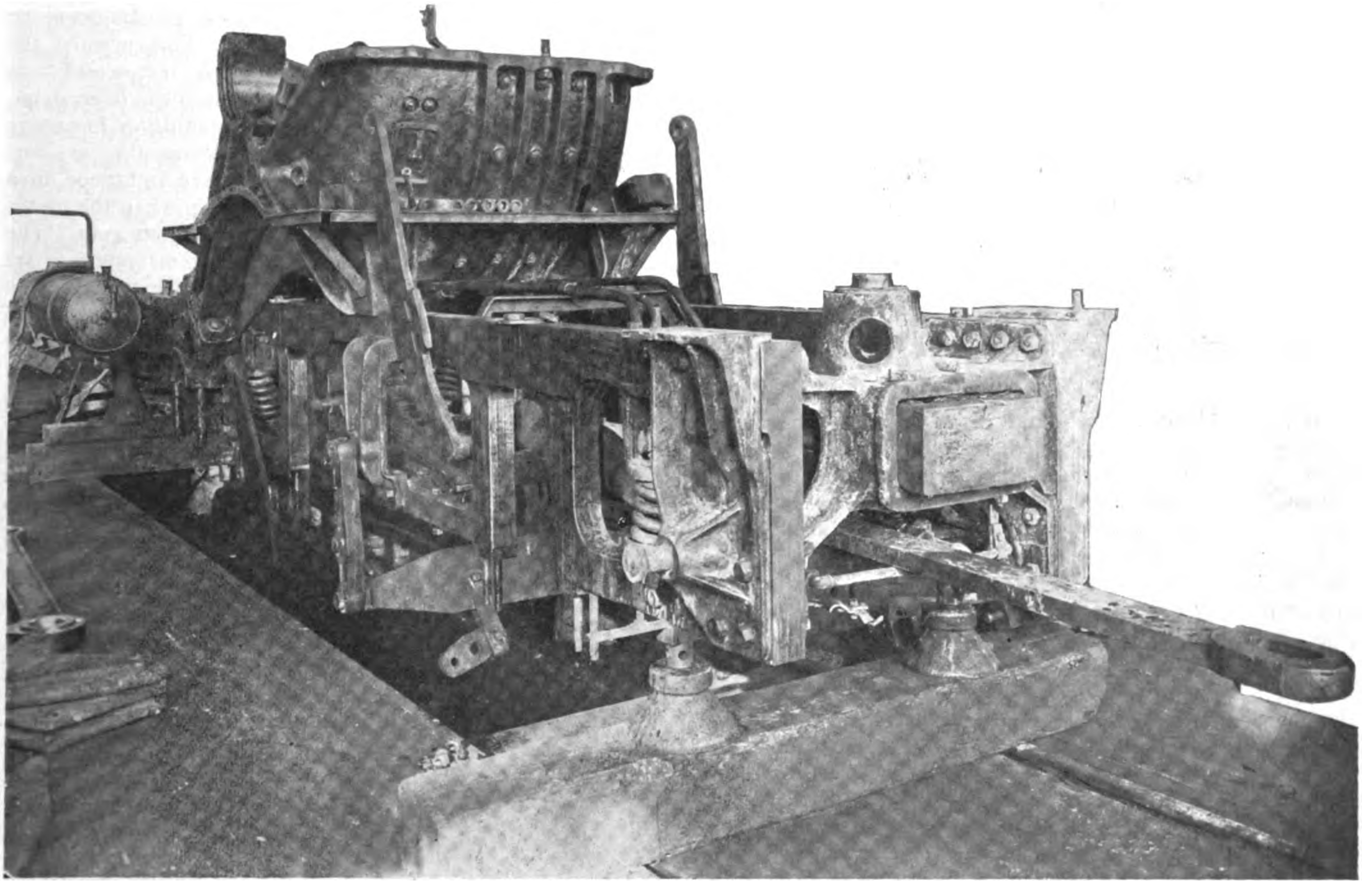
In handling the locomotives for heavy repairs in the Meadows shop, the wheels are invariably removed as soon as an engine is brought under the crane, so that the driving-box work and the re-lining of shoes and wedges can be done as required, in addition to the turning of the tires, which is always necessary at ordinary shoppings.

Each unit is handled separately, the two half locomotives being separated before being brought into the erecting shop. In lifting each unit off its wheels one of the two hooks of the traveling electric shop crane is coupled to a claw which catches under the center of the cast-steel bumper beam at the front of the locomotive. The other hook of the crane is coupled to a standard yoke for lifting steam locomotives and lifts the rear part of the unit by a lifting beam hung from it and passing across underneath the frames. After the driving wheels and truck are rolled out from under the engine it is let down upon blocks and short screw jacks in the usual manner.

If it is necessary to get at the motor for any reason, the cab is removed from the frames, taking with it the control, the resistance, the compressor and all cab fittings. The crane hooks are coupled on by means of yokes to two vertical eye-bolts at each end of the cab, these bolts extending down through the roof and being permanently attached to the cab framing. After removal the cabs are generally set upon dolly trucks and hauled to the paint shop. After the cab is off the engine the top half of the motor frame is lifted off by the crane and the armature can be lifted out in rope slings after the motor rods and bearings are removed.

With the exception of the electrical work, which is done at the Meadows shop by the electricians who ordinarily maintain the passenger coach-lighting systems, heavy repair work is so similar to that on steam locomotives that it is carried on by the regular shop force of machinists. A typical shopping report calls for approximately the following work:

Tires turned.
Driving boxes repaired as necessary.
Jack-shaft bearings renewed as necessary.
Shoes and wedges lined.
Rod bushings replaced where loose.

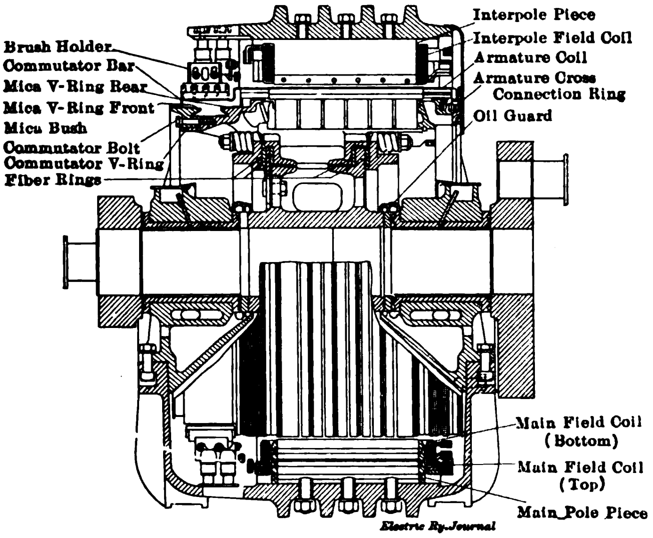


Pennsylvania Locomotives—Rear View of Unit in Repair Shop, with Wheels, Cab and Armature Removed

Engine truck overhauled.
Truck-box side play taken up.
Main rod brasses reduced.
Motor re-banded.
Cab painted.

Occasional work which is required at general overhaulings includes relining of motor bearings, equalizing engine on driving springs, overhauling brake rigging.

During the year 1912 the total number of engines receiving classified repairs at the Meadows shops was forty-six. On account of the irregular wear of jack-shaft bearing brasses, it is the custom to examine these when the engine is shopped and to re-metal or renew as necessary, although a large part of this work is done in the Sunnyside engine house.



Pennsylvania Locomotives—Sectional View of 2000-hp Motor

The spring rigging of these locomotives is exceptionally well designed. No springs have as yet been replaced for any cause, and the only work done on the rigging has consisted in leveling it up in some few cases.

Another item of the locomotive equipment which has made an exceptionally good record for maintenance is the air compressor. No air compressor has required reboring of the cylinders, and, in fact, no new cylinder rings have as yet needed replacement. The wear which exists after two and one-half years of service is not noticeable.

The weights of the different major items which make up the locomotive are as follows:

	Tons		Tons
Cab complete	22	Running gear	18
Motor	21	Chassis	17
Total			78

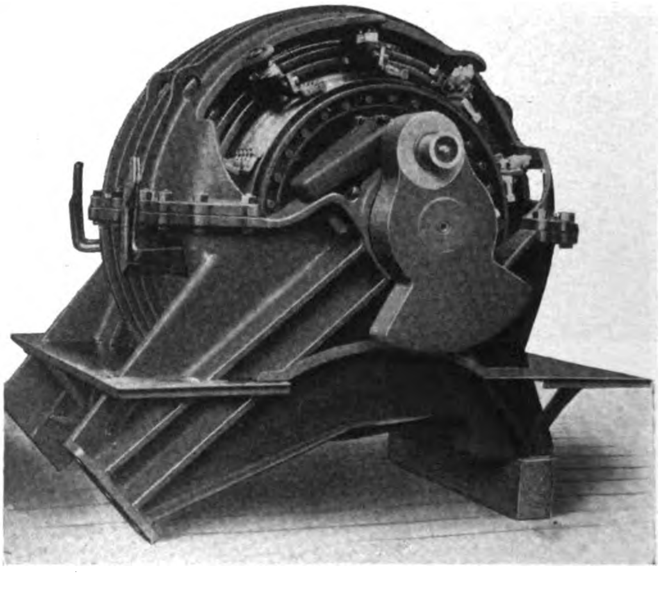
This list shows that a 60-ton crane will handle locomotives in a heavy repair shop, as this weight covers the engine without wheels and running gear. However, in case of necessity a 25-ton crane could be used to strip the engine by removing the different parts separately instead of lifting the whole engine off its wheels.

ELECTRICAL REPAIRS

In general, the electrical repairs on the locomotives are exceedingly light. Some of the work done at present consists in repairs to wiring connections which become broken on account of vibration. The repairs to the motors themselves are limited, as the location of the motors inside of the completely inclosed cab eliminates by far the greater part of the trouble which occurs on the ordinary railway motor mounted on trucks and subject, in consequence, to the effect of water, dust and even mechanical injury. This is shown especially in the remarkable results which are obtained with the motor commutator. Although most of the locomotives have been in service for over two years, none of the commutators have yet been turned and most of the original brushes are still in use. The maximum normal wear which has occurred after some 100,000 miles of service has been found to be only 3/32 in., showing that the protection afforded to the motor on account of its location is no small item in reducing trouble. No flash-overs have yet occurred, although in one case a ground occurred at the commutator on account of a wrench dropping onto it, which set up a short-circuit between the commutator and the motor frame.

As shown in the accompanying line cut, the motor is equipped with a fiber friction clutch, so that in case a short-circuit should be set up while the locomotive was traveling at high speed the tendency of the armature to come to a sudden stop would not be disastrous to the side rods. The armature is mounted on a spool, which is independent of the motor shaft, except through disks on an interior spool keyed directly to the shaft. Against these disks shoulders on the spool are pressed by a series of bolts and springs, strips of fiber being introduced between the shoulders on the spool and the faces of the disks. This permits the spool to revolve independently of the shaft in case sufficient torque is exerted to overcome the friction at the fiber strips, and this friction can be adjusted by tightening or loosening the bolts which compress the springs holding the two surfaces together. Ordinarily these bolts are tightened to a point which will permit the armature to slip when the motor is under a draft of current in excess of 4000 amp. The circuit breaker forming a part of the control system is set at 3500 amp, and the enginemen are under instructions to operate with care after the draft of current reaches 2700 amp, the latter point being indicated by a heavy red mark on the ammeter in the cab.

It is estimated by the operating officials that if all electrical repairs including electrical inspections for the sixty-six units were done at one point a force consisting of one wireman, two electricians and five electricians' helpers would be required. This would include the light repairs to the wiring and control apparatus now carried on in the Sunnyside engine house.



Pennsylvania Locomotives—General View of 2000-hp Motor

GENERAL

Now that the necessity for keeping lost motion or binding out of the running gear is understood, the riding qualities of this type of electric locomotive are actually better than those of the best types of steam locomotives. Little pounding or nosing takes place.

The maintenance costs, as might be expected on account of the simplicity of the design, together with its adherence to the principle of the high center of gravity now generally accepted as a requisite for high-speed electric locomotives, are very much less than those for steam locomotives. For six months between June and November of the past year the maintenance costs per unit were as follows:

MAINTENANCE COSTS OF ELECTRIC LOCOMOTIVE UNITS .
CENTS PER MILE

During 1912	Mechanical	Electrical	Total
June	1.51	1.01	2.52
July	2.18	0.85	3.03
August	2.86	0.66	3.52
September	2.46	0.97	3.43
October	2.84	0.79	3.63
November	2.84	0.90	3.74
Average	2.45	0.86	3.31

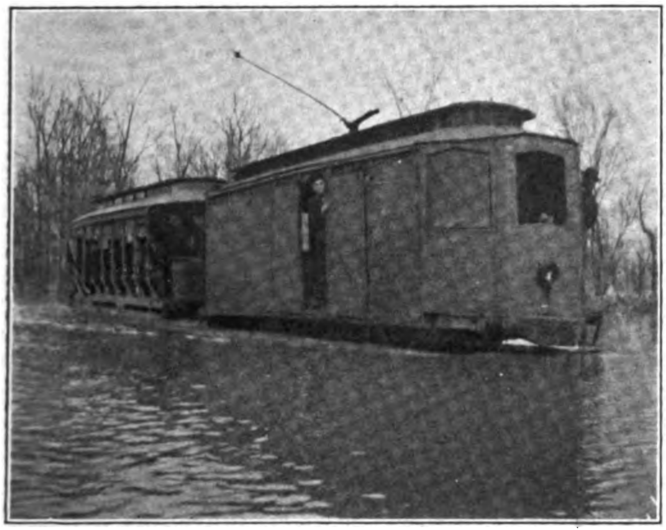
These costs include all operating overhead charges, such as the cost of general labor, supervision, heating and lighting of the shops and the like. They do not, however, include any charges for capital account nor charges due to repairs to buildings or machinery.

These costs are equivalent to those which might be expected from an 80-ton steam locomotive in heavy high-speed service requiring in addition a considerable amount of switching. The average train which is handled consists of seven cars, the smallest type weighing 60 tons and the largest approximately 71 tons. A fair average train might be estimated at about 450 tons exclusive of the weight of the engine, and as before mentioned these trains have to be hauled up grades close to 2 per cent and sometimes even stopped and started on these grades.

CARS FOR FLOOD SERVICE

The accompanying illustration shows a car on the Fort Wayne & Northern Indiana Traction Company operating through water about 19 in. above the top of the rail, or well over the axles. The railway runs a line parallel to the Wabash River, and during a recent period of extreme high water, which lasted for about a week, the tracks on this line for about 3500 ft. were covered with water varying in depth from 6 in. to 20 in.

In order to maintain traffic on this line an old work car was fitted up to operate with a trailer over the flooded section. The rearrangement of the car for this service consisted in turning the motors, which were of GE-800 type, so that the pinions ran on the tops of the gears instead of on the sides. The work was done with the regular shop force and it was reported to have taken only three hours. With this arrangement it became possible to haul the trailer over the flooded track and thus maintain service for the week during which the flood lasted. No trouble was experienced in operation, but the car, of course, was run at speeds not exceeding 3 m.p.h. to keep it from throwing water.



Flood Service on the Fort Wayne & Northern Indiana

EDUCATIONAL EXPERIMENT IN ROCHESTER

For some years there has been in operation at a number of technical and industrial schools one form or another of the so-called "co-operative plan" of education. Under this plan students spend alternate periods in school and shop. Continuity of the shop jobs is maintained by having the students work on them in relays, one set taking the work up where the others leave it when they return to school. An industrial school which has applied this principle in its work is the Mechanics' Institute of Rochester, N. Y. The presence of the institute and the operation of its co-operative scheme has suggested to the management of the Rochester Lines of the New York State Railways the desirability of utilizing the facilities thus conveniently placed at their disposal. It has seemed to them that the co-operative plan, as applied to industrial establishments, does not fit the needs of a railway company and a modification has, therefore, been devised by the master mechanic, G. M. Cameron. The plan is now in operation on a small scale, but the intention is to extend it as rapidly as it demonstrates its value.

For the first year two boys without high school training were selected from the repair shop force. Their work was arranged so that each is on duty one-half day, one in the morning, the other in the afternoon. They work on the same job, which at present is car wiring. In the evening they attend classes at the Mechanics' Institute, the off half-day being devoted, under pay, to the preparation of the evening's lessons. The first year's studies comprise English, mechanical drawing and arithmetic or algebra. These subjects relate directly to the requirements of shop work. English, in which so many young men are deficient, is needed to an increasing extent owing to the reports which employees are expected to be able to prepare intelligently. Practice in drawing is not only directly useful in itself but it leads to accurate observation and attention to detail. Arithmetic is more necessary than algebra, but if a boy is proficient in making simple calculations algebra lends interest and gives an incentive to further study.

The second year will be spent on elementary electricity and mechanics. Mr. Cameron believes that a young man in the electrical shops should be able to make accurate measurements of electromotive force, electric current, power and energy. Laboratory practice will teach this efficiently and will also assist in the understanding of the reasons for certain shop operations. Obviously, if an armature winder, for example, understands the underlying principles of electric motors he will be able to do a better, because a more intelligent, job. Elementary mechanics will give a tangible idea of forces, strength of materials and mechanical movements and should make of any mechanic a more useful all-around man.

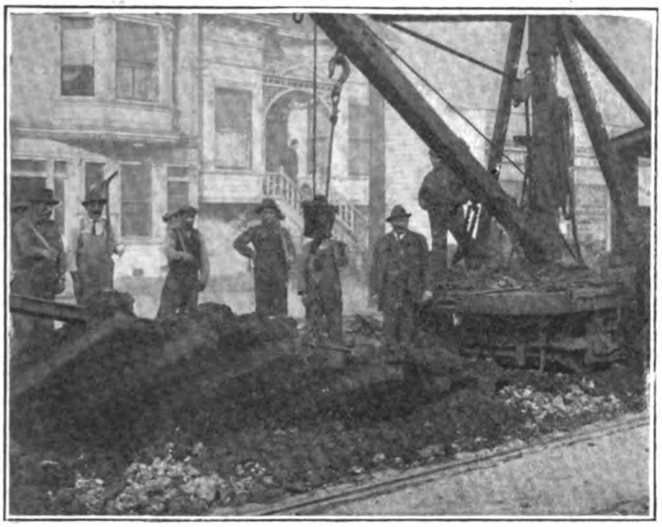
The school training is to be supplemented by occasional instruction from an assistant to the master mechanic, one with a technical education. Wiring diagrams and other matters directly related to their work will be taken up with a view to getting rid of the apparent mysteries of these diagrams, which are considered by many shop men to be entirely beyond their comprehension. This supplementary work will also include the holding of written and oral examinations at the close of each year, and the instruction will be continued only to the worthy ones.

A number of interesting results are expected from this co-operative plan. In the first place, it will try out the staying qualities of the boys, automatically eliminating the mental weaklings. Those who survive the test are bound to become useful, resourceful, loyal mechanics. It is also certain that occasionally a young man of exceptional ability will come to the attention of his superiors, who will encourage him to obtain more education. So far the plan is bringing the expected results, and while it is still in the experimental state it will probably be extended.

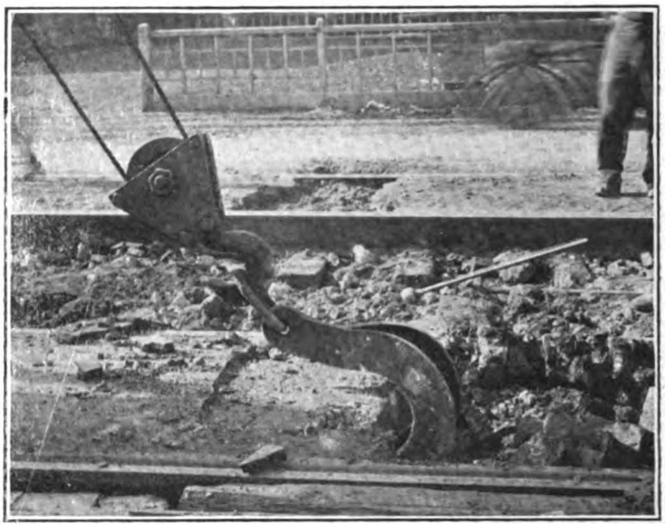
Track Maintenance and Reconstruction in San Francisco

Interesting Track Appliances and Machinery Have Been Developed in the Way Department for Removing Paving, Old Rail and Track Foundations and for Laying New Tracks and Paving

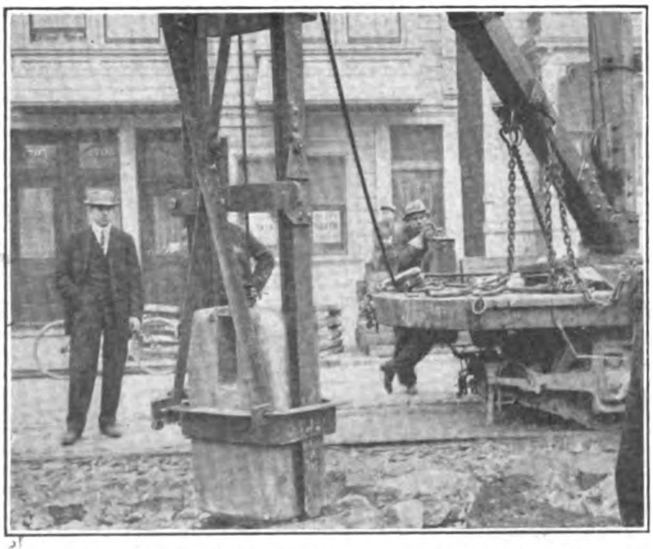
During the past five years the United Railroads of San Francisco have been obliged to undertake a large amount of track reconstruction. This has been due in large part to the fact that prior to the fire many of the lines were operated by cable power. Another reason for the work has been that the near approach of the fair to be held in 1915 in San Francisco has encouraged the company to put all of its equipment, including the track, in good physical condition. As a result of this program of rehabilitation, the company has developed a large number of track appliances and apparatus for track reconstruction and maintenance, which have greatly reduced the cost usually incurred in this work. Some of this apparatus is special and was designed particularly to remove cable tracks. Much of it, however, is of a character which is entirely suitable to ordinary construction and maintenance and could well be employed elsewhere. This work has been conducted by the engineering department of the company, which has charge of all new construction and maintenance of way, and has been under the direction of B. P. Legare, engineer of maintenance of way and construction, assisted by W. C. Chamberlain, assistant engineer.



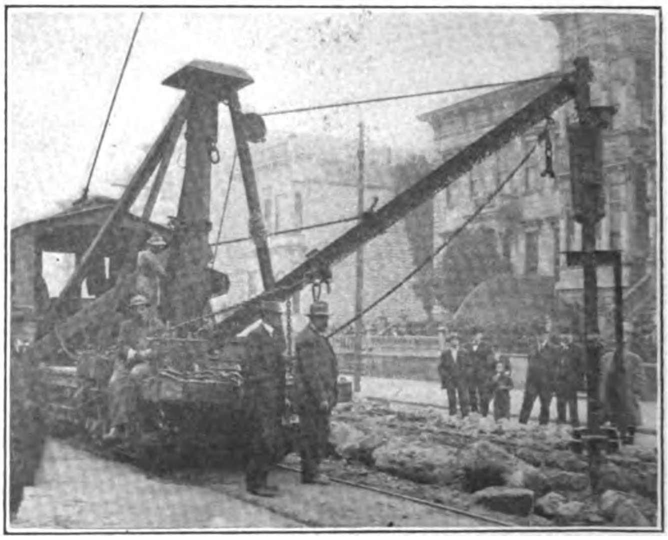
San Francisco Track—Pulling Old Electric Track with Derrick



San Francisco Track—Pronged Hook for Tearing Up Concrete



San Francisco Track—Drop-Hammer for Breaking Concrete

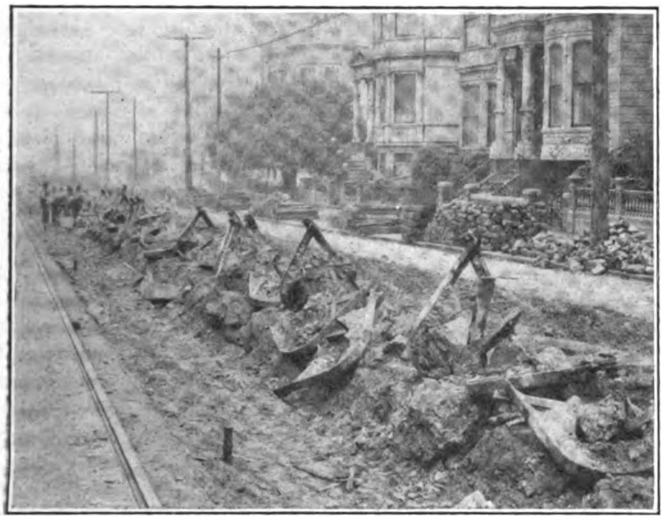


San Francisco Track—Setting Drop-Hammer Legs

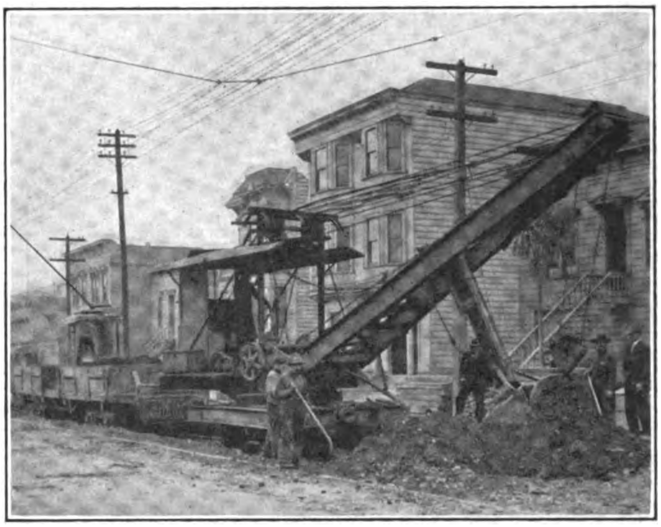
ELECTRIC TRACK RECONSTRUCTION

Most of the old electric track was built with a concrete substructure, and its renewal means that this substructure has to be removed. Where asphalt paving has been used this is first cut away. The concrete between the rails and above the ties is then either loosened by a plow which is pulled by the hoisting winch on a 8-ton derrick car, or it is broken up by means of a 3100-lb. drop-hammer rigged on the boom of the derrick. The cost of the two processes amounts to a small fraction of a cent per foot of track.

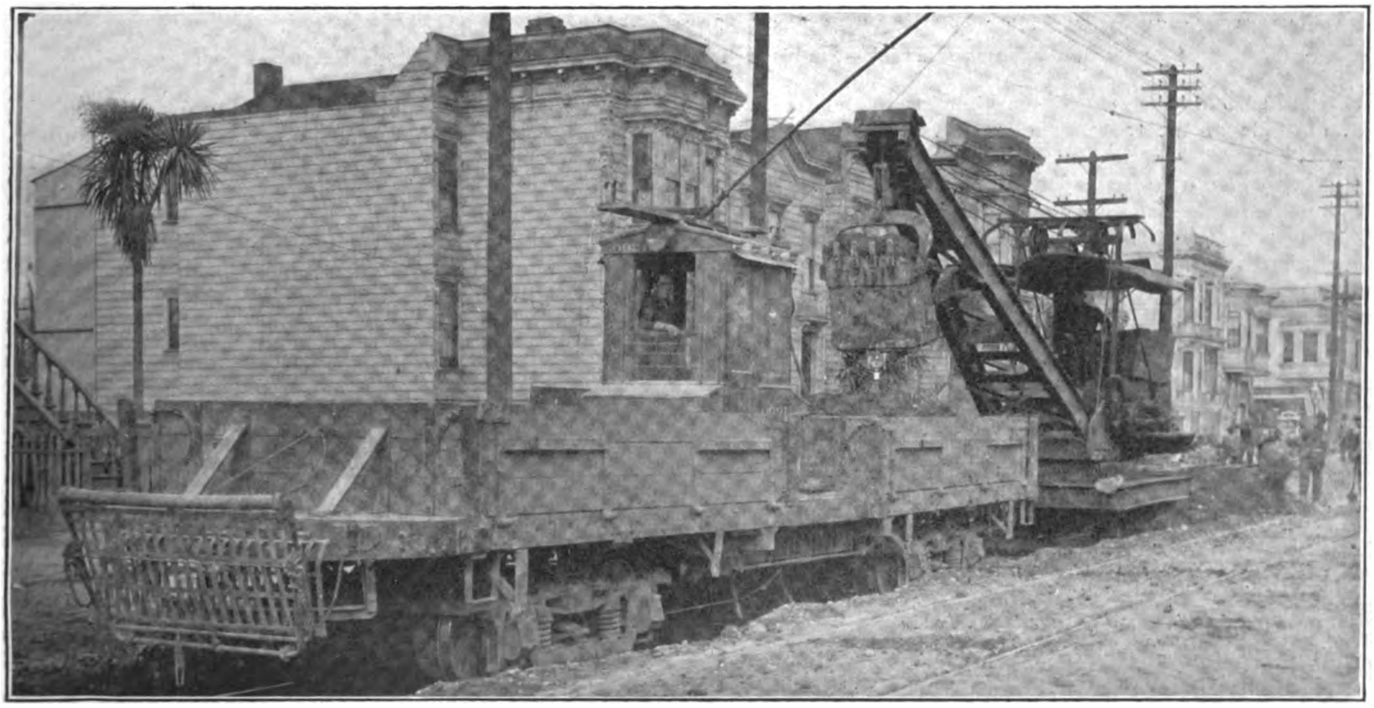
The concrete paving base on the 2-ft. strip outside the rails is next broken by means of the same drop-hammer, which strikes a blow on 30-in. sections of 9-in. girder rail, laid on its flat side on the concrete. This shatters the concrete and breaks it approximately on a line 2 ft. from and parallel with the outer rail.


San Francisco Track—Dismembered Cable Track Ready for Excavator

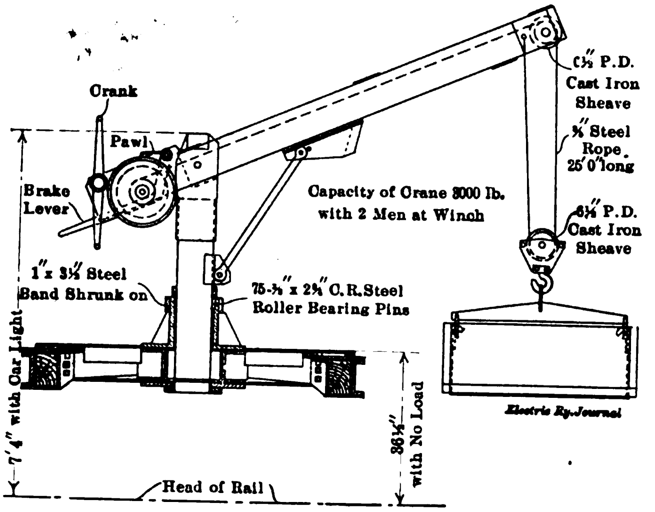
The next process is that of tearing up the old track by means of this same derrick car. The derrick is on the same track that is being pulled, and a hook is attached by means of a chain to the end of a tie. The track, ties, concrete, etc., are then raised bodily from 3 ft. to 4 ft. This process shatters the concrete in the track, breaking everything loose. While the track is suspended in this position, a gang of five men with sledges drive the ties from the rails. Without having its position on the track changed, the derrick is then attached to the other end of the tie and that side of the track is elevated in the same way, the process being repeated. The derrick is then backed from 10 ft. to 15 ft. away from the torn-up track and goes through the same process already described, so that it gradually tears up the track as it advances. When this work has been completed, the rail, ties, concrete, spikes, old chairs, etc., are lying loose and ready to be loaded on cars to take to the dump.


San Francisco Track—Excavating Trench for Track with Shovel Car

The next process is that of excavating the trench by means of an electric shovel equipped with a ¾-yd. bucket. A space at the end of the job, about 30 ft. long, is first excavated by hand, and a temporary T-rail track is laid so that the shovel may get a start. The trench thus excavated is 9 ft. wide and 2 ft. deep. The shovel advances on this temporary track, excavating and loading the material into 22-cu. yd. cars which are stationed behind the shovel on the same track. These cars are equipped with a cab in the center, so that the end of the car is free and the shovel can load into it. When the shovel has excavated a distance of 10 ft, or has advanced the entire length of the temporary track then laid, another section of temporary T-rail track, all made up and spiked together and lying at the side of the trench, is picked up by the shovel by a chain, one end of which is attached to the section of track and the other end is thrown over the teeth of the bucket of the

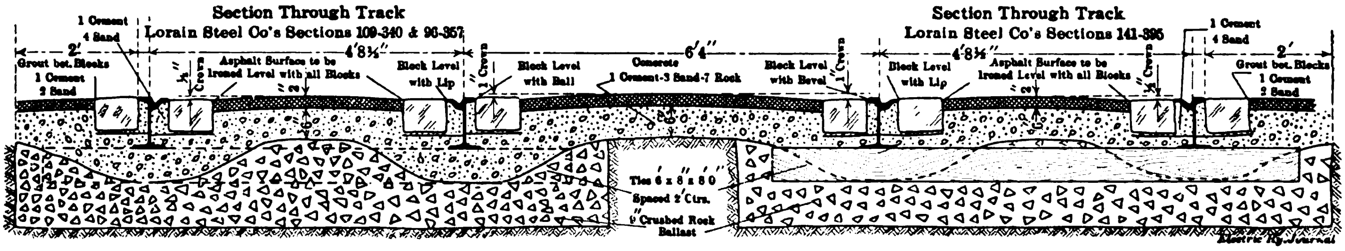

San Francisco Track—Shovel Car Loading Dirt Cars

shovel. In this way the section of track is lifted and put in place in front of the shovel. This allows the shovel to advance and excavate another 10 ft. This process is repeated until 30 ft. in linear length of track route have been excavated. The two 10-ft. sections of temporary track are then lifted by the shovel, and a built-up section of temporary track, 30 ft. long, is placed in the trench. As this process is continued a series of 30-ft. sections are left behind the shovel.

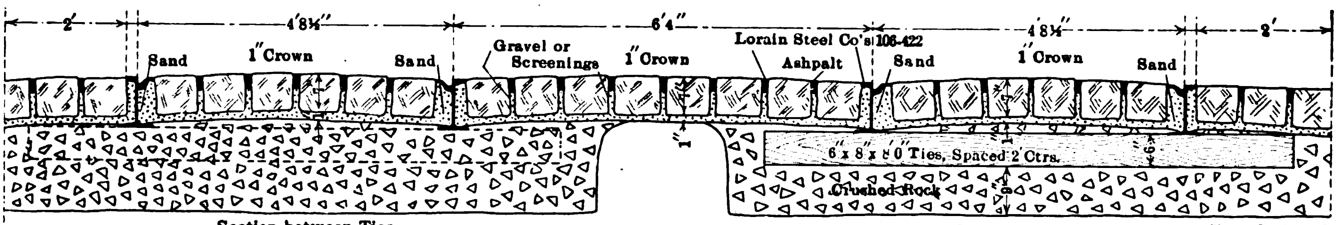

Crank
Pawl
Brake Lever
1" x 3½" Steel Band Shrunk on
Capacity of Crane 8000 lb. with 2 Men at Winch
75-⅜" x 2⅜" C.R. Steel Roller Bearing Pins
1½" P.D. Cast Iron Sheave
⅜" Steel Rope. 25' 0" long
6½" P.D. Cast Iron Sheave
7' 4" with Car Light
36¾" with No Load
Head of Rail
Electric Ry. Journal

San Francisco Track—Crane for Bitumen Car

During the noon hour of each day these temporary 30-ft. sections of track for a distance of 120 ft. to 180 ft. are taken out behind the shovel by a 5-ton crane and are placed at the side of the trench ahead of the shovel, ready for future work. The permanent 9-in. girder rails are then laid in the gap of this temporary track, thus keeping a continuous track behind the shovel, so that each day there is added from 120 ft. to 180 ft. of permanent track. The operation of this shovel method, in place of the ordinary hand method for excavating, has brought down the cost on this particular kind of work from 30 per cent to 50 per cent. The hammering of the concrete and the pulling and tearing up the track with the derrick have also aided greatly in bringing down the cost of track reconstruction over the ordinary hand method.


Section Through Track
Lorain Steel Co's Sections 109-340 & 96-357
Section Through Track
Lorain Steel Co's Sections 141-395
1 Cement 4 Sand
2'
4' 8½"
6' 4"
Grout bet. Blocks 1 Cement 2 Sand
Asphalt Surface to be Ironed Level with all Blocks
Block Level with Lip
Block Level with Ball
Concrete 1 Cement-3 Sand-7 Rock
Block Level with Bevel
Crown
Ties 6 x 8 x 8 0 Spaced 2' Ctrs.
Crushed Rock Ballast
Electric Ry. Journal

San Francisco Track—Standard Track Construction with Asphalt Paving


2'
4' 8½"
6' 4"
Sand
1" Crown
Gravel or Screenings
Lorain Steel Co's 106-422
Ashpalt
6" x 8" x 8' 0" Ties, Spaced 2' Ctrs.
Crushed Rock
Section between Ties
Section at Ties
Electric Ry. Journal

Gravel or screenings to be placed between blocks to a point 2" from the top. The upper space is to be filled with hot asphalt with a layer of screenings or gravel spread over top of blocks. Use 1-50 gal. barrel of asphalt to 250 □' of paving. Ballast and crushed rock base to be flushed thoroly full of sand with water. Crushed rock, from bottom of tie up, to be filled in in two layers, each layer being well rammed. Blocks must be well rammed after laying and before grouting.

San Francisco Track—Standard Track Construction with Block Paving

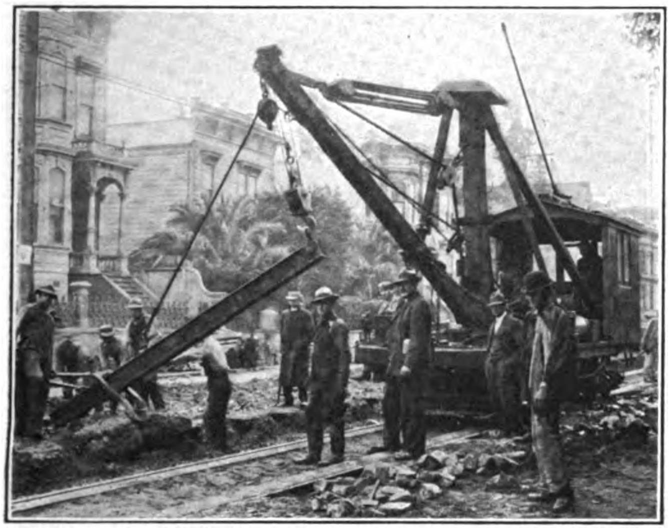
CONVERSION OF CABLE TO ELECTRIC TRACK

The process described is not suitable where old cable track has to be removed because of the existence of the old cable yokes and conduit. In some cases electric track has been built directly on the old cable foundation, but this is not preferred practice, and where any electric track of this kind has to be rebuilt the old cable foundation is now being torn out. Most of the old cable roads were of a 3-ft. 6-in. gage, the yokes were 4 ft. apart and the concrete extended 3 ft. below the surface of the street.

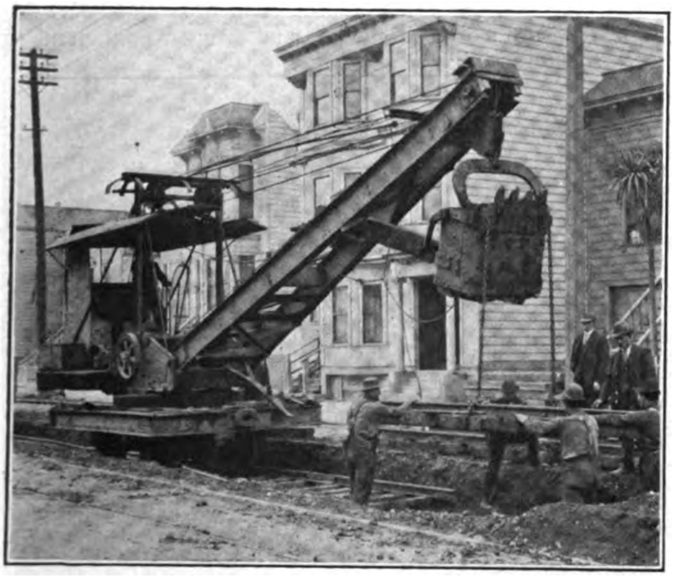
To break up the old foundation, the asphalt or other pavement is first stripped from the track. The 3100-lb. drop-hammer is then used to break the concrete paving base between the tracks. About six blows of this hammer are also delivered at one end of each yoke to crush the concrete about it and free the end of the yoke so that a pulling link may be slipped over the end of the yoke. A 13-ft. lever, as shown in the illustration on page 465, is then slipped through the link. This lever is made of 141-lb. girder rail. The outer end of this lever is placed upon one end of the yoke, and the link is placed under the lip of the other end of the yoke and over the lever. The other end of the lever is attached to the cable at the end of the boom. The derrick car, or a 5-ton crane car on the opposite track, then begins to pull the yokes out by means of a cable attached to the end of the lever. By this combination of leverage a powerful pull, estimated to be in some cases 35 tons, is obtained on the link. This process lifts one end of the yoke out and tears it bodily away from the track. It also tears up the old concrete and fractures it so that everything is lying about loose after the yoke is pulled.

On the outer end of the lever is a lug, which passes over the end of the yoke, and on the lever at the link is another lug which prevents the link from slipping. This also prevents the lever from slipping off the yoke or the link from slipping off the lever and the harder the derrick pulls on the yoke the tighter the link will hold. The only limit of pull obtained is the strength of the yoke and the strength of the derrick.

Another crane follows the pulling derrick and lifts the yokes from the concrete, leaving them ready to be loaded on the car by hand. The derrick car is then sent to the shop and within two hours is returned to the job rigged up with a drop-hammer. This drop-hammer works on the track opposite the track which has been pulled, the hammer being located on the outer end of the boom. The boom of the hammer is swung out, and the hammer legs are placed on the pieces of concrete which are lying in the ditch. Successive blows are applied, from two to six blows being sufficient. The pieces of concrete are gradually broken in this way, large and small. The top layer is broken first. The small pieces are then placed at the side of the trench, after which the hammer goes over the job once more, repeating the process and breaking up the remaining pieces of concrete which were on the bottom layer. It is not necessary to shatter the bottom layer completely. It is sufficient if the pieces of concrete are forced into the soil far enough so that there is space for tamping the ties above them.

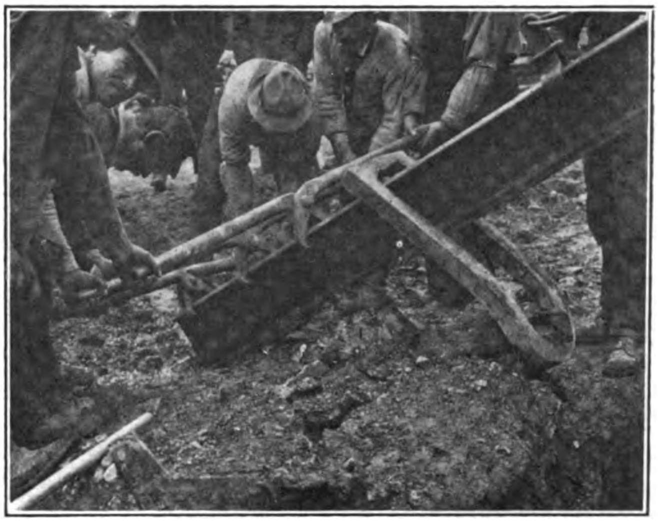

San Francisco Track—Tearing Up Track of Old Cable Railroad

The track gang follows the yoke-pulling apparatus and lays a permanent track on the sub-grade. On this permanent track follows the portable crusher, which has a capacity of about 60 cu. yd. per day of nine hours. The pieces of concrete which were lying at the side of the trench and not completely broken up by the hammer are then crushed by this portable crusher, which drops the crushed rock directly in the track between the ties so that the only work which remains is for the track to be jacked up, surfaced and lined, etc. This process of hammering brings down the cost on this particular line of the work 62 per cent over the method in which the concrete is broken with gads and sledges by hand labor.


San Francisco Track—Shovel Car Laying 10-Ft. Temporary Track Section

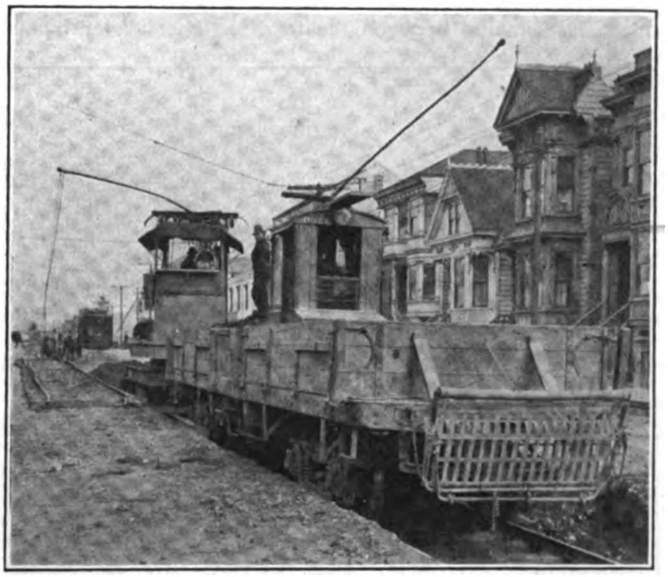
CONCRETE PULLER HOOK

When it is necessary to tear up concrete paving base and asphalt in the track without destroying ties, rails and otherwise damaging the track, a large two-prong hook is used in conjunction with the derrick car, the hook being attached to the end of the derrick rope. The derrick then pulls on the cable, and the hook tears up large pieces of concrete and asphalt. These pieces sometimes are 6 ft. long and the same width as the space between the rails. This process breaks the concrete up in small pieces which are easily loaded in the car or may be placed at the side of the track ready for crushing by the portable crusher, as the case may be. A view of this hook in the concrete is shown.

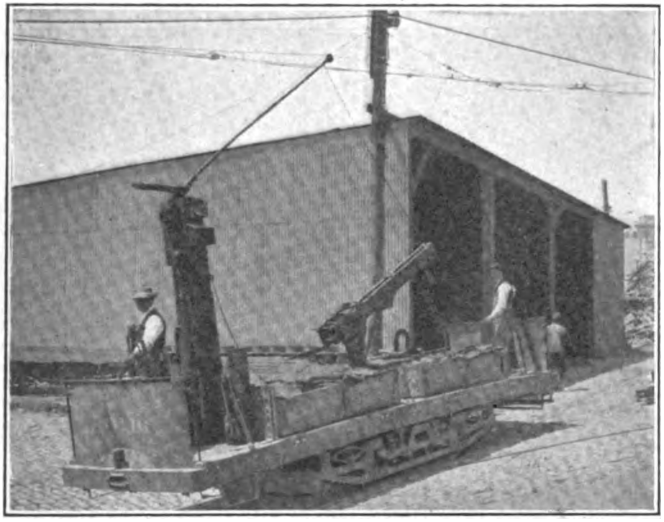

San Francisco Track—Portion of Lever and Link Over End of Cable Yoke

BITUMEN CAR

The United Railroads do a great deal of street paving and have found it desirable to have their own bitumen plant, which is at the corner of Market and Valencia Streets. The bitumen is prepared in the usual way, but the method of taking it to the points where it is to be used is novel, as it is conveyed in a special car. This car is fitted with a 3000-lb. hand-operated pillar crane hoist, which can swing in a full circle, and carries the bitumen in boxes, each box capable of holding ⅔ cu. yd. The usual capacity of the car is six boxes, but eight boxes could be carried if necessary. The view on page 466 shows the car being loaded at the plant where the bitumen is discharged directly from the mixer into the boxes on the car. After the car runs


San Francisco Track—Shovel Car in Service Laying Its Own Tracks

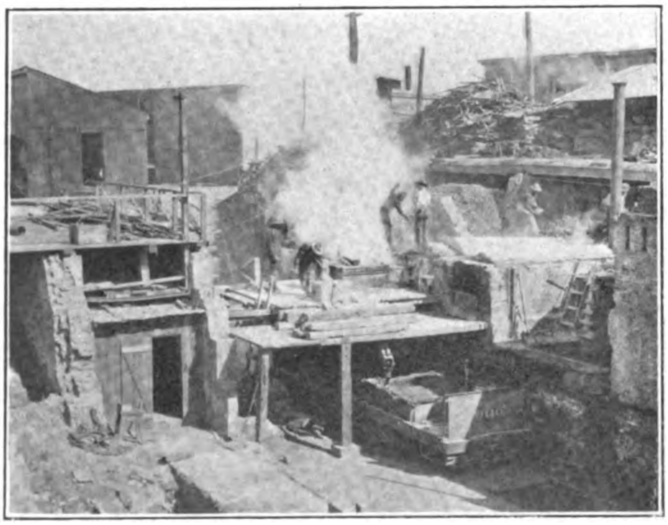
to the point where the bitumen is required the boxes are unloaded from the car by the crane at points which are most convenient to the paving gang. The car is then run back to the plant for another set of boxes which have been prepared in the meantime. This work of unloading boxes on the street is easily done in a few minutes between the regular passenger service, there being no hold-up of passenger cars on this account, except possibly a minute in some cases. The company is equipped with two of these cars, which take the place of five dump wagons and teams.



San Francisco Track—Bitumen Car Loaded with Six Filled Boxes

The crane and the trolley post are made collapsible on account of the head room under the mixing platform at the plant. As this platform is so low, it was necessary to reduce the extreme height of the car crane and trolley post to 7 ft. Before passing under the platform the trolley post and crane are dropped to the low position and can be raised to the working position after the boxes have been filled and the car leaves the platform. The crane was made by the company.

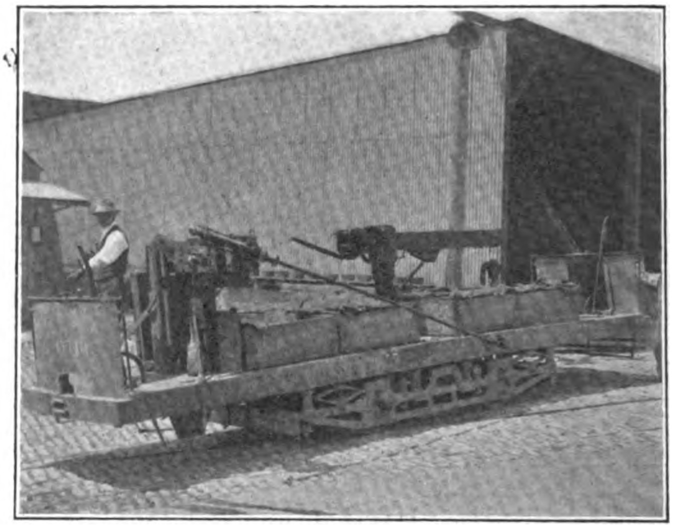
The bitumen paving, 2½ in. thick, is placed on a 6-in. concrete base in and between the tracks. The header blocks, which may be basalt or paving bricks, are laid on the sand on a cement cushion mixed in the proportion of one to four, the space between the blocks being filled with cement grout mixed one to two. Where the tracks are paved with basalt blocks, they are placed on a loose rock foundation, the loose rock voids being filled by flushing sand in with water, the blocks afterward being grouted with liquid asphalt.



San Francisco Track—Loading Bitumen Car at Plant

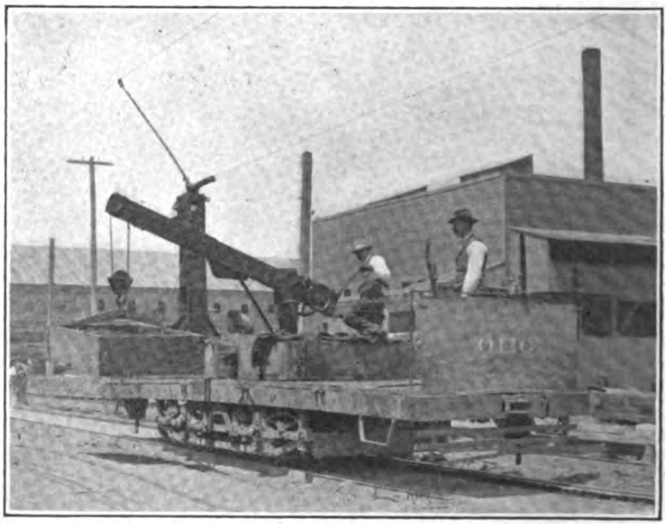
ASPHALT SCOOP

A new machine for removing asphalt between tracks, recently developed by the company, is shown in the sketch on page 467. It is essentially a scoop or plow which is carried in front of a work car which tears up the asphalt directly from the street and loads it into the work car as the car proceeds. The scoop or plow portion consists of a ½-in. steel plate, 34 in. wide and 63 in. long, with a sharp and slightly turned-up front edge. This scoop is supported at the front end of the car on a 75-lb. T-rail frame, about 10 ft. in length. The upper end of this rail is provided with an eye which fits into the coupler on the car to be loaded. A wooden runway or platform extends from the scoop to the loading car. This platform is 4 ft. wide and 15 ft. long. It is provided with sides to guide the asphalt and is sloped at an angle of about 25 deg.



San Francisco Track—Bitumen Car with Trolley Pole Collapsed and Crane Made Horizontal

When this apparatus is put in service the asphalt at the starting point is raised with bars slightly, and the point of the scoop is forced under the asphalt by moving the car ahead. As the car proceeds, the strip of asphalt between the rails is forced up the incline and drops over the end of the platform into the car, automatically piling itself, with the aid of two or three men.

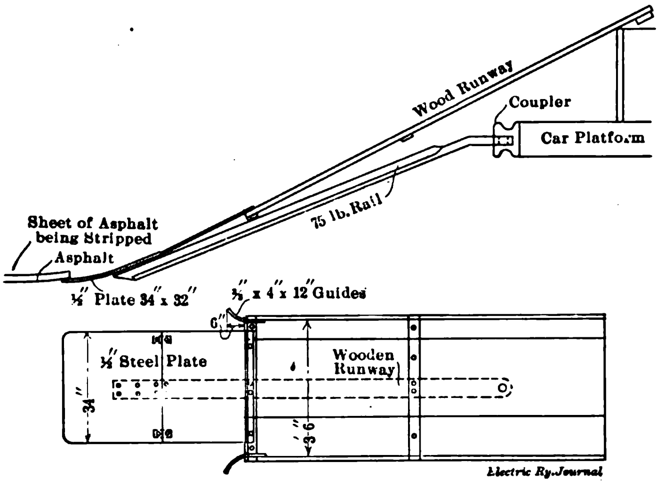


San Francisco Track—Unloading Boxes Filled with Bitumen

Under good conditions asphalt has been loaded by this method with the car running forward at a speed about as fast as a man ordinarily walks. This, however, is not always the case, as occasionally bad spots of asphalt, which cause trouble, are reached.

ELECTRIC ARC WELDING

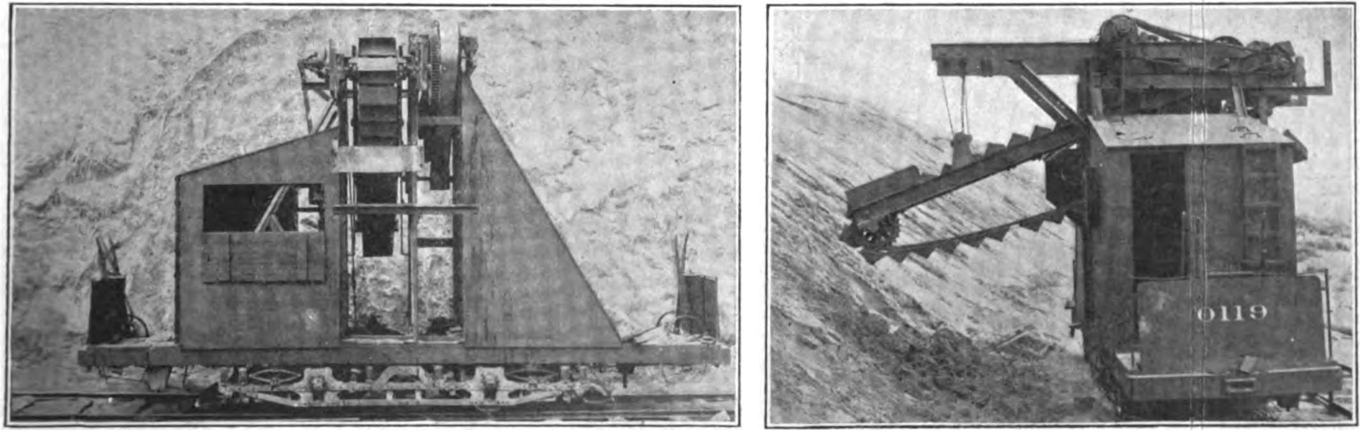
The company has used very extensively electric arc welding for welding combination joints and in filling in worn spots on the tops of rails, in hollows and in cupped joints. The practice will not be described here because an extended account was published in the ELECTRIC RAILWAY JOURNAL for Jan. 11, 1913. The experience of the company with this method continues to be very satisfactory.



San Francisco Track—Construction Details of Asphalt Paving Scoop

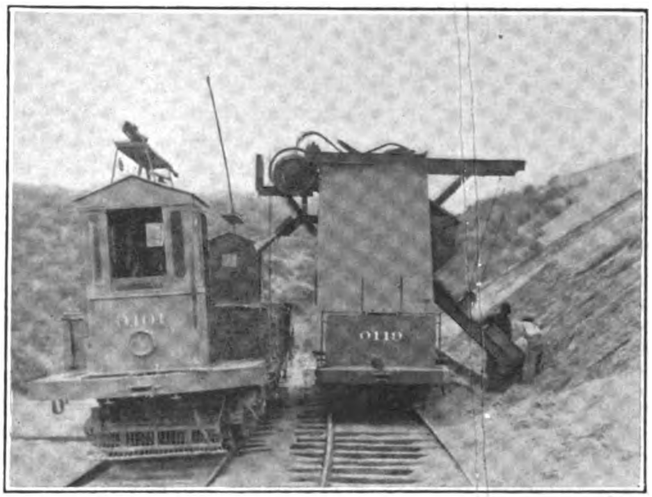
SAND ELEVATOR

Another appliance used by the way department for securing and conveying sand is illustrated in the three engravings on this page. It is a sand elevator which was made by the company in its shop out of old material, the frame being made completely of old slot rails from the cable tracks. It has a swinging elevator, 21 ft. 7 in. long, the upper end being supported by the frame of the car and the lower end being free to swing. The lower end of the elevator may be raised from its lowest position to a height of about 10 ft. above the track. The car is placed on the track parallel with the sand bank and as close to it as is found possible. The outer end of the elevator, which is located across the car and projects about 8 ft. from the rail, is then lowered into the sand bank. The elevator buckets then excavate the sand and after raising it drop it into a chute on the opposite side of the elevator. It then passes into the car to be loaded, which is on another track parallel with the loading track. The force required to operate this elevator is one operator and one laborer at the end of the elevator.



San Francisco Track—Side and End Views of Sand Elevator Equipment Built by the Company to Take Sand from Dunes in the Suburbs of San Francisco

The sand bank from which the company gets most of its sand is located in the suburbs of San Francisco on Twentieth Avenue, among the sand dunes, where there is an inexhaustible quantity of sand drifting in from the ocean. The bank is at the side of Twentieth Avenue car line, and a spur track leads from the car line to the sand bank. All sand used by the United Railroads is loaded into cars by this machine, which has practically done away with hand labor for loading sand at the sand bank. The sand is used for paving, fills and other work requiring sand. Cars are loaded by this method for a cost of from 3 cents to 4 cents per cubic yard, which is one-half or less than one-half of the cost of hand labor.



San Francisco Track—Sand Elevator in Operation Loading a Supply Car

STANDARD TRACK CONSTRUCTION

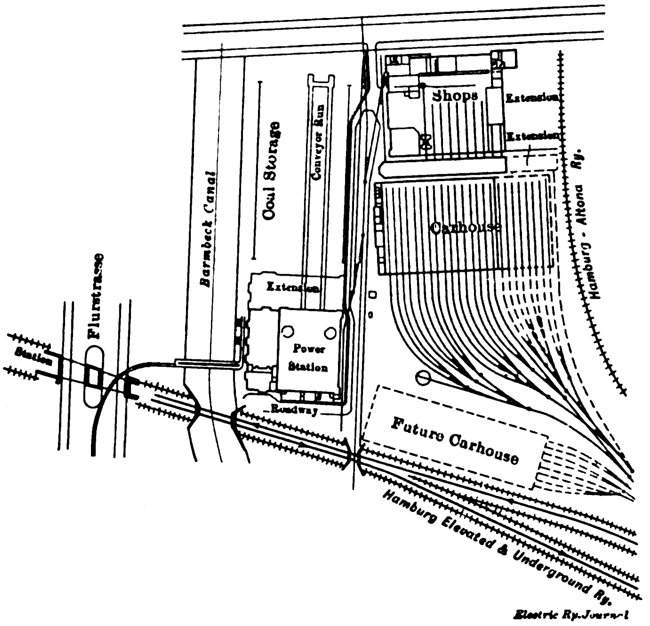
To complete this article and possibly make clearer the purposes of the different track machines described, sections of the company's standard track construction and paved streets are presented. The present standard rail section is the Lorain No. 104-422, with 36-in., twelve-bolt bridge-truss angle plates.

For the past two years the company has been using titanium steel rails and insists upon having all angle plates for these rails rolled from titanium metal also. This practice is followed because the company has found that these plates stand up much better than when angle plates of softer metal are used. These softer plates would tend to crush down or flatten out under the end of the receiving rail, and this condition would be followed by cupped joints. As yet the company has not experienced any corrugation on the titanium rails, although corrugation is frequent on the ordinary rails on account of the steep grades throughout the city and the consequent necessity for the frequent use of the braking equipment.

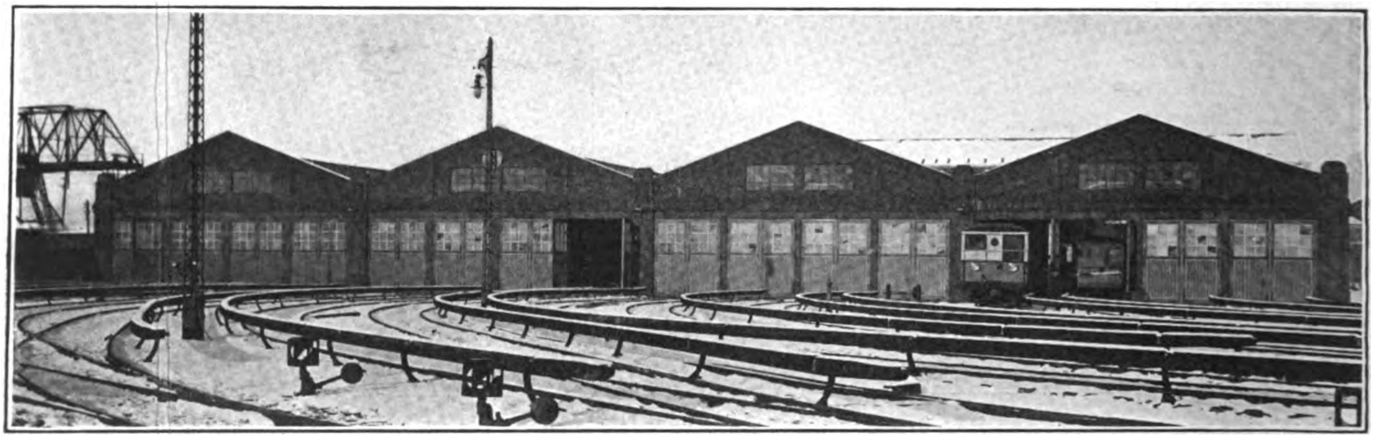
Shops and Carhouses of the Hamburg Rapid Transit System

A Description of the Interesting Constructional and Maintenance Features of These Buildings

An excellent example of the best Continental practice in car maintenance is the new carhouse and shops of the Hamburg Elevated & Underground Railway. These structures are conveniently located adjacent to the power station on a plot close to the Flurstrasse station at Barmbeck, one of the suburbs. This property is bounded on the south by the Hamburg system's own tracks, on the east by the Hamburg-Altona single-phase interurban railway, on the west by the Barmbeck canal and on the north by a public highway. Coal, machinery and other supplies are transported directly to the property over a spur track which extends from the lines of the Prussian State Railroads.



Hamburg Shops—General Plan of the Railway Properties at Barmbeck



Hamburg Shops—Front View of Carhouse Before Construction of Addition

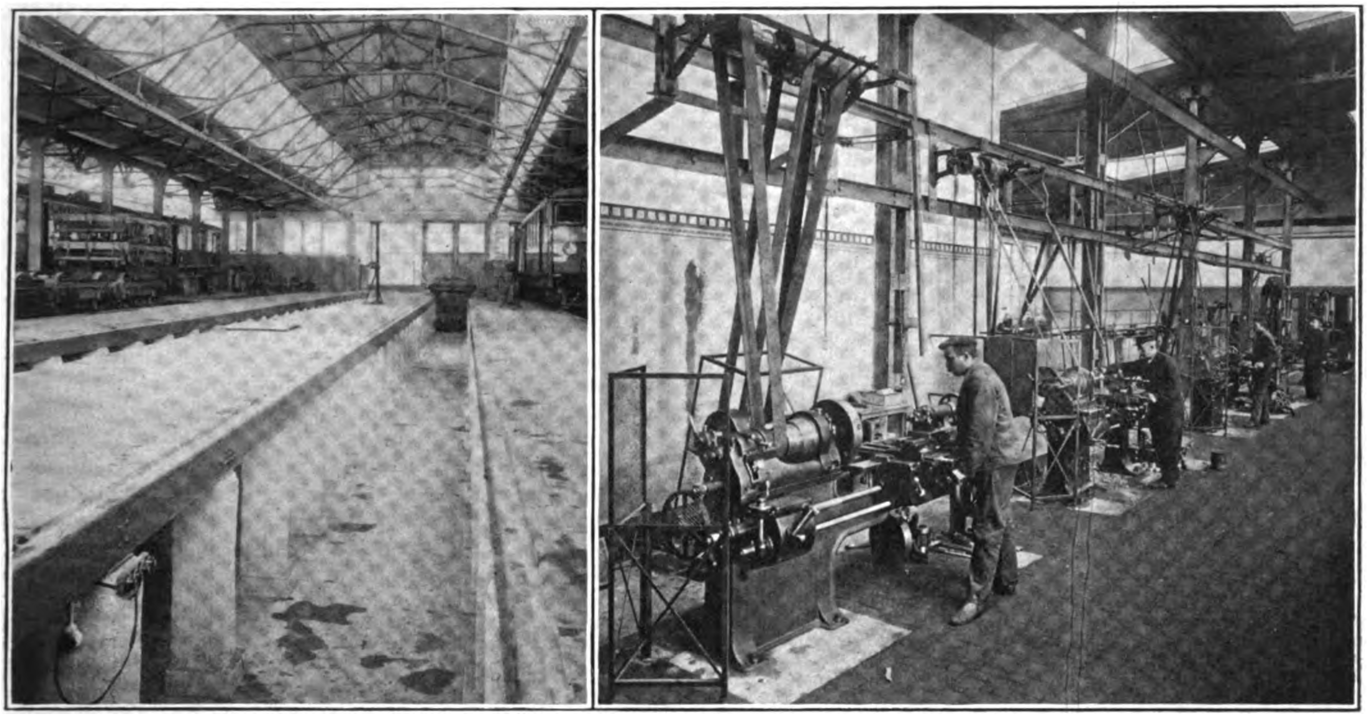
The arrangement of buildings as presented in an accompanying plan shows that the site selected permitted provision to be made for ample enlargements of the three structures named and even for the construction of a second carhouse, the latter to be placed directly along the rapid transit right-of-way. The wisdom of this policy has already been demonstrated, as the remarkable growth in traffic has made it necessary to enlarge the present carhouse to its ultimate capacity. The extension of the shops and of the transfer table between the shops and carhouse will, when made, correspond with the enlargement of the carhouse. However, the excellent behavior of the rolling stock is not likely to make this extension necessary for some years.

CARHOUSE

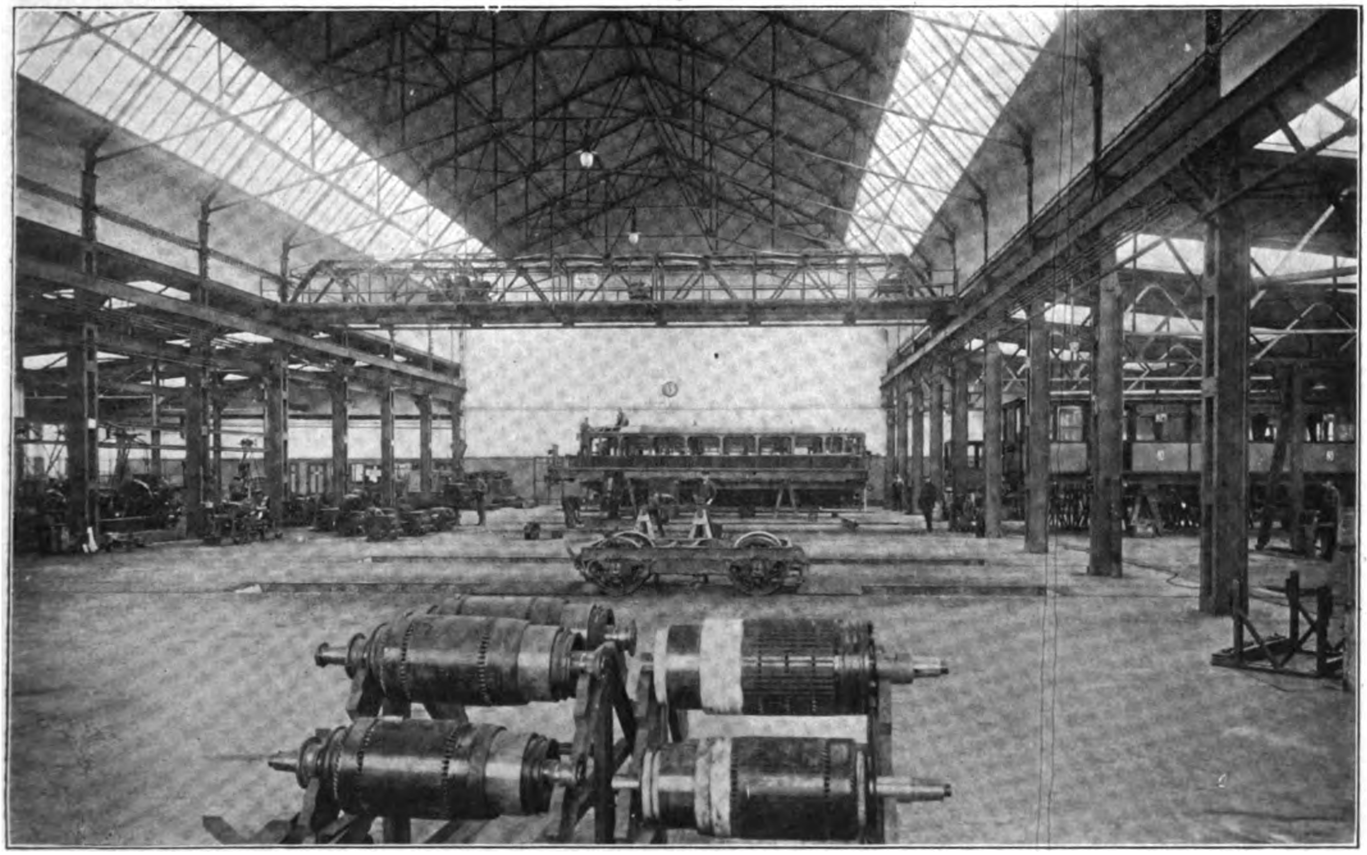
The carhouse proper as first constructed consisted of four bays having a total frontage of 226 ft. 4 in. and a depth of 183 ft. 4 in. In addition, a group of office and utilities rooms with a maximum width of 18 ft. was laid out along the complete length of the west side of the carhouse. The carhouse consisted of four four-track bays, each track serving four cars. It was believed that this capacity would be ample for some years to come as the total rolling stock did not amount to more than eighty cars. Owing to the rapid increase in traffic, however, it was necessary to order fifty additional cars before the first year of operation had been completed. In consequence, the carhouse has been enlarged by adding two four-track bays, which are similar in every respect to those of the original building which is shown in the accompanying cross-section and halftone views.

The main walls of the carhouse are constructed of steel and 15-in. red brick, but a large amount of glass is framed into the structure above both the front and rear track openings. Furthermore, the swinging doors which cover these track openings have almost all of their upper half completely glazed, thus affording a most effective addition to the natural light given by way of the longitudinal skylights in the roof.

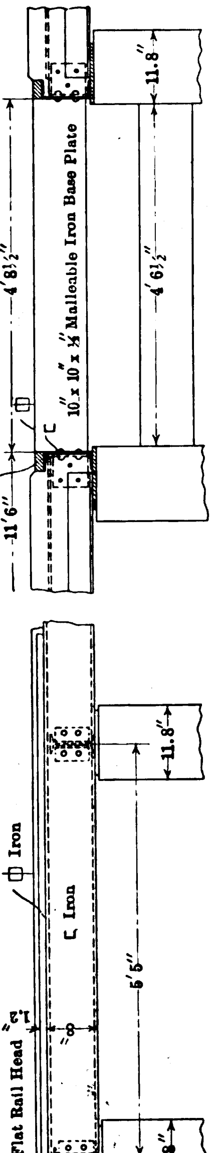
The roof is carried on eight steel trusses, all of approximately 55 ft. span. Each of these trusses, which are of the rather unusual form illustrated, carries two wire glass skylights for the complete length of the bay. The rest of the roof covering consists of ordinary concrete block. The general direction of the carhouse when facing the rear is north-northeast. For purposes of fire protection, the carhouse is divided into two eight-track sections by a 10-in. brick partition which extends the entire depth of the building, except that a clear opening of 8 ft. 2 in. is left within 4 ft. 1 in. from the front and rear pilasters respectively. The subdivision into four-track sections is obtained by rows of double-channel columns spaced about 16 ft. 5 in. The distance between tracks between these columns is 16 ft. 5 in. and elsewhere 13 ft. 1 in. The clear width between the hinged doors at the track openings is about 11 ft. 5 in. With the exception of the first track in the first bay, pits about 4 ft. 11 in. deep are provided throughout. These are of the open type and they are placed between hard-burned brick devil-strips which, including the pit rails, are 8 ft. 6 in. wide. These devil-strips are crowned to drain between the pits on each side. A rather interesting feature of the pit construction equipment is that the running rails consist of channel beams to which a tread piece is riveted flush with the devil-strip, as shown in an accompanying drawing. The channels themselves rest on a 10-in. x 10-in. x ½-in. malleable iron plate installed on top of each pit column.



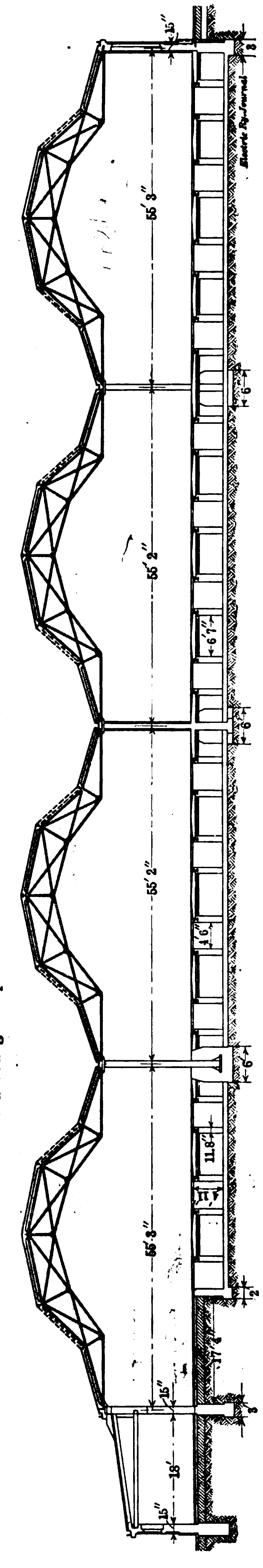
Hamburg Shops—Detail of Open Pit Construction and View of Machine Tools Fitted with Protecting Screens



Hamburg Shops—Interior View, Showing the Truck-Overhauling Shop with Machine and Car-Body Sections at Left and Right Respectively


11'6"
3 x 1.2"
4'8½"
10" x 10" x ½" Malleable Iron Base Plate
4'6½"
11.8"
Joint of ⊏-Iron and Flat Rail Head
⊏ Iron
Iron
1.2"
8"
5'5"
11.8"

Hamburg Shops—Detail of Pit Construction, Showing Separate Rail Head



Hamburg Shops—Cross-Section of Original Carhouse Before Addition of Two Bays of Like Width

The building is liberally provided with standpipes and firehose, which are kept in glazed boxes to prevent deterioration from dirt, unnecessary jostling, etc. Fire hydrants are also installed in the yard. Instead of using fire standpipe connections for car washing, small Siamese outlets are built into the devil-strips for the purpose. These outlets are covered when not in use. The radiators under the devil-strips are furnished with exhaust steam from the turbines at the nearby power station. To light the pits, lamps are plugged in only when needed.

Power for moving cars in and out of the building is taken from overhead rails which are installed above the devil-strips. Connection between this contact rail and the third-rail shoe is obtained by means of a wooden pole, the upper end of which has a grooved metal runner for the contact rail and the lower end a lug which fits into a hole at the bottom of the shoe. At first the upper end also had a spring attachment whereby the desired pressure necessary for current collection was obtained without the use of a wheel contact or similar device. In practice, however, it was found that the pressure of the springs of the third-rail shoe would be ample for current collection. The contact pole, therefore, has been simplified, as shown in an accompanying sketch.

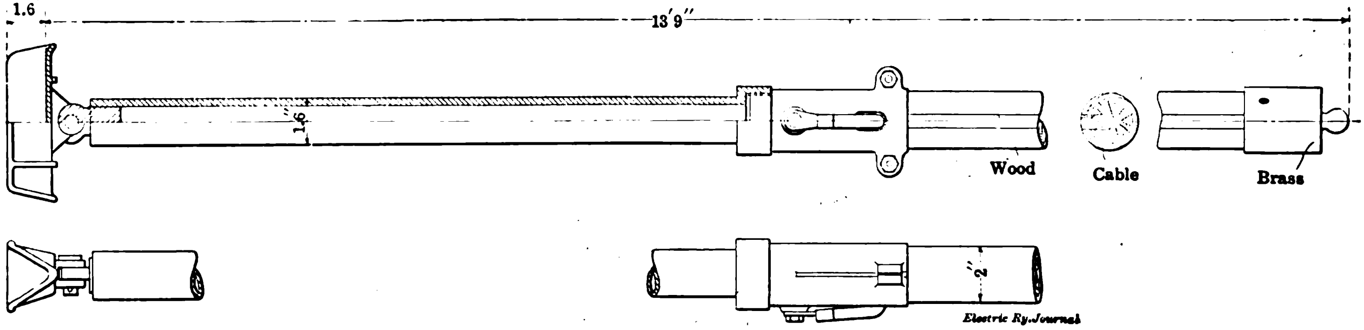
CONSTRUCTION OF SHOPS

As noted, the repair shops are located practically in line with the carhouse. The interchange of cars between the two structures is afforded by a transfer table, 33 ft. wide, the motor of which, like all other motors throughout this installation, is operated on 220-volt, three-phase current. The speed of this transfer table is about 2 ft. per second.

The construction materials of the shop building are of the same general character as the carhouse, but the skylights and side-sash arrangements differ in the several parts. Thus the skylights of the car-body overhauling section are similar to the longitudinal type used in the carhouse, those of the central or truck overhauling bay are at right angles to the tracks for the convenience of the crane run, while small individual skylights are used elsewhere. Large window areas are also provided in addition to the excellent roof lighting. The best example of natural lighting is the mill room, where almost the entire outer side is composed of steel-framed sash. The view of this room also shows the comparative area and position of the swing sash for ventilation. An incidental advantage of this construction is that the sash can be easily removed when it becomes necessary to dismantle this side of the building in order to extend the shops. The floors of the shops are paved with concrete, but wood is used also near the machine tools where the men have to stand for long periods.

A pleasing feature of the interior painting of both the carhouse and shops which alleviates the usual monotonous appearance of such buildings is the wainscoting effect which is given to the walls by applying different kinds of painted borders. Several decorations of this kind will be noted in the accompanying views. Usually they consist of a grayish-blue border about 1 ft. wide at the floor line, a 6-ft. to 7-ft. belt of some lighter shade and an ornamental striping, the rest of the wall being painted white. The doors of various rooms and compartments are painted to harmonize with this scheme of decoration. The extra cost of this work is really of no importance, as the striping is cheaply applied by means of stencils. In order to keep the walls as clean as possible, work where the spattering of dirt or oil is unavoidable is carried out in inclosed chambers as described later.

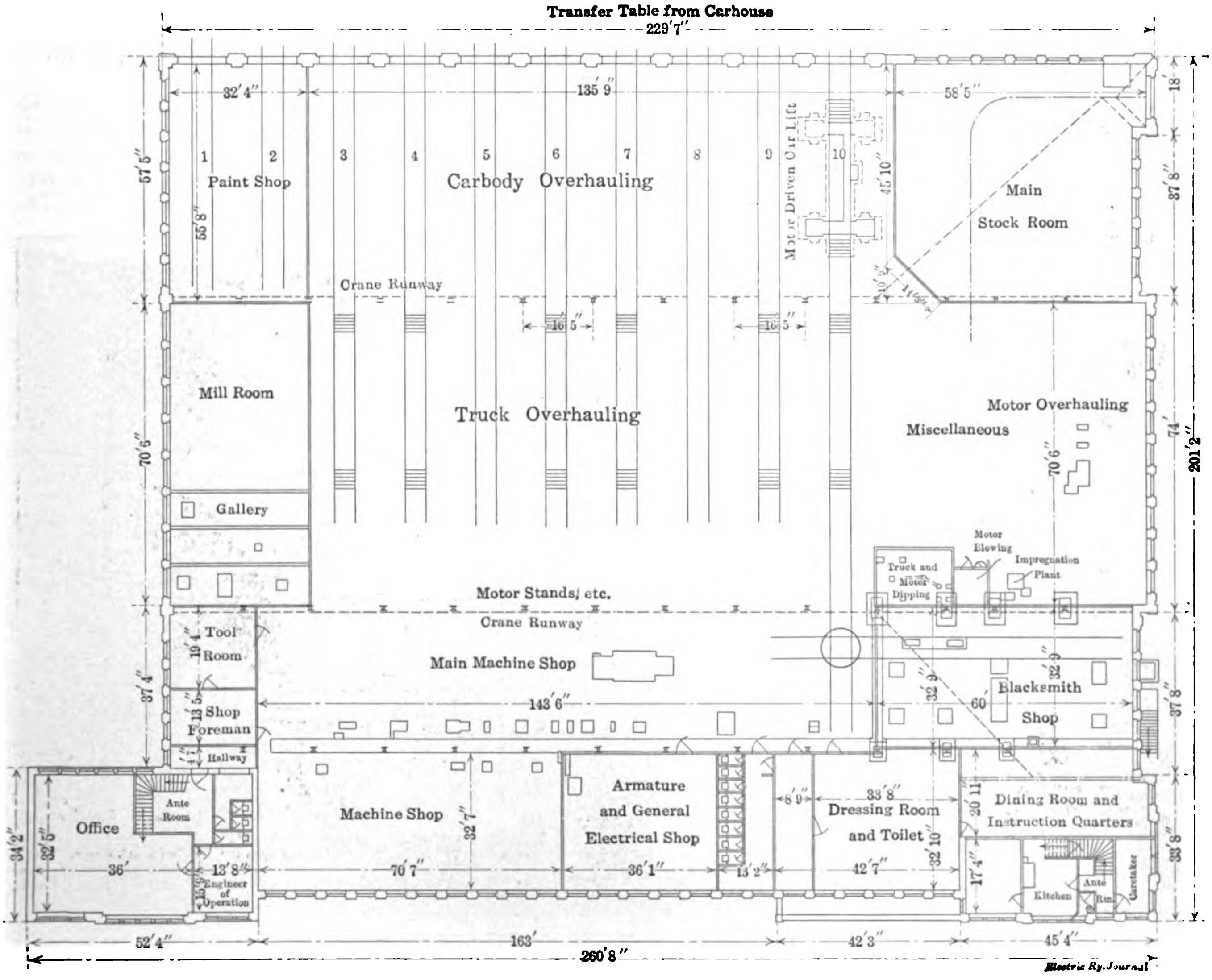
Damage from fire has been minimized by the installation of brick partition walls for such places as the paint shop, mill room, smithy, stockroom, etc. In addition, the intermediate trusses in the mill room are covered with reinforced wire concrete. The fire-fighting equipment consists of large hydrants and inside standpipes, all of which are supplied at the city pressure of five atmospheres (approximately 75 lb.). The caretaker of the shops is an experienced fireman, who has selected and trained a corps of men for fire-fighting. The fire alarm can be given by means of the two electric sirens which are used to note the beginning and ending of the working day. The building is heated by steam pipe lines from the power plant.


1.6"
13'9"
1.6
Wood
Cable
Brass
2
Electric Ry. Journal

Hamburg Shops—Construction Details of Contact Rod Used in the Carhouse

GENERAL ARRANGEMENT OF THE SHOP

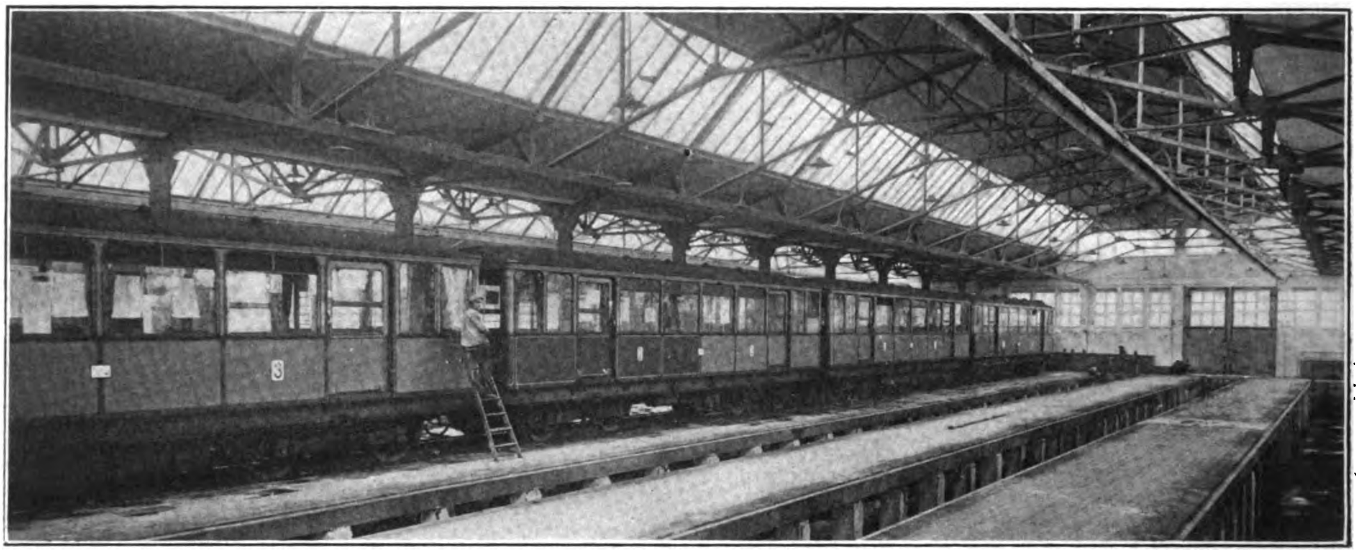
The general layout and dimensions of the several parts of the shop structure are shown in the accompanying plan. The entire building is approximately 260 ft. 8 in. long and 201 ft. 2 in. deep. At present this area, as seen from the transfer table, is divided as follows: car body overhauling section, 135 ft. 9 in. wide and 56 ft. 7 in. deep, flanked on the left by the main stock room, 58 ft. 5 in. wide, and on the right by the paint shop, 32 ft. 4 in. wide; truck overhauling section, 70 ft. 6 in. deep, but of the same width as the car-body shop and located directly behind it, flanked on the right by the mill room but continued to the wall on the left as a miscellaneous motor-overhauling section; the machine shop, of L-shape, the longer leg, which is 140 ft. 6 in. wide and 37 ft. 4 in. deep, placed directly back of the truck shop and the shorter leg, 70 ft. 7 in. wide and 32 ft. 7 in. deep, extending to the rear wall; tool room and shop foreman's office on the left side of the machine shop and blacksmith shop, 60 ft. wide, on the right side of the long machine shop; armature shop, 36 ft. 1 in. wide; dressing room, toilet, dining room and construction quarters and employees' kitchen located in line with the short machine shop.


Transfer Table from Carhouse
229'7"
32'4"
135'9"
58'5"
18'
1
2
3
4
5
6
7
8
9
10
Paint Shop
Carbody Overhauling
Motor Driven Car Lift
45'10"
Main
Stock Room
57'5"
55'8"
37'8"
Crane Runway
16'5"
16'5"
Mill Room
Truck Overhauling
Motor Overhauling
Miscellaneous
70'6"
70'6"
74'
201'2"
Gallery
Motor
Blowing
Impregnation
Plant
Truck and
Motor
Dipping
Motor Stands, etc.
Crane Runway
Tool
Room
10'4"
Main Machine Shop
32'9"
32'9"
Blacksmith
Shop
60'
37'4"
13'5"
Shop
Foreman
143'6"
37'8"
Hallway
Office
Ante
Room
34'2"
32'5"
36'
13'8"
Engineer
of
Operation
Machine Shop
32'7"
70'7"
Armature
and General
Electrical Shop
36'1"
8'9"
13'2"
33'8"
Dressing Room
and Toilet
32'10"
42'7"
20'11"
Dining Room and
Instruction Quarters
17'4"
Kitchen
Ante
Rm.
Caretaker
33'8"
52'4"
163'
42'3"
45'4"
260'8"
Electric Ry. Journal

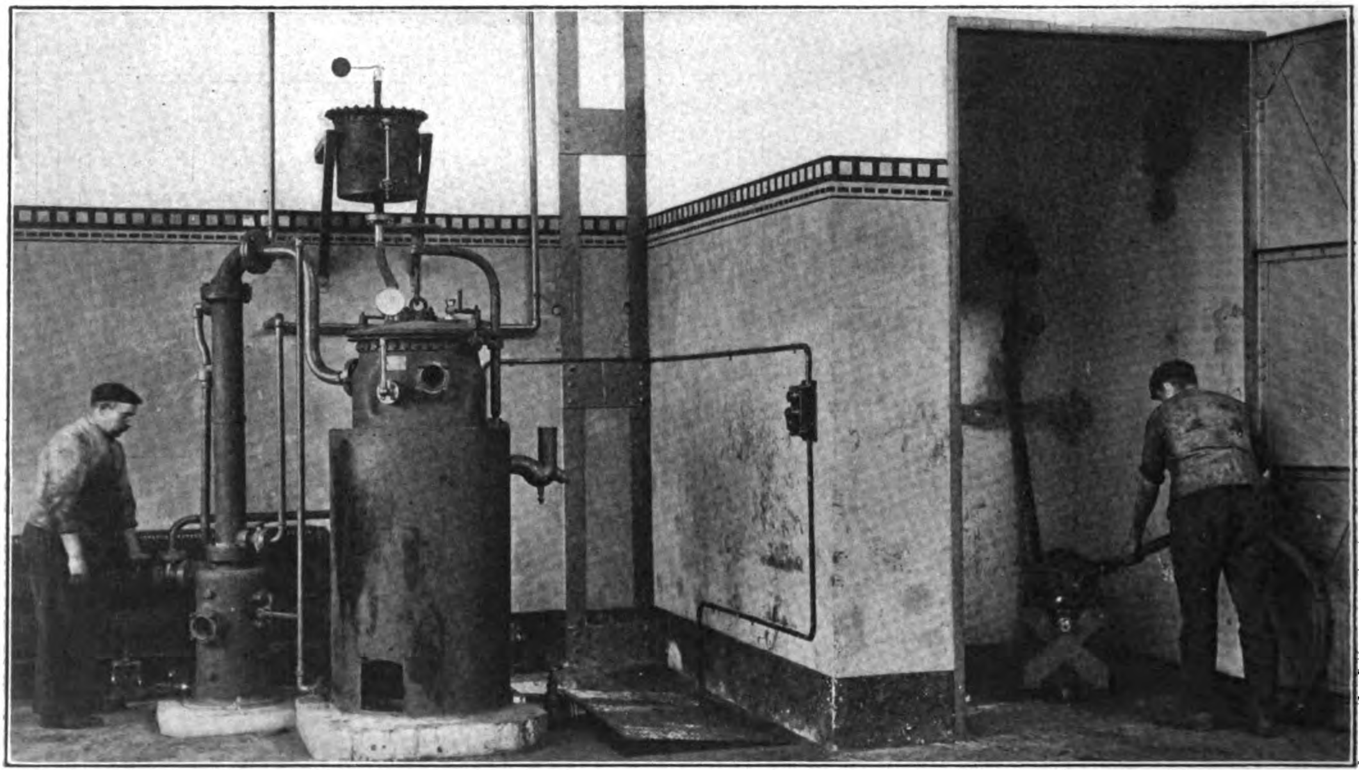
Hamburg Shops—Plan of Shop Structure, Showing Relation Between and Areas of the Several Departments

HANDLING OF CARS AND MATERIAL

It is clear from an inspection of the plan that the shop layout is very well adapted for the logical handling of maintenance work. Furthermore, the benefits of this arrangement have been fully utilized by installing an ample number of cranes, hoists and the like. The transfer table furnishes communication both to the paint shop with its two one-car tracks of flush construction and to the eight two-car tracks which pass through the car-body and truck-overhauling sections. The latter tracks extend to within some 17 ft. of the line of columns which marks the boundary of the longer machine shop. In the truck-overhauling shop six of the eight tracks are built with closed pits, but in the body-overhauling shop track No. 10 has a pit which is furnished with the motor-driven screw-type car hoist shown in two of the accompanying views. This hoist is operated by a 7½-hp motor and is capable of lifting a 20-ton car body at the rate of 0.18 in. per second on the four steel bearers which run on wheels, as shown. Track No. 10 is continued as far as the blacksmith shop, to which entrance is obtained by means of a turntable.



Hamburg Shops—Interior of Carhouse, Showing Lighting Features, Pit Arrangement, Overhead Conductor Rail, Etc.



Hamburg Shops—Vacuum Impregnation Outfit and Chamber for Blowing Out Armatures

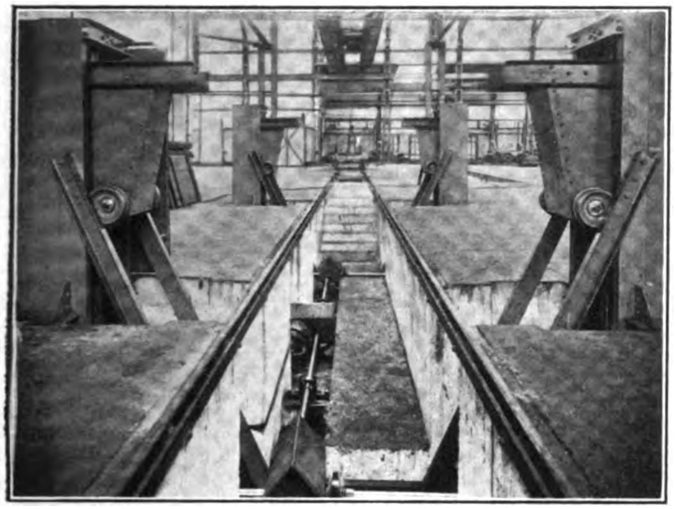
After the car bodies have been raised the trucks are pushed into the truck-overhauling shop, where the parts of dismantled cars are transported by a 7½-ton crane, the runway of which extends to the end of the miscellaneous motor shop. Thus the crane carries trucks and motors to their respective dipping tanks, motors to the motor stands, and wheel axles and other parts to the machine shop. The hoisting speed of this crane is 0.2 ft. per second, the transverse travel 1.6 ft. per second and the longitudinal travel 3.6 ft. per second. Furthermore, the two lines of tools in the machine shop are served by a 5-ton crane, consisting of a hand hoist and electrically operated bridge. The stockroom also has an overhead track with hand-operated hoist whereby material can be brought within the reach of the 7½-ton crane or taken into the stockroom upon unloading from the steam railroad cars outside the stockroom.

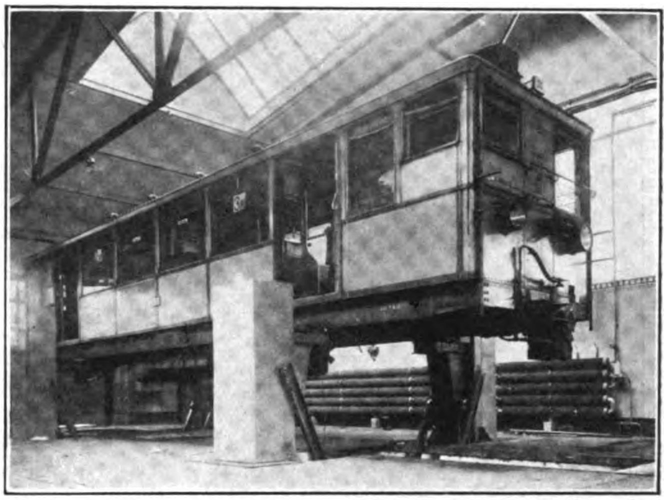
MAINTENANCE PRACTICES

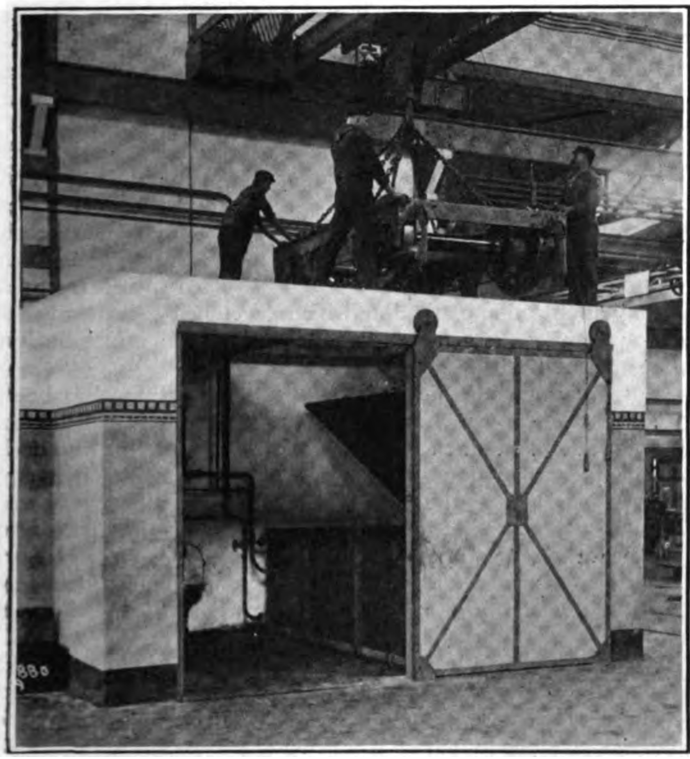
Some interesting maintenance practices of these shops are presented in several of the accompanying illustrations. Two halftones show a complete truck frame minus the journal boxes, which has been brought by the crane for dipping into a cleaning tank containing a solution of caustic soda steam-heated to a temperature of 100 deg. C. Ordinarily a steel, cement-covered sliding door completely closes this compartment at the floor line, but the top is left open to permit ingress and egress for the objects brought to the tanks. By this arrangement no dirty water can bespatter the main shop. A smaller caustic-soda tank, which is not visible in the illustrations mentioned, is provided opposite the larger tank for the dipping of motor shells. The use of a hot caustic-soda solution has proved very effective for the thorough and quick cleansing of metal parts.

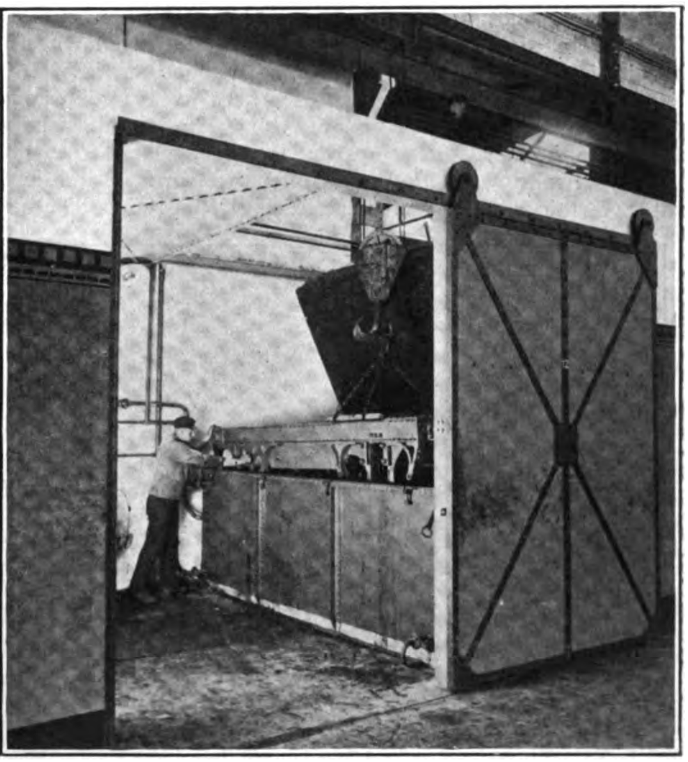
Another illustration shows a compartment in which armatures are blown out with compressed air. In order to show the interior of this room the door was left open when the photograph was taken, but in regular operation the door is closed so that the dust will be drawn off directly through an exhaust without the slightest possibility of being blown into the shop. The same illustration shows an installation of the Passburg vacuum system of coil impregnation, the impregnation tank being set in the floor alongside.

Another illustration shows the method adopted for removing and replacing armatures in the 100-hp motors, all of which are of single-shell construction. This purpose is attained by a combination of a stationary motor stand and of a carriage provided with a ram which fits into the end of the armature shaft. The motor is first placed on the stand with the aid of the 7½-ton crane. Then its end

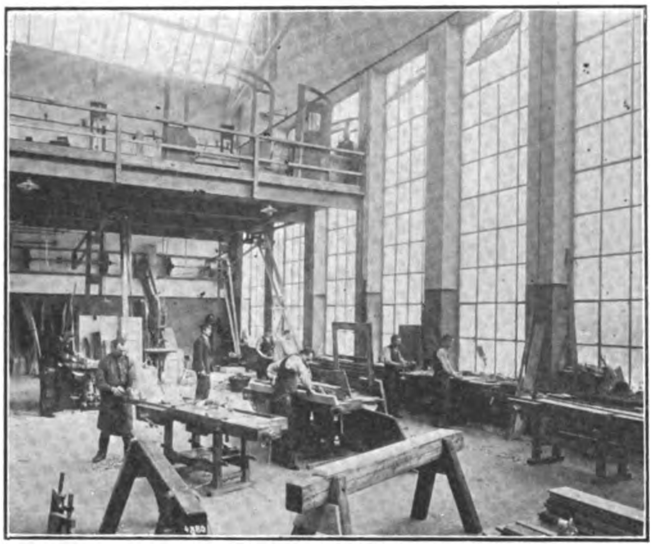

Hamburg Shops—Electrically Operated Car Hoist


Hamburg Shops—Car Body Raised on Electric Hoist


Hamburg Shops—Crane Delivering Truck to Dipping Vat

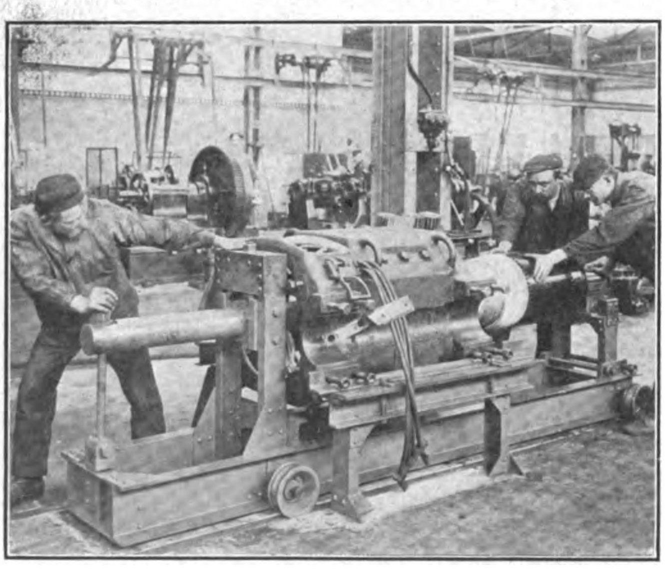

Hamburg Shops—Truck Lowered in Dipping Vat

pieces, bearings, etc., are taken off, upon which the armature is ready for removal. All that now remains is to push the carriage along its track until the ram has forced the armature out. The armature will then be supported at one end by the motor shell and at the other end by a vertical frame on the carriage. In this position desired repairs can be conveniently made, or the crane can be used to transport the armature elsewhere. The armature is restored to place merely by pushing the carriage in the opposite direction.



Hamburg Shops—Glazed Side Construction in Mill Room

The miscellaneous section of the overhaul shop contains a gas-ring equipment for expanding tires when off the wheels, but as yet no work of this kind has been necessary. Up to Feb. 15, 1913, the earlier steel-tired wheels had run 100,000 km (62,000 miles) without any replacement whatsoever. Gas is also used here for the soldering of armature leads and similar work. The machine shop contains the usual tools to permit the management to carry on practically every kind of maintenance work in addition to a certain amount of manufacturing if desirable. These tools include two wheel lathes, shaper, grinder, buffer, drills, etc. Most of them are driven from independent three-phase motors through overhead belting. An illustrated feature which should be of special interest to Americans is the use of wire screens for inclosing the lower portion of the belting and of certain parts of the machines in order to insure protection to the workmen. The high-tension testing outfit is also railed off from the rest of the shop.



Hamburg Shops—Ram for Removing Armature

The blacksmith shop now contains four down-draft forges, although space has been allowed for four more; it also contains an air hammer. The electrically driven compressor which supplies power for this hammer further supplies air for blowing out armatures and for other miscellaneous work throughout the shop. No work of any account has been done in the armature shop as not a single burn-out has yet occurred on the system. The mill room contains a lathe, mortiser, rip saw, circular saw, grinder, sharpener, etc., all of which are operated from countershafting. This shop is prepared to do all kinds of body woodwork and in fact has already had occasion to rebuild cars in part on account of a collision.

A rather novel form of alarm is attached to the door of the stockroom. This consists of a cylindrical cage which is supplied with heavy steel balls, so that some delay is experienced in opening the door while the rattling of the balls is certain to attract the attention of the storekeeper.

The utilities rooms for the employees comprise a kitchen, dining room, dressing room and toilet, all of the finest character. The employees bring their own food, but the kitchen is provided to enable them to prepare hot luncheons. The dressing room is furnished with individual steel lockers. The toilet room is finished with tile flooring and has a hot-water supply from the power station. It is also equipped with three shower baths.

LINE INSPECTION AND REPAIR IN UTICA, N. Y.

The Utica lines of the New York State Railways and the Oneida lines of the New York State Railways (the electrified portion of the West Shore Railroad) draw power from the Utica steam plant of the Adirondack Electric Power Corporation. The railway company maintains the transmission line, charging the expense to the power company.

The railway company owns 30 miles of 17,500-volt line and the power company 8 miles of 60,000-volt line, all of which is maintained in this way. The high-tension line is patrolled continually and a private telephone system keeps the patrolmen in constant touch with the repair force. On the low-tension system the custom has been to repair carefully any portion of the line which developed defects, in this way keeping the general condition of the whole installation up to standard.

Beginning with this year, however, a new plan has been put into effect which will ultimately insure a much better condition of the line than was possible under the old method. The interurban line will be inspected in great detail every three months and the city overhead construction every six months. The inspection of feeder lines will be annual. The inspection is to involve the climbing of every pole on ladders and a detailed inspection of the equipment. A report of each day's inspection is turned in to the office at night.

The interurban line is divided into two sections, east and west, each one being under the charge of a foreman and four linemen. Three men are required for doing the work on the city lines.

The work of inspection is continuous excepting when the men are required for emergency repairs. The first thorough inspection will require about nine months, as there are many small repairs to be made. The next one, however, will require less time and it is expected that very soon the lines will be in such condition that they can be gone over every three months. The company believes that this policy will result in a reduction in number of interruptions and that in the end the maintenance will cost no more than at present.

Standardization on the Michigan United Traction

A Description of the Organization and Methods Employed in Rehabilitating Track and Roadway—The Article Includes an Account of the Standardization of Rolling Stock for the Interurban and Street Railway Lines, as Well as Other Shop Practice

The Michigan United Traction Company has recently undertaken a complete rehabilitation of its property and at the same time has organized a campaign of standardization of designs as well as methods in all departments. Much has been accomplished during the past year and still more work along this line is contemplated.

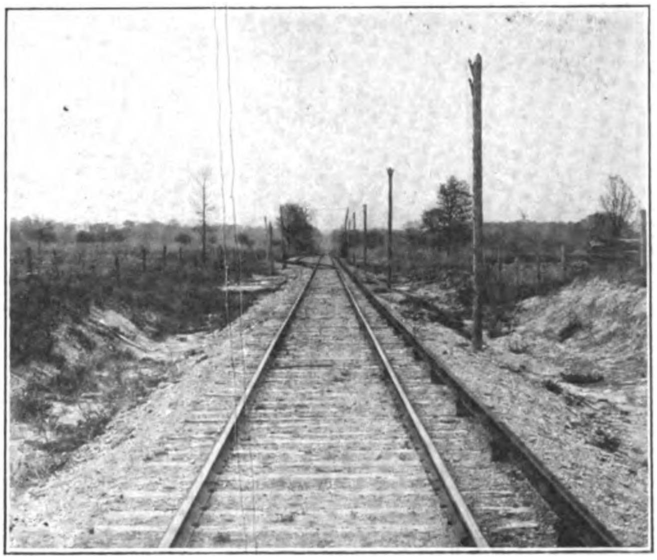
TRACK AND ROADWAY

A large proportion of the reconstruction work devolves upon the track and roadway department, which has developed a number of standards in design for track in paved and unpaved streets, as well as track on private right-of-way. These standards include roadway cross-sections, overhead transmission and trolley constructions and arrangements of bonding for the different types of special work.

Two standard types of track construction, one for paved, the other for unpaved streets, have been adopted by the track and roadway department. Both types include 100-lb. 6-in. T-rail, 24-in. continuous rail joints, 1-in. bolts and 34-in. compressed terminal cable bonds. The rails were purchased in 60-ft. lengths and laid with staggered, suspended joints. The difference between the two types of track construction lies in the kind of ties used and in the method of preparing the track foundation.

The rail is of a special design approximately conforming in section to the 100-lb. A. S. C. E. T-rail. It is ¼ in. higher than the A. S. C. E. section and has a 3-in. head and a 5½-in. base as compared with the 2¾-in. head and 5¾-in. base of the latter. The slight difference in the height of the rail is met by increasing the web thickness 1/32 in.

Standard construction in paved streets includes an 8-in. concrete base, a 2-in. gravel cushion under the ties and 6-in. x 8-in. x 7-ft. white oak ties spaced on 24-in. centers. The gravel cushion under the ties increases the resiliency of the roadbed and permits the track to be laid and brought to exact surface after the 8-in. concrete base is in position and has had sufficient time to set. The 6-in. special rail section allows a 2-in. sand cushion under the paving material. In practically every case this paving material is brick with a special filler and stretcher of Nelsonville brick to provide a flangeway next to the rail. The track special work in paved streets is practically all of the hard-center design, with a 350-ft. radius in diamond turnouts and a 100-ft. radius in other turnouts. In every case white oak switch ties, 7 in. x 9 in., cut to exact lengths were used.

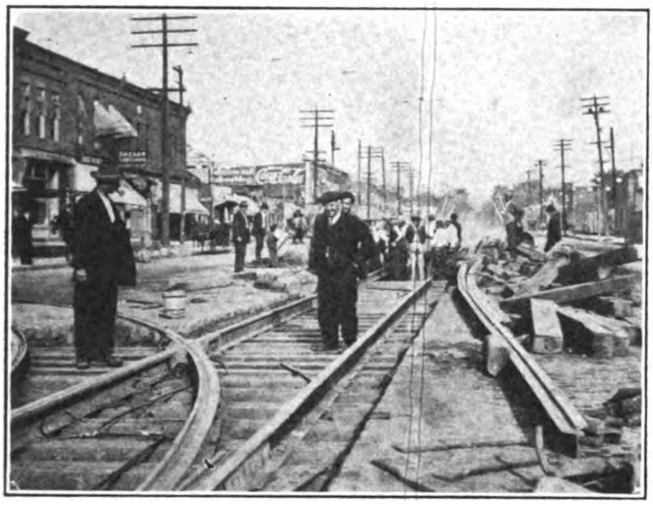


Michigan United Traction—Typical Section of Interurban Track

At the intersections of the electric line with the steam roads 100-lb. A. S. C. E. crossings were installed. These crossings provide an easier rail on the steam roads and a running guard rail on the electric line. In all instances hard-center crossings are used, except that where traffic on the steam road is especially heavy solid manganese

Michigan United Traction—General Repair Shops at Albion, Mich.

steel running rail was installed. In all cases the railroad crossing was laid on 8-in. x 10-in. x 10-ft. white oak ties with from 18 in. to 24 in. of crushed stone for a foundation.

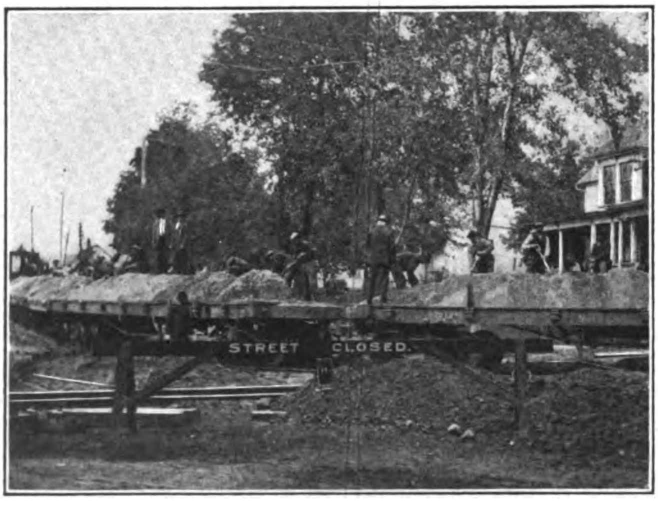


Michigan United Traction—Installing Track on Concrete Foundation

Standard track construction in unpaved streets includes the same type of rail, joints and tie spacing as in paved streets, where the department can anticipate that the street will not be paved within four years. All track in unpaved streets is laid with 6 in. of gravel ballast under the ties. If the time set for paving the street is indefinite, 8-ft. cedar ties with tie plates 3/8 in. thick and 5 in. x 8½ in. in size, having a shoulder for 100-lb. rails, are installed. If the street is to be paved within four years, the track construction exclusive of the ballast is made to conform to that standard in paved streets.

METHOD OF LAYING TRACK UNDER TRAFFIC

Two methods are employed in laying track in paved streets. If it is possible to lay a temporary track in the street, thus permitting the removal of the old rail and ties without interference from traffic, the work of excavating and placing the concrete is let by contract. If this is not possible the work is performed by the company's forces.



Michigan United Traction—Work Cars for Distributing Gravel on Unpaved Street

The work of mixing and placing all the concrete, the gravel cushion and the paving are handled by the contractor, the company removing the old ties and rails before he starts work.

At least seven days is allowed for the concrete to set before cars are operated over it. The gravel in the 2-in. cushion is actually coarse sand, and screened sand is used for the cushion under the brick. In all cases the filler employed in the brick paving is cement grout, and the space which is left between the edge of the brick and the web of the rail just outside of the track is filled with sand after the paving is in place. The grout filler combined with this sand forms a good quality of concrete. All concrete is placed in the trench by a continuous mixer, set either in the trench on a plank runway or beside the trench on the paving.

An especially low price was paid for concrete per cubic yard. This is due not only to the method of doing the work but also to the fact that all gravel is taken from pits owned by the company. Eight of these gravel pits are operated, and furnish a supply sufficient for all interurban and city work.

After all other work in connection with the laying of track in paved streets is completed, the ball of the rail at all joints is ground to surface. The company has two Kerwin rail grinders which it employs in this work. In repairing cupped or badly worn joints in track in paved streets Atlas special joints are employed. A special study is made of the requirements of each joint to be repaired, and if the wear is uniform on both rails a new straight joint is applied and the rails are ground on both sides, giving a long approach. If one rail is cupped the offset joint is applied and both rails are ground to a perfect surface.

Michigan United Traction—Preparing Double Track for Concrete While Continuing Traffic

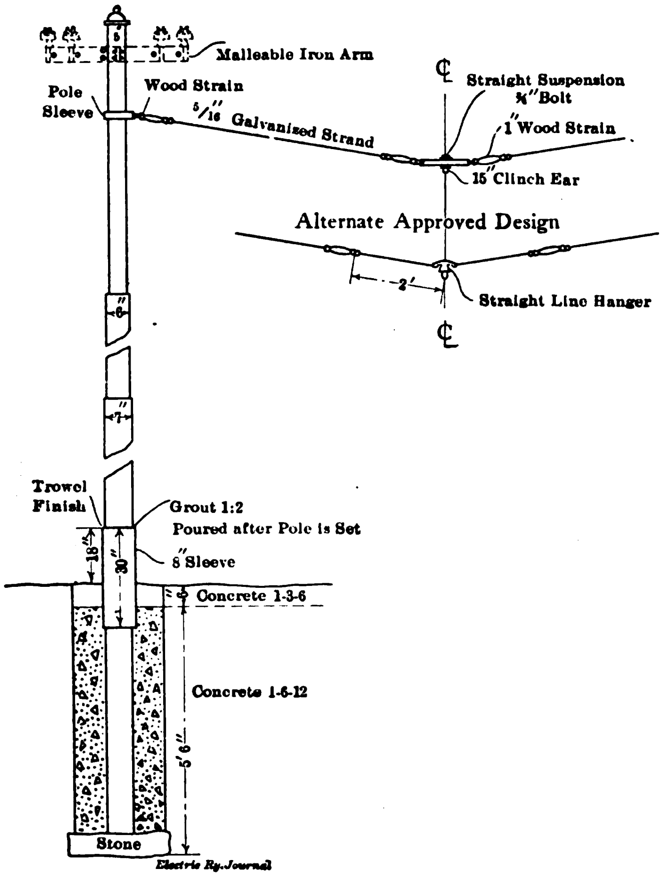
In the track rehabilitation work which was done in 1912 the standard spikes were 5½ in. x 9/16 in. in size. Owing to the fact that a great many ties were under size or checked by seasoning, the large spikes split them, and as a result of this experience the company has decided to use 5-in. x ½-in. standard spikes in oak ties and 5-in. x 9/16-in. spikes in cedar ties and switch ties.

A special gang is detailed to install the bonds in each city for both construction and maintenance work. As a direct result of this arrangement the foremen of gangs have become expert and the company has obtained better results and a very low unit cost of bonds which were thus installed. The standard arrangement of bonds around special work, as shown in the plan on page 478, greatly facilitates the work of bonding at these points.

All track rehabilitation in unpaved streets was handled by the company's own forces, and in some instances it was necessary to suspend regular service during the progress of the work. If the rehabilitation covered double track the service was continued on one track and portable cross-overs were used to permit sections of the second to be used as a passing siding. When the rehabilitation was on single track and the traffic was continued, alternate ties were removed and replaced with new ones, and new rails were fastened to the new ties alongside the old rails. By means of a set of switch points at each end of the section of new track it was thus possible to transfer traffic from the old track to the new, and after this was done the old rail and the remaining old ties were removed. As it was not possible, however, to use this method in sections of track special work, after the track was in readiness for the change-over the new special work was laid in places at night when the cars were off the line.

Following the completion of track laying, the gravel ballast was dumped in the trench and the track raised to its permanent elevation. The ballasted track was left open for several days before replacing the road material, so that the weak spots might be picked up as they developed under regular traffic.

Standard overhead construction in city streets is of two types—one made up with ordinary span wire and iron poles and used when the track is in the center of the street, and another, made up with iron poles and pipe-mast arms, which is installed when the track adjoins the curb line. Both of these types of construction are shown in the illustrations.

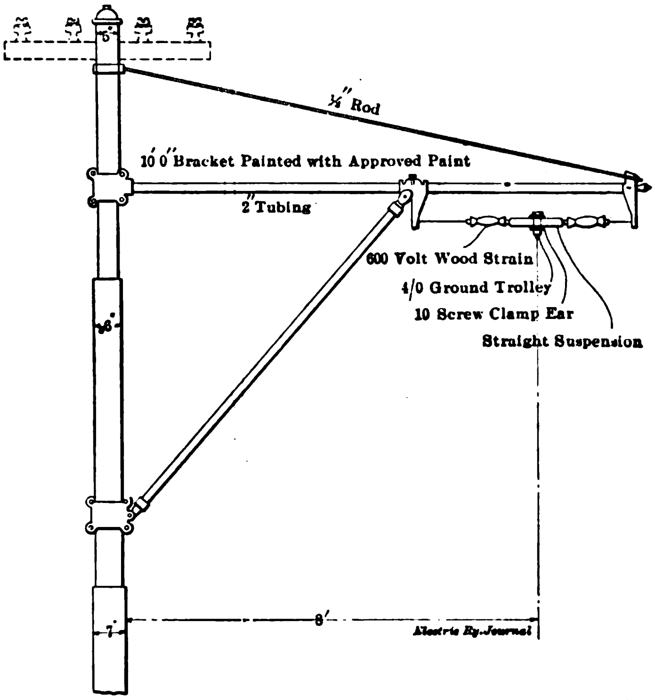

Malleable Iron Arm
Pole Sleeve
Wood Strain
5/16" Galvanized Strand
℄
Straight Suspension
¼" Bolt
1" Wood Strain
15" Clinch Ear
Alternate Approved Design
2'
Straight Line Hanger
℄
6"
7"
Trowel Finish
Grout 1:2
Poured after Pole is Set
18"
30"
8" Sleeve
Concrete 1-3-6
Concrete 1-6-12
5'6"
Stone
Electric Ry. Journal

Michigan United Traction—Overhead Construction for Cities, Type 1-D

INTERURBAN TRACK AND ROADWAY STANDARDS

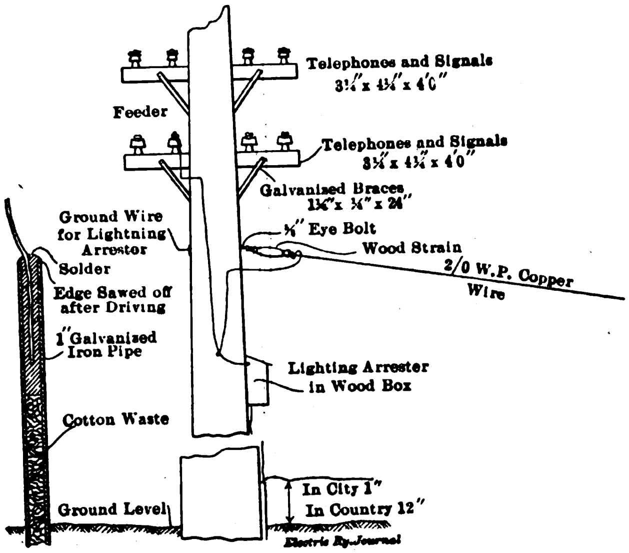
Two types of standard track construction are used on the interurban lines, one to take care of third-rail construction and the other of trolley construction. With few exceptions all track is laid with 70-lb. A. S. C. E. rail and continuous joints. The track on third-rail sections of the interurban line is built with a 9-ft. tie in the place of every fifth standard tie. Eight-foot cedar ties are used on all tangent track and white oak ties on curves. In order to obtain the maximum life from the cedar ties mechanical wear is lessened by the use of tie plates. White oak switch ties cut to length are used in all turnouts from the main line, these turnouts being No. 10, with a spring rail frog and an 87-ft. lead. In order to reduce further the curvature in the No. 10 lead a No. 12 turnout has been adopted as standard for use in main line, and this type will be installed as fast as renewals are required.

Other track standards include the use of 8 in. of gravel under the ties, a 16-ft. roadbed, with 3-ft. ditches, in cuts and fills, slopes of 1½ to 1 in the cut, and the same slopes on embankments. The standard roadbed width for double track is 29 ft.


5"
¾" Rod
10' 0" Bracket Painted with Approved Paint
2" Tubing
600 Volt Wood Strain
4/0 Ground Trolley
10 Screw Clamp Ear
Straight Suspension
6"
7"
8'
Electric Ry. Journal

Michigan United Traction—Overhead Construction for Cities, Type 1-C

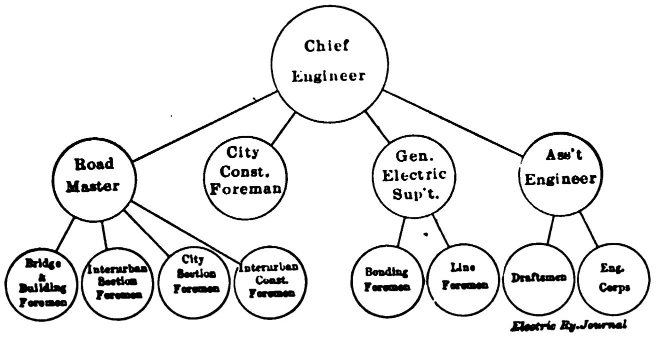
Two standard types of overhead trolley construction are used on different sections of the interurban lines, one with mast arms and the other with span wires. In either case 30-ft. poles with 7-in. tops are used. These are set 6 ft. in the ground and given sufficient rake to withstand transverse strain. Other construction details are practically the same as those used in city streets. The arrangement of the telephone, feeders and transmission lines as well as the ground-wire construction details is shown in an accompanying illustration on this page.


Telephones and Signals
3¼" x 4¼" x 4' 0"
Feeder
Telephones and Signals
3¼" x 4¼" x 4' 0"
Galvanized Braces
1¼" x ¼" x 24"
Ground Wire for Lightning Arrestor
Solder
Edge Sawed off after Driving
1" Galvanized Iron Pipe
⅝" Eye Bolt
Wood Strain
2/0 W.P. Copper Wire
Lighting Arrester in Wood Box
Cotton Waste
Ground Level
In City 1"
In Country 12"
Electric Ry. Journal

Michigan United Traction—Typical Wooden Pole Arrangement

TRACK AND ROADWAY DEPARTMENT ORGANIZATION

The jurisdiction of the chief engineer, who reports to the general manager and general superintendent, includes supervision over track and roadway. His authority also extends over the track and roadway on the four city railway properties. The track maintenance forces include a section foreman for an average of every 8 to 10 miles of track. Each foreman has a gang of two men during the winter months and five men during the rest of the year. Each section gang is provided with a section tool house.

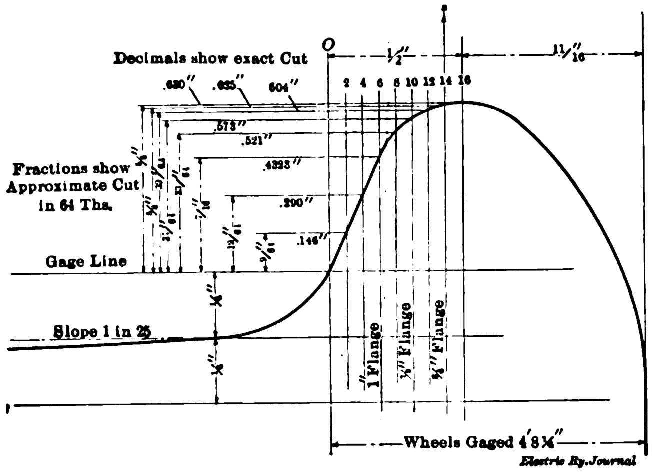

Chief Engineer
Road Master
City Const. Foreman
Gen. Electric Sup't.
Ass't Engineer
Bridge & Building Foremen
Interurban Section Foremen
City Section Foremen
Interurban Const. Foremen
Bonding Foremen
Line Foremen
Draftsmen
Eng. Corps
Electric Ry. Journal

Michigan United Traction—Track and Roadway Organization Chart

Four track foremen have charge of track work on the four city railway lines. During the winter months their gangs include four men each and during the rest of the year about seven men. In cases of extraordinary construction or rehabilitation extra gangs are provided so that the work of the regular maintenance forces will not be interrupted.

ROLLING STOCK STANDARDS

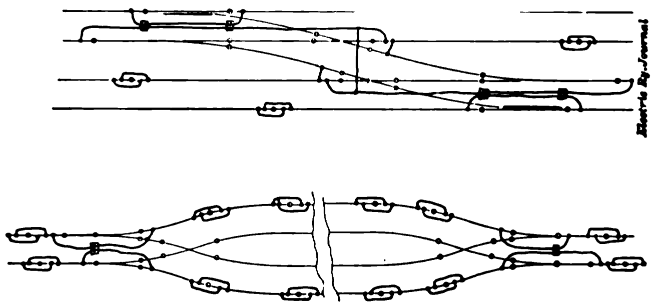
The work of developing standards and refining shop practice in the general repair shops of the Michigan United Traction Company is in a transition stage, but a vast amount of work has been accomplished along this line. Previous to the reorganization the general repair shops were sparingly equipped, so that it was necessary to purchase and install additional facilities and replace a number of the machine tools in order to accomplish appreciable results during the rehabilitation period. A wheel grinder, a wheel-turning lathe, a boring mill, a wheel press, an 1800-lb. hammer, a large lathe for turning and straightening axles, a drill press and a number of smaller machines have been added to the machine tool equipment of the shop.


Decimals show exact Cut
O
½"
11/16"
.630"
.625"
.604"
2 4 6 8 10 12 14 16
.573"
.521"
.4323"
.290"
.146"
Fractions show Approximate Cut in 64 Ths.
⅝"
39/64"
37/64"
⅝"
35/64"
33/64"
7/32"
19/64"
9/64"
Gage Line
¼"
Slope 1 in 25
¼"
1" Flange
⅞" Flange
¾" Flange
Wheels Gaged 4' 8¼"
Electric Ry. Journal

Michigan United Traction—Standard Interurban Flange, Showing Cut on Tread Required to Restore Full Flange

The wheel grinder is a special tool manufactured by Fox Brothers & Company. It includes a pair of beveled emery wheels, which are fed into the work automatically, and a set of bearings in which the axles of a pair of car wheels can be supported. The car-wheel drive is obtained by applying a sprocket wheel in two segments to the axle by means of clamps and wedges and by connecting this by a chain to a second sprocket mounted on the main shaft of the grinder. The car wheels are thus revolved at a speed of 14 r.p.m

The average life of cast wheels on this road has been approximately 40,000 miles. The life after grinding is approximately 20,000 miles. The average quantity of metal removed reduces the diameter approximately ⅛ in., and the cut requires about four hours for completion. As the cost of the grinder was only $750, the added mileage obtained from the wheels represents a considerable saving.


Electric Ry. Journal

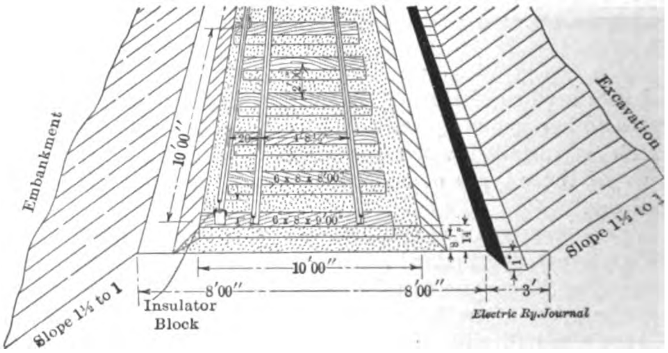
Michigan United Traction—Typical Bonding Layout for City Tracks

Another economy recently introduced in this shop is that of providing second-hand rolled-steel wheels for city car service. After the tires of these wheels have been reduced from approximately 3 in. in thickness to 1⅜ in. they are removed from interurban cars, mated as to diameter, bushed and pressed on the standard 5-in. city car axles. The standard axle used on interurban equipment is 6 in. with a 7-in. gear seat. The bushings are made of cast iron turned with a slight taper and pressed into the car wheel on the wheel press. After the wheels have been placed on a standard city axle they are turned true., Wheel practice on the city railways allows a tire to wear to ⅜ in. thick; therefore, figured on a basis of 1/16-in. wear to 12,000 miles, which is generally accepted, it will be seen that over 190,000 miles of renewed life is obtainable under average wear conditions.

The cost of obtaining this renewed life is given as follows:

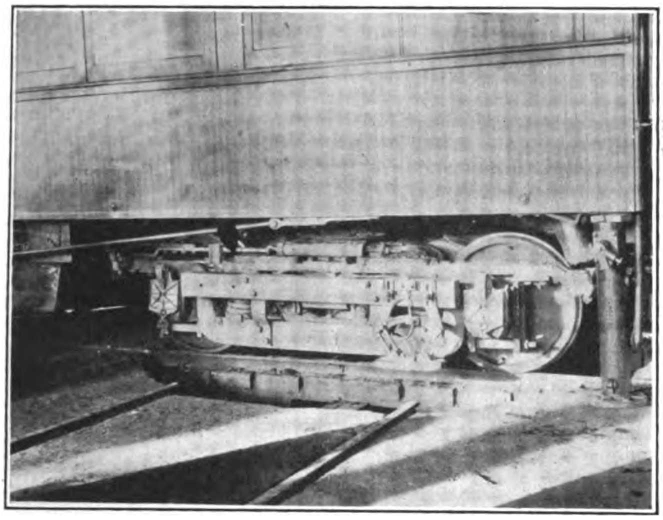
Cost of cast bushings, 53 lb., at 3 cents	$1.59
Turning bushing for press fit in wheel, two hours, at 27½ cents	0.55
Boring bushing, one hour, at 27½ cents	0.27½
Pressing on axle, two men, fifteen minutes	0.15
Turning wheels on axle, two hours, at 25 cents	0.50
Total cost of renewed life	$3.06½

Cost based on wear, to final thickness of ⅜ in., 1.6 cents per 1000 miles.


Embankment
Excavation
10' 00"
2'
20
4' 8½"
6 x 8 x 8' 00"
6 x 8 x 9' 00"
14"
8"
1'
10' 00"
8' 00"
8' 00"
3'
Slope 1½ to 1
Slope 1½ to 1
Insulator Block
Electric Ry. Journal

Michigan United Traction—Standard Interurban Roadbed, Including Slope

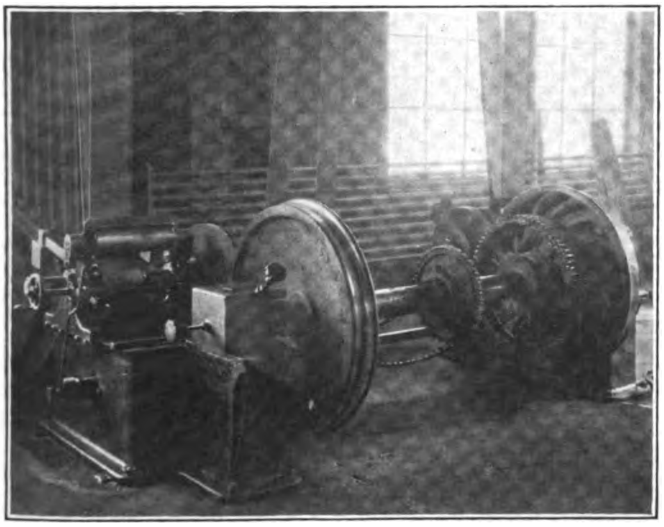
Just as soon as a lathe can be properly equipped this company will grind all bearings on axles by means of a motor-driven grinder. Instead of purchasing a special tool for this the grinding attachment will be applied on the slide rest of a lathe, and it is estimated that the complete outfit will cost approximately $200. Both new and old axles will be ground. The grinding tool will be arranged so that it automatically grinds a bearing of any length after making proper adjustment. It is contemplated that the more perfect bearing surface will save wear and tear on the bearings as well as assure better results by the reduction in the number of hot boxes.



Michigan United Traction—View of Truck Turntable in Repair Shop

The boring mill and the wheel lathe are especially powerful tools. The lathe will take a ½-in. cut at ½-in. feed. In order to reduce the time required in making a finishing cut a special tool shaped to the contour of the wheel has been purchased. Both the wheel lathe and the boring mill were designed and built by the Niles-Bement-Pond Company.

In order to provide a quick method for arriving at the proper depth of cut on any wheel tread necessary to restore a full flange conforming to the standard contour, R. C. Taylor, superintendent of equipment Michigan United Traction Company, has prepared the chart shown in the accompanying illustration. The chart shows the standard tire contour drawn six times the actual size. The vertical lines shown on the flange are arranged to show various thicknesses of worn flanges, and by selecting the line which corresponds to the actual thickness of the flange on the wheel to be turned the proper depth of cut in the tread will be at the point where the vertical line intersects the standard contour line.



Michigan United Traction—General View of Wheel-Grinding Machine

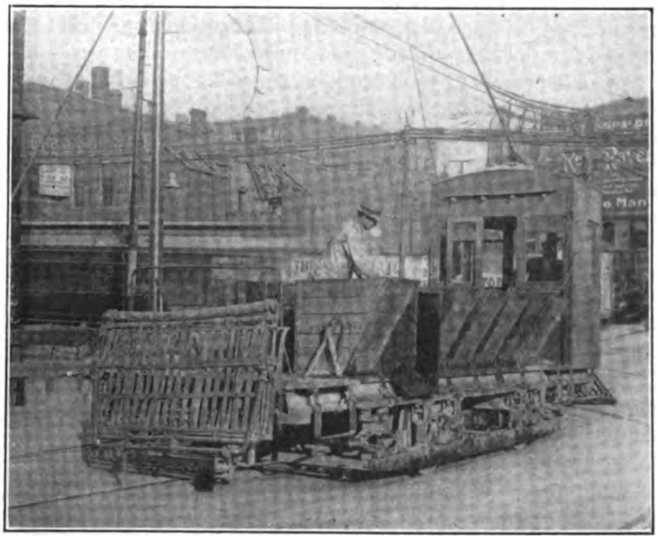
To determine the depth of cut on the tread for flanges worn to ⅞ in., for example, it is necessary to follow the vertical line marked ⅞ in. to the point where it intersects the line of standard contour. At this point the horizontal line indicates the depth of cut in decimals and fractions. Thus the depth of cut for ⅞-in. flange wear is 0.573 in., or 37/64 in.

The 1800-lb. steam hammer mentioned in the list of new machine tools has been fitted with a set of dies for making ordinary bonds, thus serving the purpose of a bulldozer as well as a hammer.

The American Electric Railway Engineering Association standard 5-in. axle has been adopted for all city cars and the standard 6-in. heat-treated axle for interurban cars. Trucks are being rebuilt to meet these requirements. The standard motor equipment is four 333-B-2 Westinghouse motors with HL control for interurban cars. This type of motor was selected because of the field control feature, which is suitable for either limited or local service. It has the advantage of low-gear ratio for starting, but is also suitable for high-speed operation. The city car motor equipment has been standardized by using two GE-210 motors with K-36 control. All wiring is being installed in conduit to standard diagrams, and the electrical equipment mounted under the car floor is arranged and balanced on an inch-pound basis.

ASPHALT CAR AT KANSAS CITY, MO.

One of the problems in making asphalt repairs is the transportation of the prepared asphaltum from the mixing and heating place to the place where repairing is required. To do this economically, A. E. Harvey, chief engineer Metropolitan Street Railway Company, Kansas City, Mo., recently built the large asphalt car shown herewith.



Asphalt Delivery Car for Kansas City

This asphalt delivery car consists of the underframe of an old single-truck car which had been arranged for single-end operation. As asphalt is very heavy and hard to handle in large lots by hand, fourteen separate bins of 7½ cu. ft. capacity each are provided. These are supported on brackets and trunnions which are slightly off center and are arranged symmetrically on the car deck, seven on each side. The size of these bins is such as to provide for an aisle along the center of the car, and the method of balancing the bins on trunnions as well as the shape of the bins themselves makes dumping by hand possible with little effort. The bins are built of 2-in. yellow pine lined with sheet asbestos and 16-gage sheet steel. The control cab at one end is glazed on all sides to give the motorman a clear view at all times.

Maintenance of Electrical Equipment of Cars in Brooklyn

A Description of Improvements Made by the Brooklyn Rapid Transit System in Recent Years in the Maintenance of Motor and Control Equipments—Particular Attention Is Given to the Development of Testing Sets

Three previous articles published within the last four months have described chiefly the mechanical improvements made during the past three years by the Brooklyn Rapid Transit System in the maintenance of rolling stock. The present article, which is the last in the series, will describe in detail the improvements which in general may be considered to be of an electrical character.

REDUCTION IN ELECTRICAL DEFECTS

No better criterion of the improvements in electrical maintenance could be afforded than the table of electrical defects as kept from month to month and year to year by the mechanical department. These statistics are of particular value, inasmuch as they have been made in accordance with the same method of tabulation for all the years under review. As it would be impracticable to reproduce all of these figures, it has been decided for purposes of publication to select the month of December of the years 1908 to 1912 inclusive as typical of the report for each year, in so far as the number of control and motor equipment defects on both the surface and elevated divisions is concerned.

As shown in Table I, covering the surface division, the number of control defects decreased from 316 in December, 1908, to 185 in December, 1912. The actual improvement, of course, is greater than these figures indicate, owing to the increase in passenger mileage from 3,606,136 miles to 4,084,803 miles, so that 11,411 miles were operated per defect in December, 1908, and 22,080 miles in 1912, an improvement of nearly 100 per cent. Upon examining the figures in this table, it will be seen that of the larger items the greatest decrease is in troubles relating to control fingers, cam rollers, circuit-breakers, main fuses and broken resistances. The second part of this table, enumerating defects of surface motors, shows a reduction of 329 defects in 1908 to 300 in 1912, the corresponding change in mileage per defect being from 10,963 miles to 13,616 miles. It will be noted that the number of motor troubles was actually greater in December, 1909 and 1910, than in 1908, but this was due largely to special conditions which have since been eliminated. The figures for 1912 show that conspicuous improvements have been made in practically abolishing flat, low and short-circuited commutators and greatly reducing motor lead and carbon brush troubles. Perhaps the greatest single factor was the introduction of a high-grade brush in conjunction with the slotting of the commutators.

Table II, relating to the elevated control and motor equipment, shows what remarkable reductions have been obtained by the application of the several major and minor improvements hereinafter described. Thus the control troubles diminished from 414 in December, 1908, to 104 in December, 1912, thereby increasing the mileage per defect from 6098 miles to 25,928 miles. The most prominent improvements were the reduction of defects relating to reversers, control fingers, seven-point jumpers, magnetic limits, magnetic releases, circuit-breakers, resistances and storage batteries. Even the great improvement in control troubles is exceeded by the reduction of elevated motor defects, which decreased from 392 in December, 1908, to 64 in December, 1912. The corresponding change in mileage per defect was from 6440 miles to 42,133 miles. It will be noted that the principal improvements were in brush-holder leads, motor flash-overs and mica and string band troubles. The last defect was due to the carbonization and burning of the string band when the brushes were cut by the high mica of non-slotted commutators. The reduction of flash-over troubles was effected by several changes in maintenance practices, among which was the thorough blowing out and painting of motor shells at each inspection and the elimination of short-circuited fields or armatures. Further, the monthly records were used to detect and to have removed armatures which showed an excessive number of flash-overs despite the fact that they had been reported by the inspector as "cleaned and tested out, O.K." The examination of the removed armature in such cases indicated that short-circuited coils had been the cause of the repeated flashes, and in preventing this the rule that after three successive flash-overs the armature should be replaced at once, whether the commutator showed evidence of short-circuit or not, has proved very successful. To insure compliance with this rule, a separate flash-over record was

TABLE 1.—CONTROL AND MOTOR EQUIPMENT DEFECTS—SURFACE DIVISION

	December				
	1908	1909	1910	1911	1912
Mileage	3,606,136	3,630,347	3,841,834	4,004,311	4,084,803
Control:					
Control grounded	..	1	1	..	3
Control open-circuited	..	..	..	1	..
Control short-circuited	1	..	..	..	..
Control back	4	3	3	5	4
Control cover	..	..	..	..	1
Control water collar	..	..	..	18	..
Control cylinder	6	3	14	5	6
Control segment	..	1	..	..	..
Control finger board	3	1	2	2	..
Control finger	63	35	48	31	40
Control reverse cylinder	1	1	1	2	7
Control deflector	..	..	..	..	..
Control arc shield	..	..	..	..	1
Control blow coil	..	2	..	1	1
Control cut-out	..	2	..	..	..
Control cam roller	50	56	49	40	22
Control miscellaneous	9	5	7	3	..
Control circuit-breaker	64	83	49	36	47
M.M. switch	3	..	1	..	..
Main fuse	35	47	10	6	2
Resistance broken	..	52	41	43	24
Resistance grounded	8	26	3	3	6
Resistance open-circuited	4	14	3	2	2
Resistance short-circuited	2	10	4	3	2
Resistance miscellaneous	60	28	32	17	12
Lightning arrester	3	1	..	..	1
Controller wiring	..	..	..	..	4
Total	316	371	268	218	185
Motor:					
Motor bolts	..	..	..	..	..
Motor covers	3	..	..	..	..
Axle housing	..	..	..	..	..
Armature housing	..	..	1	..	..
Armature bearings	..	4	2	6	5
Axle bearings	..	3	24	5	2
Axle cap bolt	8	22	15	3	3
Motor suspension	7	8	6	4	5
Armature grounded	52	90	84	80	81
Armature short-circuited	4	7	10	4	5
Armature open-circuited	19	22	20	13	3
Armature bands	18	33	29	13	23
Armature shaft	1	..	1	1	1
Fields baked	..	..	..	..	..
Fields grounded	17	27	41	39	26
Fields water-soaked	..	1	1	..	1
Fields open-circuited	6	12	16	14	21
Commutator flat	13	26	5	..	..
Commutator low	..	6	..	..	..
Commutator short-circuited	21	40	..	3	4
Gear	1	9	10	3	1
Gear case	1	3	13	4	2
Gear case bolts	2	..	..	..	..
Pinions	2	13	26	5	6
Leads	60	101	91	44	44
Junction box	10	1	..	..	..
Brush holder	32	51	78	54	61
Cable	2	5	15	4	4
Carbon brush	50	53	7	1	..
Commutator carbonized	..	..	14	..	
Hand-hole cover	..	..	..	1	
Motor shells	..	..	..	..	
Total	329	537	509	301	300

instituted with the highly successful results indicated in the lower part of Table II.

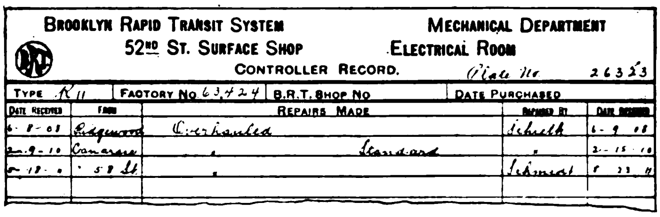
The work described in the following paragraphs is done at the Fifty-second Street general repair shops except the maintenance of multiple-unit control, which is carried out at the elevated maintenance shops.

Table II—Control and Motor Equipment Defects—Elevated Division

	December				
	1908	1909	1910	1911	1912
Mileage	2,524,577	2,692,154	2,699,351	2,676,783	2,695,516
Control:					
Main drum	9	13	15	2	..
Reverser	24	31	34	4	1
Reverser drum	..	..	..	..	..
Reverser finger	..	..	..	..	..
Control finger	73	38	30	9	4
Main fingerboard	6	15	16	..	..
Reverse fingerboard	13	6	3	..	..
Jumper, four-point	1	2	1	..	..
Jumper, seven-point	27	8	14	12	18
Magnet limit	10	13	8	..	..
Magnet operating	5	9	18	5	2
Magnet reverse	6	3	21	5	..
Magnet release	21	19	24	..	1
Circuit breaker	25	9	11	..	..
Operating cylinder	..	..	2	..	..
Reverse cylinder	..	..	1	..	..
Resistance	12	17	12	1	1
Receptacle, four-point	1	2	4	2	1
Receptacle, seven-point	2	1	10	2	3
Receptacle covers	1	..	7	2	..
Storage battery	24	36	47	2	2
Spring, operating	14	12	1	2	3
Spring, pawl	10	8	23	7	6
Spring, wiper	..	..	..	..	..
Interlocks	10	1	8	5	4
Switch, battery	2	..	1	1	..
Switch, main	3	7	8	..	..
Switch, master	2	4	18	1	1
Switch, operating	..	..	..	..	..
Switch, repeating	5	2	8	2	1
Switch, reverser	..	..	..	..	..
Switch, safety release	11	10	12	1	5
Line switch	8	18	29	9	8
Series and multiple switch	28	7	10	..	1
Reducing valve	8	8	12	1	4
Magnets	34	28	30	..	..
Switches	13	7	26	..	..
Leathers	6	2	33	6	5
Contact tips	..	14	5	2	..
Feed valve	..	..	6	..	..
Pawl	..	..	..	18	4
Other control springs	..	..	..	1	1
Magnets	..	..	..	4	3
Magnet leads and terminals	..	..	..	4	..
Junction box	..	..	..	1	..
Switches, U. S. G.	..	..	..	5	6
Line switch trip	..	..	..	2	1
Line switch cut-out	..	..	..	1	..
Line relay	..	..	..	4	3
Auxiliary relay	..	..	..	1	..
Battery-charging relay	..	..	..	1	1
Limit switch	..	..	..	5	6
Battery fuse	..	..	..	1	3
Resistance, insulating bolts	..	..	..	1	..
Blow-out coil	..	..	..	1	..
550-volt lead	..	..	..	..	2
Resistance leads	..	..	..	..	1
Controller air piping	..	..	..	..	2
Total	414	350	508	133	104
Motor:					
Axle bearings	..	..	2	1	..
Armature bearings	1	..	7	7	1
Armature shaft	..	2	..	..	..
Armature grounded or short-circuited	54	33	54	25	25
Armature open-circuited	12	8	5	1	1
Armature wire band	7	1	2	2	2
Armature mica or string band	118	..	..	..	1
Commutator loose	3	5	1	1	..
Commutator flat	20	..	..	..	4
Brush holder broken	..	1	..	..	1
Brush holder grounded	28	9	9	1	8
Brush holder lead	18	5	15	8	2
Brush holder shunt	..	5	4	..	1
Brush holder spring	20	3	4	1	..
Carbon brush	..	..	..	..	..
Babbitt block	..	..	1	..	..
Field leads	..	11	12	3	3
Fields	2	3	4	5	2
Gear wheels	2	5	2	1	3
Gear case	..	..	..	..	..
Motor shell and parts	..	..	..	..	..
Motor leads	7	4	3	4	3
Motor flashed	93	86	126	21	5
Pinion	5	20	15	5	2
Motor smoked	2	..	..	..	..
Total	392	201	266	86	64

CONTROLLER RECORDS AND REPAIRS

Early in 1909 the mechanical department began to overhaul its surface controllers on an eighteen-month basis. Owing to the excellent results shown by these overhauled controllers, it was decided that from Jan. 1, 1913, the period should be extended to two years so that now one-twenty-fourth of all surface controllers go through the shop every month. The decision to adopt this long overhauling period is all the more interesting in view of the fact that most of the controllers are of the older types. Exclusive of the equipment of the 101 center-entrance cars, the surface controllers now in use on the Brooklyn Rapid Transit System are made up as follows: 42 type K-27A, 188 type K-6, 204 type K-28L, 270 type K-2, 1104 type K-28B and 2975 type K-11.



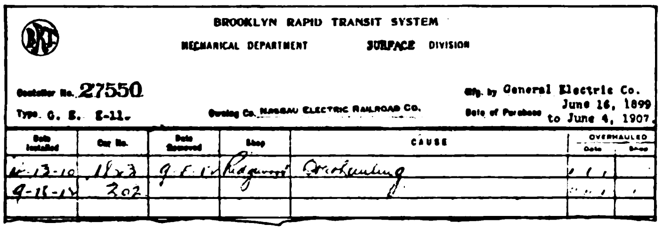
BROOKLYN RAPID TRANSIT SYSTEM
52ND ST. SURFACE SHOP
MECHANICAL DEPARTMENT
ELECTRICAL ROOM
CONTROLLER RECORD. Plate No 26323

TYPE K 11	FACTORY NO 63424	B.R.T. SHOP NO	DATE PURCHASED

DATE RECEIVED	FROM	REPAIRS MADE	REPAIRED BY	DATE RETURNED
6-8-08	Ridgewood	Overhauled	Schulth	6-9-08
2-9-10	Canarsie	" Standard	"	2-15-10
5-18-"	52 St.	"	Schmeat	5 23 11

B. R. T. Electrical Shops—Shop Card Record of Controller

Records of controller repairs are kept on 5-in. x 8-in. standard cards both at the Fifty-second Street shops and at the office of the superintendent of equipment. As shown in one of the accompanying reproductions, the shop card is a record of the individual controller showing the dates when it was received from different carhouses for overhauling, when overhauled, by whom and when completed. The shop does not keep a record of the location of the controller but notifies the office of the superintendent of equipment once a month that certain controllers are due for overhauling. The record clerk at headquarters then determines the location of the controller by referring to a record card, also reproduced, which shows the cars upon which the controllers are in use and the carhouses where the cars in question are in service. The carhouses are then

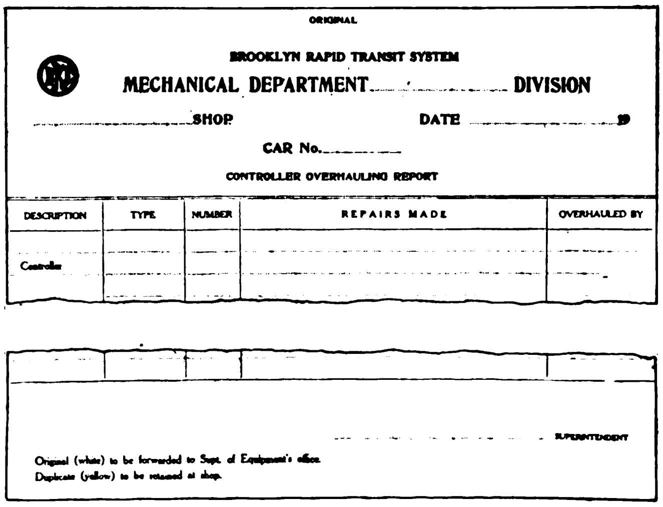


BROOKLYN RAPID TRANSIT SYSTEM
MECHANICAL DEPARTMENT SURFACE DIVISION

Controller No. 27550
Type. G. E. K-11.
Owning Co. NASSAU ELECTRIC RAILROAD CO.
Mfg. by General Electric Co.
Date of Purchase June 16, 1899 to June 4, 1907.

Date Installed	Car No.	Date Removed	Shop	CAUSE	OVERHAULED Date	OVERHAULED Shop
6-13-10	1823	9-8-11	Ridgewood	Overhauling	" "	
9-11-11	302				" "	"

B. R. T. Electrical Shops—Home Office Card Record of Controller



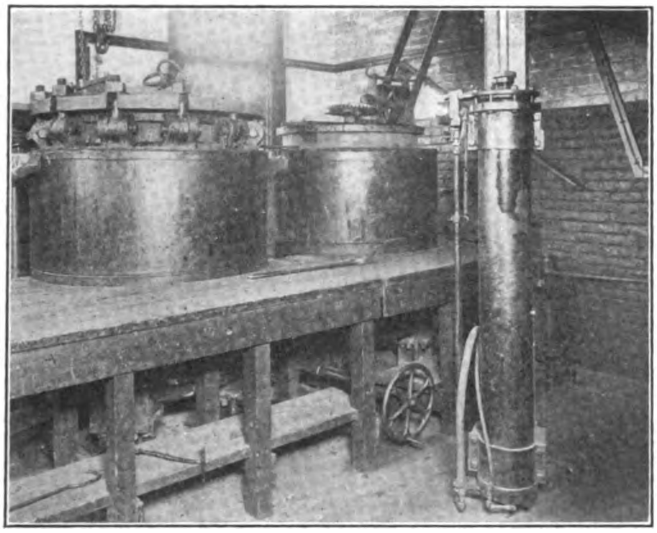
ORIGINAL
BROOKLYN RAPID TRANSIT SYSTEM
MECHANICAL DEPARTMENT ________ DIVISION
________ SHOP DATE ________ 19
CAR No. ________
CONTROLLER OVERHAULING REPORT

DESCRIPTION	TYPE	NUMBER	REPAIRS MADE	OVERHAULED BY
Controller				

________ SUPERINTENDENT

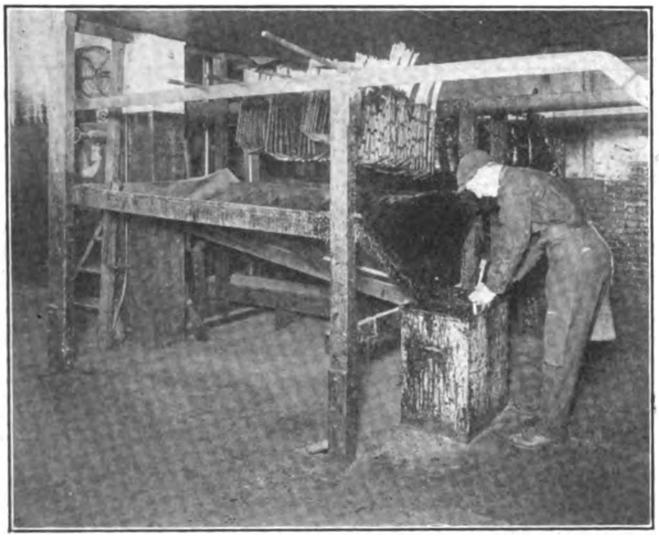
Original (white) to be forwarded to Supt. of Equipment's office.
Duplicate (yellow) to be retained at shop.

B. R. T. Electrical Shops—Report on Controllers Overhauled Sent by Shop to Home Office notified on a form entitled "Controllers Due for Overhauling." Another form in connection with this work is the report on which the Fifty-second Street shop notifies the superintendent of equipment that certain controllers have been overhauled and are ready for assignment. The date of overhauling shown for each controller is then transferred to the proper cards at the office. Later this information serves as a check on the shop should it ask for a controller which is not really due for overhauling. This last form is also furnished with spaces for recording similar information on the overhauling of circuit-breakers, line switches and storage batteries.



B. R. T. Electrical Shops—Vacuum Impregnating Equipment at Fifty-second Street Shops

The overhauling of control equipments of elevated cars is carried on at the elevated maintenance shops in accordance with a regular annual schedule which shows the location of elevated cars throughout the system. The changes in the elevated control equipment will be detailed at length hereinafter, but it will be appropriate to summarize here the improvements in surface controllers, the K-11 type offering the most typical case on account of the fact that it is the oldest and most used design on the system.



B. R. T. Electrical Shops—Dipping and Hanging Coils

The cost of stripping a K-11 controller and replacing all worn material averages about $2.50 for both labor and material. Among the departures which have been made from the original design of this controller during the past five years are the following: A board of ½-in. vulcabeston has replaced the 1/16-in. fiber barrier between the main and reverse cylinders; in addition to the single-arc shield above the trolley controller finger four arc shields have been installed; the binding posts have been changed to permit the screws to go in perpendicularly so that the wires are no longer cut by the threads as occurred when the screws were inserted at an angle to the wire; the back is treated with asbestos and shellacked and all wires and cables are also shellacked. It may be added that the controller contact plates are lubricated with vaseline at the regular inspections.

SURFACE MOTOR IMPROVEMENTS

As a number of important electrical improvements made by this company have already been described in these columns, it may be convenient to summarize them as follows, before describing those which have not been mentioned hitherto:

Reboring of Westinghouse 68 and 81 motor shells and use of tin-base bearing metal for all surface and elevated motor and truck journal bearings, issue of Jan. 18, 1913.

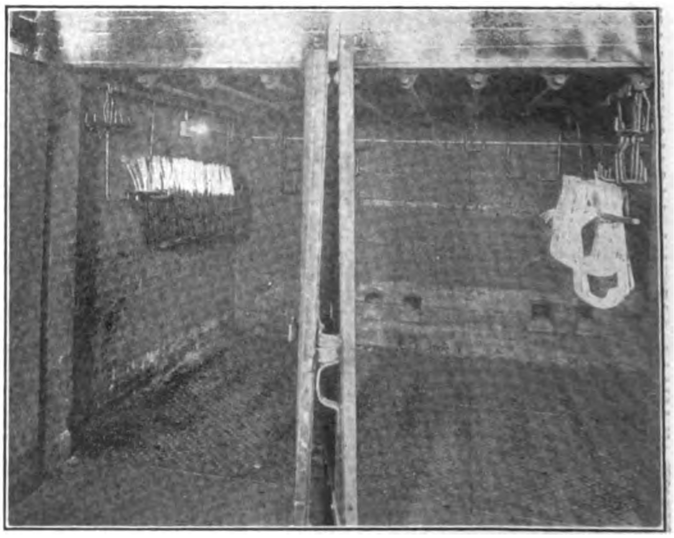
Heater standardization and specialization of maintenance, issues of June 26, 1909, and Feb. 18, 1911.

Substitution of Westinghouse three-point suspension grid resistances for old and obsolete types and rearrangement of resistance steps, issue of Feb. 18, 1911. In an article on "Resistance Standards," in the issue of May 11, 1912, it was brought out that the number of resistance types had been decreased from nine to four, that there had been a decrease of 7.3 per cent in the maximum starting torque on the first notch, a decrease of 8.6 per cent in the maximum starting current, and a decrease of 9 per cent in the maximum variation in torque during acceleration.

The slotting of commutators by this company in connection with the use of high-grade carbon brushes began in 1908 with the slotting of the commutators of the 150-hp elevated motors. The company's comprehensive tests with such brushes were described and tabulated in the issue of June 19, 1909, and the excellent results from the practice of using these brushes with slotted commutators was described in the issue of April 22, 1910.

IMPREGNATION OF FIELD COILS

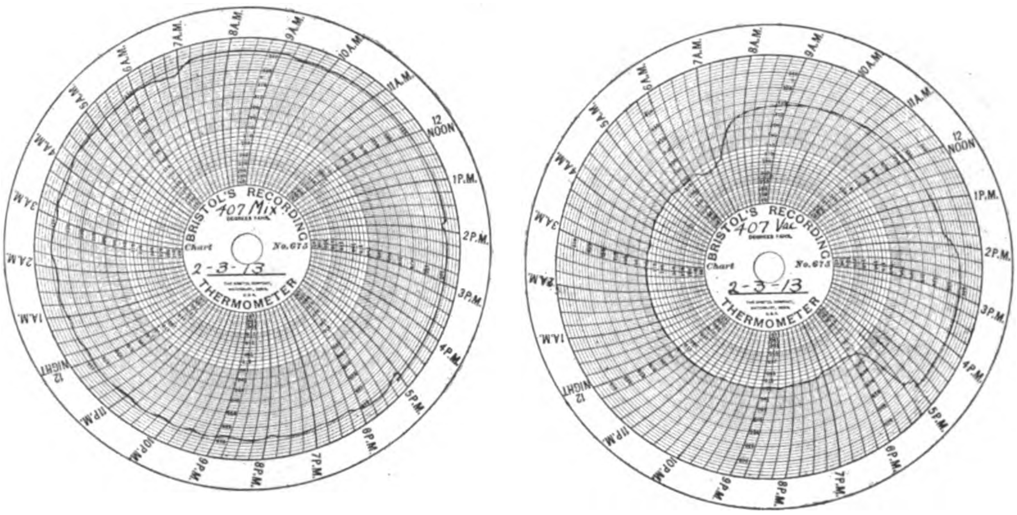
For two or three years previous to 1910 the company had in service several thousand field coils that were impregnated by the manufacturers of the motors. The impregnated coils proved so satisfactory that the company decided to install a plant of its own at the Fifty-second Street shops. This equipment, which is shown in an accompanying illustration, consists of one vacuum and one pressure tank furnished by the Buffalo Foundry & Machine Company. The tanks of this design are heated by a steam



B. R. T. Electrical Shops—Coils in Drying Oven

jacket instead of steam coils, allowing them to be cleaned with greater ease. No trouble has been experienced from leakage of the steam jackets. This equipment has been in operation from June 4, 1910, and from that date to Dec. 31, 1912, 12,817 field coils, or approximately 73.33 per cent of a total of 17,478 coils, had been impregnated. Experience has convinced the company that impregnation has easily paid for itself in lengthening the life of the coils and thus minimized their rewinding.

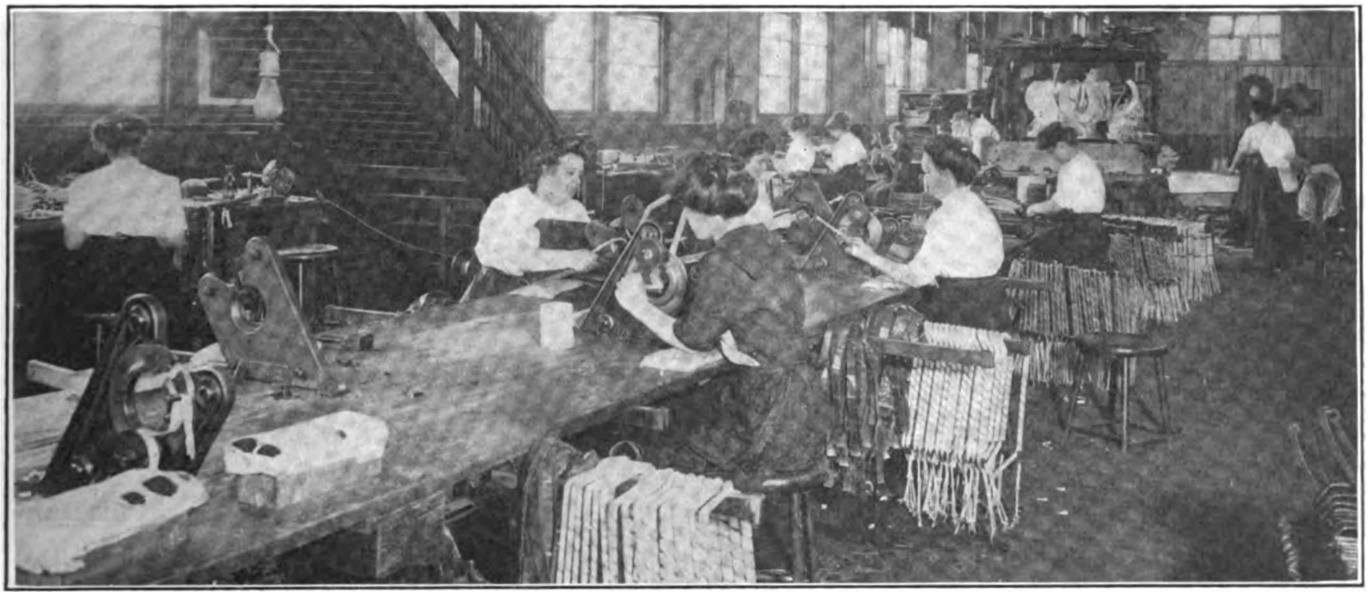
An important auxiliary to each tank is a Bristol recording thermometer. The dial of each thermometer bears an identification number which is also stamped on the tin tags which are attached to each field coil of the group impregnated at any given time. In this way a record of the temperature conditions which exist in each tank at the time the work is done is obtained so that a possible clue is afforded to determine the cause for any trouble which an impregnating coil may develop later in service. The accompanying reproductions of a pair of these records refer to the impregnation of twenty-two Westinghouse No. 81 coils which were tagged as part of group 407. The records show the changes in temperature from the time the coils were placed in the tank, 5 p. m. Feb. 3, 1913, to the time they were taken out, 5 p. m. the next day.



B. R. T. Electrical Shops—Temperature Records of Compound and Vacuum Tanks

FIELD-COIL PRACTICE

Field coils which are returned to the shops for impregnation are first tested as hereinafter described. If found in good condition they are covered with what is termed a "sacrifice tape" of 1½-in. width cotton which is put on as a preliminary to the impregnating process. After the coils have been kept in the vacuum for four and a half hours they are placed for a like period under pressure after Sherwin-Williams impregnating compound is drawn in. When the coils have cooled and hardened, upon removal from the pressure tank, the sacrifice tape is pulled off, thus leaving a smooth coil which is insulated like a new field in the following manner: Put on the leads, apply one layer of friction tape, one layer of Empire cloth 15 mils thick, place canvas cap on the motor side of the field and complete with one layer of 1½-in. Imperial waterproof tape and dip in Sherwin-Williams air-drying varnish.

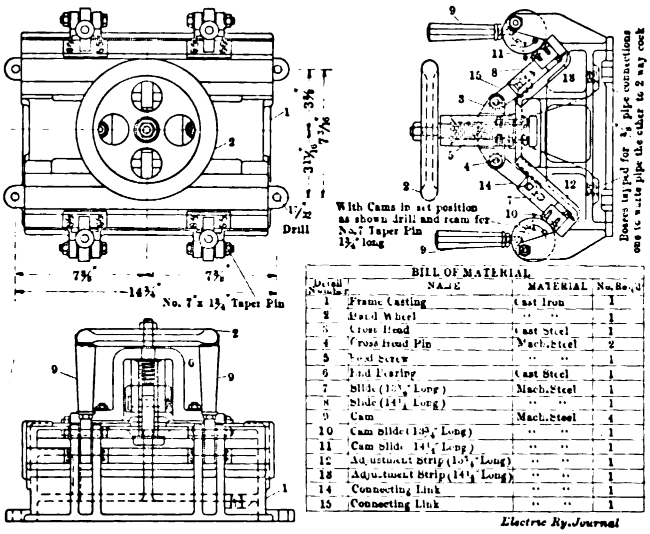


B. R. T. Electrical Shops—Winding Department at Fifty-second Street Shop

ARMATURE AND COMMUTATOR PRACTICE

After an armature coil has been wound on one of the coil forms, the ends are taped and sleeving is placed on the leads. The coil is then baked in an oven for two hours, after which it is dipped in Sherwin-Williams baking varnish. The coils are then hung up to drip, as illustrated, after which they are baked for four hours. Upon completion of the second baking the coil is taken to the winding room, where both sides are covered with three thicknesses of Empire cloth, each layer 8 mils thick. This cloth is applied with shellac and covered with fish paper, which is tied on until the shellac is dried sufficiently to retain it. The coils are now ready for the hot presses. The details of one of these presses are shown in an accompanying drawing. In this design a central screw is used to transmit the pressure to steel plates which bear on the sides of the coil. There are one or more side clamps, depending upon the size of the coil, to secure a uniform distribution of pressure. The presses are steam-heated and water-cooled. Of the sets of four valves illustrated in connection with each press, two are for steam inlet and exhaust and two are for water inlet and exhaust. When the coil has been hot-pressed it is taped and dipped again and returned to the oven for the final drying. The leads are then tinned and the coil is ready for assembling. The use of hot presses has greatly improved the insulating qualities of the coils.

A simple but important improvement in the banding of all surface and elevated armatures is the use of tin binding strips to prevent the loosening of the bands in service. The strips are laid over the banding insulation which is in the bottom of each banding slot. Then the wire bands and clips are installed in the usual manner and the tin strip is soldered to the entire wire band.

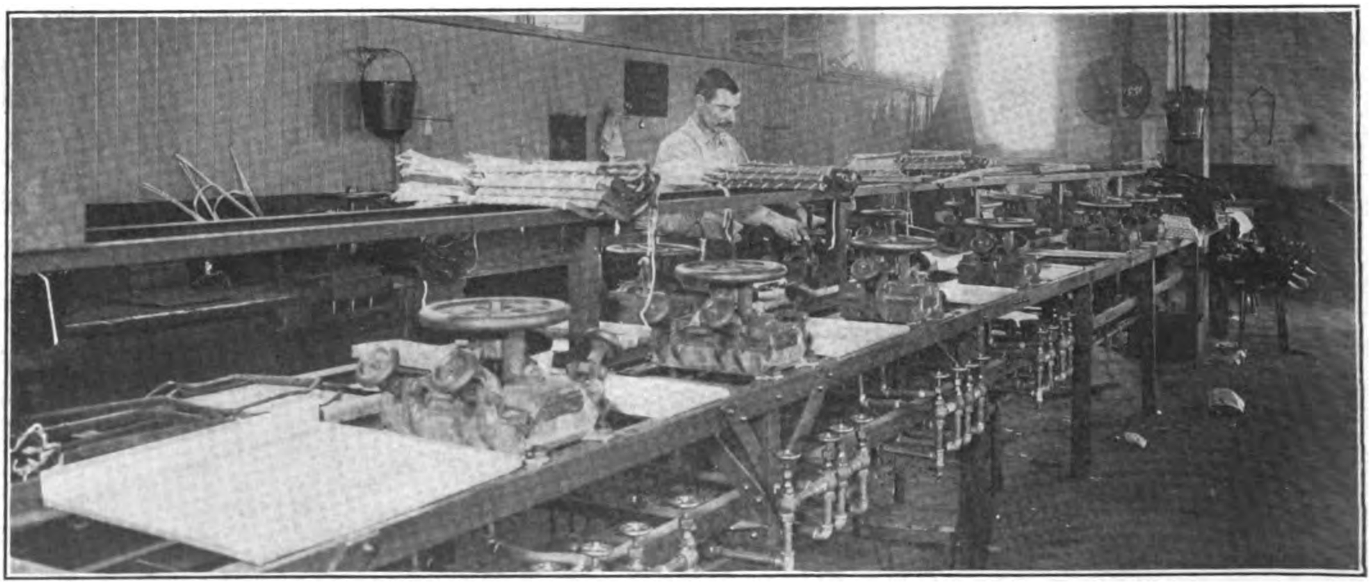

9
11
15
8
18
3
5
4
14
12
2
7
10
9
1
2
3⅝"
7 3/16"
3 1/16"
17/32
Drill
7⅝"
7⅝"
14¾"
No. 7" x 1¾" Taper Pin
With Cams in set position as shown drill and ream for No. 7 Taper Pin 1¾" long
Bosses tapped for ⅜" pipe connections one to waste pipe the other to 2 way cock
2
9
6
9
1
Electric Ry. Journal

BILL OF MATERIAL

Detail Number	NAME	MATERIAL	No. Req'd
1	Frame Casting	Cast Iron	1
2	Hand Wheel	.. ..	1
3	Cross Head	Cast Steel	1
4	Cross Head Pin	Mach. Steel	2
5	Feed Screw	.. ..	1
6	End Bearing	Cast Steel	1
7	Slide (13¾" Long)	Mach. Steel	1
8	Slide (14¼" Long)	.. ..	1
9	Cam	Mach. Steel	4
10	Cam Slide (13¾" Long)	.. ..	1
11	Cam Slide (14¼" Long)	.. ..	1
12	Adjustment Strip (13¾" Long)	.. ..	1
13	Adjustment Strip (14¼" Long)	.. ..	1
14	Connecting Link	.. ..	1
15	Connecting Link	.. ..	1

B. R. T. Electrical Shops—Armature Coil Press for Westinghouse 81 Motor

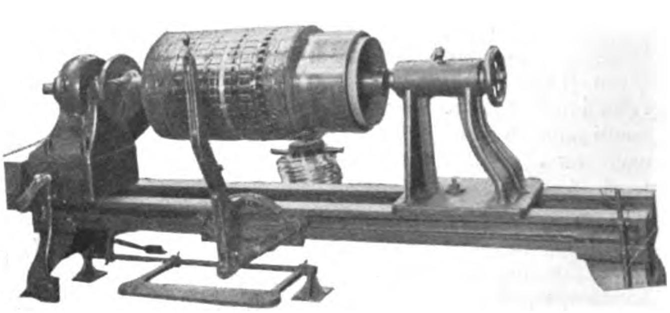
When armatures are brought to the Fifty-second Street shops for repairs they are blown out by compressed air, the cleaning being done in a horizontal cylindrical tank of the type illustrated. This tank is provided with an exhaust which carries off all dust and dirt.



B. R. T. Electrical Shops—Table of Hot Presses at Fifty-second Street Shops

The commutators of all types of motors are now slotted. The slotter in use for the surface armatures at the Fifty-second Street shop has a slide rest which carries a small swinging frame and an arbor for a circular saw. Means are provided to adjust the machine for commutators of various dimensions. The slotter for elevated armatures is shown in one of the illustrations. It is of the reciprocating type and is based on a design used by the General Electric Company. It will be seen that the armature is arranged to rest on a channel beam framework, and that two screw posts are provided for height variation with a horizontal screw in each post to make adjustments to prevent end motion. The reciprocating-type slotting saw is belt-driven.

The two slotting machines referred to are used now in reslotting commutators that may be sent in to Fifty-second Street for repairs and for the slotting of new commutators as installed. Since it was impracticable when slotting was inaugurated to have all armatures sent to Fifty-second Street for that purpose, on account of the time set for the completion of this work, each overhauling shop was furnished with a pneumatic slotting machine of the type used by the Westinghouse Electric & Manufacturing Company. These machines consist of a small circular saw on a shaft operated by a pneumatic rotary engine. Adjustable guides or rests on a square shaft are also provided to permit the operator to rest the machine on the commutator. These machines are still being used at the maintenance overhauling shops for reslotting.

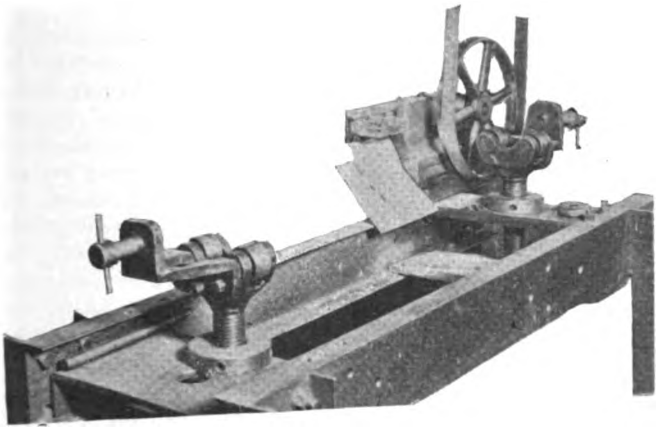


B. R. T. Electrical Shops—Type of Standard Bander in Use at Fifty-second Street Shops

An interesting point in connection with the commutator work is that all nuts are tightened while the cone ring is under pressure so that there is no strain on the threads when the nuts are sent home. The pressure on the cone ring under these conditions varies from 5 tons to 15 tons, according to the type of commutator.

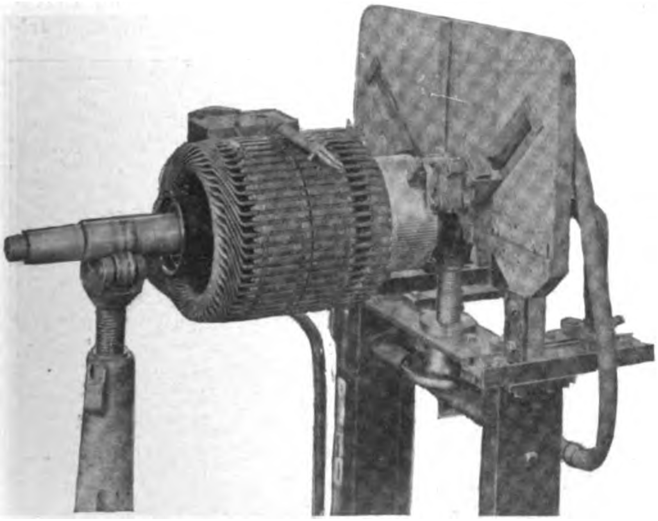
TESTING EQUIPMENTS

A very important factor in the reduction of maintenance costs has been the installation of equipments for testing fields, armatures, heaters, jumper connections, circuit-breakers, etc. The most elaborate installation of this kind is the armature outfit for testing poor soldering, commutator short-circuits, or short-circuits in the armature itself. The equipment comprises a rheostatic controller, a set of car resistances which give any desired amount of current from 8 amp to 300 amp in order to include the currents used by the motors in service, an ammeter to measure the current going through the armature coils and a millivoltmeter to note the drop between commutator bars. By passing an operating current through the armature it is possible to discover such defects as would otherwise develop after the armature had been placed in service on the car, namely, melting of poorly soldered connections and the burning off of abraded wires. By permitting the armature to receive exactly the same current as if it was installed between the fields of its motor, the practical benefits of an actual test on the car are obtained without the inconvenience of removing and replacing an armature which might prove defective.



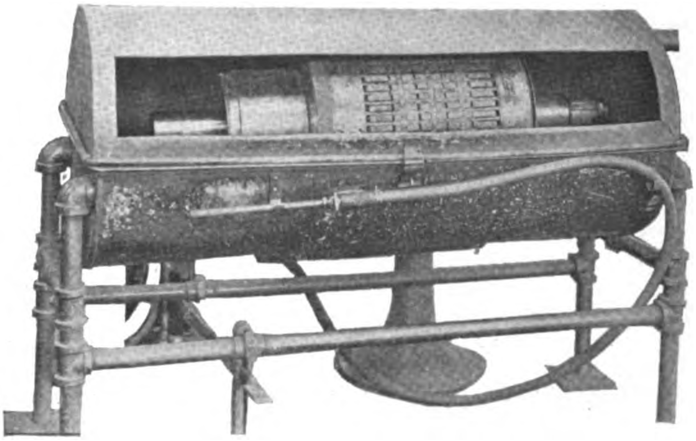
B. R. T. Electrical Shops—Commutator Slotter for Large Armatures

The connections of the armature-testing outfit are indicated in the accompanying wiring diagram and other details are shown in two accompanying halftones, particularly the adjustment of the brush holders for any size commutator. This adjustment is obtained by means of two slots in the board through which the terminals are connected to the brush holders. The illustrations also show a shelf above the armature stand which is used for trying out and adjusting circuit-breakers. For this purpose the controllers and resistances are used to increase the current until the circuit-breaker blows, the current being indicated by the ammeter. Circuit-breakers used on four-motor equipments are set to blow at 325 amp, and those on two-motor equipments are set at 275 amp. Armatures of compressor motors can have an additional given running test by installing them in a compressor located near the field-testing outfit. As this compressor is furnished with a split frame, the armatures are taken in and out very readily.

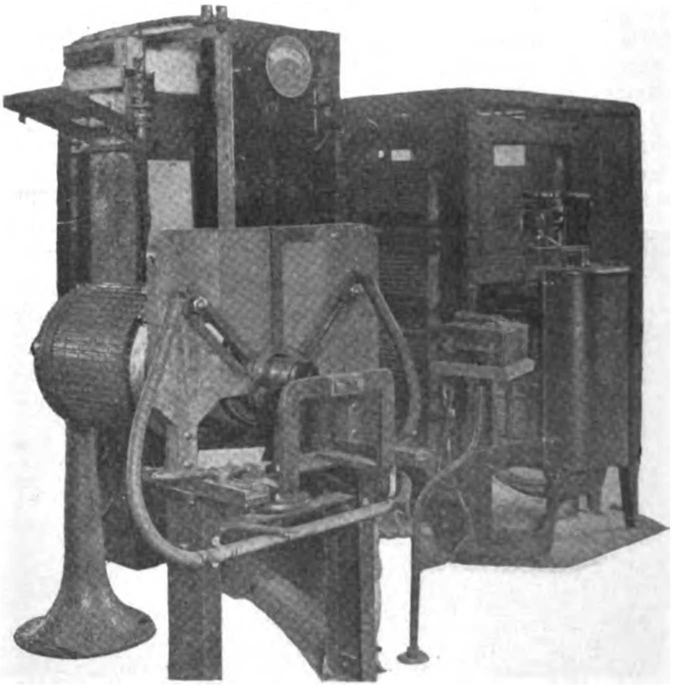


B. R. T. Electrical Shops—Brush-Holder Mechanism for Armature-Testing Outfit

In the field-testing apparatus shown on page 482 the principle of the transformer is used. The field under test acts as a secondary and a coil made up of eighty-one turns of No. 5 D. C. C. wire acts as a primary. The primary coil receives current from a small 110-volt, 35-cycle generator, which is driven directly from the main shaft. This coil also has a 40-amp circuit-breaker, an ammeter and a 90-amp double-pole, single-throw switch in series. First the reading of the ammeter is noted when the switches are closed and without a field coil in position for testing, this reading corresponding to the primary current of the transformer when the secondary is open-circuited; or this will be the reading of the ammeter when the field coil under test is in good condition and without short-circuits. A reading higher than this normal reading indicates that the field coil has a short-circuit, the reading varying in accordance with the number of turns thus short-circuited. If the current is maintained for a while, the point of short-circuit will be indicated by the additional heating of that portion of

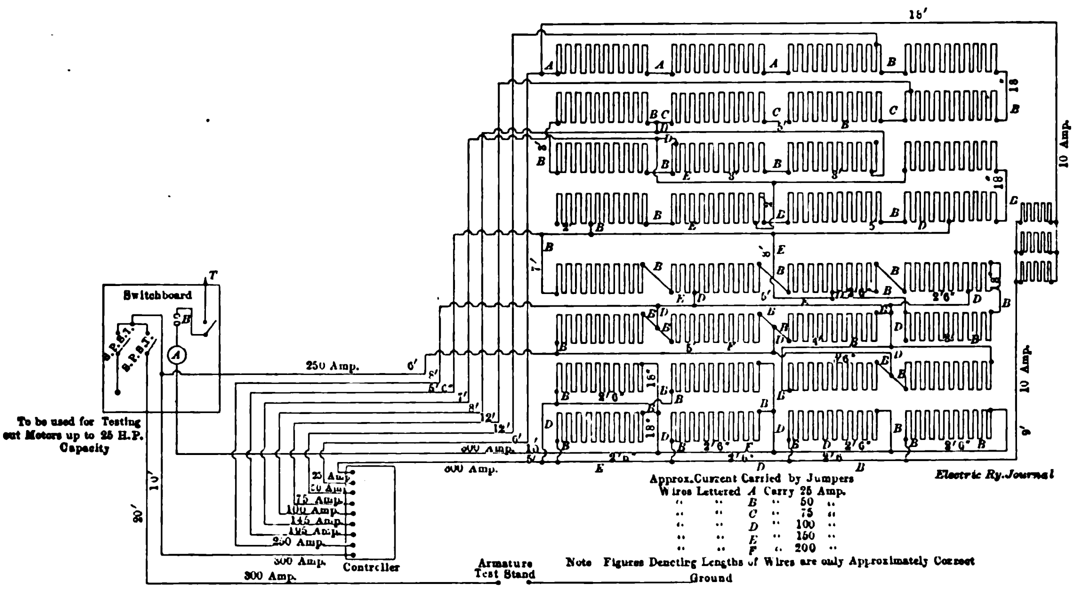


B. R. T. Electrical Shops—Cylindrical Tank for Blowing Out Armatures

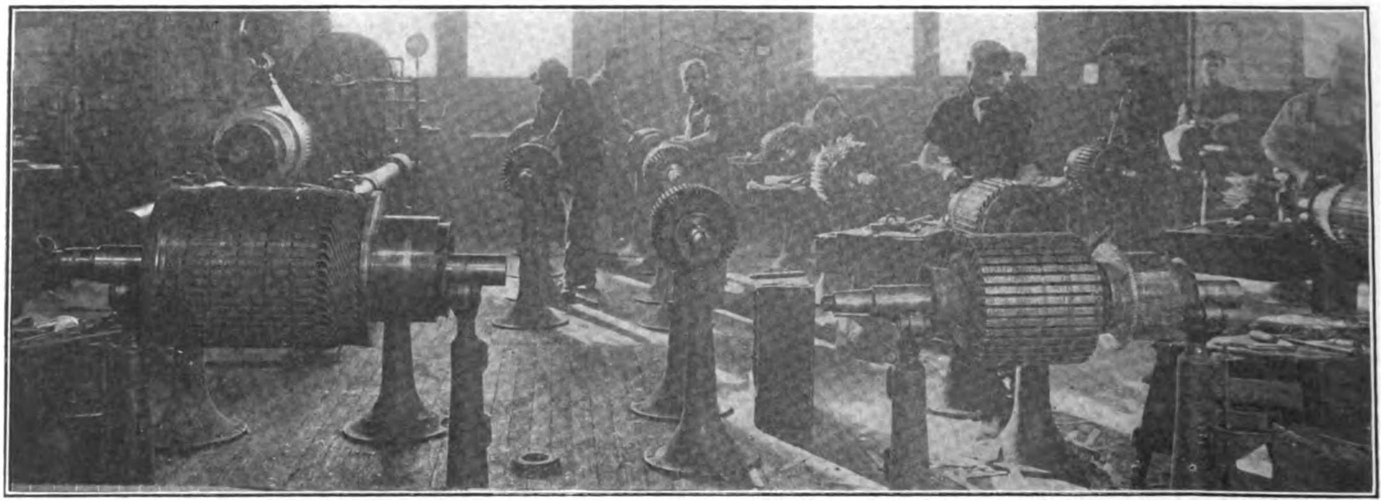


B. R. T. Electrical Shops—Armature-Testing Outfit Showing Also Bracket for Circuit-Breaker the coil. In testing for open circuits one terminal of the coil is grounded and a light circuit is put on the other terminal. The burning of the lamps, of course, will show the absence of open circuits.

The construction of the field-testing outfit consists of the parts shown in an accompanying drawing. The framework part, *A*, is made of wood. Part *B* is a slate panel, 20 in. x 11½ in. x 1 in., on which the circuit-breaker, ammeter and switch are mounted. Parts *C, H* and *D*, which comprise the magnetic circuit, are made up of several thicknesses of 1/32-in. wrought iron dipped in shellac. After the shellac is dried, the laminations were placed between the two ¼-in. side pieces and riveted together. The primary coil is made up of eighty-one turns of No. 5 B. & S. D. C. C. wire with twenty-seven turns between *T*-1 and *T*-2 and eighty-one turns between *T*-1 and *T*-3. Part *E* is a cast-iron counterweight 6⅝ in. in diameter and 6 in. wide which assists in raising part *D* and also in keeping it in the upper position while a field coil is being replaced in position for testing or while one is being removed. The arms, part *F*, are made of ½-in. x 2-in. flat iron, are bolted to part *D*, have the counterweight attached at the other end and are free to turn on a pin. Part *D* and counterweight *E* thus revolve on the same pin, which is supported by two brackets, one on each of the upright members of the wooden frame.


16'
18"
10 Amp.
Switchboard
T
B
A
D.P.S.T.
D.P.S.T.
To be used for Testing out Motors up to 25 H.P. Capacity
250 Amp.
600 Amp.
25 Amp.
50 Amp.
75 Amp.
100 Amp.
145 Amp.
195 Amp.
250 Amp.
300 Amp.
300 Amp.
Controller
Armature Test Stand
Ground
10'
20'
2'6"
9'
Approx. Current Carried by Jumpers
Wires Lettered A Carry 25 Amp.
" " B " 50 "
" " C " 75 "
" " D " 100 "
" " E " 150 "
" " F " 200 "
Note Figures Denoting Lengths of Wires are only Approximately Correct
Electric Ry. Journal

B. R. T. Electrical Shops—Switchboard and Resistance Wiring Diagram for Armature-Testing Outfit



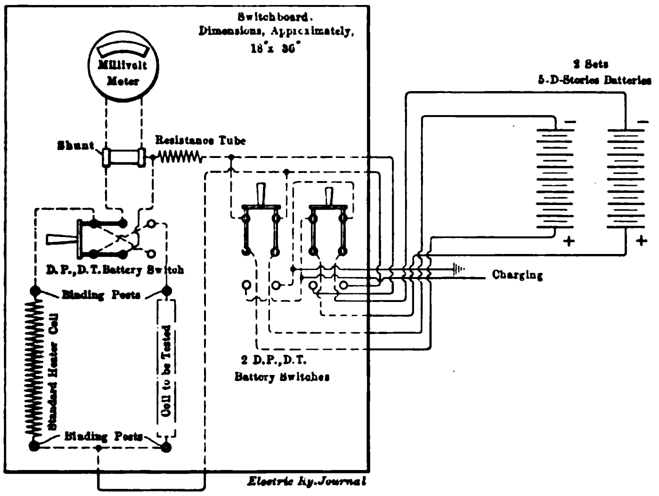
B. R. T. Electrical Shops—Part of Fifty-second Street Shops, Showing Armature Workstands, Armature Sling Carried from Crane Track, Hydraulic Press, etc.

To test a field coil, *D* is raised and the field coil is slipped over *H*. *D* is then lowered, in which position it rests on *H* and *C*. After the field coil is in position and *D* has been lowered, the circuit-breaker and switch are closed, thus sending alternating current through the primary coil. The terminals of the field coil under test should be entirely free and not connected together.

A transformer box is used for testing windings for any potential up to 6000 volts. The 500-volt d.c. lighting circuit is used for testing individual coils before they are assembled.

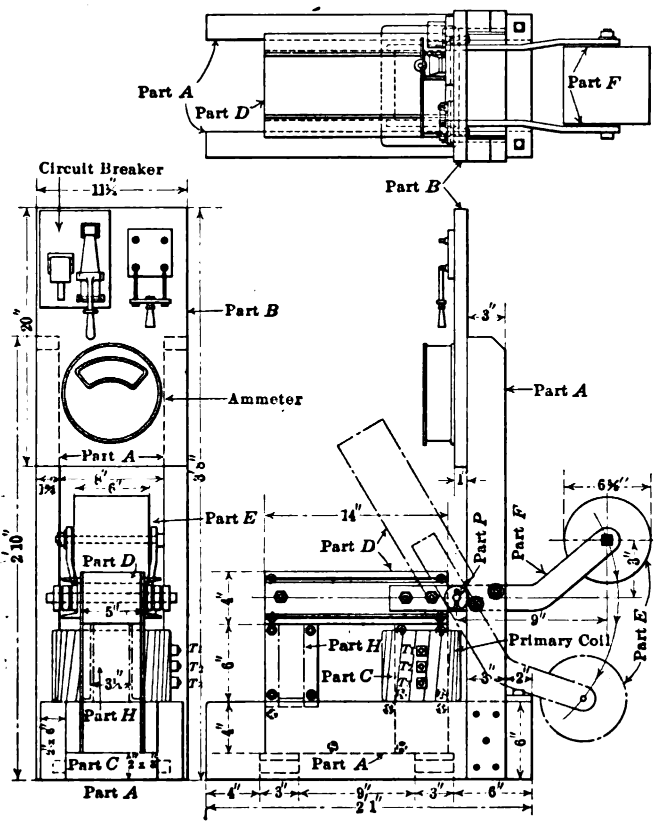
Heater tests are of two kinds, those of energy consumption, which are made by the heater maintenance specialists directly on the cars, as described in the ELECTRIC RAILWAY JOURNAL for Feb. 18, 1911, and those which are made in the Fifty-second Street shops as now described. The purpose of the shop tests is to make certain that individual coils of heaters sent in for repairs are of the proper resistance. The method of tests is to use a modified Wheatstone bridge on which the individual coil is balanced against the resistance of the master coil of a given type of heater. The necessity for tests of this kind is indicated by the fact that there are twenty-nine types of Consolidated and ten types of Gold heater coils on the Brooklyn Rapid Transit System. The master coils of each type are kept on a board in the local storeroom of the department of electrical repairs at the Fifty-second Street shop, whence they are taken out as required for comparisons with new coils for size of wire, number of turns, resistance, etc. If the coil is of unknown type it can readily be identified by means of a calibration curve which shows what the resistances should be for different values of current.

The heater-testing equipment, as shown in the accompanying drawing and halftone, consists of an 18-in. x 36-in. board on which a millivoltmeter and two double-pole, double-throw battery switches and a third double-throw, double-pole switch are mounted. The battery switches are thrown one way for charging and the opposite way for discharging, while the third switch is so arranged that when thrown in one direction the current goes through the master coil to give a reading on the meter and when thrown in the opposite direction the current is sent through the coil under test. If the resistance of the coil is correct, the two readings must be practically the same. This testing outfit is also used for magnet coils and the like.


Switchboard.
Dimensions, Approximately,
18" x 36"
Millivolt Meter
2 Sets
5-D-Series Batteries
Shunt
Resistance Tube
D. P., D. T. Battery Switch
Binding Posts
Standard Heater Coil
Coil to be Tested
Binding Posts
Charging
2 D.P., D.T.
Battery Switches
Electric Ry. Journal

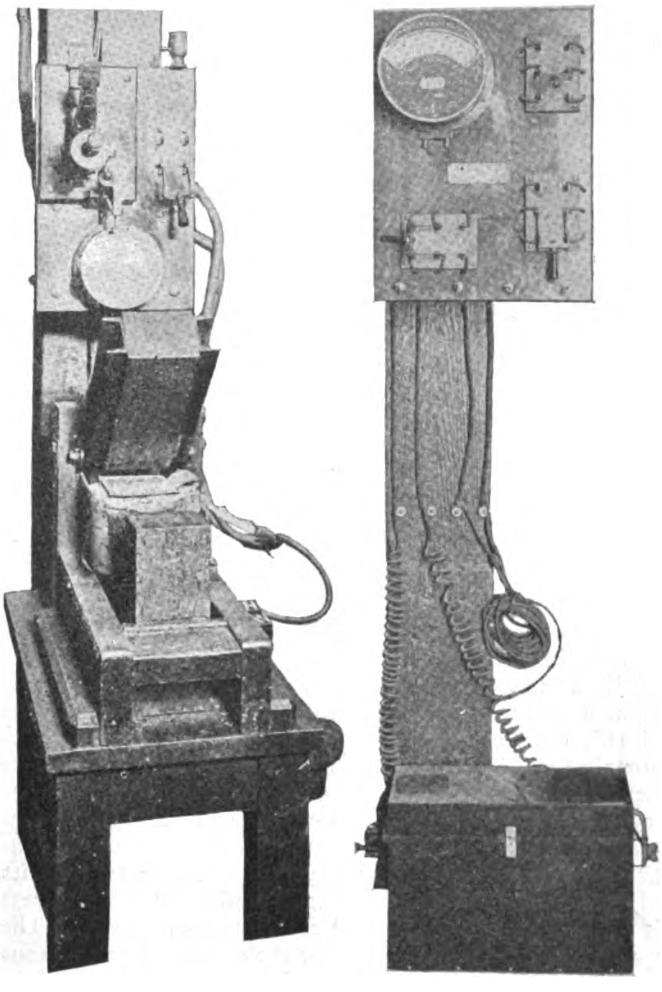
B. R. T. Electrical Shops—Wiring of Board for Testing Heater Coils

The shops which maintain elevated equipment have been equipped with seven-point jumper testing outfits. The test part is fitted with jumper receptacles and with sixteen 5-ohm coils so wired that a current of 50 amp will pass in series through all of the wires of the test jumpers. As the normal service current which passes through these jumpers is not more than 2 amp to 3 amp, a trial with 50 amp results in burning out any weak connections such as are due to the abrasion of wire or similar causes. A fuse is installed to limit the testing current to 50 amp. There is also a lighting circuit of five 115-volt, 16-cp lamps to indicate that the jumper circuit is closed. If the lamps light up but go out immediately, the operator knows that the connection has been burned out. This test board also carries a jumper and receptacle gage, of the design shown in the drawing, to make certain that good train-line connections will be secured without having recourse to a hammer or other violent means. The inspection of jumpers is made once a month upon which occasion a streak of red or green paint is applied to indicate the month when the test was made.


Part A
Part D
Part F
Part B
Circuit Breaker
11½"
Part B
20"
Ammeter
Part A
2' 10"
8"
6"
Part E
Part D
5"
3¼"
T₁
T₂
T₃
Part H
Part C
Part A
3"
Part A
1"
6⅝"
14"
Part D
Part P
Part F
3"
4"
6"
4"
Part H
Part C
9"
Primary Coil
Part E
3"
2"
6"
Part A
4"
3"
9"
3"
6"
21"

B. R. T. Electrical Shops—Field-Testing Outfit

It is intended to install one Herrick testing outfit, as manufactured by J. G. Kjellgren, in each of the general repair shops and in each of the overhauling shops. All cars, immediately upon being brought into the overhauling shops for regular overhauling on the mileage basis, and all cars brought into the general repair shops for the periodical varnishing will be examined by means of these outfits, and any defects thus found will be corrected. Tests again will be made after all work on the cars is completed and just before they are returned to service.

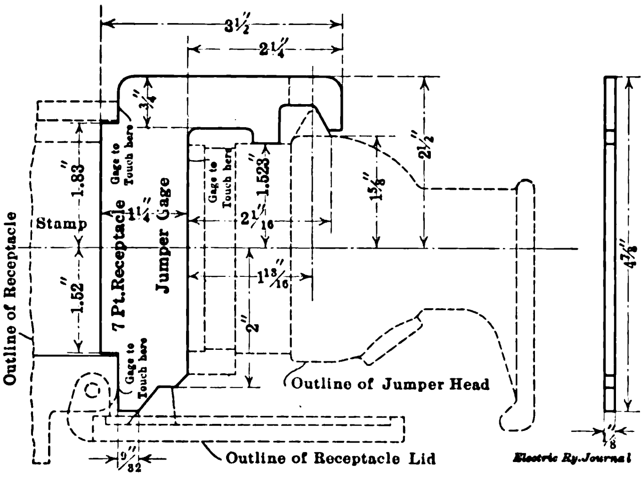


B. R. T. Electrical Shops—Field and Heater Testing Equipments at Fifty-second Street Shops

The work will be the testing of the resistance of all electrical parts as follows: First, of the equipment by steps from each controller; second, resistance of each motor; third, resistance of compressor motor; fourth, resistance of heaters, and fifth, insulation resistance of car wiring.

The first test will locate any crossed leads, wrong connections or improperly made-up resistance; the second and third tests will locate short and open circuits in motors or fields, the fourth test will locate wrong connections, crossed circuits or defective heater equipment, and the fifth test will locate partial grounds or watersoaked wiring. These are the principal tests which will be made, but other tests will, no doubt, be found advantageous.

It is expected that these tests will enable the mechanical department to locate and eliminate at once those incipient defects which are not detected with the ordinary tests made on inspection, and which while not sufficient to cause trouble at first are liable to increase and cause difficulties in service later.



Electric Ry. Journal

Material-Steel

B. R. T. Electrical Shops—Seven-Point Jumper and Receptacle Gage

EQUIPMENT AT FIFTY-SECOND STREET SHOPS

Before considering the multiple-unit control circuit improvements made at the Thirty-ninth Street shops, brief reference may be made to the equipment for handling electrical work at the Fifty-second Street shops. A general view of that portion of the shops where the heavier work is done is presented in the illustration on page 481. This illustration shows the stands on which the armatures are assembled and repaired, an armature sling carried from the 1½-ton crane which spans this bay and one of the two hydrostatic presses. Besides the 1½-ton crane a number of jib cranes and armature trucks are used to eliminate manual labor. In addition to the two slotting machines already described and the hydrostatic presses, these shops contain the usual coil winders, banders, etc. The armature trucks, coil forms, coil-winding machines and banders were manufactured and furnished by the American General Engineering Company. Of the presses, the 150-ton Watson-Stillman press is used for removing the armature shafts of elevated motors and the home-made hydrostatic press is employed for removing and replacing commutators. The usual pressure of application for the commutators is 5 tons to 8 tons. The shop also contains a home-made upright commutator press for convenience in building up new commutators.

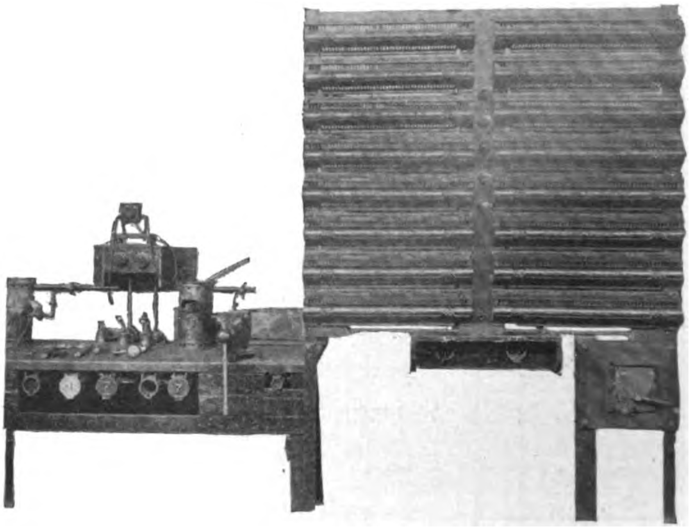
CHANGES IN MULTIPLE-UNIT CONTROL CIRCUITS

Several important changes which add greatly to reliability and safety in service have been made during recent years in both the main and auxiliary circuits of the multiple-unit control systems.

Formerly the batteries were charged through the lighting circuit so that charging occurred only when the lights were on. This method proved particularly unsatisfactory in the short summer season when an average of 250 to 300 weak batteries a month was reported. The batteries are now charged from the compressor circuit, the current passing through sufficient resistance to secure the desired maximum of 2 amp to 3 amp. The resistance can be changed to have the rate of charging vary according to the type of control. The resistance to ground is merely one shunt of the circuit in which the battery forms the other shunt. A relay in this circuit opens the battery circuit whenever the compressor is not operated, thus preventing the batteries from discharging through or, in other words, attempting to operate the compressor.

Another battery change was to place in parallel all batteries on cars equipped with the old drum-type controllers. The batteries on each motor car were formerly connected to a single train line, the opposite terminal of each battery being grounded. In operation, however, it was found that if any set of batteries on one car was weaker than the others there would be a reversal of current because the high-voltage batteries would try to charge the low-voltage battery, thus reducing the available train-line voltage. The evil was corrected by placing all batteries in parallel so that their differences in voltage would always be equalized. This end was accomplished by so changing the connections in the control circuit that an additional train-line wire was obtained to serve as the battery minus wire. The availability of a wire for the battery minus circuit was due to the fact that a wire which had previously been in the reverser circuit was now utilized in the operating circuit by placing an interlock on the reverser. The change in train wiring was directly associated with the general alterations made to permit the interoperation of the older and newer types of automatic control. Formerly the unit switch group type of control could not be operated with the older drum type because the seven wires of the train line did not perform the same functions. Consequently, the circuits in the older type were rearranged so that the corresponding train-line wires of both systems would have the same duties.

The second important change in the drum-type control was the installation of the limit switch in series with the armature and field of No. 2 motor, instead of placing it in a shunt around the field of this motor. One trouble with the shunt connection was that the switch was frequently out of adjustment owing to the difficulty of maintaining the proper ratio of current division, for since the shunt carried a small current it was more easily affected by minor variations in voltage than if placed in the series circuit. The shunt limit switch also gave trouble in case of an open circuit in the armature of No. 2 motor, for in that event there was the possibility that all current would go through the switch and burn it up. Of course, when connected in series, the limit switch is also on open circuit when the rest of the equipment is.

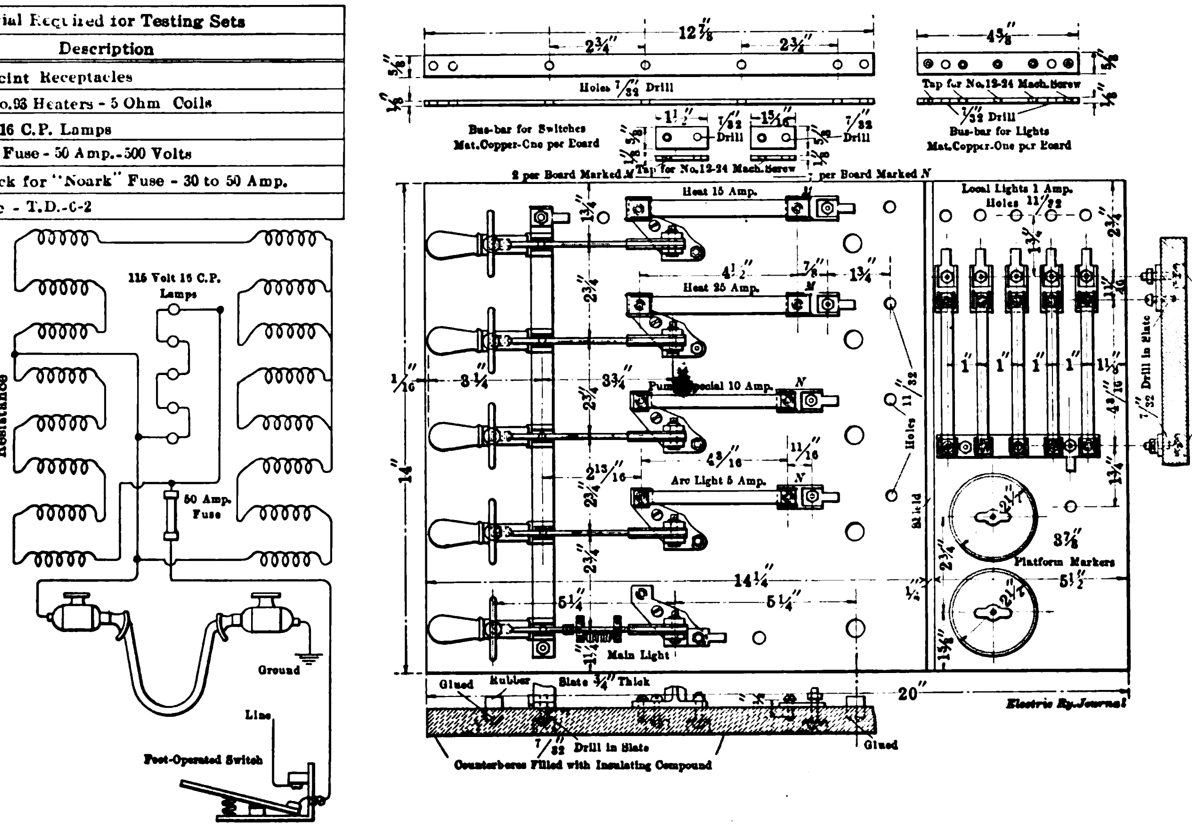


B. R. T. Electrical Shops—Jumper-Testing Outfit

A third change in the drum-type control was the substitution of a line switch in place of a circuit-breaker. Formerly when dropping off the main motor circuit in this control was opened directly at the controller, thus causing the burning of fingers and contacts. Controller explosions were also possible on account of short-circuits. These controllers are mounted above the floor level in a compartment adjacent to the motorman's cab, and it was therefore considered desirable to eliminate defects of this character. Consequently a line switch was installed to open the circuit independent of the controller. This line switch is placed in a box underneath the car, where its operation cannot disturb the passengers. It not only serves to open up a circuit during ordinary operation, thereby taking the arc away from the controllers, but it also replaces the circuit-breaker as a means for opening the circuit on overloads.

The release safety switch cylinders of Westinghouse 131 and 160 control have been drilled to secure air connections which insure uniform acceleration throughout the train even when cars with old and new types of automatic control are operated together. This change was made because the old controller gave considerable trouble from what is termed "hanging up" owing to the sluggishness of the repeating switch in cases where the motorman desired to secure a quick release. The trouble was that the operating pawls would fail to complete their forward stroke for advancing the controller drum before the rack and pinion of the release cylinder was at work pushing in the contrary direction. The consequence was a wedging action at the star wheel. The control equipment is now so interlocked that air cannot enter the port of the release cylinder until the interlocking circuit for the operating cylinder has been opened.

Material Required for Testing Sets	
No. Req'd	Description
2	West. 7 Point Receptacles
16	Consol. No.93 Heaters - 5 Ohm Coils
5	115 Volt - 16 C.P. Lamps
1	"Noark" Fuse - 50 Amp.-500 Volts
1	Fuse Block for "Noark" Fuse - 30 to 50 Amp.
40 ft.	No.C Wire - T.D.-C-2


115 Volt 16 C.P. Lamps
Resistance
50 Amp. Fuse
Ground
Line
Foot-Operated Switch
Holes 7/32 Drill
Bus-bar for Switches Mat. Copper-One per Board
Tap for No.12-24 Mach. Screw
7/32 Drill
Bus-bar for Lights Mat. Copper-One per Board
2 per Board Marked M
per Board Marked N
Heat 15 Amp.
Heat 25 Amp.
Pump Special 10 Amp.
Arc Light 5 Amp.
Main Light
Local Lights 1 Amp.
Holes 11/32
Platform Markers
7/32 Drill in Slate
Filled with Insulating Compound
Glued
Rubber
Slate 3/4" Thick
7/32 Drill in Slate
Counterbores Filled with Insulating Compound
Electric Ry. Journal

B. R. T. Electrical Shops—Wiring Diagram of Board for Train Line Jumper Tests, and Layout of Switchboard for Cabs of Elevated Cars

All elevated car equipments have been fitted with the Ellcon interlocking stop cock, which makes impossible the operation of the controller until the stop cock in the train line is opened. In other words, the motorman cannot operate his train until he is certain that he has air for the operation of the brakes. The stop cock contains a conducting metal strip whereby contact is established with the line switch circuit when the handle of the stop cock is at the open position. When the stop cock handle is at the closed position the circuit to the line switch is open so that no power is available for starting the car. The stop cock furnished with these equipments is of standard design except that it had to be enlarged at the head to allow for the addition of the electrical connections.

One of the accompanying drawings shows the slate panel switchboard in the motorman's cab of the elevated cars. Formerly transite-lined boxes with a board equipped with snap switches were used for this purpose. The new outfits are better constructed, better insulated, use knife switches instead of snap switches to secure greater mechanical efficiency, and, furthermore, the back of the box is arranged so that every wire can be easily inspected when desired.

LIGHTING IMPROVEMENTS

Beside the foregoing improvements, a number of minor changes have been made, including an additional circuit of five lights in the 1000-1100 series of elevated motor cars, making a total of twenty-one 16-cp lamps inside the car and four lamps for other purposes.

In this connection the Brooklyn Rapid Transit System is arranging for the use of twenty-three-watt tungsten wire lamps in its 100 new center-entrance surface cars which are to be placed in service during the coming summer. The use of these tungsten lamps will be gradually extended to all cars of the system.

At a recent meeting of shop superintendents a novel point was brought up in connection with the unequal service of paint on opposite sides of car exteriors. It appears that a certain electric railway observed that the paint on one side of its cars was deteriorating much faster than the paint on other side. This seemed inexplicable until it was suggested that as the cars were operated east and west without looping the difference might be due to the fact that one side of the car was always exposed to the south and the other to the north. Arrangements were thereupon made to overcome this inequality in future by turning the cars occasionally.

Scientific Design of Carhouses and Shops

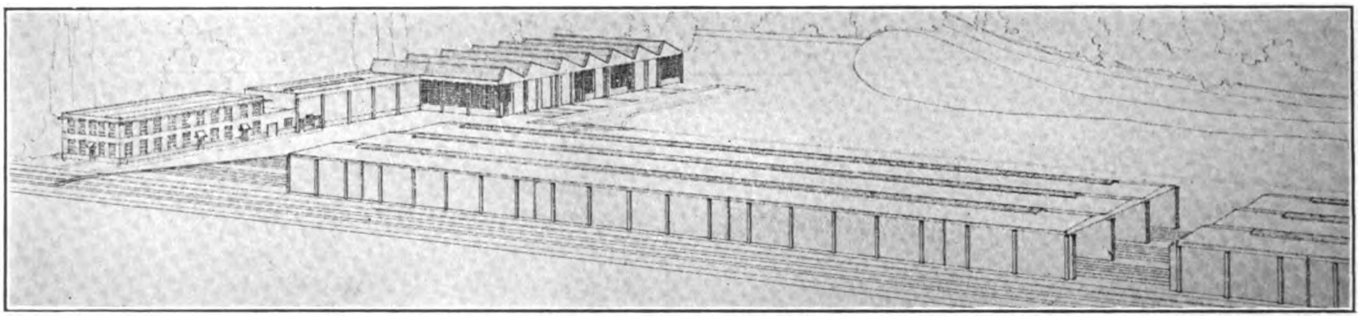
The Authors Analyze the Rquirements, Design and Construction of a Carhouse Installation as Applied by Them to the Planning and Erection of the Norfolk Car Maintenance Plant of the Virginia Railway & Power Company—The Reasons for Selecting Certain Designs and Materials from the Dual Standpoints of Cost and Operating Convenience Are Explained in Detail

BY C. A. NEFF AND T. P. THOMPSON, ARCHITECTS AND ENGINEERS, NORFOLK, VA.

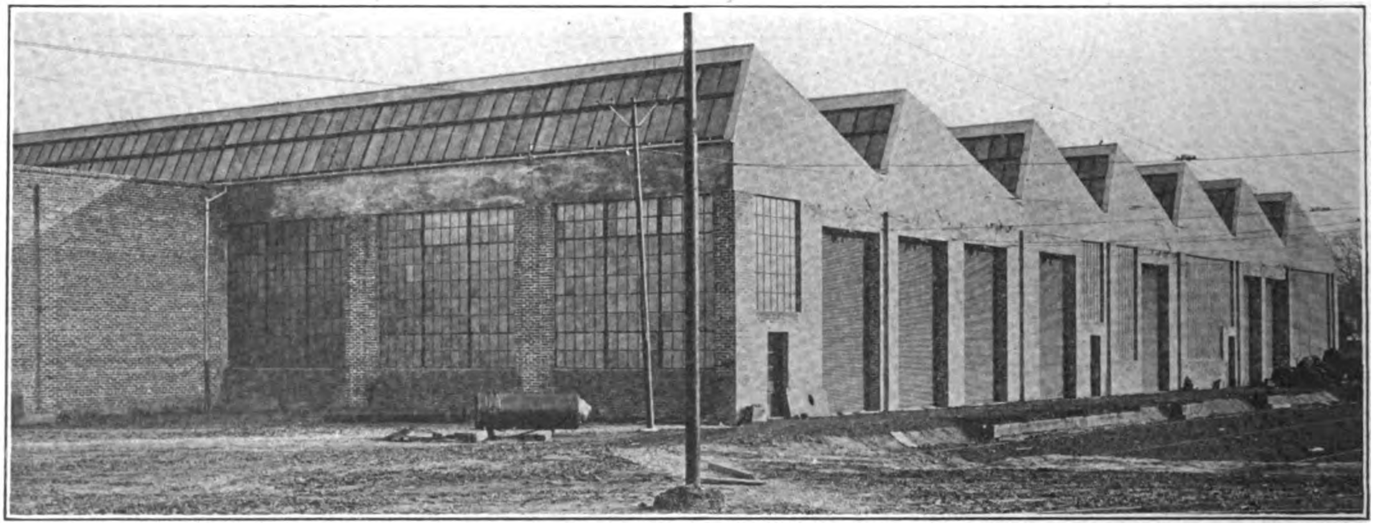
A decade ago the average shop superintendent would have hooted at the idea of applying scientific methods in his shop, but nowadays he is either alert to the changed conditions or he is looking for a new job. To-day the farmer who does not know how to grow more corn to the acre than he used to think possible is a back number and must take summer boarders to help make ends meet. Just so will it be with electric railway and other industrial managers who cannot see the advantages of scientific design as compared with the usual haphazard, poorly studied, often copied and wasteful arrangements which are being used throughout this country in the construction of carhouses, storage structures, shops and other buildings for industrial purposes.

"Scientific design" is nothing more nor less than a design which has been evolved after scientific research and study.

A carhouse consists primarily of walls and their foundation, a roof and its waterproof covering and some skylights. Therefore, to design a carhouse which shall be most economical to construct, it is necessary to find the most economical type of foundation, the most economical kind of wall, the most economical form of roof and the most economical form of skylight. When all of these features have been combined in one plan, a design for the most economical carhouse has been developed. This dictum sounds simple and is simple, and it is exactly the method which should be followed in order to produce a successful solution.


Norfolk Installation—Panoramic View of Shop Buildings and Carhouses. The Offices, Storerooms and Shops Are in Line at the Left and the Two Carhouses of Equal Size Are in the Foreground

Each problem, however, has tied to it a great many special conditions which must be met. If it were not for these, a standard carhouse would soon be designed and this would be universally adopted. However, the most satisfactory form of foundation is different in different localities, prices for the same materials vary in different cities, labor conditions differ, some carhouses have to be large and some small, underwriters' regulations have to be considered, building ordinances have to be observed; so that in a multitude of ways this problem, primarily so simple, is complicated to such an extent that it is necessary to resort to scientific design in order to discover the most economical form of the various parts and to combine these in the most economical whole.


Norfolk Installation—Front and Part Side View of the Shop Building, Illustrating the Liberal Use of Glass at the Sides and Front, the Reinforced Concrete Saw-Tooth Roof, Etc.

QUESTIONS BEFORE THE DESIGNER

When complete data upon all of these limiting conditions have been obtained, a careful study should be made to determine the most economical form of the building and to give a comparison of the costs of the various types of construction in detail. It goes without saying that before a designer can make such an analysis intelligently he must not only be capable of designing the several types of construction in detail but by experience and data available he must also be able to estimate correctly the market costs of the various materials and labor and thereby determine accurately the actual cost of the different parts of the buildings. To the careful designer a large number of questions such as the following immediately arise for investigation:

Will a short wide building cost more than a long narrow building?

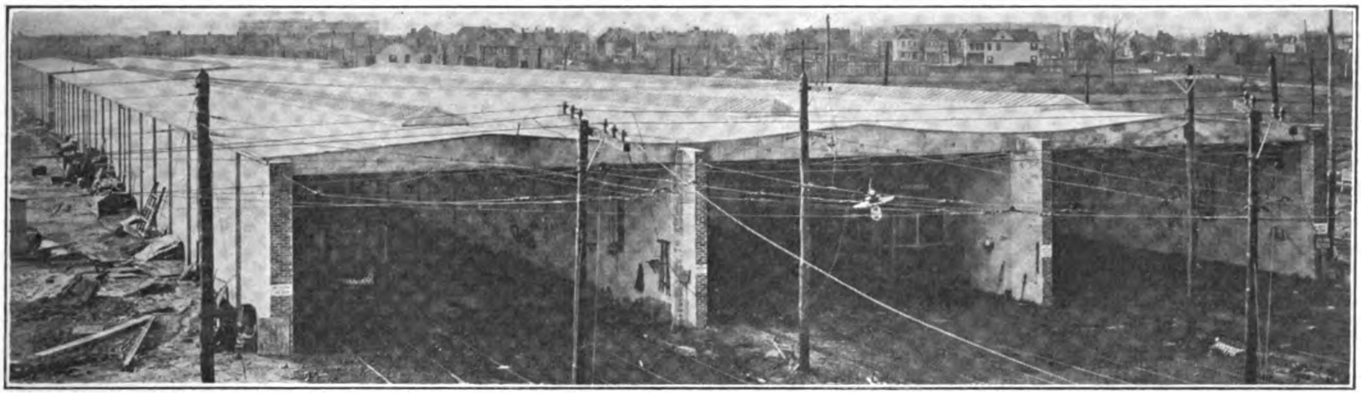
Will a two-track unit or a three-track unit or a four-track unit be most economical?

Will a brick foundation, one of concrete or one of stone be best suited to the needs of the building?

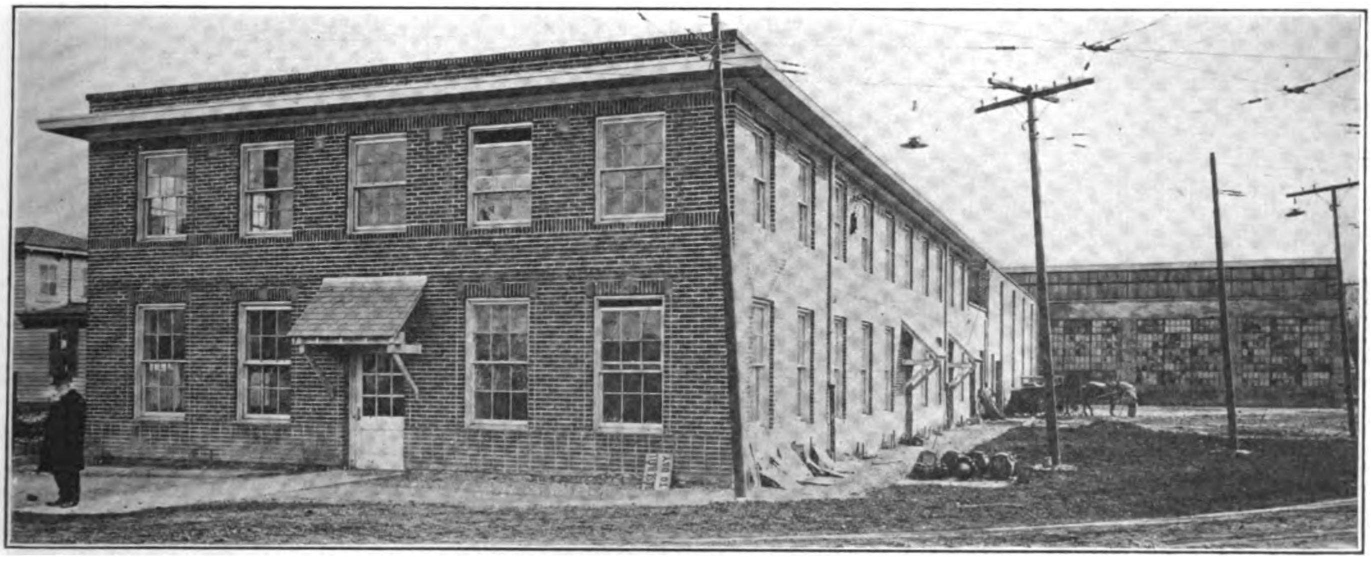
Should the walls be constructed of brick, terra-cotta blocks, concrete blocks or concrete?

Should the roof construction be of structural steel protected or unprotected, of reinforced concrete, of a combination of reinforced concrete and structural steel, or of some of the many patented types of construction on the market?

Should the waterproof covering be "built up" or of the "prepared" type, and should pitch or asphalt, slag or gravel be used?



Norfolk Installation—General View of One of the Three-Bay Carhouses, Showing the Unusual but Most Economical Form of Roof and Most Favorable Skylight Arrangement



Norfolk Installation—Brick Office Building and Storage Structure, Showing Also One of the Glazed Sides of the Shop Building at the Rear

These questions cannot be considered singly, for in many ways they are interdependent. A type of foundation for one wall will not always be best for another wall, the most economical form of roof may not lend itself to the most economical type of roof support, and so on through the entire design. Each type of foundation, each kind of wall, every form of roof must be analyzed and designed and costs tabulated so that the designer can select with a free mind from these tabulations the most economical combination which is applicable to the problem in hand. It will usually be found that after a careful study is made and the results properly tabulated the matter of selection is very simple; in fact, the correct combination is generally obvious.

For the purpose of illustrating the methods herein discussed, views of the carhouses designed by the authors and erected for the Virginia Railway & Power Company at Norfolk, Va., are reproduced, and details of the methods used in designing these buildings are explained.

ACTUAL CONDITIONS OF THE NORFOLK LAYOUT

It is impossible in an article of this kind to treat fully all of the factors considered in evolving the design. An attempt has been made, however, to outline in general the methods employed.

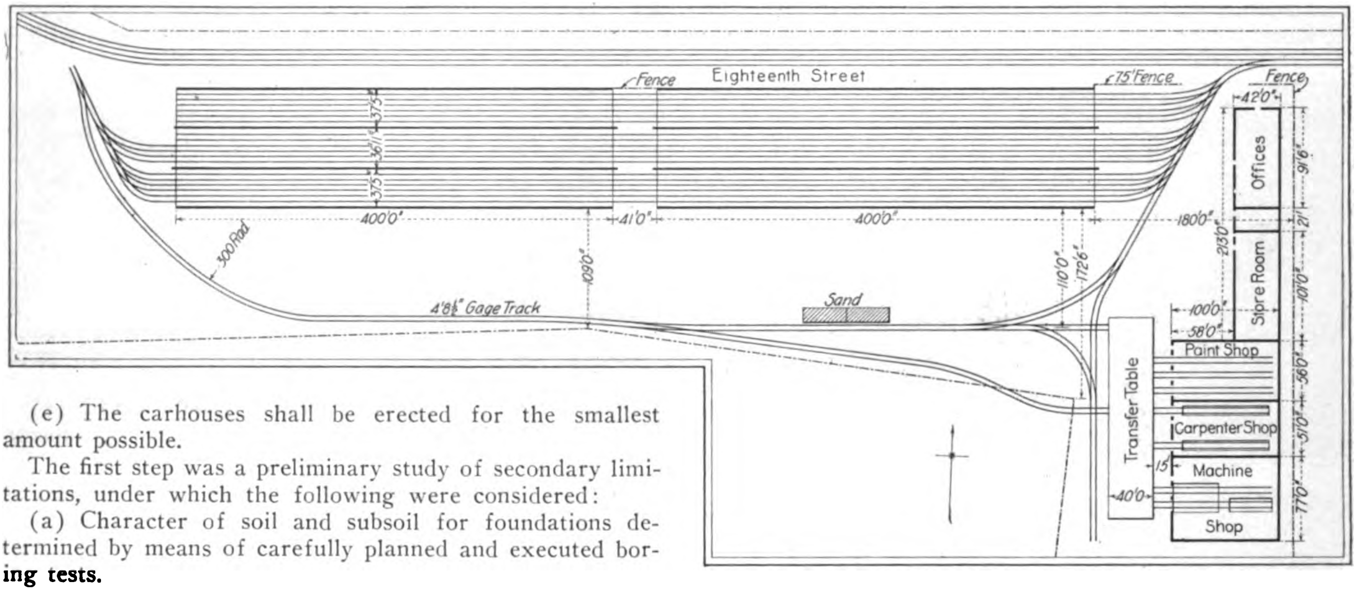
In the present case the designer had to meet the following primary conditions:

(a) The carhouses shall contain 7200 ft. of track.

(b) The carhouses shall carry the minimum rate of insurance.

(c) The carhouses shall be erected upon a lot already owned by the the railway company and set aside for this purpose.

(d) There shall be a free headroom for trolleys of 16 ft. above tracks.


Eighteenth Street
Fence
75' Fence
Fence
400'0"
41'0"
400'0"
37.5
36.1
37.5
300' Rad.
4'8½" Gage Track
109'0"
Sand
110'0"
112'6"
180'0"
213'0"
42'0"
91'6"
21'
101'0"
56'0"
57'0"
77'0"
100'0"
58'0"
15'
40'0"
Offices
Store Room
Paint Shop
Carpenter Shop
Machine
Shop
Transfer Table

Norfolk Installation—General Plan of the Shop, Office, Storeroom and Carhouse Properties

(e) The carhouses shall be erected for the smallest amount possible.

The first step was a preliminary study of secondary limitations, under which the following were considered:

(a) Character of soil and subsoil for foundations determined by means of carefully planned and executed boring tests.

(b) Municipal regulations and building ordinances applicable to the contemplated operation.

(c) Rules and requirements of fire underwriters having jurisdiction.

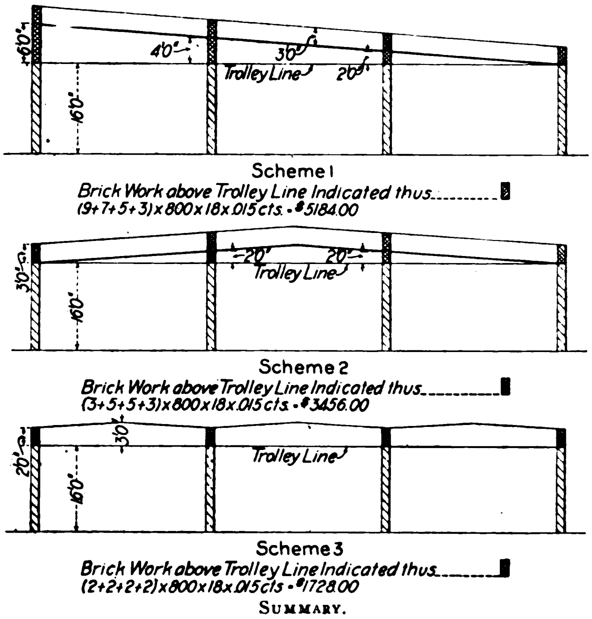
(d) Accurate costs of various building materials and kinds of labor.

(e) Cost of special work and tracks to equip carhouses.

(f) Practicability from operating standpoint.

FORM OF BUILDING

A study of existing and necessary trackage, size and shape of lot and insurance regulations showed at once that several units or stalls would be required and that two detached buildings each containing three units would probably be most practical and afford better opportunity for extension.


6'0"
4'0"
3'0"
Trolley Line
2'0"
16'0"
Scheme 1
Brick Work above Trolley Line Indicated thus
(9+7+5+3)x800x18x.015cts.=$5184.00
3'0"
2'0"
2'0"
Trolley Line
16'0"
Scheme 2
Brick Work above Trolley Line Indicated thus
(3+5+5+3)x800x18x.015cts.=$3456.00
2'0"
3'0"
Trolley Line
16'0"
Scheme 3
Brick Work above Trolley Line Indicated thus
(2+2+2+2)x800x18x.015cts.=$1728.00

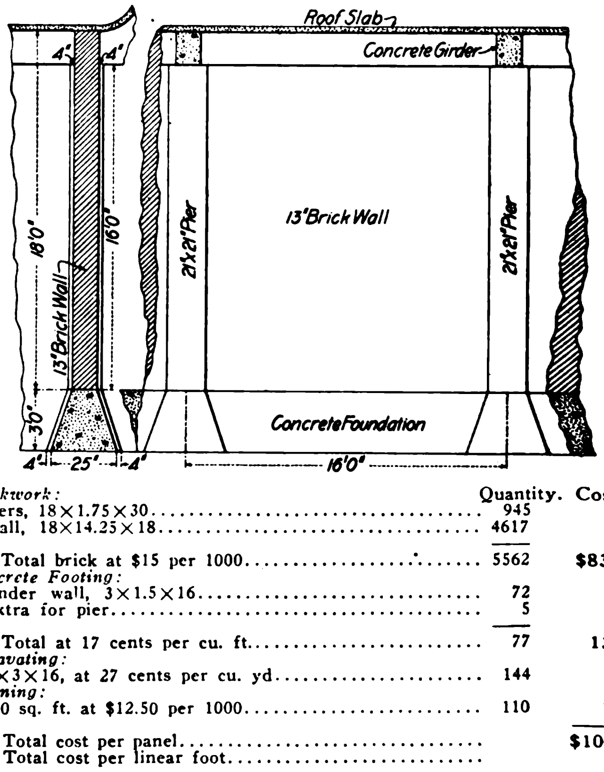
SUMMARY.

Scheme No. 3 saves over scheme No. 1	$3,456.00
Scheme No. 3 saves over scheme No. 2	1,728.00
Scheme No. 3 saves over form of roof on certain carhouses built by others	5,580.00

Norfolk Installation—Fig. 1—The Three Roofing Schemes Compared on the Basis of Cost

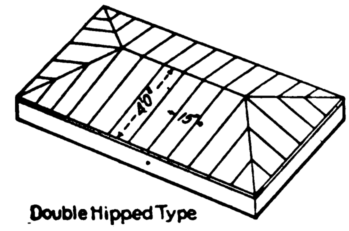
The number of stalls was fixed by two factors, the shape of the lot and the underwriters' requirement that no section should contain more than 20,000 sq. ft.

Fig. 1 is a reproduction of the study sheet prepared to show the results of an investigation of three different plans of roofing three units in one building. It will be noted that scheme No. 1 shows the roof over the three units high on one side and low on the other and sloping all one way. Scheme No. 2 shows the roof high in the center of the center unit and sloping two ways, while scheme No. 3 shows the roof high over the center of each unit and sloping two ways over each unit. In each scheme the slope per foot of the roof is the same. As the necessary distance between track and trolley was fixed at 16 ft., it was considered that all wall used above the horizontal


Roof Slab
Concrete Girder
4'
4'
18'0"
16'0"
13" Brick Wall
21"x21" Pier
13" Brick Wall
21"x21" Pier
3'0"
Concrete Foundation
4"
2.5'
4"
16'0"

	Quantity.	Cost.
Brickwork:		
Piers, 18×1.75×30	945	
Wall, 18×14.25×18	4617	
Total brick at $15 per 1000	5562	$83.43
Concrete Footing:		
Under wall, 3×1.5×16	72	
Extra for pier	5	
Total at 17 cents per cu. ft	77	13.09
Excavating:		
3×3×16, at 27 cents per cu. yd	144	1.44
Forming:		
110 sq. ft. at $12.50 per 1000	110	1.37
Total cost per panel		$100.33
Total cost per linear foot		6.27

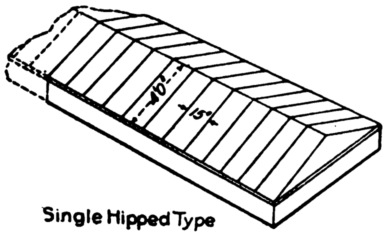
Norfolk Installation—Fig. 2—Typical Analysis of Wall and Foundation for Carhouse Construction line 16 ft. above the tracks should be charged against each scheme in considering the relative cost. For purposes of comparison, the walls were considered as 13-in. brick walls, the figures being based on brick laid in the walls at $15 per 1000 and each wall being 400 ft. long. The indicated calculations show a saving for scheme No. 3 of $3,456 compared with scheme No. 1; a saving for scheme No. 3 of $1,548 compared with scheme No. 2, and a saving for scheme No. 3 of $5,580 compared with a certain building previously erected by others. It will be noted that in scheme No. 3 there are only 2 ft. of brickwork above the trolley line at the outside wall, whereas in schemes Nos. 1 and 2 there are 3 ft. of brickwork. This seeming discrepancy results from the fact that in scheme No. 3 a girder 3 ft. deep in the center and only 2 ft. deep at the wall line was possible, whereas girders 3 ft. deep throughout were required in the other two schemes for the same strength.



FOR UNITS 15 FT. × 7 FT. 6 IN.

Glass, 36×4×1.25×11 cents	$19.80
Bars, 32×4×10 cents	12.80
Ridge, [7.5+(5.5×4)]×10 cents	2.95
Cap bars, [7.5+(5.5×4)]×10 cents	2.95
Curb, (15+15+7.5+7.5)×13 cents	5.85
	$44.35

$\frac{\$44.35}{15\times 8}$ = 37 cents per sq. ft.



FOR UNITS 15 FT. × 7 FT. 6 IN.

Glass, 24×4×1.25×11 cents	$13.20
Bars, 26×4×10 cents	10.40
Ridge, 15×10 cents	1.50
Cap, 15×10 cents	1.50
Curb, (15+15+7.5+7.5)×13c.	5.85
Ends, 7.5×2×1.5×10 cents	2.50
	$34.95

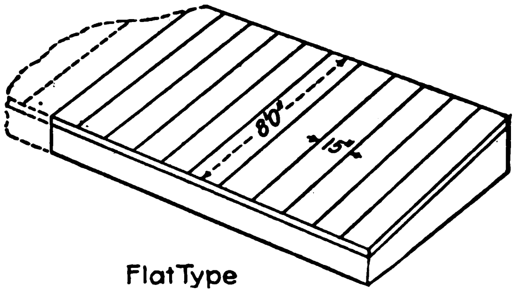
$\frac{\$34.95}{15\times 8}$ = 29.1 cents per sq. ft.

For continuous units 7 ft. 6 in. wide deduct:

Bars, 2×4×10 cents	$0.80
Curb, (7.5+7.5)×13 cents	1.95
Ends, as above	2.50
	$5.25

$34.95—$5.25=$29.70

$\frac{\$29.70}{15\times 8}$ = 24.75 cents per sq. ft.



FOR UNITS 15 FT. × 7 FT. 6 IN.

Glass, 12×8×1.25×11 cents	$13.20
Bars, 13×8×10 cents	10.40
Curb, (15+15+7.5+7.5)×13 cents	5.85
Ends, (7.5+7.5)1.5×10 cents	2.50
	$31.95

For units 7 ft. 6 in. wide continuous deduct from above

Bars, 1×8×10 cents	$0.80
Curb, (7.5+7.5)×13 cents	1.95
Ends, as above	2.50
	$5.25

$31.95—$5.25=$26.70

$\frac{\$26.70}{15\times 8}$ = 22.25 cents per sq. ft.

ALLOWANCE FOR EXTRA CONCRETE CURB.

Concrete curb, one side, 15×0.5×30 cents	2.25
Metal covering of same, 15×1.5×10 cents	2.25
	$4.50

With curb allowance, units 15 ft. × 7 ft. 6 in. = $\frac{\$31.95+\$4.50}{15\times 8}$ = 30.4 cents per sq. ft.

Continuous 7 ft. 6 in. wide with curb allowance = $\frac{\$26.70+\$4.50}{15\times 8}$ = 26 cents per sq. ft.

Norfolk Installation—Fig. 3—Comparison of Skylight Costs for the Carhouse

TYPE OF WALL AND FOUNDATION

In a similar manner the various types of walls and foundations were analyzed. Fig. 2 shows the results of an analysis of one type of wall and foundation which was considered. Several other types were analyzed in this manner. The cost of excavation, of forming, of mixing concrete, of handling concrete, of brick and laying of same, of concrete blocks, of terra-cotta blocks and of each operation and all materials required for each type was tabulated as indicated and the final selection made after considering all of these data. In the buildings actually erected it was not practicable to use the cheapest form of wall developed on account of difficulty in erecting that form in the time which the railway had allotted for the completion of these structures.

TYPE OF ROOF

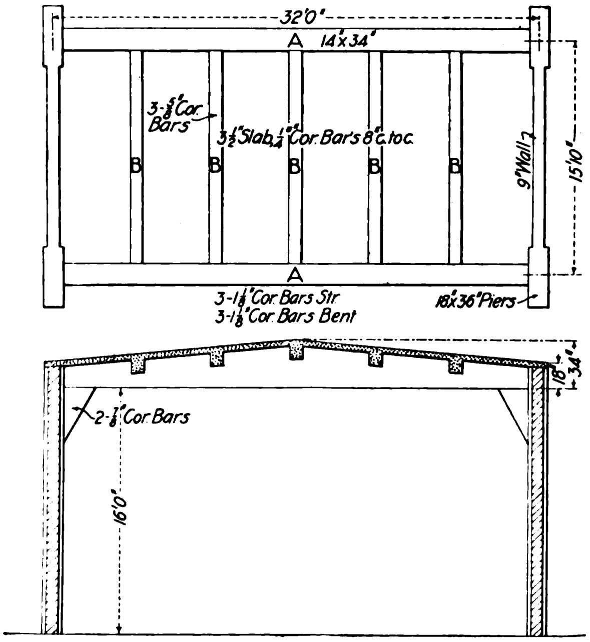
The type of roof afforded a broader opportunity for study and analysis than any other feature of the design because here there were so many more types of construction which could be used and which would meet all of the primary conditions.

A study was made to determine whether a two-track, three-track or four-track unit would be most economical and whether units constructed with or without columns would be best. Actual roof construction which had been used for carhouses already built by others was carefully measured and analyzed.

Some forty-odd different study sheets as shown in Fig. 4 were prepared. These sheets covered the various systems of steel supports with concrete slabs, combination tile and concrete construction, ferro-inclave and ferrolithic plates, magnesia fireproofing and numerous reinforced concrete systems both "monolithic" and "unit built." When the proper form had been determined by this process, a detailed study was made to consider the possibility of further reduction in cost by adapting the design to stock sizes and lengths of forming lumber, by including skylight curbs and by utilizing in every way possible every pound of material entering into the construction to produce greater strength at less cost. The girders in the finished building were designed to conform to the form of roof which had been found to be most economical, and at the same time the costs of these were reduced, for the lowest cost corresponded with the theoretical form of a beam of uniform strength which gives the maximum strength for a minimum of materials.

A large amount was saved by standardizing the design so that in the actual construction each slab and each beam was exactly like every other slab and beam in the building. This standardization resulted in economy in forming, in erection, in placing steel, and in other ways. At the same time it reduced to a minimum the possibility of error in the actual construction work.

When the details were being designed for the reinforced concrete members, care was taken to assure a "balanced design," namely, to have the same factors of safety for all parts and at the same time the correct economic combination of concrete and steel. It is true, in general, that any required strength can be obtained in a number of different ways. If the designer's problem is to obtain the desired strength with the minimum amount of steel, the construction will require more concrete than is economical, or if the minimum amount of concrete is sought, it is probable that the amount of steel will be excessive; but when a designer's problem is to produce the most economical design from a total cost standpoint he proceeds to find the correct relation between the quantities of steel and concrete to be used and is repaid for his tedious study by a considerable reduction in the cost of the building. This desirable result is seldom obtained commercially unless the designer of the building is the actual designer of the reinforced concrete work which enters into it. It is true that the quite common practice of architects and railroad engineers to rely upon those who sell steel for the actual design of the reinforced concrete has led to wasteful and unnecessarily expensive designs. Often even a greater damage is done by accepting designs of this kind and becoming thereby obligated to use the particular type of reinforcement sold by the party who furnished the design, instead of buying under competitive conditions. It is the same old story that something cannot be obtained for nothing. When the owner pays for reinforced concrete design, he will get more for his money from a competent engineer who represents him than he can by buying his steel from the representative of a steel concern who furnishes designs "free." One man studies the problem as a whole while the other is merely selling steel.



	Quantity.	Cost.
Concrete:		
Girder A, 26×14×32.15÷144	82	
Girder B, 5×8×14×14.66÷144	57	
Knees, 3×4×14÷12	14	
Slabs, 14.66×28.9×3.5÷12—4.75×4.66×3.5÷12	104	
Total concrete at 20 cents	257	$51.40
Steel:		
Girder A, 6—1⅛ c.r.×34	895.	
Girder B, 5×3—⅝ c.r.×17	344.	
Knees, 2×2—⅞ c.r.×9	95.5	
Slabs, 1×16×34× area ¼ sq. c.b.	190.	
Total steel	1524.5	45.74
Forming:		
2560 bu. at 25 cents per 1000 = 65 + 5 for knees		70.00
Total cost		$167.00
Total cost per sq. ft.		0.33

Norfolk Installation—Fig. 4.—One of the Typical Study Sheets of Construction Materials (Not Adopted)

SKYLIGHTS

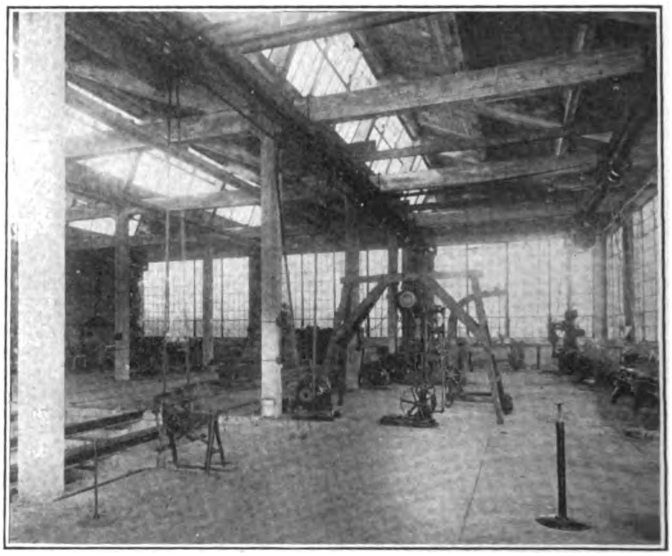
The underwriters require a certain glass and certain details of construction, but they are not concerned with the form of the skylight. The size and location of the skylights must be determined after a study of the location and needs of the building. When it has been decided what percentage of light is desirable the designer should consider the various forms of skylights. Fig. 3 shows the study sheet prepared for this purpose.

It will be noted that the "flat type" embodying continuous construction is the cheapest for the skylight alone, as would have been expected, but actually the most economical type cannot be selected until careful calculations have been made to determine the relative cost of curbs and flashings for the various types. A consideration of these factors in the present case showed the "single-hipped type" of continuous construction to be the cheapest under the prevailing conditions. There are often limiting conditions which make the selection far more difficult than in the present case. In some latitudes snow and ice have to be carefully considered in this connection. Special lighting is often required over inspection pits and various problems of ventilation are encountered, but in each case the same general method of investigation as outlined should be employed.

RATE OF INSURANCE

Part of a designer's duty is to predetermine all of the requirements of the underwriters in connection with the building and to establish the exact rate which will be given upon the completed structure. This is very important, but it is not a difficult task when taken up in an intelligent manner. The abuse which is usually hurled at the insurance companies by designers and operators is frequently born of ignorance and results from the application of penalties for defective design, construction or equipment.

The engineering departments of the underwriters have formulated certain requirements and restrictions which by experience they have found to be helpful in their effort to prevent loss by fire. A designer can obtain these rules and requirements and will find a sincere desire on the part of the underwriters to co-operate with him in his efforts to justify a minimum rate of insurance. Of course, a certain familiarity with their regulations is necessary before a designer can successfully apply their rules to any separate problem, but to submit detail plans and specifications to the underwriters for criticism even before proceeding to take bids will often be found to be of value and will eliminate the possibility of error and disappointment later on.



Norfolk Installation—Roof, End and Side Lighting in the Machine Room

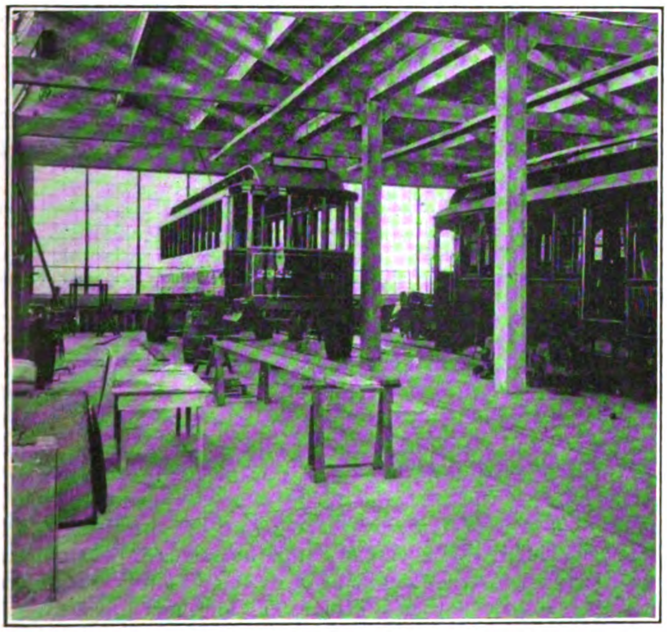
The rate of insurance on a carhouse is of far greater importance than the rate on most buildings because the value of the rolling stock is many times the value of the building and its rate is based on the rate upon the building.

The carhouses herein illustrated have been given the lowest rate possible in their district. This rate is 20 cents per $100. To this rate 5 cents per $100 was added on account of defective wiring in cars. The average rate on old buildings in the same district is $1.29 per $100. Therefore, the rate granted will mean a saving to the company in premiums on building and cars of about $3,562 a year, or 5 per cent interest upon $71,240. If all buildings in use by the company containing tracks were reconstructed in the same manner as those herein illustrated the saving in premiums would represent 5 per cent upon a total sum of more than $90,000.

DETAILED STATEMENT OF COST

The following tables cover the detailed costs of the carhouses as actually erected:

1000 cu. yd. earth excavation, at $0.30		$300.00
Labor, eight-hour day	$1.50	
Carts, ten-hour day	3.00	
Double team, ten-hour day	5.00	
1,460,000 bricks, at $14 per 1000		20,440.00
Bricks delivered to site, per 1000	$8.50	
Sand delivered to site, per cu. yd	.65	
Lime delivered at site, per bbl	.90	
Lime (slaked), per bbl	.20	
Cement (sacks returned), per bbl	1.02	
Bricklayer, eight-hour day	5.20	
Laborers, eight-hour day	2.50	
1527 cu. yd. concrete, at $11.16 per cu. yd		17,041.32
Gravel delivered to site, per cu. yd	$1.85	
Cement (sacks returned), per bbl	1.02	
Sand delivered to site, per cu. yd	.65	
Forming lumber, per 1000	18.00	
Carpenters, eight-hour day	3.25	
Common labor, eight-hour day	1.50	
110 tons reinforcing steel, at $42.78 per ton		4,705.80
Placing steel at $3 per ton		30.00
715 squares tar and gravel roofing, at $3.15		2,252.25
Labor, eight-hour day	$2.00	
Pitch, f.o.b. Norfolk, per ton	15.00	
Felt, f.o.b. Norfolk, per ton	29.00	
Gravel, f.o.b. Norfolk, per ton	2.25	
Hauling to site, per ton	.60	
17,300 sq. ft. wire-glass skylights, at $0.24		4,152.00
¼-in. wire glass cut to size, f.o.b. factory, per sq. ft.	$0.09	
Freight on glass, per sq. ft	0.01	
Hauling and handling glass, per ton	3.00	
No. 24 galvanized iron, per 100 lb., f.o.b. city	3.80	
Sheet-metal workers, average eight-hour day	3.50	
Terra-cotta drain pipe		412.00
Gutters and down-spouts		206.00
Permit, bond and incidentals		375.00
Contractors' profit		5,021.44
Total cost		$55,235.81



Norfolk Installation—Painting Section of Reinforced Concrete Shop

It may appear that the cost of leaders and drainage piping should be analyzed for each form of roof, but when it is considered that it is customary to apportion leaders on a basis of area of roof surface and that the cost of drainage piping, at best, is small, the factors are negligible.

For purposes of comparison, this cost may be expressed in the following terms:

	Cents
Cost of carhouses per square foot of floor space	61.66
Cost of carhouses per cubic foot of contents	3.09
Cost of carhouses per foot of track	$7.67
Cost of carhouses per car (50 ft. of track)	$383.50

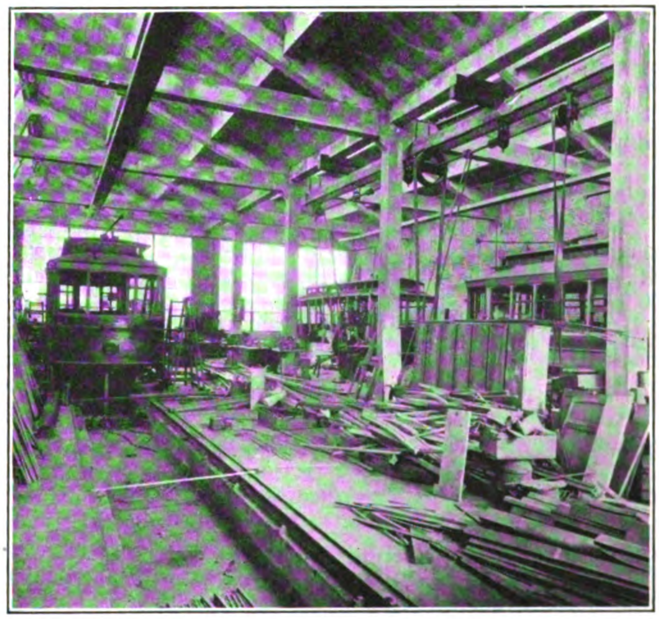
RÉSUMÉ

The same methods of design were employed in connection with the shops, storehouse and offices as illustrated. The carhouses, however, being the simplest of the buildings erected, have been used to explain the methods.

The general character of the shop and office buildings is apparent from the accompanying half-tone views. The shops are constructed of reinforced concrete and brick with steel sash and saw-tooth roof. Attention is called to the successful use of large glazed surfaces in the side-wall construction, a principle so extensively applied to modern factories. The saw-tooth trusses are composed of reinforced concrete instead of the customary structural steel, thereby eliminating the usual penalty assessed by the underwriters. In the use of the saw-tooth roof the question of exposure is often neglected. It is erroneous to expose a large glazed surface in a position which will cause it to receive the direct rays of the sun during an extended period of the day. It is obvious that such lack of forethought will tend to make the building unendurable to the workmen in summer on account of the excessive heat. The office building is also built of fireproof materials. While the saving in insurance might not justify this construction, the additional saving in upkeep unquestionably does. The cost of fireproof construction, as a matter of fact, is not so excessive as is generally supposed.

The authors believe that the results justify the painstaking and tedious processes which they have employed. Success does not depend alone upon the design. The methods used in obtaining bids and in preparing contracts and in superintending the actual work of construction are all important factors.

The fallacy which is probaby responsible for the greatest waste in constructing buildings of this kind is the common one which prompts a manager to say "Let's do it ourselves." This idea is based upon the assumption that the master mechanic or chief engineer knows better than anyone else what is needed and how it should be built. No matter how able these officers of the company may be, they cannot be specialists in designing buildings, and if they were they would not be suited for their other duties. Even if they know how, they seldom have the time to make an exhaustive study of the problem and they rarely have the experience and data before them to make an efficient study assuming that they do have the time. Excessive cost is the natural result of this condition. Sometimes the same unfortunate result is obtained by attempting to copy some satisfactory building, and ignoring entirely the local conditions which were involved in its success from a cost standpoint.



Norfolk Installation — Interior View of the Carpenter Shop, Showing End Lighting

In other cases architects are actually required to put useless ornamentation on the building or the "designing" services of the steel salesman are secured "free of cost."

If the problem is to be studied thoroughly and the building erected for a minimum of cost, it is certain that considerable time must be devoted to it by someone who knows how, and that someone is going to be paid for his services somehow. It is pretty generally recognized nowadays that it is better and cheaper to buy services, as well as commodities, directly rather than indirectly, and that in the long run the service of the specialist is cheapest.

BLOCK SIGNALS ORDERED BY INDIANA LINES

In accordance with the order of the Railroad Commission of Indiana, outlined in the ELECTRIC RAILWAY JOURNAL for Oct. 26, 1912, page 920, the Terre Haute, Indianapolis & Eastern Traction Company and the Union Traction Company of Indiana have placed an order with the General Railway Signal Company for light signals to protect the following sections of track:

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

		Miles
Indianapolis-Lafayette Division	County Line to Whitestown	8.39
	Marts to East Mulberry	3.13
Indianapolis-Martinsville Division	Carhouse to Martinsville	13.81
Indianapolis-Richmond Division	Dunreith to Blue River	3.02
Indianapolis-Terre Haute Division	Tucker to Greencastle	1.94
	Boys' School to Dilley	3.47
Total		33.76

UNION TRACTION COMPANY OF INDIANA

		Miles
Noblesville to Tipton		16.40
Gas City to Marion		5.84
Indianapolis-Anderson Division	Siding 22 to Siding 26	8.38
	Siding 13 to Belt Railway, Anderson	5.56
Total		36.18

Protection for both railways will be afforded by light signals with a. c. track circuits and polyphase relays, similar to those which have been installed on sections of these two railways heretofore as described in the ELECTRIC RAILWAY JOURNAL for Aug. 24, 1912, page 286.

The Kokomo, Marion & Western Traction Company has also ordered signals of this type from the General Railway Signal Company to protect the track for 5 miles west of Kokomo. This installation was not included in the original order of the commission, but at a later date the company was required to protect a 5-mile section of its track with block signals. The Fort Wayne & North Indiana Traction Company has also ordered signals from the General Railway Signal Company for 24.6 miles on its Fort Wayne-Logansport division.

It is also reported that the other railways which are included in the order of the commission will close contracts for signals of the track circuit type in the near future, part of the orders to be placed with the Union Switch & Signal Company and part with the General Railway Signal Company.

Construction has begun on a 15,000-hp water-power plant at Martigny, in the canton of Wallis, Switzerland, to utilize a fall of 5400 ft., making this station the highest-head water-power plant in the world. Special interest attaches to the penstock lines, which are 3 miles in length. The upper section, which will be under comparatively light hydraulic pressure, is being built of welded steel pipe, 23.6 in. in diamete. The lower section, which will withstand a hydrostatic pressure of nearly 2500 lb. per sq. in. or 165 atmospheres, is to employ special ingot-pressed seamless steel pipe. The tube sections vary in wall thickness from 1.24 in. at the top to 1.77 in. at the region of highest pressure. The turbines, which will be of the Pelton type, will be furnished by Piccard, Pictet & Company, of Geneva. Only 30 cu. ft. of water per second will be necessary to develop the output.

CONVENTION LOCATION COMMITTEE VISITS WASHINGTON

The committees on location of the 1913 convention of the American Electric Railway Association and allied bodies visited Washington on Wednesday evening and Thursday, March 12 and 13. The party, which left New York on the Congressional Limited, was composed of C. Loomis Allen, C. L. Henry and Secretary H. C. Donecker, as representatives of the American Electric Railway Association, and E. H. Baker, James H. McGraw and H. G. McConnaughy, as representatives of the American Electric Railway Manufacturers' Association. The object of the trip was to study in person the facilities which the capital offers in accommodations for convention guests and exhibits. This problem has become one of ever-increasing difficulty owing to the greatly increased attendance and more elaborate displays at the annual meetings. At the 1912 gathering in Chicago, for example, accommodations had to be found for some 4500 visitors, and about 85,000 sq. ft. of exhibit space, exclusive of aisles, etc., was in use.

On arrival at Washington the party was met by President Callahan and Secretary Grant of the Washington Chamber of Commerce. It was met also by Clarence P. King, president Washington Railway & Electric Company; George E. Hamilton, president Capital Traction Company, and other electric railway officials, who expressed their desire that the 1913 convention shall meet in Washington. To accommodate the convention the Chamber of Commerce proposes to erect a temporary structure on the site of the old Pennsylvania Railroad station. It will make a definite proposition to the convention location committee within a few days. The committees were entertained at luncheon on Thursday at the New Willard by Mr. Hamilton. Those present in addition to Mr. Hamilton and the committees were D. S. Carll, general manager, H. D. Crampton, secretary, R. D. Simms, treasurer, and J. H. Hanna, chief engineer, Capital Traction Company.

The committee will also give consideration to invitations received from cities in several sections of the country.

BALANCING THE ROTORS OF TURBO-ALTERNATORS

In American factories practically all turbo-alternators are balanced by a cut-and-try process. The turbine is first assembled on the test floor and connected to the steam and exhaust mains and to the oil and water systems of the plant. As the machine is driven under its own power, the test men determine which end of the machine is the roughest by placing the forehead against the casing at different places. A weight is then inserted into one of the tapped holes provided in the runner, and the machine is speeded up, the result of the "shot" being noted. If the vibrations are less violent but still noticeable, another and heavier weight may be inserted in the same hole. If the first attempt produces more violent vibrations, the weight is removed and placed in some other part of the runner. Each tester generally has his own "follow-up scheme" of placing the successive weights. This process is continued until both ends of the turbine are free from vibration at rated speed. When the generator is attached to the shaft this process is repeated and weights are placed upon the ends of the rotor at various points on the circumference until all bearings and the casings of both the turbine and the generator are free from vibrations as far as can be detected by placing the forehead against them. Many of the foreign factories balance the rotors of their generators dynamically before they are assembled in the machine. Special apparatus fitted with delicate balancing mechanism is required in this work. As a precautionary measure these machines are generally subjected to a high-speed test before they are allowed to leave the factory.

Fond du Lac Avenue Carhouse of The Milwaukee Electric Railway & Light Company

Detailed Account of a Modern Carhouse Embodying a Number of New Design Features—A New Trainmen's Club House Connected with the Carhouse Is Described

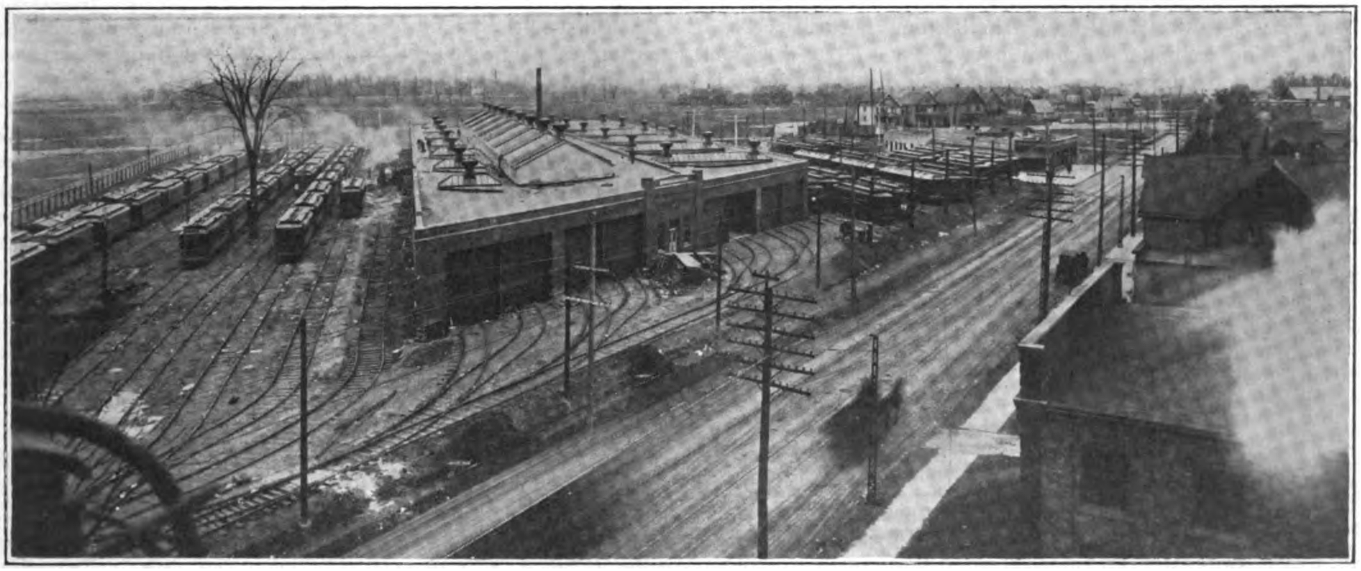
The new Fond du Lac Avenue carhouse, recently completed by The Milwaukee Electric Railway & Light Company, is situated in the extreme northwest portion of the city and serves thirteen street railway lines which are readily accessible to it. Milwaukee is laid out like Chicago, with the business district on the lake front and the residence and industrial sections adjacent to it on three sides. Avenues cutting the north and south and east and west streets diagonally extend out from the business district in a northwesterly and southwesterly direction. This arrangement of streets and avenues permits the cars of various lines in the northwest portion of the city to reach the new carhouse without excessive non-revenue mileage.

As indicated by its name, the new carhouse is located on a triangular plot at the intersection of Fond du Lac Avenue, a main thoroughfare extending from the city limits into the heart of the business district, and Thirty-fifth Street, upon which is a double-track line extending north and south. The over-all dimensions of the property are 850 ft. east and west, 550 ft. north and south and 1200 ft. along Fond du Lac Avenue.

The carhouse proper is situated 140 ft. north of the south line of the property. Three entrance leads from the double track on Fond du Lac Avenue and three from the double track on Thirty-fifth Street form the approaches to an eight-track storage yard south of the carhouse and also to the through tracks in the carhouse and the eleven storage tracks on the north of the building. The south storage yard has stub-end tracks with the leads from Fond du Lac Avenue. The north storage yard also has stub-end tracks, the leads coming in from Thirty-fifth Street. Eight tracks through the building and one at the extreme north side of the north storage yard provide access to the yards from either side of the property. The present storage capacity is sufficient for 230 cars with 66 inside the building and 164 outside. Except for cars that require inspection, running repairs or washing, all storage is in the open.

All track special work in the approaches is laid with 60-lb. A. S. C. E. rail with hard-center tongues, mates and frogs, and an 80-ft. radius turnout. The yard tracks are spaced at 11-ft. and 13-ft. intervals alternately, with provision for a future 13-in. brick firewall extending the full height of a car, and room for a future storage track is provided adjacent to each set of three tracks. A small cast-steel bumper bolted to the end of the rail has been installed at the end of each stub storage track.

The carhouse, which includes a general repair shop bay and a car-washing bay, is 136 ft. 6 in. wide with one end paralleling Thirty-fifth Street and the other Fond du Lac Avenue, making the south extreme length 503 ft. and the north extreme length 372 ft. The general repair shop bay occupies the south portion of the building, 78 ft. in width. Four through tracks spaced at 13-ft. intervals were built adjacent to the south wall so as to leave a 5-ft. aisle next to this wall and a 33-ft. aisle adjoining the north wall of this section of the building. This arrangement permits the north aisle to be used as shop quarters, and the track and pit spacing allows a 4-ft. walkway between cars.



Fond du Lac Avenue Carhouse—General View of Property, Showing Buildings and Storage Tracks

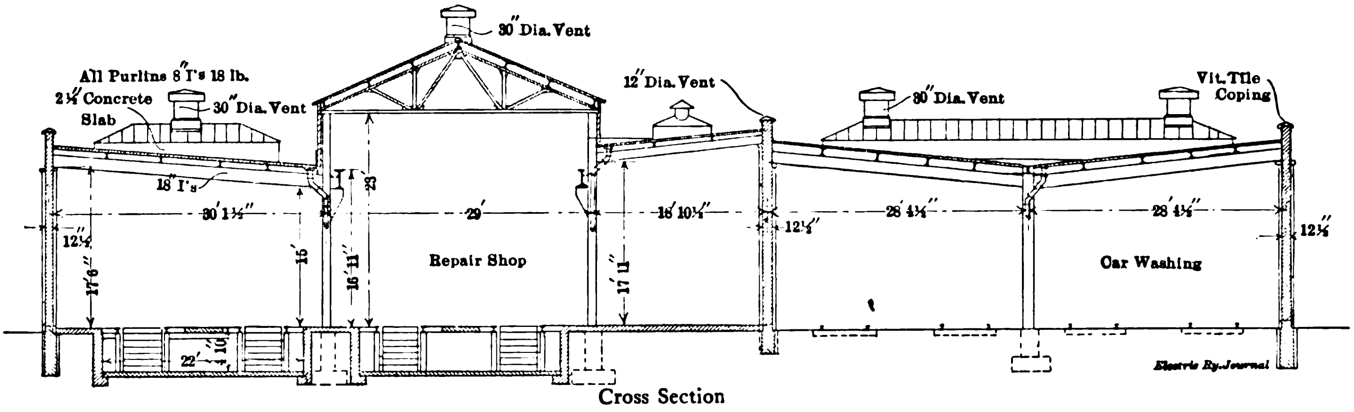
The entire car-washing bay, which is 56 ft. 9 in. wide,, is occupied by four tracks spaced at 13-ft. centers. The track capacity in this section permits thirty-one cars to be set for washing at one time. All four tracks extend through the building, connecting with the Thirty-fifth Street line as well as the Fond du Lac Avenue line.

BUILDING CONSTRUCTION DETAILS

The building walls are constructed on concrete foundations and are of sufficient height to provide a minimum clearance of 15 ft. under the roof structure. They extend approximately 2 ft. above the roof and are capped with a vitrified tile coping. Exterior and interior pilasters at 20-ft. intervals provide ample bearing area for the roof beams, and those on the exterior also serve in combination with brick corbels and stone trim to carry out a paneled architectural treatment. In order to eliminate exterior fire hazard windows were omitted from the longitudinal walls. In fact, the only windows in the building are those provided in the walls at the ends of the shop aisle in the repair bay. The floors of the repair bay are of concrete, 6 in.

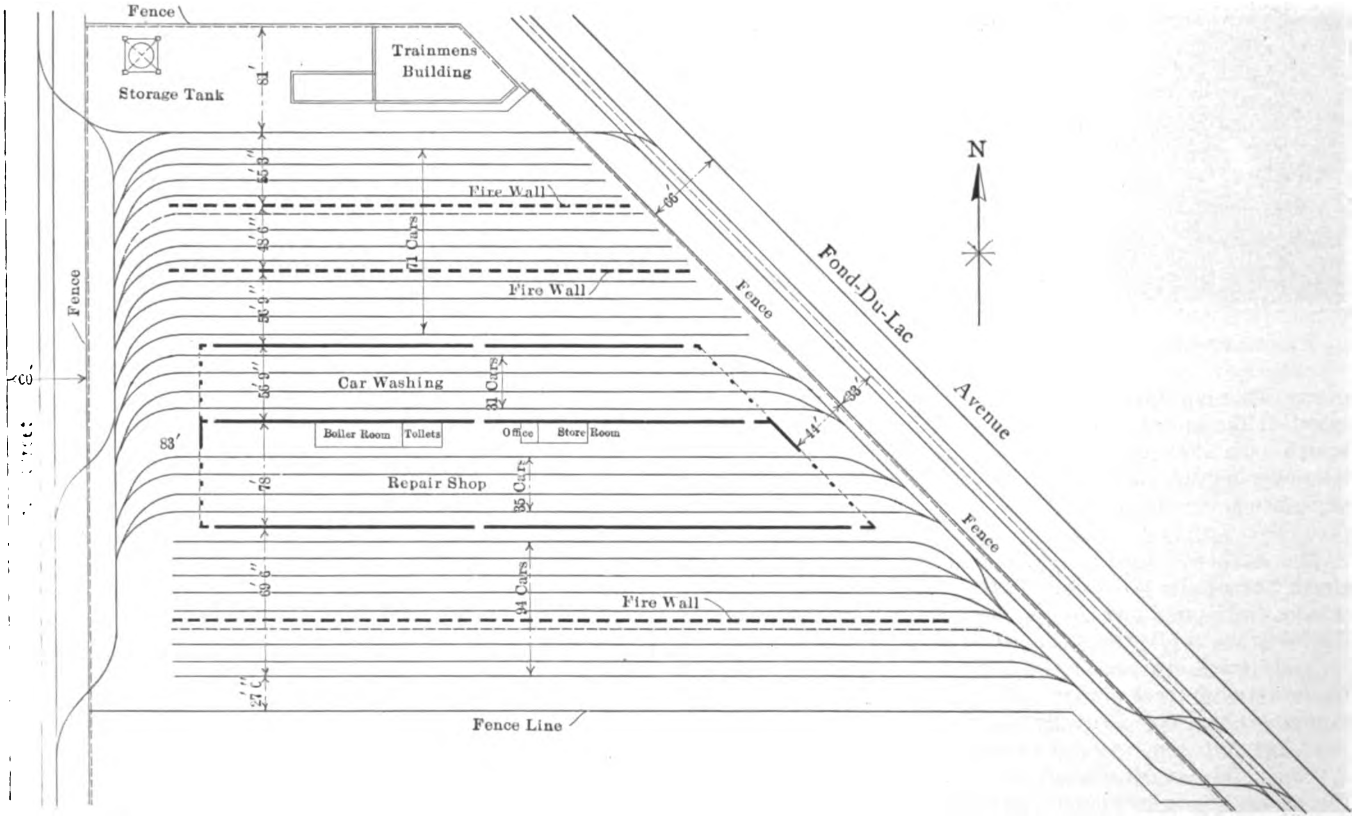
thick, with a sidewalk finish, and that in the car-washing bay is of crushed stone on a cinder fill.

The roof is supported upon I-beams resting on the building walls and on a row of columns in the center of the wash bay. The roof over the repair bay is divided into three panels, the two outside ones being supported on I-beams. The center panel projects above the rest of the roof, providing a 23-ft. clearance under the bottom chord of the roof truss. The columns which support this roof truss, as well as the ends of the I-beams on the adjoining bays, were designed with the object of carrying a runway for a 20-ton bridge crane.


30" Dia. Vent
All Purlins 8" I's 18 lb.
2¼" Concrete Slab
30" Dia. Vent
18" I's
30' 1½"
12¼"
17' 6"
15'
16' 11"
23'
29'
Repair Shop
12" Dia. Vent
18' 10½"
17' 11"
12¼"
30" Dia. Vent
28' 4½"
28' 4½"
Car Washing
Vit. Tile Coping
12¼"
22'
10'
Electric Ry. Journal
Cross Section

Fond du Lac Avenue Carhouse—Cross-Section of Main Building

The roof proper is a 2¼-in. concrete slab reinforced with bars and covered with a four-ply composite asbestos sheathed roofing. In providing drainage to the down-spouts which lead to the carhouse sewer by way of the building columns no change was made in the supporting structure, but enough cinder concrete was applied on top of the concrete roof slab to give a gentle slope to each down-spout. Concrete curbs built in conjunction with the roof slab bound the numerous skylight openings, which are the only source of natural illumination. The skylight frames are built of twenty-gage sheet steel and glazed with ¼-in. rough wire glass. Six skylights, 8 ft. x 44 ft. in length, spaced at 60-ft. intervals, were installed over the wash bay, each skylight containing two 30-in. globe-type ventilators. Seven 8-ft. x 22-ft. skylights of similar design and spaced at the same intervals were installed in the roof over the south panel of the repair bay. Several smaller skylights of the same design also furnish individual illumination to portions of the shop in the north panel of the repair bay.


Fence
Trainmens Building
Storage Tank
81'
55' 3"
Fire Wall
71 Cars
48' 6"
Fire Wall
56' 9"
66'
N
Fond-Du-Lac Avenue
Fence
Fence
60'
Car Washing
31 Cars
56' 9"
33'
44'
Boiler Room
Toilets
Office
Store Room
83'
Repair Shop
78'
35 Cars
Fence
Fire Wall
94 Cars
69' 6"
27' 0"
Fence Line

Fond du Lac Avenue Carhouse—Central Arrangement of Tracks and Buildings

The skylights over the central panel or crane runway section of the repair bay are flush with the roof surface, the glass area replacing the reinforced concrete slab. Nine sections of this glass roof, having approximate dimensions of 16 ft. x 32 ft., are spaced at 40-ft. intervals. Each glass area is provided with a 30-in. ventilator and the whole is supported on a pressed-steel frame.

Sixteen rolling steel doors of the interlocking slat design are installed at the car entrances. These doors are in two sizes, eight of them being 12 ft. x 15 ft. and eight 17 ft. x 15 ft. All are manually operated by way of chain hoists and locks beside the entrance. At each opening in the longitudinal walls of the building is an Underwriters' automatic fire door.

PIT DESIGN DETAILS

Pits are provided under the four tracks in the general repair shop bay, and those under the three south tracks occupy practically the full length of the building, except for the 10-ft. aisle across the center and a 30-ft. space at the Thirty-fifth Street end. The two pits under the north track are approximately 45 ft. in length, one at each end of the building, so as to give additional floor area in the center of this section for the repair and inspection forces.

A single pit 40 ft. 10 in. deep extends across two tracks, and the running rail, as well as the floor in the aisle between the two tracks, is supported on a structural-steel frame. To avoid reinforcing the track rail between the columns, which are spaced at 5-ft. intervals, a 7-in., 95-lb. T-rail is used over the pits. Special bearings and clips formed of two angles, 9 in. long, riveted to the 6-in. I-beam column, support this rail. No footings are provided under the columns, but the pit floor, which is 6 in. thick, is reinforced with ⅜-in. round bars to take the load. Each column is anchored to the floor by two anchor bolts.

To provide for lateral stiffness and against overturning, the two inside columns between parallel tracks are connected by 6-in. I-beams and two knee braces formed of angles, the beams being strong enough to carry the reinforced aisle floor slab. This slab spans the 5-ft. interval between columns and its edges are protected by an angle against chipping. The columns under the outer rails are stiffened by 6-in. I-beams riveted to them just under the rail supports and anchored in the concrete pit wall by a ⅝-in. round pin 2 ft. long. The 8-in. concrete pit walls are reinforced both vertically and horizontally against any thrust or strain that may come to them from this strut. The space outside of the pit walls is filled and covered with a 6-in. concrete floor.

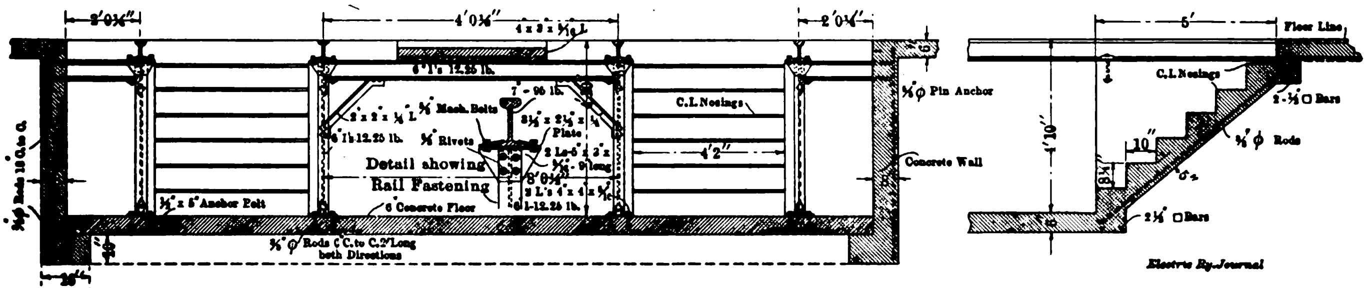
The opening outside the rails of each track is approximately 24 in. wide. This permits the inspector or repair man to make truck adjustments from either side of the rail. It is of special value in inspecting and adjusting brakes.

No general pit illumination is provided, but lamp sockets, to which extension cords may be attached, are installed in the pit walls at uniform intervals.

CAR-WASHING FACILITIES

All cars are scheduled for an exterior soap wash every fourth day, the floors being mopped and the woodwork rubbed with a damp chamois at the same time.

Permanent car-washing platforms extend the full length of the four tracks in the car-washing bay, except for an aisle through the center of the building. These platforms are 3 ft. wide between cars, a 2-ft. 10-in. platform adjoining the building walls. They are elevated approximately 3 ft. above the top of the rail. The platforms are built of 1¾-in. yellow pine supported on 3-in. x 4-in. stringers, which in turn are bolted to 4-in. channel bents. As shown in the illustration, these bents are formed of a single section of 4-in. channel bolted to yellow pine stringers by way of angles riveted to the base. The bents are spaced at 5 ft. and the supporting stringers rest directly on the crushed stone floor of this section of the building. Each washing platform may be reached by steps provided at each end.

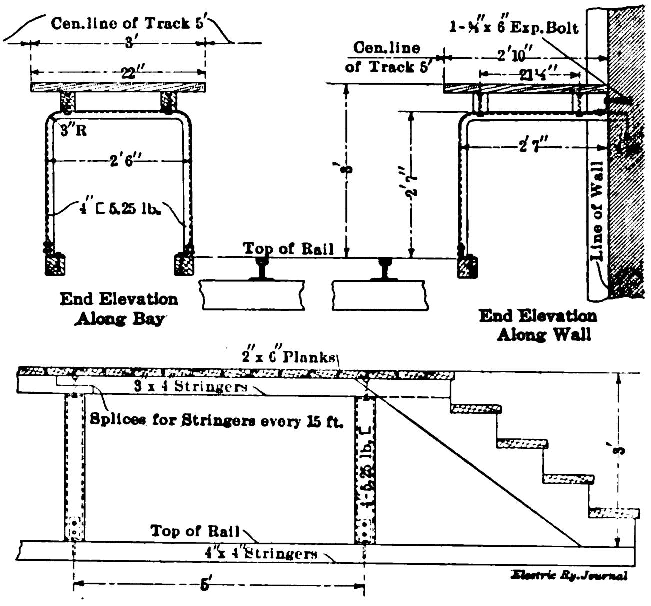

2'0½"
4'0½"
2'0½"
4 x 3 x ⅜ L
6" I's 12.25 lb.
7"-95 lb.
⅝" Mach. Bolts
3½ x 2½ x ¼
Plate
2 x 2 x ¼ L
6" I's 12.25 lb.
⅜" Rivets
Detail showing Rail Fastening
6" Concrete Floor
2 L's 4 x 4
1-12.25 lb.
C.L.Nosings
4'2"
⅝" φ Pin Anchor
Concrete Wall
¾" x 6" Anchor Bolt
⅜" φ Rods 6" C. to C. 2' Long both Directions
5'
Floor Line
C.L.Nosings
4'10"
10"
8½"
⅜" φ Rods
2-⅜" □ Bars
2¼" □ Bars
Electric Ry.Journal

Cross Section Through Pits

Section Through Stairs Leading to Pits

Fond du Lac Avenue Carhouse—Construction Details of Repair Pits

Drainage under the car-washing bay is provided by installing 4-in. drain tile laterals at 40-ft. centers the full length of this bay and sloping them to the center of the bay where they tap the main sewer. These drain tiles are laid in a cinder trench, the bottom of which is about 6 in. under the ties. To provide for cleaning the main drain under the car-washing floor several manholes are provided.


Cen.line of Track 5'
3'
22"
3"R
2'6"
4" C 6.25 lb.
End Elevation Along Bay
Top of Rail
Cen.line of Track 5'
1-⅜" x 6" Exp.Bolt
2'10"
21¼"
2'7"
3'
2'7"
Line of Wall
End Elevation Along Wall
2" x 6" Planks
3 x 4 Stringers
Splices for Stringers every 15 ft.
4" C 6.25 lb.
Top of Rail
4" x 4" Stringers
6'
3'
Electric Ry.Journal

General Elevation of Platform Stairs

Fond du Lac Avenue Carhouse—Details of Car-Washing Platforms

OTHER SHOP DETAILS

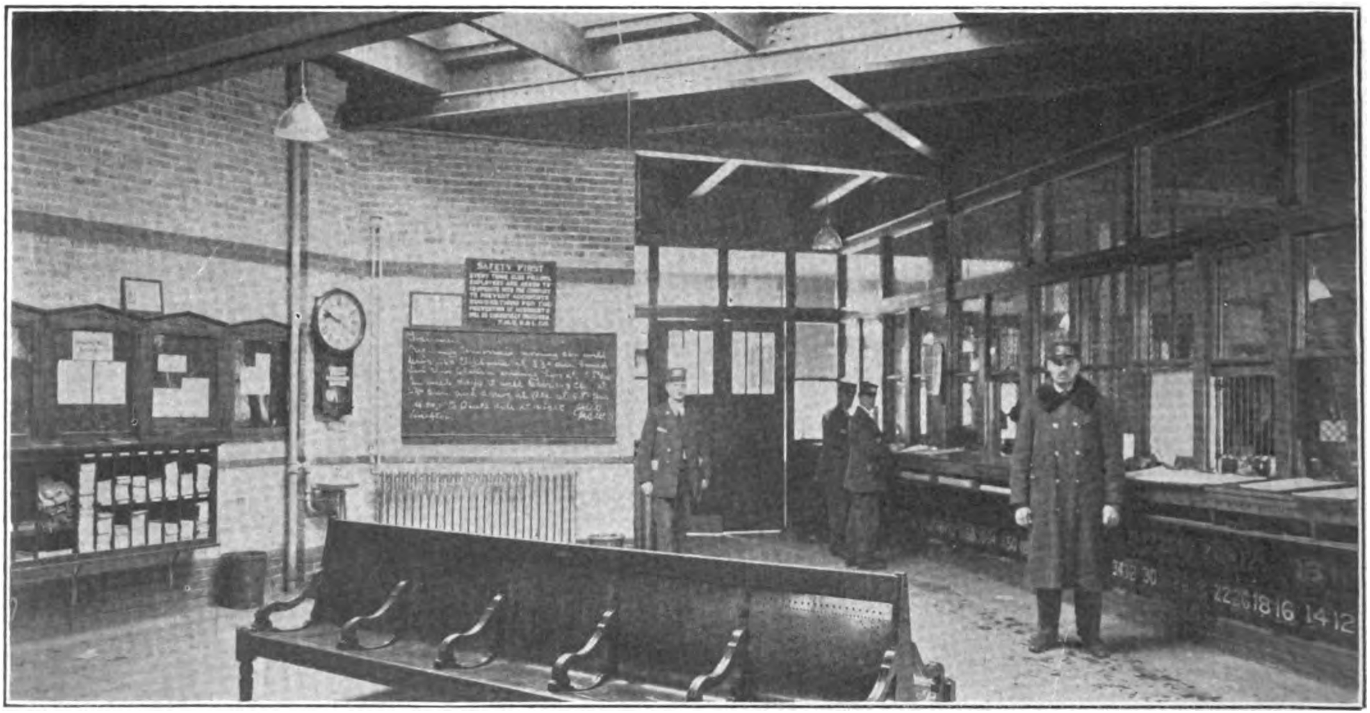
A portion of the 33-ft. aisle on the north side of the general repair bay is occupied by the running repair department. A number of small machine tools required to facilitate this class of work have been installed and include the following: a ¼-hp sensitive drill, a 24-in. drill press, a 6-hp, 18-in. double emery grinder and a 48-in. x 50-in. forge. Near these tools and against the partition wall are two 15-ft. workbenches. A section of this aisle, 15 ft. x 36 ft. 8 in., has been screened off by a heavy wire-mesh partition to be used as a storeroom, and adjoining it is a portable office, 12 ft. x 15 ft. in size.

Another portion of the 33-ft. aisle in the repair bay has been partitioned off for toilet facilities and heating plant. The partition walls are of 6-in. hollow tile, providing a toilet room 14 ft. 6 in. x 29 ft. in size and a boiler room 13 ft. x 40 ft. in size. The floor of the boiler room as well as that of the coal bins is dropped 7 ft. below the carhouse floor level. This was done in order to provide drainage for the heating pipe system and to put the boilers on the same level as the coal bins. The arrangement also permitted the reinforced concrete floor to be carried over the coal bins, thus giving additional shop floor space without limiting the coal-storage capacity. Coal may be dumped into these bins from a car set on the north track in the general repair bay, through three 24-in. openings in the reinforced concrete floor.

Fond du Lac Avenue Carhouse—Exterior of Trainmen's Quarters

The heating plant proper is of the vacuum-return type with pipe coils mounted on the building walls as well as on the walls of the car pits. Two 50-hp horizontal tubular boilers compose the steam generating plant.

Artificial illumination is provided by 150-watt tungsten lamps swung by drop cords from the ceiling. These lamps are spaced at 20-ft. intervals longitudinally with the building, and a row is provided directly over the center of each aisle. Yard illumination is obtained from a number of inclosed-arc lamps swung from brackets at the tops of the poles from which the trolley span wires are supported.



Fond du Lac Avenue Carhouse—Interior of Registry Room

In the buildings wood trolley trough construction is used. Provision is made for continuous trolley through the rolling-steel door entrances by dead-ending it on either side of the building walls and closing the break by a V-shaped clip attached to the bottom of each rolling door. The trolley wire in the yard is span-wire construction.

FIRE PROTECTION

A complete system of water mains for fire protection purposes has been installed in the carhouse and storage yard. The system normally depends on the city water supply, but to provide for emergency cases a 50,000-gal. water supply tank is supported on a tower 90 ft. above the ground. This water tank is supplied from the city water mains and connected to the fire protection system by way of a check valve which opens whenever the city pressure falls below the tank pressure, which is approximately 40 lb. per sq. in.

Storage yard fire protection is obtained by installing standard fire hydrants with Underwriters' hose houses and equipment at 125-ft. longitudinal intervals and 50-ft. transverse intervals. Fire protection inside the carhouse is obtained by a complete arrangement of dry sprinklers supported on the roof beams with outlets about 9 in. below the tops of the car windows.

TRAINMEN'S CLUB ROOMS AND OFFICE BUILDING

As a necessary adjunct to the general carhouse and storage yard layout, an attractive looking club house has been built fronting on Fond du Lac Avenue, just north of the north storage yard. This building is constructed with 13-in. brick walls on concrete foundations, a gabled roof and the dimensions are approximately 60 ft. x 176 ft. It contains a spacious trainmen's club room with adjoining toilet rooms and shower bath, a barber shop, a lunch room and an office for the station clerk. An addition to the rear of the building, 23 ft. wide by 64 ft. long, provides space for the heating plant as well as a small office for the way department and a stable for the track repair wagon and horses.

The interior of the trainmen's quarters is finished in natural yellow pine with concrete floors in the club room, toilet and shower baths and wooden floors in the rest of the building. Liberal natural illumination is obtained from the five skylights in the roof in addition to the windows in the exterior walls of the building. All of the skylights, excepting one containing a 20-in. globe-type ventilator and two 30-in. ventilators, are installed in the hip of the roof over the trainmen's club room.

Artificial illumination is obtained by a liberal installation of 150-watt tungsten lamps in the trainmen's club room, 100-watt lamps in the toilet and shower-bath rooms and lamps varying from 25 watts to 150 watts in the other rooms in the building.

The design of both the carhouse and club rooms was prepared by the engineering department under the supervision of R. H. Pinkley, engineer of way and structures. and R. B. Stearns, vice-president in charge of interurban and street railway operation of The Milwaukee Electric Railway & Light Company.

BLOCK SIGNAL MAINTENANCE NOTES ON THE ILLINOIS TRACTION SYSTEM

Approximately 80 miles of automatic block signals have been in operation on the Illinois Traction System since 1911. The protected track includes six sections of continuous blocking ranging from 5.7 miles to 20 miles in length and eleven sections each containing two signals for curve protection. The equipment consists of about 160 "style B" semaphore signals built by the Union Switch & Signal Company, the design and construction details having been described in the Electric Railway Journal for June 24, 1911. As about two years have elapsed since the first section was put in operation, it is now possible to draw some conclusions as to the efficiency of this system as well as the cost of maintaining it.

When operation was started under these block signals two sets of maintenance men were assigned to each division, one for telephones and the other for signals. This meant that two men covered practically the same territory on different classes of work, because the supervision of the telephones and the signals came under two different departments. The arrangement continued in effect from March, 1911, until April, 1912. At the latter time the signal engineer received charge of all the overhead lines and he combined the two departments, making one man responsible for both telephones and signals. Although the responsibility of each maintainer was thus considerably increased, the new plan has worked out very satisfactorily and has greatly reduced the expense of maintaining both classes of apparatus.

In the signal and telephone maintenance organization direct supervision over the men is obtained through a supervisor or inspector, to whom the division maintainers report. The territory assigned to each maintainer varies somewhat in length, but is based on the principle that the work on a mile of telephone line is equivalent to that on one signal. The divisions cover from 108 to 150 miles of wire or the equivalent. Investigation has shown that the amount of time required to maintain one automatic signal is somewhat less than for one mile of telephone line.

Reports are mailed daily to the signal engineer's office if no signal failure has occurred. In case of a failure, however, an additional report is sent explaining, if possible, the reason for the failure, and what delay, if any, was occasioned in making repairs. From the commencement of operation under this system, the signals have operated at 99.98 per cent efficiency.

Under the original arrangement—that is, where one telephone and one signal maintainer were detailed to each division—the expense of maintenance per blade per month was approximately $4, and after the extra man had been dropped from the division the cost was reduced to approximately $3 per blade per month. As soon as other contemplated refinements in organization and in methods are made it is believed that the cost will be reduced to about $2 per blade per month. These figures include the cost of tools, material and labor, the cost of labor alone being about 50 cents per blade per month.

Illinois Traction System Signal Department

Monthly Report for January 1913

Number of signals	173
Number of movements	258,074
Number of failures	109
Number of trains stopped	109
Minutes delayed	292
Movements per failure	2,368
Movements per train stopped	2,368
Movements per minute delayed	884
Per cent perfect operation	99.960
Failures chargeable to:	
Signal department	9
Blown fuse	14
Defective apparatus	1
Track department	—
Power department	20
Overhead department	3
Operating department	—
Broken wire	6
Bad bonding	46
Miscellaneous	2
Creditable failures	8

Remarks:
Eight creditable failures due to trains in the block.
Two broken-wire failures caused by sleet.

The largest single item to which signal failures may be attributed is the effect of bad bonds. Whenever a bond failure occurs the signals controlled by the affected track circuit give false indications, and to eliminate this trouble the Illinois Traction System is at present engaged in completely rebonding all signal territory. However, the fact that a signal failure occurs whenever a bond fails practically prohibits waste of propulsion energy through signaled territory. It is estimated that the amount of energy saved by the detection of defective bonds by the signals is more than the current consumption required for the signal operation.

COASTING RULES IN DENVER

The Denver Tramways, through Norman Read, its electrical engineer, makes the four following suggestions to its motormen for improving coasting records:

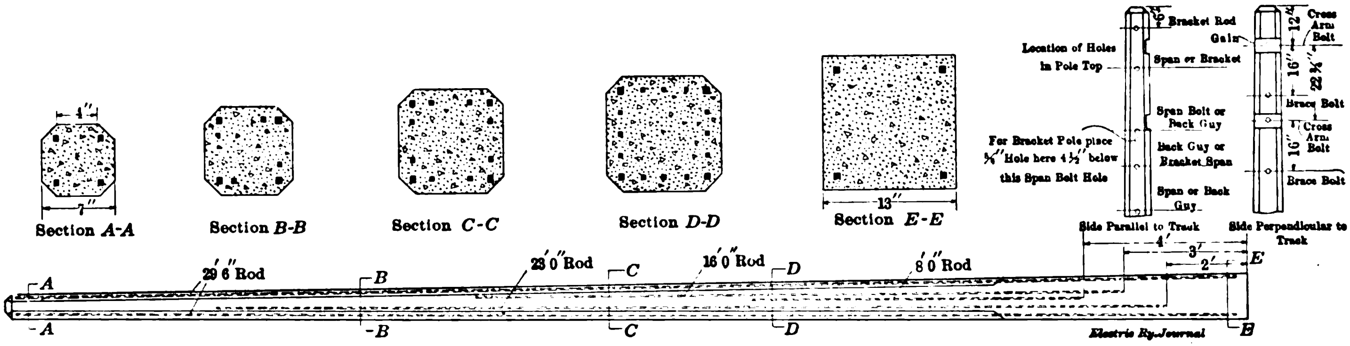
1. Coast behind a leading car. Keep far enough behind so that all its stops will not cause you to stop.
2. Coast to a passenger or bell stop. Throw off the power a few seconds before applying the brakes.
3. Coast to a traffic stop.
4. Coast to curves. Don't keep your power on till the very last moment. Utilize some of the stored-up energy in your car to carry you to the point where you should apply your brakes.

During the last week of December, 1912, the installation of coasting recorders on all cars was completed. For the first month of operation, January, 1913, the entire system averaged a saving of 24 per cent, with the four divisions ranking as follows: South, 28.30 per cent; Central, 26.60 per cent; North, 21.46 per cent; East, 20.08 per cent.

Experiences with Concrete Poles by the New York State Railways

Regular Manufacture of Several Standard Weights of Pole Is Now Carried On in the Model Pole Yard of the Company, for Use in Syracuse and Utica—The Poles Are Giving Excellent Satisfaction—Details of Manufacture and Specifications Are Given

For the past three seasons concrete poles have been manufactured in Syracuse for trolley and transmission line work in that city and in Utica. The poles have proved so satisfactory that last year a plant was built at the East-wood yards, having a capacity from ten to fifteen poles a day. The plant is carefully laid out to facilitate economy in handling and storage. It occupies an area 50 ft. x 300 ft. at one end of the company's material-receiving yard and is adjacent to a steam railroad over which poles can be shipped to distant points. A spur also connects it with the company's tracks. A gantry crane of 36-ft. span and equipped with a triplex hoist of 3 tons capacity travels on rails the length of the yard. This improved crane handles the concrete hopper and the poles both to the storage and to the cars.



Concrete Poles in Syracuse—Arrangement of Reinforcing and Holes in Pole Top

New York State Railways, Utica-Syracuse Lines

SPECIFICATIONS FOR FORMS FOR CONCRETE POLES

This form to be built of hard pine and chamfer strips to be put on with screws and finishing nails. Side cleats to be bolted.

Chamfer strips to be placed on side sections of form. Gain block placed on bottom section; if chamfer strips come higher than gain block two small strips are to be placed on gain block as shown. ¼ ¼

Forms should be oiled before using inside and out with raw linseed oil. Holes through pole for bolts made by blank bolts, same size as hole, embedded in concrete through form and pulled out two days after casting pole.

Bolts should be loosened by turning slightly six hours after pole is cast.

New York State Railways, Utica-Syracuse Lines

INSTRUCTIONS FOR CASTING CONCRETE POLES

Before casting poles oil form inside with a mixture of one part black oil and one part gasoline. This oiling to be done immediately before casting pole.

The concrete mixture to be formed from one part cement, two parts sand and two parts stone, measurement to be made by volume.

All stone used to be clean and free from loam or dirt. Thoroughly wet the stone in the pile before mixing.

Sand to be free from loam or dirt. Place the proper amount of sand on the mixing board and spread out to a thickness of 4 in. On this sand place the cement and turn both three times, after which apply the water and turn so that the mass is entirely wet. Spread out this mortar again in a 4-in. layer and dump the stone in another layer on top. Turn the mortar and stone until mortar and stone are thoroughly intermixed. The concrete mixture must not be left on the board long enough to require retempering, but should be placed in the forms at once.

In placing the reinforcing rods great care must be used properly to locate the same and maintain in the proper position.

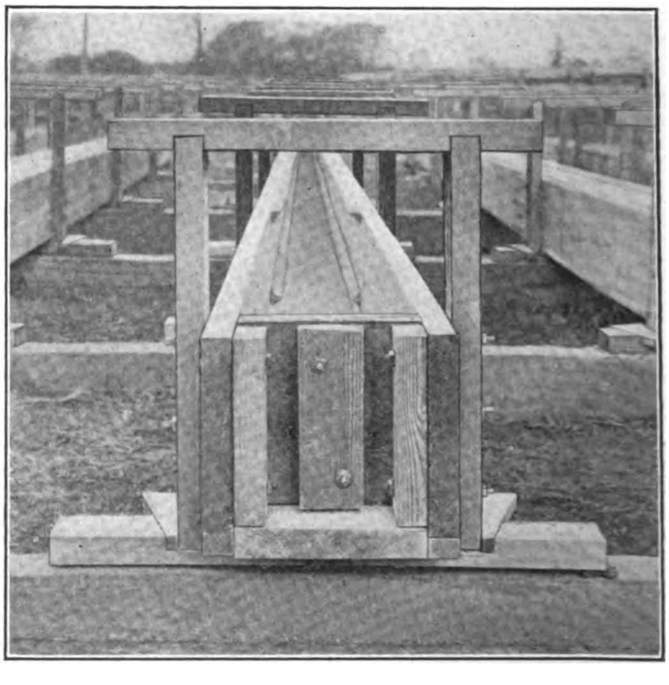
The time of removing of side forms and moving of pole to storage will vary with the weather, but in no case shall a pole be lifted until ninety-six hours have elapsed after casting. After removal from the forms the pole shall be painted with a mixture of one part cement and one part sand, the pole being wet before the application of this paint.

Remember that a crack formed in a pole by handling too green cannot be healed.

In the storage and shipping of poles 2-in. cleats must be placed between the separate horizontal layers of poles to allow attachment of clamps for handling.

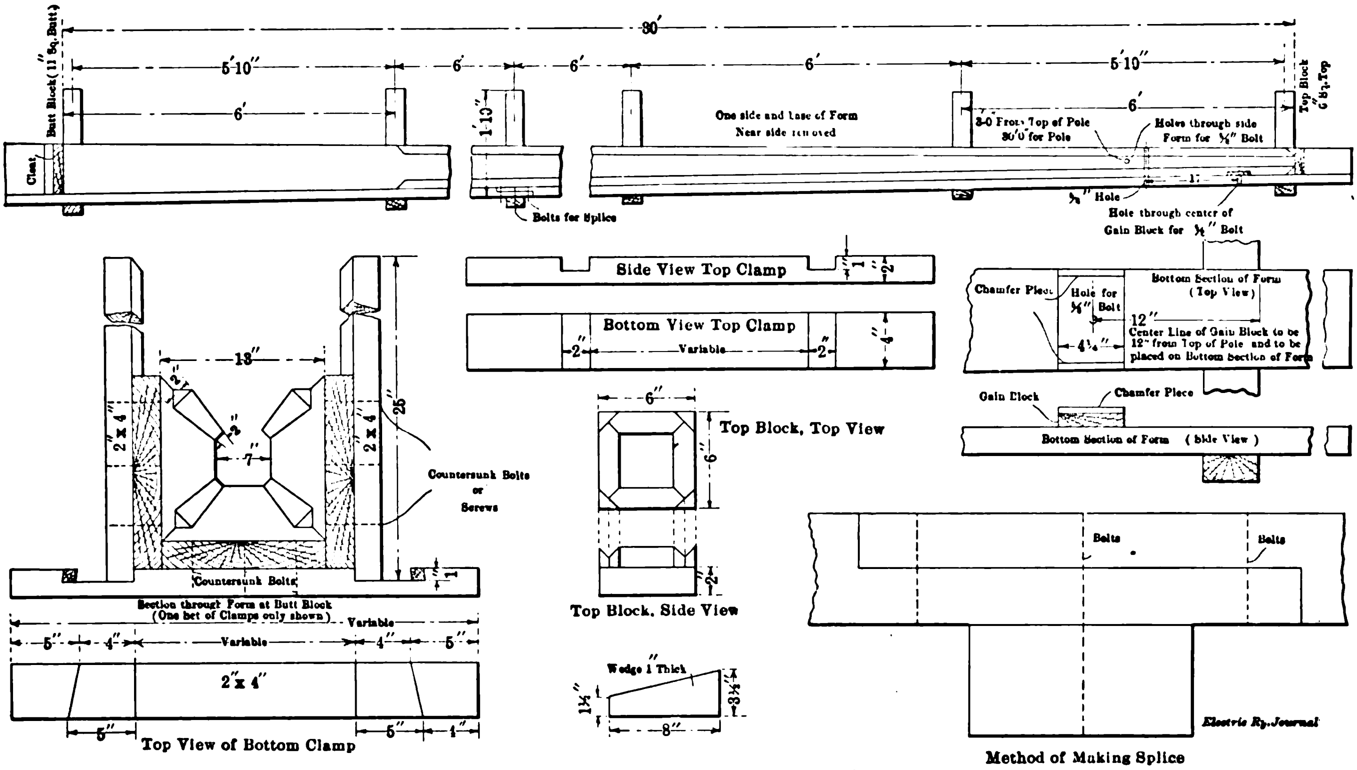
The poles are cast in molds, like that shown in the illustration, consisting of three 2-in. Georgia pine planks. The side planks are clamped in position by means of notched 2-in. x 4-in. studding above and below. The chamfer of the pole corners is provided by strips of triangular cross-section nailed inside the side planks. Pieces of round iron are inserted wherever holes in the pole are required. The gains are produced by blocks nailed in at the proper places. The concrete mixture consists of one part cement, two parts sand and two parts broken stone of ⅜-in. to ¾-in. size. The concrete is mixed by hand and transported in a hopper of 1-ton capacity handled by the crane.

Four standard sizes of poles are made at present as follows: one with 7-in. top, 30 ft. long, the standard trolley pole for city construction either bracket or span; one with 7-in. top, 35 ft. long, for interurban work; one with 8-in. top, 30 ft. long, for heavy city construction, and one with 8-in. top, 45 ft. long, for feeder lines. The reinforcement of these poles has been designed for maximum economy of steel on the basis of theoretical calculations and actual tests.

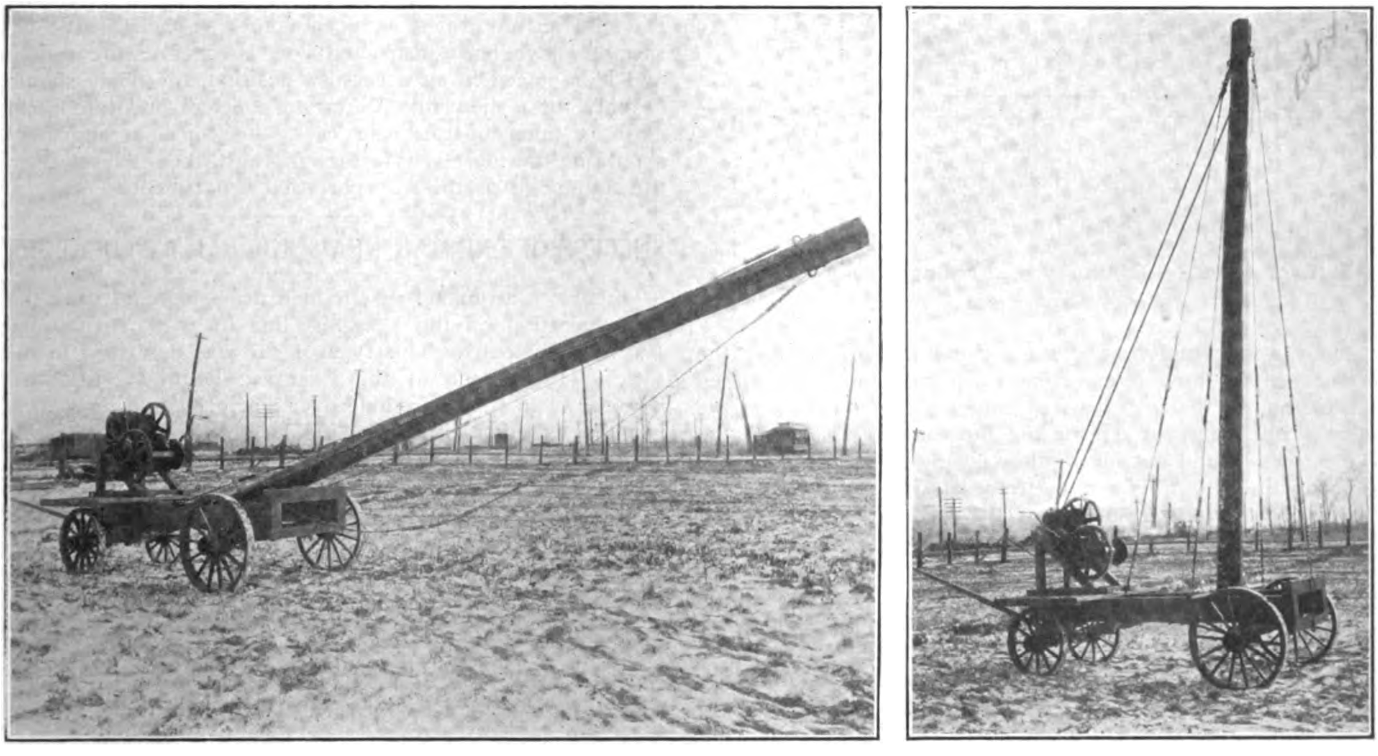


Concrete Poles in Syracuse—View of Form Ready for Concrete

The standard 7-in. x 30-ft. pole has the following reinforcing: twisted steel rods placed about 1 in. from the surface—four ⅝ in. x 29 ft. 6 in., four ½ in. x 23 ft., four ½ in. x 16 ft., and four ½ in. x 8 ft. The details of this reinforcing are shown in the drawing on page 502. The poles with 8-in. tops have the same arrangement of rods, all ⅝ in. instead of ½ in. The longer poles have the rods lengthened at the top ends. The cost of the standard pole is from $9.50 to $12 each, not including fixed charges on the plant. This cost is based on stone and sand at $1 a cubic yard, cement at $1.10 a barrel and labor at from 16 cents to 17½ cents an hour. On page 502 are reproduced the specifications for building forms and the instructions for casting poles which are issued to the workmen in blueprint form.


Butt Block (11" Sq. Butt)
30'
5'10"
6'
6'
6'
5'10"
6'
6'
1'10"
Cleat
Bolts for Splice
One side and base of Form
Near side removed
30' From Top of Pole
30'0" for Pole
Holes through side
Form for ⅜" Bolt
⅜" Hole
17
Hole through center of
Gain Block for ⅜" Bolt
Top Block
6" Sq. Top
Side View Top Clamp
1"
2"
Bottom View Top Clamp
2"
Variable
2"
4"
13"
2"
2"
7"
2 x 4"
2 x 4"
25"
Countersunk Bolts
or
Screws
Countersunk Bolts
1"
Section through Form at Butt Block
(One Set of Clamps only shown)
Variable
5"
4"
Variable
4"
5"
2" x 4"
5"
5"
1"
Top View of Bottom Clamp
6"
6"
Top Block, Top View
2"
Top Block, Side View
Wedge 1" Thick
1¼"
3½"
8"
Chamfer Piece
Hole for
⅜" Bolt
4¼"
Bottom Section of Form
(Top View)
12"
Center Line of Gain Block to be
12" from Top of Pole and to be
placed on Bottom Section of Form
Gain Block
Chamfer Piece
Bottom Section of Form (Side View)
Bolts
Bolts
Electric Ry. Journal
Method of Making Splice

Concrete Poles in Syracuse—Details of Construction of Wooden Forms



Concrete Poles in Syracuse—Views of Derrick Wagon Used for Installing Poles

In the spring of 1911 some tests were conducted on the 30-ft. pole with 6-in. top which had been adopted tentatively. In this test two poles were set about 38 ft. apart with a 15-in. rake. A ring of concrete was placed at the butt of each pole and at the ground line. A span wire was stretched between the top of the two poles and pulled up to a tension of 1100 lb. This initial pull produced a deflection of 3 in. Next a platform was suspended from the span wire from points corresponding to the center lines of the two tracks and loaded to 1332 lb. On the removal of this load a permanent set of 2¾ in. remained in the pole. The same load was again applied and the span wire cut at the center. The pole then returned practically to its original position. Last June this test was repeated with the new standard pole with a 7-in. top, with the result that it showed sufficiently greater strength to warrant its adoption in place of the lighter pole. The new pole has a much greater area of steel at the ground line, where the older design gave indications of failure.

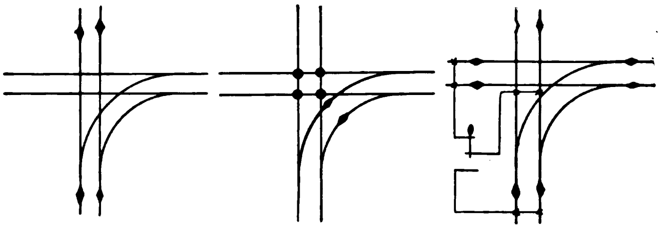
It was found that success with concrete poles depended partly upon the facilities provided for handling them. As the 30-ft. x 7-in. pole weighed 330 lb. and the large ones correspondingly more, the ordinary methods of erection were not applicable. The company originally used a portable derrick made from an old road scraper to erect the poles. From the experience thus obtained the derrick wagon shown in the accompanying halftones was built in Utica for use during the season of 1913.

FEEDING STREET INTERSECTIONS

BY G. H. M'KELWAY, ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

It is an easy matter, so far as assuring continuity of current supply is concerned, to care properly for the feeding of a street intersection where the only special work installed is a plain crossing. All that is required in that case is the installation of insulated crossings and, as the trolley wire will not have to be cut to put them in, there will be no trouble from the stalling of cars on one line because the intersecting line happens to be dead. The only exception to this rule would be to have a car roll into a position across the crossing and stop there with its trolley pole on the dead wire.

On the other hand, when connecting curves are included in the special work such trouble cannot be avoided so easily and cheaply. The most usual way of feeding the more complicated intersection is to put plain uninsulated crossings in the trolley wires and section insulators in the main line wires of one of the lines on both sides of the intersection and outside of the curves. This arrangement, shown in Fig. 1, is not entirely satisfactory because, being fed entirely from one of the lines, if that line goes dead the crossing too must remain dead until the line is made alive. If the motormen on the cars of the live line crossing the dead one know that the other line is dead, they often can operate their cars across the special work by running quite fast on their own section and then coasting across the dead portion. Many times, however, the first notice that the motormen of the live line will have that the other one is out will be when one of their number starts across at the normal speed and this proves too slow to enable the car to roll across after it has lost its power. The result will be that both lines will be blocked.


Figs. 1, 2 and 3—Methods of Feeding Trolley Wires at Crossovers

One way to avoid this trouble is to install insulated crossings where the straight trolley wires cross and also to place circuit-breakers in the connecting curves. This arrangement, as shown in Fig. 2, makes impossible the blocking of both lines if power is off on only one of them unless a car should be stalled directly across the track of the intersecting line. It therefore gives the same freedom of operation as a crossing without connecting curves if wired with insulated crossings. The only disadvantage of the arrangement is confined to the use in the curves of the section insulators, which are a cause for increased trouble not only owing to the trolley poles of the cars leaving the wire and so hindering operation but also because of the resulting pounding that the overhead work receives when the poles do leave the wire. This drawback can, however, be largely overcome by careful location and setting of the circuit-breakers.

Although it is quite unusual to have one line blocked because a car of another one has become stalled on the crossing, this possibility can be prevented by the layout shown in Fig. 3. Here section insulators are installed in all four of the main line wires outside of the special work, thus insulating it from both of the intersecting lines. A double-throw switch is provided, however, with connections running to the feeders or trolley wires on both of the streets. By this means the special work can be cleared from the dead feeder and thrown over on to the live one at any time.

A double-throw switch should always be employed, because if two single-throw switches are used in its place there is always the possibility of both being closed at the same time, thereby putting the two feeders into multiple, which, if both feeders are alive, may be undesirable. However, if one is grounded and dead and the other thrown in before the intersection is cleared from the first, the supply of current from the second will do no good so far as moving cars is concerned and may make more trouble.

The only disadvantage of this last arrangement, aside from its greater cost and the necessity of caring for four circuit-breakers in addition to the uninsulated crossings, is that when the line feeding the crossing goes dead the whole special work is killed, thus affecting both lines, and remains so until the switch is thrown over. At any rate, if the motormen and conductors as well as the inspectors have been instructed how to operate the switch and it is placed in an accessible position, the delay should be only for a moment. Where an efficient and intelligent class of men operate the cars, the third arrangement should be the most satisfactory of the three, at least from the standpoint of the transportation department.

SUCCESS OF ONE-MAN NEAR-SIDE CAR AT LOCKPORT

On Feb. 9 a number of one-man near-side cars were put into operation on the Lockport line of the International Railway Company. This type of car was described in the Oct. 5, 1912, issue of the Electric Railway Journal. The car is 30 ft. 7½ in. long over platforms and its seating capacity is thirty-six. Like the larger two-man near-side cars used by the same company in Buffalo it is equipped with the Dayton fare recorder. This is an important element in the operation, for by its use the motorman is relieved of practically all clerical work.

During the first week's operation the increase in gross receipts was 39 per cent. The road is operating with twelve conductors fewer than before and even without the increase in gross receipts it is expected that the new cars will pay a good return on the investment. The increased receipts are accounted for by the better service possible with the new cars. No material increase in the length of stops is noticeable. The additional time required for the motormen to collect fares is made up for by the condition that they are not obliged to wait for bell signals but start their cars immediately after the passengers have boarded. The favorable showing of the first week has been maintained since and the management is greatly pleased with the results of the experiment.

Meeting of the Keystone Railway Club

Papers Were Read on Electric Railway Management and Parks; a Blackboard Talk Was Given on Motor Testing, and the Question Box Was Discussed

The fifth meeting of the Keystone Railway Club was held at the Hotel Walton, Philadelphia, Pa., on the evening of March 10 and the morning and afternoon of March 11. The routine business was transacted at the evening session.

ELECTRIC RAILWAY MANAGEMENT AND PARK BUSINESS

The first order of business on March 11 was the paper on "Electric Railway Management," by William H. Heindle, general manager Wilmington (Del.) & Philadelphia Traction Company, which is published in abstract elsewhere in this issue. Mr. Heindle's paper was actively discussed, particularly as to passes. Most of the delegates said that they had, with advantage, abolished passes for outsiders.

C. F. Crane, superintendent Eastern Pennsylvania Railways Company, Pottsville, Pa., then read his paper on "Parks and Their Transportation Problems," which is abstracted elsewhere in this issue. In discussing this paper, F. M. Davis, Harrisburg, took exception to Mr. Crane's strictures on free attractions. For the last two years his park had had balloon ascensions at a cost of $175 a week with the result that the daily travel increased from 2500 to 5000 and the weekly travel from 1200 to 20,000. Of course, the company's other attractions, such as the merry-go-round, figure-eight coaster and the theater, benefited in proportion. Fireworks also greatly increased the evening attendance. As booking conditions had been greatly improved in recent years, the railway manager could obtain his attractions at the same prices as any regular theatrical man. He approved the idea of a park theater circuit, but one must not overlook the fact that the tastes of the public differ in various localities.

C. F. Crane, Altoona, said that about six years ago his company had leased its park on a percentage basis to an amusement company, thereby relieving itself of much annoyance. However, the maintenance and order of the park were still in the hands of the company. The company also provided the band. No matter who supplied the attractions, the railroad would still be held responsible by the public for the attractiveness and order of the park.

Mr. Heindle thought that most of the street railways would be better off without parks. He was sorry that his company had a park at Wilmington. It was a fact that nine-tenths of the parks really were like circuses and had to be treated as such.

Mr. Davis remarked that Mr. Heindle's idea was right in most cases. The Harrisburg company's park, however, was ideally located as it was within a five-cent zone from each direction and furthermore was located on a line which had all-year travel. As to extra cars, he was also favorably situated in that connection because his company used for park service the additional rolling stock which it needed for its rush-hour travel between Steelton and Harrisburg.

MOTOR TESTING, QUESTION BOX, ETC.

The next speaker was Harry W. Branson, Philadelphia, who gave a blackboard talk on motor testing and trouble finding.

Following Mr. Branson's talk, an active discussion arose on the slotting of commutators. W. J. Jeandron, New York, said that some companies had poor results from slotted commutators because they slotted them too deep. The cut should not be more than the thickness of mica, say 1/32 in. Slotting permitted the use of brushes of higher current-carrying capacity and the removal of mica reduced voltage losses. Probably 90 per cent of brush trouble was caused by too much tension. He recommended for slotted commutators a general maximum of 4½ lb. and believed that it was possible to go down to 3 lb. One fault of the operator was to use a brush 2¼ in. instead of 1¾ in. long. In the longer brush the effect of continued side wear would cause arcs between the brush and its holder.

At the conclusion of the morning session it was announced that J. G. Baukat had tendered his resignation as secretary owing to the increased work placed upon him as superintendent of equipment for the Lehigh Valley Transit Company. R. J. Pike, purchasing agent Lehigh Valley Transit Company, was chosen as his successor. It was also decided to hold the next meeting of the club during the month of June at York. At 1:30 an adjournment was taken for luncheon.

During luncheon W. E. Harrington, Philadelphia, introduced H. H. Adams, engineer Ford, Bacon & Davis, New York, as one who had been a pioneer in bringing electric railway car maintenance to a high standard. Mr. Adams then made a brief address in which he pointed out how an organization like the Keystone Railway Club could supplement the work of the American Electric Railway Association.

The Question Box discussion began with Question 22, relative to life of car axles. The discussion developed the fact that several delegates were not fully satisfied that heat-treated axles had reached the desired point of reliability, as they had experienced breaks with such axles.

J. G. Baukat, Allentown, said that the Pennsylvania Railroad changed its axles from passenger to freight service after three years. He had had practically new axles break in the same place as axles which had been in service for nine or ten years. Most axles broke next to the wheel and generally near a tight fit. Mr. Hill, American Brake Shoe & Foundry Company, discussed the whitewashing method of the Interborough Rapid Transit Company, New York, for determining the location of cracks, and J. G. Cooley, Standard Roller Bearing Company, gave a blackboard demonstration of axle breakage.

A. Stucki, Pittsburgh, did not believe that a mileage limit would help to avoid cracked axles. First of all one must be certain that the fiber stresses in the axles were kept to a minimum. He had seen enough of treating carbon steel to realize that a heat-treated axle must come. Improvement could also be attained by using an alloy steel such as vanadium which could take great dynamic punishment.

Questions 23, 24 and 27, relating to inside-hung brake rigging, use of brake beams and brake power, were answered in detail by W. G. Kaylor, Westinghouse Traction Brake Company. He pointed out that if inside-hung brake rigging was properly designed it was much better than outside-hung rigging, but it was necessary to give more thought to its design in order to make it adjustable. Inside-hung brakeshoes used with a fairly long wheelbase were released separately without release springs, whereas outside-hung shoes did require them. A release spring on a brakebeam was always undesirable, for with the wear of shoes and wheels its tension almost invariably increased, often to such an extent as to affect seriously the efficiency of the brake. Brakeshoes were held in better alignment with the wheel when mounted on a brakebeam, and the use of the brakebeam with inside-hung brakes also permitted the employment of a single lever at the center of the beam so that the braking power was evenly distributed. As to braking power, he believed that for interurban service a maximum of 100 per cent should be obtainable with full service application of 50 lb. in the brake cylinders, but this braking power should be increased to 130 per cent in an emergency application. In city service under average conditions a maximum braking power of 100 per cent was as great as was desirable.

Mr. Baukat, referring to a visit to Columbus, Ohio, said that he had found that the Columbus company, which had the low brakeshoe cost of 30 cents per 1000 car miles, used brakebeams on 75 per cent of its trucks with both inside-hung and outside-hung brake rigging. He had almost decided to adopt brakebeams entirely.

Question 25, on field testing, was not discussed, as it was announced that the ELECTRIC RAILWAY JOURNAL for March 15 would contain a description of the Brooklyn Rapid Transit Company's equipment for this purpose.

W. H. Rushton, Altoona, said that on a number of his interurban cars weighing 44,000 lb. light the braking power was 144 per cent. The first trouble was with the brakebeams, which had to be strengthened, and the body bolsters also had a tendency to tilt. He had expected much trouble from flat wheels and higher brakeshoe cost, but these disadvantages had not followed. He did not consider it good mechanical practice to exceed 100 per cent in braking power, but it had been done to meet transportation requirements.

Question 26, on electric welding, was then discussed. Mr. Branson said that the Philadelphia Rapid Transit Company had begun electric welding some nine years ago. He did not know just how economical it was in comparison with other methods, as no record was kept on the amount of electrical energy used, but he did know that it had cut down the blacksmith labor from twenty to seven men.

In reply to A. F. Rexroth, Harrisburg, Mr. Baukat said that the oxy-acetylene welding might be cheaper than electric welding but it was not so convenient because the gas and auxiliary appliances were not readily obtained like electric current.

Mr. Stucki stated that he would not recommend electric welding for brake rods or other parts which are subject to great stresses. He had also used oxy-acetylene, but found that it was costlier than electricity. In one case the cost for electric welding was $4, as compared with $7 for oxy-acetylene.

President Gould, Reading, said that his oxy-acetylene welding of armature shafts had not proved successful, as they broke at the point where the weld had been made, but three shafts electrically welded three years ago were still in service.

The meeting was then adjourned.

A TALE OF TWO CITIES

BY WILLIAM A. HEINDLE, GENERAL SUPERINTENDENT WILMINGTON & PHILADELPHIA TRACTION COMPANY

Unlike Dickens' "A Tale of Two Cities," I propose to relate, not a story of intrigue or conspiracy, but events which occurred within the past few years in the management of the street railway systems in two cities not far from here. The population of city "A" was, roughly, double that of city "B." As the combined population approximates but 135,000, trolley operations were on a moderate basis.

The trolley lines of each city were formerly operated under separate local managements but controlled by the same ownership. System "B" operated a through line of cars to the railroad center in system "A." The lines of both systems had reached the age in which wear and tear greatly overbalanced much needed maintenance.

In 1910 new interests assumed control, facing the problem of building up the properties both physically and financially. They were at once besieged with numerous complaints and suggestions for better service. A careful survey of conditions was made, a program of work and expenditures mapped out in advance and authorization given the manager to proceed at once with the most urgent improvements. From the start two rules were laid down as necessary to success—first, the public must receive courteous treatment; second, good service must be given.

Some of the cars were very old, and the replacement of many older motors by modern machines was carried out. Standardization of other parts, such as brake rigging, brakeshoes, wheels, etc., went into effect as rapidly as possible. Changes in shops and in the working conditions of shop and carhouse men and the installation of efficient heating plants, lockers, improved lighting and regular cleaning of carhouses and shops quickly resulted in greater efficiency from the men and equipment. The three "R's" of rolling stock—namely, water, paint and varnish—helped to better the appearance of the car bodies. The request to change from longitudinal to cross seats on cars operating on the 20-mile suburban line was heeded and the patrons greatly pleased. To meet the need for new cars, the semi-convertible type suitable for all year operation was selected after careful consideration. The cars had large platforms without the prepayment feature, but the design was such that this could be added if found desirable. The new cars were spaced on the principal lines, and public comment was very encouraging.

While the program as outlined above was in progress, new joints were installed and the best special track work obtainable was purchased invariably. Sample sections of high T-rail construction were built and contrasted with tram and grooved girder types to demonstrate that the objections to it by the city officials were unfounded, at least for certain locations.

The chief problems were to instil loyalty into the employees, to encourage all to co-operate toward the general good, to make the former separate city divisions act as a unit under the same management, and finally to win public favor through good service. The new operators first made known that merit alone marked the man; there were to be no favorites. Particular care was exercised in selecting new men; great attention was given to their training, and a small school of instruction was added for training recruits. A weekly bulletin was issued treating on live topics, and a word of praise here and of condemnation there was addressed to the trainmen. Each week the total number of accidents was recorded with short comment on their causes and remedies.

An employees' relief association was organized with customary dues, sick and death benefits, and club rooms for the men were established on a small scale. An annual field day at the company's park with sports and games between individuals and divisions was inaugurated. Gun clubs were formed, match shoots were held and general good feeling was soon found to prevail.

All employees had the fact impressed upon them that they held important positions worthy of their best attention, that the company employing them was a public servant in the fullest sense of the word, and that the public expected courteous treatment on their part.

In the treatment of the public all suggestions or complaints received investigation, and courteous replies were always made. Often calls were made in person by the manager or his assistants. The pass privilege was abolished, newspapers received all news of interest and no part was taken in politics. The orders of municipal bodies received prompt attention, without, however, waiving the company's rights in the matter.

When demands were made for more service on a particular line the total number of passengers hauled on each trip as shown on conductors' trip sheets, or by actual count, was plotted on cross-section paper, this curve indicating the true conditions at a glance. Across this curve a line was drawn to represent the seating capacity of a car. These curves proved valuable in discussing the question of service with the parties interested and indicated very forcibly what could be accomplished by shortening the headway during the rush hours as against the use of trippers. By working along these lines improved service was possible with but a small increase in the total number of car hours, and the friendly feeling of the public which finally was brought into being was exemplified by the often repeated remark that the schedule was so perfect that clocks could be regulated by it.

PARK MANAGEMENT AND ITS TRANSPORTATION PROBLEMS

BY C. F. CRANE, SUPERINTENDENT OF RAILWAYS EASTERN PENNSYLVANIA RAILWAYS

A few years ago summer electric parks came into existence and were fathered principally by electric railways for the sole purpose of creating traffic. They did create quite an increase, but, unfortunately, it seems to be the history of parks catering to a population of 100,000 or less that in the course of a few years public interest in each particular park seems to die out. The railroad manager is generally at a loss to keep this public interest alive, and in order to make his park appear profitable he may resort to what is termed "bookkeeping jugglery."

Unless the property is large enough to employ a park manager, his duties generally fall on a railroad operating official, so that after years of study and experience in operating railroads this person finds himself called upon to be practically an amusement expert. It is gradually dawning on the electric railway managers that, instead of operating a park in this manner, it would be much better to lease the entire park grounds and privileges outright to an amusement company. Such a company should be divorced entirely from the electric railway, which could then devote its labor and studies solely to the profitable transportation of park passengers, its legitimate business, while the responsibility of amusing the public would be placed directly in the hands of people trained for such purposes. I might further suggest that the electric railways go a step farther and work toward the creation of a park amusement company composed of practical amusement men who would lease the park grounds and privileges on long terms and maintain an amusement park circuit similar to the many successful theater circuits now in being. If your local theater is part of a circuit, why not your park?

Take your theater privilege, for instance. The average electric railway official will book his attractions through a booking agent and generally will pay a higher rate for acts than a professional amusement man. Often the railroad man finds himself in this position: A new show has arrived at his park and rehearses. It is to open on Monday evening and will probably consist of four or five vaudeville acts, with moving pictures, or possibly an illustrated song, between. The man who is thoroughly competent to operate a railway must now attempt the rôle of critic for his park patrons. During the course of the performance he may feel that something is wrong, but nine times out of ten he has not had the dramatic training to enable him to determine the real source of trouble with any degree of accuracy. On the other hand, a practical theatrical man might be able to produce a first-class show from the same materials merely by rearranging the order of the acts and eliminating some objectionable features.

One of the greatest leaks in park operation is the free attraction. For some reason or other in years gone by the electric railway officials imagined that they must give a free attraction. Evidently they obtained this notion from the circus method of giving a "free open-air performance immediately before the big show starts"; but a summer park is entirely different from a circus. With the increased cost per mile of carrying a passenger and the constant tendency to lengthen the distance a passenger is carried for a 5-cent fare, only a very small margin is left for a free attraction. We will assume that 60 per cent of the gross fare receipts are required for operating expenses. This would be 3 cents out of your 5-cent fare. On allowing 1 cent for fixed charges, you would have left approximately 1 cent profit per passenger. If you give a free attraction that costs you $50 a day, you would necessarily be obliged to handle 5000 passengers every day just to pay for this feature. This first 5000 passengers would be handled at practically a total loss and with no margin of reserve to cover the greater liability for accidents due to the use of open cars and inexperienced extras. Hence one of the problems a park manager should study most thoroughly is that of placing each and every attraction in his park upon a self-sustaining and, if possible, upon a profitable basis. This end would naturally be the sole aim of the amusement company which leased your park property and privileges outright. Thus each operator, the railway company and the amusement purveyor, would be in the best position to earn a profit from its own legitimate business.

Another problem of the smaller companies is the satisfactory handling of park traffic. If the park is in territory serving working people, it necessarily becomes an evening resort. Consequently, extra cars are required in the evening. For a period of one and one-half to two hours the people travel to the park. After the performance and dances, there must be available enough equipment to handle the traffic on the home trip in less time than it took to transport the people to the park earlier in the evening. If the company has ten extra cars stored up waiting for the rush trip home, it necessarily loses ten car hours' service, or twenty hours' platform time, for each hour the cars are stored up.

Another serious problem is to have the park located on a division that is operated only during the summer. The railway manager finds himself called upon to operate some sort of a schedule for a few weeks before he opens his park, if the weather is pleasant after a winter siege. Generally, this schedule barely pays for axle grease. To console himself for the loss, the manager tries to place a value on it in assuming that he is pleasing the public. When he closes down the park, generally Labor Day week, after, say, 115 days' operation with good and bad weather, he stil finds that some sort of an unprofitable schedule must be operated until the weather becomes too cold for outdoor excursions. These losses would be avoided if the park was located on one of the suburban or interurban divisions where a schedule is maintained by the company all the year round as a matter of course.

In conclusion, do not lose track of the fact that your park season may be of 100 or 115 days' duration, during which time you may carry a greater number of people than for any corresponding period during the rest of the year; but, to offset this, you must maintain your park properties, carry expensive building insurance and pay interest on your investment in parks and summer cars. Hence the question of eliminating the park property on a number of roads might be seriously considered. It is the day-to-day travel for 365 days of the year that the railroad manager most desires. I believe in creating and developing such day-to-day travel by co-operating with the local business men's associations and boards of trade with a view of increasing the number of manufacturing interests in each locality, and thereby increasing the traffic from the transportation of working people and shoppers. The same amount of money that you now expend to induce 1000 additional people to travel to your park would bring in far more revenue at the end of the year if it was expended carefully along these co-operative lines of creating every-day-in-the-year travel.

ANNUAL MEETING OF ILLINOIS ELECTRIC RAILWAYS ASSOCIATION

The postponed annual January meeting of the Illinois Electric Railways Association was held on March 7 at the La Salle Hotel, Chicago. This meeting was unusually well attended, practically all member companies being represented. The morning session opened with E. C. Faber, the president, presiding, and, following an announcement that the association would give a "get together" luncheon at the noon hour, the secretary proceeded with the roll call and the minutes of the last meeting.

COMMITTEE REPORTS

The next subject in the regular order of business was the report of the various standing committees.

Frank E. Johnson, Ohio Brass Company, reported, as chairman of the membership committee, an increase of 40 per cent in the membership for the second year of this association's existence. Secretary Flenner reported for G. W. Quackenbush, chairman of the traffic committee, on the adoption of an interchangeable coupon ticket. He said that the ticket had been accepted as to form and each company has filed its concurrence in the tariff. Copies of these concurrences as well as the tariff have also been filed with the Interstate Commerce Commission. The interchangeable coupon ticket would be ready for delivery in time for general use by April 10. The chairman of the traffic committee will furnish requisition blanks for coupon ticket stock to each of the member companies and will issue tickets in accordance with these requests, keeping a record of their distribution.

A report of the signal committee was made by its chairman, John Leisenring. It included a written description of the Simmen signal system as installed on the Greensburg division of the Indianapolis & Cincinnati Traction Company. Mr. Leisenring called attention to the proposed set of rules for construction, reconstruction and maintenance of interlocking plants which was being prepared by the railroad commissions of Illinois, Indiana and Wisconsin. He said a letter had been issued by the engineer of the Illinois Railroad and Warehouse Commission requesting the signal engineers of the different roads in these three states to appear before a joint meeting of the three commissions held in Springfield, Ill., to discuss the proposed rules. Signal engineers from twenty-five different railroads attended this joint meeting, and in conclusion it was decided to continue the hearing until the roads could have sufficient time to prepare their objections. Following the hearing, the signal engineers appointed a committee to prepare a set of objections to the proposed rules. Mr. Leisenring advised that a number of requirements in them should be opposed vigorously by all roads operating and maintaining interlocking plants. The principal objections are to the amount of protection required at these plants as well as the location of the signals. H. E. Chubbuck suggested that the standing signal committee be requested to attend the final hearing before the Railroad and Warehouse Commission, which is to be held in Chicago in the near future. B. J. Fallon, engineer maintenance of the elevated railroads of Chicago, was requested to assist the signal committee in its work.

Chairman F. G. Buffe of the committee on publicity stated that his committee was having excellent success in obtaining all kinds of newspaper publicity throughout the State. At the conclusion of this report the president urged this committee to proceed with the statistical information so that it could be used to impress the new public utility commission with the importance of this industry in Illinois. Mr. Chubbuck urged that a large delegation meet the new commission at the first opportunity, as well as the various House and Senate committees considering bills affecting electric railways. The secretary was instructed to write each of the member companies in case one of these committees desired the appearance of representatives to discuss a particular bill.

Following the completion of reports from the different standing committees, President Edwin C. Faber, general manager Chicago, Aurora & Elgin Railroad, read the annual address of the president to the association, as follows:

PRESIDENT'S ANNUAL ADDRESS

"A brief survey of the work done in this organization during the past two years reveals the fact that the Illinois Electric Railways Association has already much more than justified its existence, and that its purposes and aims have been demonstrated as capable of successful accomplishment. I think we may look with considerable satisfaction on the progress made by our association in so short a time. Necessarily the first year of our association's life was devoted chiefly to organization and the working out of those details necessary to secure a continued existence. Yet at the very beginning important questions thrust themselves forward—questions and problems that could be met most successfully by the concerted action of the association.

"Matters affecting the common interests and welfare of our members have been brought up, investigated and in some instances settled to their mutual advantage. The coordinated interests of the various properties which constitute our membership and the increasing complexity of their relations to the State and the various municipalities demonstrate with ever-growing insistency the necessity of unified action to conserve their welfare.

"Since our association has been organized laws have been passed affecting the railroad interests of the State. During the pendency of these enactments your executive committee was active and on the ground at various times, observant of the interests of the members and alert to secure for the railways the best consideration obtainable. The committee's efforts and watchfulness undoubtedly obtained beneficial results that would otherwise have been lost.

"Besides the concrete examples of good work done by the committee along these lines, an important and influential attainment may be found in the recognition its work has gained for electric railroads before legislative committees and the State commission. This will be of increasing value to the interests represented by this association. It will eventually result in establishing the true status of the electric railways of this State. It will secure recognition before the legislative bodies and commissions commensurate with their importance among the industries of the State.

"Shortly after the recent State election Mr. Chubbuck and myself, representing the association, had a most satisfactory interview with the Governor-elect. At that meeting the affairs of the electric railways of Illinois were discussed and the important position they occupy in the industrial life of the State was impressed upon him. As a result of this conference we secured the assurance that our interests will be properly considered by the executive department during the present administration.

"It has been a matter of common knowledge that hitherto steam roads have been reluctant to give electric roads any recognition or accord to them the rights to which they are entitled as common carriers. In this field a new light is dawning and electric roads are coming into their own. Steam roads are generally showing a disposition to treat with us and enter into friendly and reciprocal relations, in some instances taking the initiative in seeking to promote an alliance for the development of interchange business, physical connections, etc. The steam road organizations also are opening their doors to us. At least two of our member companies have been admitted recently to the per diem rules agreement, which carries with it membership in the American Railway Association and the Master Car Builders' Association. They are also inviting us to cooperate with them in organizations designed to promote the welfare and protect the interests of both classes of railroads.

"A short time ago the principal steam roads of the Central States organized for the purpose of anticipating and safeguarding against unfavorable legislation in various states. Electric railways were invited to co-operate in this movement, and the executive committee of this association was represented at the initial meeting held at Chicago early this winter. Some of our members have joined hands with the steam roads in this organization and others will no doubt do likewise.

"The initiative taken by this association last October in subscribing to membership in the American Association and in establishing headquarters at the convention hall at the last annual meeting created a new departure. It has resulted in the American Association formulating a plan to bring into closer relations with that body all the sectional associations of the country.

"The work done by other standing committees has been no less important and successful. The traffic committee has labored faithfully with many questions and produced important results, such as the adoption of an interchangeable coupon ticket, a sectional map of the electric railways of this and adjoining states, joint freight rates, etc. The signal committee's report, which has been printed by the association and distributed, is a notable achievement, embodying a vast amount of investigation, statistical data and scientific information on the subject. This work will prove a valuable guide and most helpful to all our railway members in their consideration of this highly important element in railway operation. The membership committee should receive the highest praise for its active and successful work during the past year. The success of our association is due in no small part to its earnest and efficient endeavor. Twelve new members were admitted this year, and more would have been added had this committee not deemed it prudent for certain reasons to slacken its efforts toward the end of the year.

"In addition to that which has been outlined, the educational side has been strongly featured. The program committee has placed before our meetings many meritorious papers, in the preparation of which various members have responded in a most praiseworthy manner. With two or three exceptions, all the papers read before this body have been prepared by our own members. By the literary excellence and learning displayed these papers reveal the fact that we have among us many men of high attainment in their respective lines—men qualified to give this association a character and standing second to none.

"In view of what we have already done, in the light of the achievements of our brief career as an organization, can we not safely predict more notable successes, greater accomplishment, more good, in the future? Busy as we all are in our own special environment, I know how difficult it is to spare even a few moments from the duties that engross every hour. But I must urge upon every one of you to spare enough of your time, your brains, your energy, to build up this association to the highest success. Let every member make our meetings more beneficial by his presence and hearty participation."

ELECTION OF OFFICERS AND OTHER BUSINESS

The "get together" lunch was informal and was served in a private dining room where the members could freely discuss subjects of interest to themselves and the association.

The report of the nominating committee was received immediately following the luncheon and adopted as a whole. The new officers of the association are: President, Marshall E. Sampsell, president Central Illinois Public Service Company and Central Illinois Traction Company, Chicago; first vice-president, Britton I. Budd, president Chicago Elevated Railway Companies; second vice-president, F. E. Fisher, general superintendent Chicago, Ottawa & Peoria Railway Company, Ottawa, Ill., and secretary and treasurer, C. E. Flenner, auditor Aurora, Elgin & Chicago Railroad Company, Wheaton, Ill.

The executive committee will be composed of E. C. Faber, chairman; H. E. Chubbuck, Peoria, Ill.; W. C. Sparks, Rockford, Ill.; L. C. Haynes, East St. Louis, Ill.; J. R. Blackhall, Joliet, Ill., and H. T. Dillon, Springfield, Ill.

Other standing committees include a traffic committee, of which G. W. Quackenbush, Springfield, Ill., is chairman, and R. Breckenridge, F. D. Eckmann, A. W. Jordan and C. C. Shockley are members.

John Leisenring again was appointed chairman of the signal committee, the membership of which includes E. F. Gould, J. O. Tucker and M. J. Feron.

F. E. Johnson, Ohio Brass Company, was again appointed chairman of the membership committee, which includes G. T. Seeley and R. H. Heyworth. The committee on publicity is composed of F. G. Buffe, chairman; C. E. Patten, A. B. Furlong and Joseph Bush.

Following the appointment of the several standing committees by President Sampsell, Mr. Chubbuck called the association's attention to an important decision rendered for his company in a case before the Interstate Commerce Commission in which the Peoria & Pekin Union Railway was made the defendant. His road had asked for a general interchange of traffic with the defendant company by the establishment of through routes, which the latter had refused to grant. The result of this important decision was that all steam roads were forced to handle electric railway cars in traffic interchange. This gave the Illinois Traction System use of the defendant company's terminals as well as its connections to various industries. The decision was subject to further appeal, but no action had yet been taken by the defendant company. Mr. Chubbuck emphasized further the effect this decision would have on the future of electric railroads, and he suggested that the secretary be instructed to secure copies of the decisions for the member companies, which was so ordered.

In further discussion of the subject of interchange between steam and electric roads, F. E. Fisher, general superintendent Chicago, Ottawa & Peoria Railroad, suggested that the member companies of the association should exchange information as to their traffic relations with steam roads. He suggested that information of this character could be used by all roads in urging a request for general interchange of traffic.

Upon motion, it was decided to make this annual meeting of the association take the place of the regular March meeting and that the next meeting should take place on the third Friday in May, the place of meeting to be selected by the executive committee. The meeting then adjourned.

COMPARATIVE ENERGY CONSUMPTION ON THE SPIEZ-FRUTIGEN RAILWAY

According to an article by J. Bourdel in a recent number of *Le Génie Civil*, the results of recent energy consumption tests on the Spiez-Frutigen Railway, a part of the Lötschberg tunnel route, were as follows for the conditions noted:

	Siemens-Schuckert Motor Car	Oerlikon Locomotive	Allgemeine Locomotive
Length of test track, miles	8.37	8.37	6.14
Greatest difference in height, feet	492	492	337
Weight in metric tons	125	346	497
Per cent load	100	50	100
Performance, metric ton miles	1048	2790	3038
Calculation of work done at the wheels, kw-hr.	84.5	220	227
Calculation of watt-hours per ton mile	80	78.4	74.1
Metered energy, kw-hr.	107.5	264	310
Metered energy, watt-hours per ton mile	101.6	94.4	101.6
Total efficiency, per cent	78.5	83.5	73.3

According to these figures the series motor appears to be superior to the repulsion motor from the standpoint of economy in energy consumption, and more particularly at starting. It was also found that a coefficient of rail friction of one-fifth was sufficient for good starting.

RESULT OF INQUIRY INTO COST OF LIVING IN PHILADELPHIA

The following statement from Co-operative Bulletin No. 12 issued by the Stotesbury management of the Philadelphia (Pa.) Rapid Transit Company gives substantially in full the result of the inquiry by the company into the cost of living of its trainmen as contained in the bulletin:

"The committee of six members from the co-operative committee appointed to audit the returns decided to base its report of housekeeping expenses on the statements of the 500 families who had no other income than the wages received from the company by the head of the family and who were paying a monthly rent for their homes.

"The result of the investigation by the committee is as follows:

EXPENSES MONTH OF JANUARY, 1913
(500 typical families having no other income than wages of head of family received from company)

	Total	Per family
Rent	$7,007.00	$14.01
Foodstuffs	16,092.21	32.18
All other expenses	10,356.27	20.71
Total expenses	$33,455.48	$66.90

"The average rent as shown, $14.01 per month, was found to secure a comfortable two-story house with from four to six rooms with bath, located in a respectable residence neighborhood.

"The average cost of foodstuffs, $32.18, includes fresh meats, $9.65; groceries, $13.20, and all other foodstuffs, $9.33.

"In the item 'All other expenses,' amounting to $20.71 per family, were included all other expenditures actually made by the 500 families in January, i. e., heating and lighting, clothing, insurance, entertainment, charities, taxes, interest, doctors' bills, etc. In this item were also included purchases of household effects such as carpets, furniture, kitchenware, etc.

"Inasmuch as the expenses for heating and lighting, winter clothing, doctors' bills and other items are usually higher in January than at any other time of the year, the average total expenses per family of $66.90, as shown in the committee's report, may be fairly said to represent the maximum monthly expenses that the motormen and conductors are called upon to meet out of their wages.

"The average size of the families of these motormen and conductors was found to be four persons, i. e., two adults and two children.

"This committee on cost of living was continued and instructed to secure a comparison as between the wholesale and retail prices of the several standard articles of foodstuffs which are in general use in the homes of the men.

"The earnings of the 500 men whose expenses are included in the foregoing statement were carefully drawn from the pay rolls for January, 1912, as well as for January, 1913. This was done not only for the purpose of arriving at the income of the men as compared with the cost of living, but also for the purpose of supplying definite information as to the exact result of the wage increases secured by means of the co-operative plan and 22 per cent fund during the past year.

"During January, 1913, 131.147 hours of service were performed by these 500 men, the average time of service per month per man being 26.2 ten-hour days. The wages paid for this service at 27 cents per hour amounted to $35,409.66, making an average of $70.82 for each man.

"These 500 men performed in January, 1913, one and a half days' service more than they did in January, 1912. The men in working 26.2 days in the thirty-one-day month of January, 1913, performed that amount of service which would approximate working every day with an average lay-off of one day in seven. The increased wage of $$11.42 per man was partially due to the one and a half days of added service rendered as compared with January, 1912 but mostly because of the increase of 3 cents per hour, which is the amount wages have been increased during the past year. The net average result of $70.82 per man for the month as compared with the wages paid last year, $59.40 per man, has, it is plain, not only made possible a higher scale of living but raised the wage paid to the men from the point of a bare sufficiency to that which provides a small amount in excess of the cost of living. We may, therefore, expect further increases, as they occur, to make possible to the men the laying aside of savings and the ability to provide in a better way for their own necessities and those of their families."

UNION TRACTION COMPANY SHOP NOTES

The Union Traction Company of Indiana has been making an efficiency campaign in shop methods and processes. In order to keep the high-priced workmen constantly employed on a given repair job and at the same time keep them supplied with tools and material, several shop errand boys have been added to the force. Heretofore it has been necessary for the workmen or foreman personally to make trips to the tool room or stock room for additional tools or supplies. Now a properly signed order carried by an errand boy receiving $5 a week accomplishes the result.

Another source of economy has been obtained by carrying an assorted stock of second-hand hardware. All hardware, such as car fittings, bolts, screws, etc., is carefully removed from a car which is being overhauled and thrown into a heap where it is sorted by the errand boy into the different sizes and types. If the threads are faulty on bolts and it is possible to make them good by rethreading, this is done. In case the threads are so badly battered that the bolt cannot be rethreaded for use in its original length, it is cut off and rethreaded to some shorter standard stock size. The cost of obtaining this renewed life is nominal.

Hardware and fittings for use in cars which are being rebuilt are dumped into a nitric-acid bath to remove the lacquer and then polished with a scratch wheel. This applies a satin finish, making the metal appear as though new. In order that the foreman in the erecting carpenter shop may know what second-hand hardware is on hand at all times a board of sufficient size to take the various sizes and types is mounted conveniently on the shop wall. Samples of all the different kinds of second-hand hardware are attached to this board and remain there as long as there is any of the type in the second-hand stock. All workmen are required to use this supply of second-hand material as far as it will go in making repairs to old cars.

In a number of instances it has been necessary to remove air compressors from rolling stock because they were of an obsolete type too low in capacity to meet operating needs. Rather than scrap them or sell them as second-hand equipment one has been installed in each of the substations on this company's line. The air compressor in combination with a reservoir is used in cleaning around the substation, as well as for supplying air to car reservoirs in case of failures en route. The possibilities of an installation of this kind at each substation are evident and this company has found that the compressors are worth more in such locations than their value as scrap or second-hand equipment.

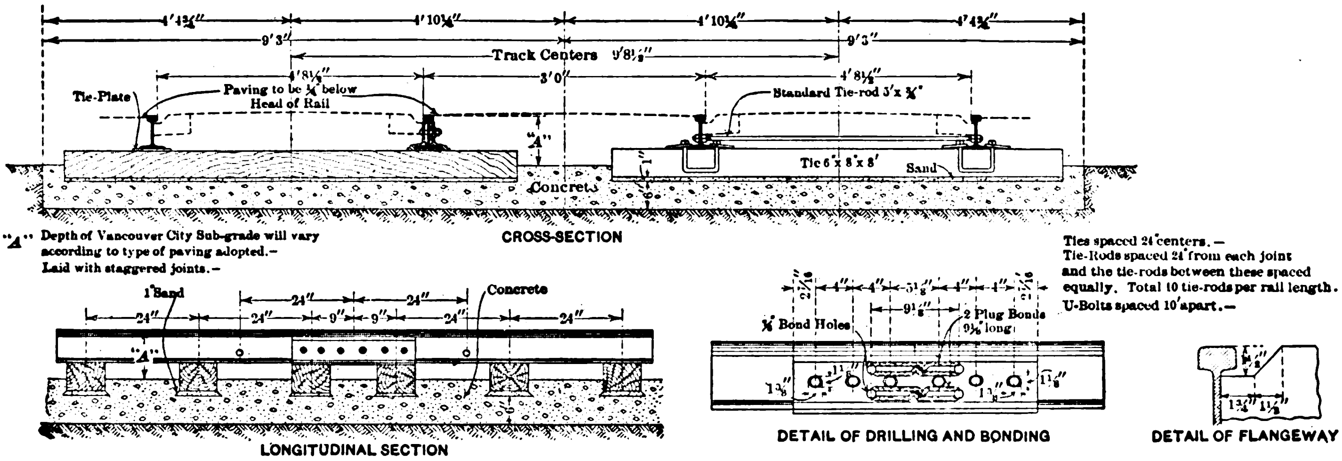
This company has equipped all of its passenger cars with a complete outfit of fire-fighting apparatus. A soda-ash fire extinguisher is installed in the baggage compartment, a Pyrene extinguisher in the passenger compartment and a canvas bucket in the tool box under each car. In addition to the canvas bucket, which also is used in case of a hot bearing, the tool box is supplied with a grease bucket containing saturated waste and packing tools.

A reduction in the damage resulting from a short-circuit in an armature or field coil is being effected by the introduction of the type of armature band recently adopted by motor manufacturers. This consists of a 24-gage tire channel cut so as exactly to encircle the armature. The usual wire banding ranging from 15-gage to 17-gage is wound around the armature inside the channel. After the wire has been applied, the flanges of the channel are bent down over it and the whole is filled with solder. The advantages of this type of banding are that it produces a stronger band at about the same cost as the ordinary method and at the same time the whole acts as a unit. In case a short-circuit appears in the armature near the band and a portion of this is fused, the wire does not unwrap, resulting in great damage to the armature and fields.

The addition of a portable welding outfit to the shop equipment has been made recently and will be used in rehabilitating all kinds of rolling stock equipment as a welder and building-up tool. It will also be used in obtaining renewed life from badly worn special work in paved streets along the company's line.

SAND CUSHION SUPPORT FOR CROSS TIES*

As a part of the discussion on a paper read before the American Society of Civil Engineers and abstracted in the ELECTRIC RAILWAY JOURNAL for Oct. 19, 1912, page 883, C. B. Vorce contributed an account of his experiences with track on the British Columbia Electric Railway in Vancouver, B. C. He stated that very poor results had been obtained with the concrete-girder and steel-tie form of construction. This type had been standard, but, on account of poor foundations, the concrete girders had broken badly with most disastrous results to both the pavement and the track. The type of construction shown in the accompanying line cut was thereupon recommended and later adopted, since which time about 15 miles of double track had been laid. Up to the present time no signs of failure had been noticed.


4'4¾"
4'10¾"
4'10¾"
4'4¾"
9'3"
9'3"
Track Centers 9'8½"
4'8½"
3'0"
4'8½"
Tie-Plate
Paving to be ¾" below Head of Rail
Standard Tie-rod 3'x ¾"
"A"
1"
Tie 6"x 8"x 8'
Sand
Concrete
"A" Depth of Vancouver City Sub-grade will vary according to type of paving adopted.–
Laid with staggered joints.–
CROSS-SECTION
1" Sand
Concrete
24"
24"
24"
9"
9"
24"
24"
24"
"A"
LONGITUDINAL SECTION
Ties spaced 24" centers.–
Tie-Rods spaced 24" from each joint and the tie-rods between these spaced equally. Total 10 tie-rods per rail length.
U-Bolts spaced 10' apart.–
¾" Bond Holes
2 Plug Bonds 9¼" long
4"
4"
3⅛"
4"
4"
9⅛"
1⅜"
1⅛"
DETAIL OF DRILLING AND BONDING
1¾"
1⅛"
DETAIL OF FLANGEWAY

Vancouver Track—Section Showing Ties Supported on Sand Cushion

It was the writer's opinion that it was possible to build too rigid a track and it was desirable to avoid hardness and lack of elasticity, which increased the cost of maintenance for both cars and track. He objected to the use of steel ties embedded in the concrete, as the concrete between the ties and between the rails would shrink, allowing the rail to move slightly. Wooden ties spaced 2 ft. center to center and surfaced on about 1 in. of sand to act as a cushion were preferable. The life of the wood was stated to be satisfactory, as in Vancouver ties which had been embedded in concrete for fourteen years had been taken up and found to be perfectly sound.

The writer stated that although the best paving bricks obtainable on the Pacific Coast had been tried, the results with them in forming a flangeway on the running side of the rail had been very poor, and for this reason the company had been forced to adopt granite flangeway blocks although the cost was at least 50 per cent greater than that of brick. As many of the streets in Vancouver were paved with wood blocks which were narrower than the granite flangeway blocks no bond was possible and a straight joint parallel to the rail resulted. However, since the adoption of the concrete slab type of construction there had been very little trouble with this.

The selection of a type of permanent track for the city of Vancouver was influenced by the fact that the streets had first been planked and then macadamized, the macadam seldom being renewed before laying the permanent pavement on the concrete base. For this reason the foundation was very poor and the type of construction used was selected to meet the peculiar existing conditions.

The construction work was carried on with a temporary track outside of the track allowance to take care of traffic during construction, thus enabling the company to build both tracks at once. When the traffic was turned over to the temporary tracks the old track was torn up and piled on the side of the street for removal by work cars. Grading was then started and forms were set by the company's engineer to the proper grade for the top of the slab, a small gang of fine graders following up the rough graders. As soon as one city block had been rough-graded work on the concrete slab below the level of the ties was commenced, concrete being run through the mixer and delivered into a traveling bucket on a 30-ft. boom attached to the mixer and which swung through 180 deg. The rails were distributed by an electric derrick car and the ties by the company's motor car. After the lower portion of the slab had set twenty-four hours the ties were distributed and the rails were laid, the track being surfaced to grade with sand varying in thickness from ¾ in. to 1¼ in. After the track had been surfaced, the sand was scraped out from between the ties and the final concrete course was laid. The four operations—grading, laying the lower part of the slab, laying the track and putting in the upper part of the concrete slab—were carried on at the same time, resulting not only in rapidity but also in economy.

The record of passenger train performances on the steam railroads of New York State for January shows that during the month the number of trains run was 65,892. Of the number of trains run, 82 per cent were on time at the division terminal. The avergae delay for each late train was 29.1 minutes and the average delay for each train run was 5.2 minutes.

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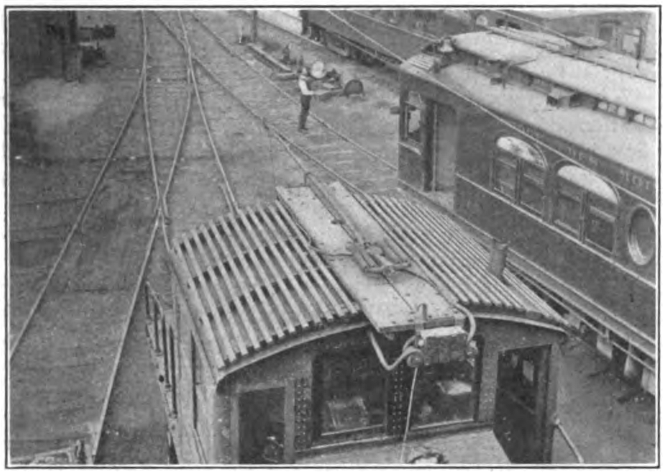
*Abstract of discussion of a paper presented Oct. 16, 1912, before the American Society of Civil Engineers, entitled "A Brief Description of Modern Street Railway Construction," by A. C. Polk. Printed in full on pages 249 to 255 of the society's "Proceedings," for February, 1913.

AN INSULATED ROOF FOR ELECTRIC LOCOMOTIVES

The Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., which is now being operated at 1200 volts d. c., has insulated the entire roof of each engine with wooden slats. The nailing strips, 3-in. x 6-in. yellow pine, are cut to fit the contour of the roof and bolted to it. The slats are 1-in. x 2½-in. yellow pine applied so as to leave a 2-in. space between them. The addition of this protective feature is simple and inexpensive and adds greatly to the safety of trainmen, who in emergencies may have to mount the engine roof. The slatted roof of one of these locomotives is shown in the accompanying illustration.



Fort Dodge, Des Moines & Southern—Insulated Cab Roof for Electric Locomotives

LIGHT SIGNAL PERFORMANCE RECORD ON THE TERRE HAUTE, INDIANAPOLIS & EASTERN

Although the light signal installation on the lines of the Terre Haute, Indianapolis & Eastern Traction Company has been in operation less than one year, some idea as to its efficiency may be drawn from the performance record for the three months ended Jan. 31, 1913.

The protected section is situated between Greencastle and Brazil on the Brazil-Terre Haute division and includes twelve signals in six blocks, covering approximately 15 miles of road. The signals are of the General Railway Signal Company's light-signal type arranged for the absolute-permissive block system. The engineering details, as well as the design of the signals themselves, were described in the Electric Railway Journal of Aug. 24, 1912.

For the three months' operation ended Jan. 31, 1913, the total number of signal movements recorded was 44,896. In this total number of movements there were twenty-seven failures, giving an efficiency average of 99.937 per cent, or one failure in 1662 movements. The record of the failures and the causes therefor are as follows: five false red indications from unknown causes, one false red indication caused by changing a check relay, one false red indication on account of maintainer working on blocks, two false red indications due to bad bonds and one false red indication on account of sluggish relay. On Jan. 20 all blocks were out of service from 7:30 a. m. to 8:10 a. m. on account of a fuse being burned out by lightning.

It will be seen from this record that in no case was there a false clear signal, that several of the false movements were of a character which it is possible to eliminate, and that of the twenty-seven failures twelve occurred on Jan. 20 because of fuses burned out by lightning. Failures from the latter cause are extraordinary, and when the average signal performance for the year is available the efficiency will show an increase.

JOINT CALIFORNIA COMMITTEE ON INDUCTIVE INTERFERENCE

The Railroad Commission of the State of California has had brought to its attention many cases of inductive interference between power lines and lines of communication systems. In considering these cases the commission has found that much theory but comparatively little accurate information is available as to the quantitative effect of different factors in such interference. For the purpose of formulating plans to remedy this condition a conference of representatives of power, communication and railroad interests of the State was held on Dec. 16, 1912. The commission was also officially represented. A committee of fifteen was appointed, with sub-committees on ways and means, finance, transportation, program and publicity. A special committee was also appointed to supervise the tests and to analyze the results obtained. The work will be supported by voluntary contributions.

The committee on tests will first utilize all data now available and will continue tests already begun by the Pacific Telephone & Telegraph Company and the Coast Counties Gas & Electric Company. These companies have a parallel in the Santa Clara Valley, which they have been investigating for some time. The preliminary program has been laid out on the basis of making tests on telephone circuits, on telegraph circuits and on railroad signaling circuits and of making miscellaneous tests on special types of equipment not otherwise covered. In making these tests it is expected that the companies concerned will be willing to allow the use of circuits for testing purposes whenever this will not interfere with public service and that they will cooperate in every way in obtaining the desired results. For example, in making telephone tests it is proposed to disconnect at both ends parts of circuits exposed to interference and thus isolate the testing sections. From these isolated sections insulated wires will be run to the testing stations, the wires being well transposed en route.

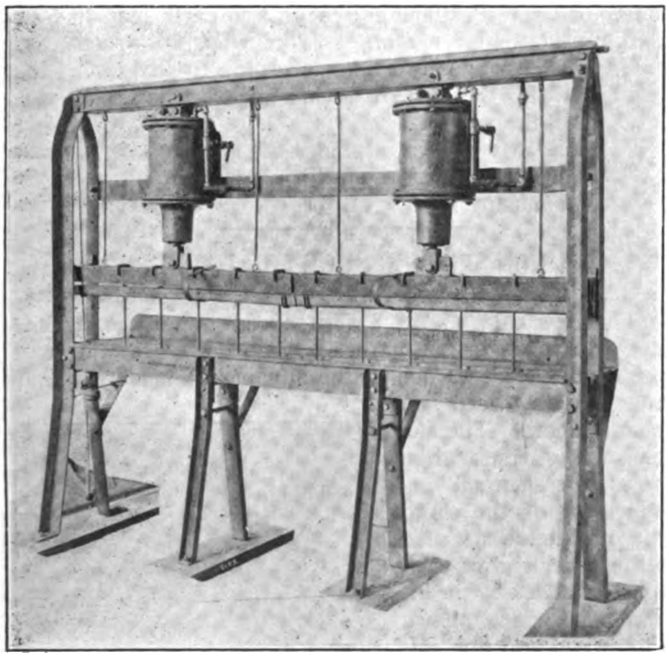
As examples of the kinds of tests that will be made the following are outlined: determinations of the capacity and insulation balance of each telephone circuit; of the total noise induced in the telephone circuits; of the current flowing between the telephone wires and ground on short-circuit; of the voltage induced between telephone lines and ground on open-circuit, etc. Oscillograms of the voltages and currents in connection with the above-mentioned tests will be made. The tests on telegraph circuits and on railroad signaling circuits will be carried on in the same comprehensive manner. Special attention will be given to the conditions of the power circuits liable to cause disturbance. The committee has outlined the following as tests which seem desirable:

(1) With the power line cut dead, to determine that under these conditions the signaling circuits are free from disturbances. (2) The inductive disturbance under normal operating conditions, both light and heavy load. (3) The effect of different transformer connections on the induction in signaling circuits. (4) The effect of grounding and opening the neutrals of star-connected transformers. (5) The effect of operation of relief and emergency steam stations. (6) The effect of charging aluminum lightning arresters. (7) The effect of switching high-tension lines. (8) The disturbance caused by known residual voltages and currents. In these tests the conductors of the power line involved in a given parallel will be cut dead and a known voltage will be impressed between the three power wires in parallel and the ground. Tests of the effects of unbalanced current will be made by passing a known current through each of the line wires with a ground return. (9) Tests with one line wire grounded. In these tests the method of procedure will probably be to create a ground on one wire when the line is dead and then to switch potential on the circuit.

RATTAN BROOM FILLING MACHINE AT MILWAUKEE

In order to replace rotary brooms quickly and economically in the sweepers used by The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., the mechanical department of this road has designed and built an efficient rattan broom filling machine. The machine consists essentially of a structural-steel frame 12 ft. long, a length sufficient to permit filling an 8-ft. sweeper segment at one time, and 10 ft. in height, which places the work at a convenient elevation. Two standard 10-in. x 12-in. brake cylinders, which are mounted on the upper portion of the frame and to which two bars are attached, furnish the pressure necessary to force the outer core and rattan into position in the U-shaped inner core. These when bolted together form a sweeper segment.

Just below the pressure bars is a table provided with a limit gage on one side and a slot formed with a Z-bar and angle on the other side. This slot receives the outer core, which is a U-shaped sheet-steel form with holes for bolts at uniform intervals. Hook bolts hung on the pressure bar guide the inner wooden core into position so that bolts may be inserted both through the outer and the inner cores when they, with the rattan, have been forced into permanent position. Four small spiral springs attached to the frame and pressure bars return them to the upper position when the air is released from the cylinder. Air for the pressure cylinders is supplied from the shop compressed-air system at 90 lb. per sq. in. A view of the machine is shown in the illustration.

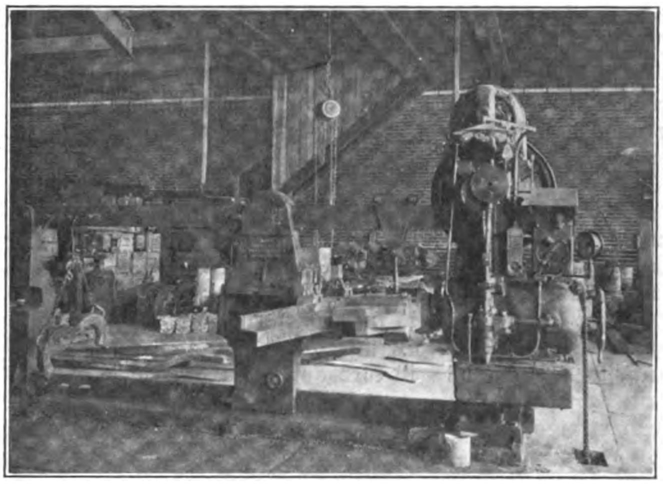


Rattan Broom Filling Machine

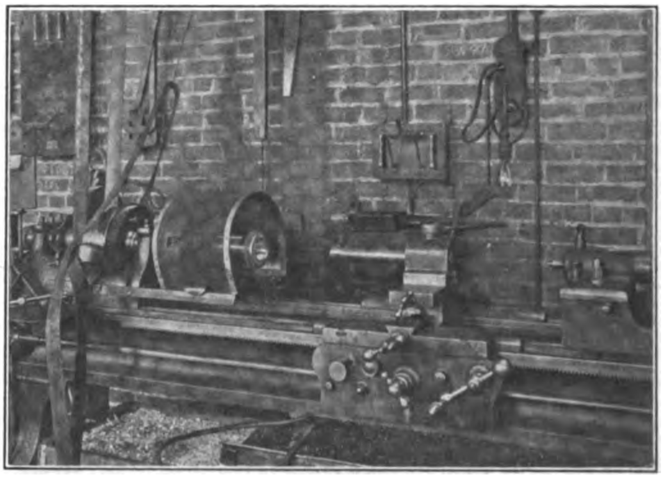
The process of filling a rotary broom segment, of which eight are required on each broom, consists in first placing the outer U-shaped core in the slot and then placing strips of thoroughly steamed rattan on the table as closely together as they can be conveniently laid with one end against the limit gage. After a sufficient number of rattan strips have been placed for a 4-ft. or an 8-ft. segment and the inner wood core has been clamped temporarily in position so that the hook bolts may be passed through the holes in both outer and inner cores, the temporary clamps are removed and the inner core lowered to the rattan. The air valves are then opened at one or both cylinders as required, which lowers the pressure bar until the outer and inner cores with the rattan between them are forced into position. Bolts are then passed through both and pulled up tight, and next the air is released from the cylinders, allowing the pressure bar to return to the normal position. The removal of the hook bolts then permits the finished broom segment to be removed. The whole process requires about twenty minutes, but when it was done by hand the same work used to require about two hours.

SHOP NOTES FROM OMAHA

The Omaha & Council Bluffs Railway has solved in an ingenious manner the problem of adapting standard tools to special operations. The lathe in the armature shop serves for a commutator slotting machine and an armature taping, banding and testing machine, and in addition is also used in boring bearings. The slotting feature is obtained by a special lathe attachment which takes the place of the tool post in the carriage. The attachment consists of a slotting saw driven by a belt passing around a small pulley attached to it. A quarter-turn belt drives this pulley from the countershaft of the lathe and is passed over two guide pulleys, one of which acts as an idler and permits the tool carrier to pass through a considerable movement with proper tension in the belt. As an armature banding tool no special equipment aside from a tension device for the band wire is needed, but as soon as an armature is banded and ready for service an armature testing yoke mounted in a slot in the wall just back of the machine is slipped into position for testing. The bracket supporting the test yoke is mounted on the wall slot so as to be in correct line with any armature set in



Omaha Shop Notes—Wheel Press Used for Bending Platform Knees



Omaha Shop Notes—Armature Lathe and Armature Test Yoke

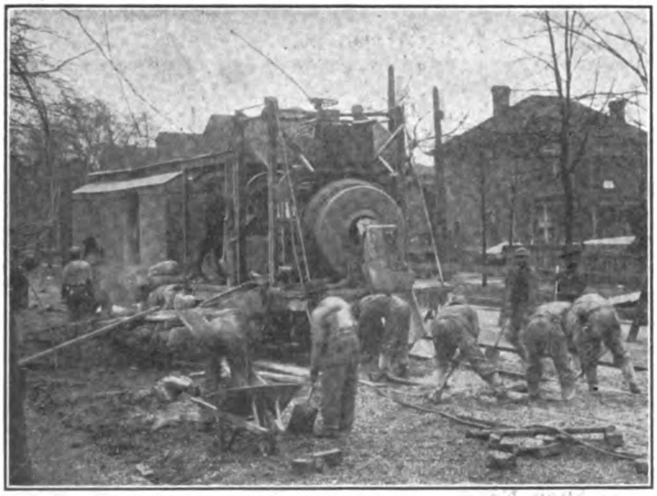
the lathe. A series of holes in the slide and a pin permit the test yoke to be held firmly in position for an armature of any diameter.

When the lathe is not required for handling armatures it is used in boring the babbitted lining of bearings, a Davis boring bar with two cutting edges being employed for this purpose. The use of the boring bar eliminates chattering of the tool, performs the work in one-half the time and assures a perfectly circular bearing. The application of the screen shown in the illustration of this lathe is to keep the babbitt chips from being thrown away from the machine and to deflect them instead into a box under the lathe.

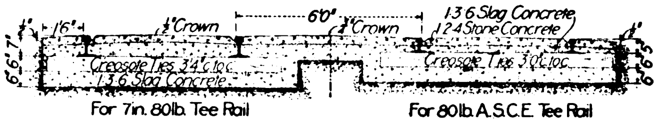
Another machine from which maximum service is being obtained is the wheel press. This and the punch take the place of a bulldozer at the mere cost of making the castings used for dies. The dies are supported as shown in the illustration between the plunger head of the press and the large bearing casting. All bends in bolsters, platform knees, and in fact practically all structural shapes, are handled by the wheel press after preheating the material in a small portable gas oven. Short bends in bars up to 1 in. x 6 in. are made in the punch after preheating. This tool has also been fitted with a set of cast dies for all standard short bends and will turn out the work almost as fast as a workman can remove the bent bars and replace them with straight ones.

CONCRETE PAVING BETWEEN CAR TRACKS IN BIRMINGHAM

Concrete pavements between the street railway tracks have been in service in Birmingham, Ala., since April, 1910. Although the concrete was laid directly against both sides of the T-rails, the pavement alongside is in good condition. About three and a half blocks of double track were placed originally, but during the last year there have been added 6½ miles of single track, making a total of 7 miles on streets having ordinary heavy teaming traffic. In the accompanying drawing the dimensions of the pavement and the kind of concrete used in the various layers are given. The line dividing the 2½-in. top-coat layer is imaginary because it was placed over the slag concrete before the latter had a chance to set.


Concrete Mixer for Track Work at Birmingham

After traffic had been removed to one track, the sub-grade for the other track was excavated, the material removed, the track built and concrete material dumped alongside of the trench. Very little rolling was necessary, as generally the sub-grade is in stiff red clay. First, the track was raised approximately to grade and line and supported on piles of slag or blocks under the ends of ties. A Chicago mixer mounted on a short flat car running on the tracks deposited concrete under the ties and between them to a depth of about 3 in. above the bottom. When the mixer was moved along, the track behind it was brought to final line and grade by shovel-tamping the concrete under the ties and allowing it to set for seven days. After the base concrete had set the mixer was again run along the track and the two upper courses were poured, the top course being placed before the bottom one had set. Expansion and contraction, longitudinally, were provided for by laying a ½-in. creosoted pine board, cut to conform to the crown, on top of a 1-in. board laid in the concrete base. These boards were laid transversely every 16½ ft.

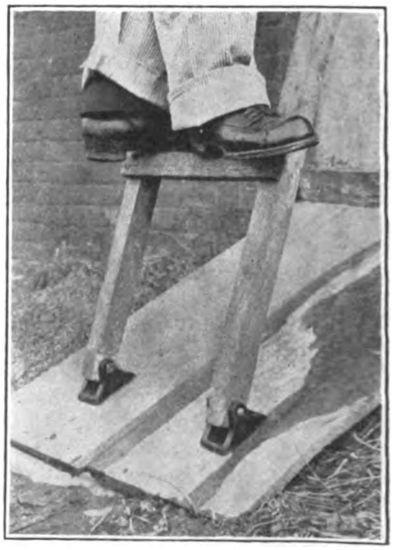

1'6"
½" Crown
6'0"
½" Crown
1:3:6 Slag Concrete
1:2:4 Stone Concrete
Creosote Ties 3'4" c. to c.
1:3:6 Slag Concrete
Creosote Ties 3'0" c. to c.
6" 6" 7"
5" 6" 6"
For 7 in. 80 lb. Tee Rail
For 80 lb. A.S.C.E. Tee Rail
Cross-Section of Birmingham Track

To form a flangeway next the rail a wooden strip of the proper cross-section was forced down with the top level with the top of the rail. The surface was floated but not troweled. After the top had been allowed to set seven days, traffic was resumed. While the top coat was approximately one part Portland cement to two parts sand to four parts crushed stone passing a ¾-in. ring, the proportions were varied from time to time according to analysis of the aggregate with the idea of having an excess of small material to fill the voids.

The work was carried on under the direction of Thomas R. H. Daniels, engineer of the Birmingham Railway, Light & Power Company.

A NON-SLIPPING SHOE FOR LADDERS

The American Mason Safety Tread Company has recently placed upon the market a novel device for the prevention of accidents due to the slipping of ladders which have to be used on smooth floors. The accompanying illustration shows the general arrangement of the shoe: One of these is attached to the lower end of each leg of a ladder by means of a bolt, which allows it to swivel and thus adjust itself automatically to its proper position, no matter at what angle the ladder may be placed. The base of the shoe, as shown, is provided with a heavy, rough carborundum surface which holds the ladder firmly in place and thus prevents it from sliding from under its occupant.


Non-Slipping Ladder Shoe

The composition of the bottom surface is the same as the well-known Mason safety stair tread, and it has in consequence a permanently rough face regardless of its age or of the amount of usage to which it is subjected. As this surface is composed of material of almost diamond-like hardness, it will exert a grip on the hardest classes of flooring, stone, wood or even glass, and yet will not leave a mark or other disfigurement such as occurs when spikes are used in the bottoms of ladder legs.

News of Electric Railways

Electrification of Pennsylvania Railroad Between Philadelphia and Paoli

The directors of the Pennsylvania Railroad on March 12, 1913, authorized the electrification of the company's main line for suburban traffic out of Philadelphia as far as Paoli, a distance of 20 miles, as part of a comprehensive plan to change the motive power from steam to electricity on all the company's branches within the city limits of Philadelphia. The official announcement follows:

"The president of the Pennsylvania Railroad announces that the board of directors has authorized the taking of the second important step in the improvement of the Philadelphia passenger terminal, i. e., the electrification of the main line for suburban passenger traffic between Philadelphia and Paoli. It is expected that this improvement will be completed in 1914 and will involve an expenditure of about $4,000,000.

"In reaching this decision, the company realizes that negotiations with the city as to the company's property that will be required for the Parkway, the acquisition of all the property on Filbert Street by the company and the working out of the final terminal plans will take considerable time.

"Relief in the shape of increased track capacity at Broad Street station is essential and should be provided at the earliest possible date. Therefore no time should be lost in proceeding with this electrification work.

"The first step in the terminal improvements has previously been undertaken and announced, namely, the construction of an eight-track station at North Philadelphia and the increased tracking of the connecting railway, including a new arch bridge crossing the Schuylkill River at Girard Avenue."

It is stated unofficially that the company has decided to erect its own power station. The estimate of $4,000,000, given as the probable cost of the work, is understood to cover in general only the track and the electrification work and not the power plant or equipment changes.

Results to City and Companies in Chicago Under 1907 Surface Railway Ordinances

Bion J. Arnold, chairman of the board of supervising engineers, Chicago Traction, sent a letter on March 6 to the sub-committee of the local transportation committee of the City Council of Chicago which is considering the proposed consolidation of surface and elevated railways. He said that he believed it to be his duty as a citizen to set forth some of the opinions and conclusions which he had formed as the result of his study of transportation in many large cities of the country without in any way attempting to commit the Board of Supervising Engineers.

In summarizing the work of which the board has had charge Mr. Arnold said that the amount paid into the city treasury as its proportion of the net profits divisible under the 1907 surface railway ordinances during the six years these measures have been in effect was $10,108,212, which with accrued interest to date made the total as of Dec. 31, 1912, $10,504,334. There had been placed in the renewal funds of the companies during the three years since the rehabilitation period ended, that is, up to Dec. 31, 1912, the sum of $5,857,484. Of this sum there had been expended upon the properties in betterments not chargeable to capital up to Dec. 31, 1912, the sum of $4,415,764, leaving now in cash in the renewal funds $1,441,720. In addition to this the companies have received $45,781,793. The companies have received an average of 7.4 per cent upon their investment and the city has received an average of 7 per cent of the gross receipts during the life of the present ordinances. Supervision of the entire work of rehabilitation and capital expenditure has been done by the board of its staff at an expenditure of approximately 1.6 per cent of the cost of the work constructed.

Mr. Arnold also made a detailed criticism of the provisions included in the 1907 ordinances.

Provisions of Indiana Public Utility Measure

Governor Ralston of Indiana has signed the public utility bill. The Governor is to appoint two new members of the commission and the three members of the Indiana Railroad Commission are, by the new law, made public service commissioners. The new law declares that it is the legislative intention to substitute the Public Service Commission for the Railroad Commission, and it confers the powers of the Railroad Commission upon the new commission. Public utilities are defined so as to include street railways, interurban railways, telegraph and telephone companies, heat, light, water or power companies, and elevator and warehouse companies. Steam railroads are not called "public utilities" under the law, but are continued under the railroad commission law which is given to the new public service commission to enforce after May 1.

In the matter of valuations it is provided that where the physical property of interurban railways is valued by the Interstate Commerce Commission the Indiana Public Service Commission may accept the physical valuation made by the Interstate Commerce Commission. In addition it is provided that in valuing utilities the Indiana Commission "as one of the elements in such valuation . . . shall give weight to the reasonable cost of bringing the property to its then state of efficiency."

The law says the commission "shall value" the utilities, and that valuation shall be one of the things on which the commission shall base rates, charges and tolls in the future. The utilities have the right to appeal from an order of the commission to any Circuit or Superior Court of the State and to the Appellate and Supreme Courts, giving the Appellate Court power to determine appeals transferred from the Supreme Court.

Ten citizens or any civic body or council may complain to the commission about service, charges, rates, tolls or fares of any public utility, and the commission is empowered to alter schedules, after proper hearing, and to enforce its orders. Rate sheets are to be published by the companies. The law provides that cases appealed from the finding of the commission shall have precedence over other civil cases in the courts. New evidence presented in court on appeal shall be sent back to the commission to be considered in a new hearing before the commission. There is a provision for indeterminate permits for utilities to be issued to the utility by the commission in place of the existing franchise or grant. A certificate of public necessity issued by the commission will enable a utility to enter territory where there already is service of the kind the new company plans to render, but any existing concern can so fill the field as to show there is no necessity for competition.

No city is to supply utility service where there already exists a utility under an indeterminate permit furnishing like service. A city may take over a public utility plant and service under the supervision of the commission and at a price fixed by the commission, subject to appeal. A municipality, under the law, could enter into competition with a utility which does not hold an indeterminate permit issued by the commission. All franchises hereafter issued are to have the effect of an indeterminate permit and are to be subject to revocation by the commission for cause.

All franchises which contain any term interfering with the existence of a rival public utility are "against public policy" and the law amends such franchises in such manner as to permit any city to grant a permit to a second utility concern. It is provided under the law that a municipality owning a utility plant must obtain the approval of the commission before disposing of the plant. In the matter of rates and charges the new law defines unjust, unreasonable and unlawful charges. A provision says that "nothing in this act contained shall authorize any public utility during the remainder of the term of any grant or franchise under which it may be acting at the time this act takes effect to charge for any service in such grant or franchise contracted exceeding the maximum rate or rates therefor, if any, that may be fixed in such grant or franchise."

The law provides for uniform reports to the commission by the utilities. Stock is to be issued at a discount or other premium only with the approval of the commission, and where sold at a discount the commission is to record the fact and give the matter such publicity as it deems necessary. There is a provision to prevent the issuing of bonds at less than 75 cents on the dollar, but in the case of bonds authorized but not issued before Feb. 1, 1913, it is provided the bonds may be issued as low as 65 cents on the dollar. There is a provision under which the commission may consent to the issue of refunding bonds to take up issues made after Feb. 1, 1913, but no such refunding bonds may be put out without the consent of the commission. A public utility which desires to issue stocks or bonds must obtain a certificate of authority from the commission to enable it to make the issue. The commission may consent to the issuing of securities to raise money to reimburse the income funds for moneys used heretofore for extensions or additions, but the utility must apply for such consent before Jan. 1, 1915. There can be no merger of utilities except under a written order by the commission after a hearing. Non-assenting stockholders are to be paid in cash for their holdings at values fixed by the commission. The members of the commission are to receive $6,000 a year. A general counsel who is to serve the commission and the Governor jointly is to be paid at the rate of $6,000 a year. There is to be a secretary at $3,600 a year, and a clerk at $3,000 a year.

With the advice and consent of the Governor, the commission is authorized to appoint counsel or attorneys, engineers, examiners, experts, clerks, accountants and other assistants and to fix their compensation. The commission is to organize within thirty days after the law goes into effect, the appointments to date from May 1, 1913. The commission is to select its secretary and its chief clerk.

Board of Estimate Acts on New York Contracts

Unless some unforeseen difficulty intervenes, the negotiations will be consummated within a few days for the building and operation of the dual system of rapid transit which will give to New York City a subway and elevated system having 629 miles of single track and costing, for new work and new equipment, upward of $300,000,000. The Public Service Commission for the First District adopted the contracts with the operating companies on March 4, and sent them to the Board of Estimate and Apportionment, which acted upon them at a special meeting on March 11. They were then returned to the Public Service Commission for execution. The only contract not included is the certificate for the third-tracking of the elevated railroads in Manhattan and the Bronx. This certificate originally was made out to the Manhattan Railway, owner of the elevated roads, which refused to accept it. The commission thereupon made out a new certificate to the Interborough Rapid Transit Company as lessee of the roads. A public hearing on this certificate was arranged for March 15, and after that hearing it is expected the certificate will be approved by the commission and the Board of Estimate and then executed. Excluding the assignments of Contracts Nos. 1 and 2, covering the existing subway, for which the new contracts will be substituted, there are eight different instruments involved in the new agreement. These are as follows:

Operating contract with Interborough Rapid Transit Company covering the existing subway, the proposed extensions thereof and the equipment and operation of the enlarged system.

Operating contract with the New York Municipal Railway Corporation (Brooklyn Rapid Transit) covering the new subway system to be operated by that company and its existing elevated lines, to be operated in conjunction therewith, and the reconstruction of those lines, and the equipment and operation of all.

Certificate to the Interborough Rapid Transit Company for extensions of the elevated railroads in Manhattan and the Bronx and the equipment and operation thereof.

Certificate to the New York Municipal Railway Corporation (Brooklyn Rapid Transit) for extending, equipping and operating the elevated railroads in Brooklyn and Queens.

Certificate to the Interborough Rapid Transit Company for the construction and operation of additional tracks on the Second, Third and Ninth Avenue elevated railroads.

Certificate to the New York Municipal Railway Corporation (Brooklyn Rapid Transit) for the construction and operation of additional tracks on the Brooklyn elevated railroads.

Agreement between the Interborough Rapid Transit Company and the New York Municipal Railway Corporation (Brooklyn Rapid Transit) conveying to the latter trackage rights over the Queens rapid transit lines.

Agreement with the Interborough Rapid Transit Company giving that company, as grantee under the elevated certificates, trackage rights over the Jerome Avenue, White Plains Road and Steinway Tunnel extensions of the subway system.

When all these contracts are signed, the Public Service Commission will push the work of letting construction contracts on such portions of the new system as have not been already awarded. The most important of these are the proposed extension of the existing subway from Times Square down Seventh Avenue to Park Place and under the East River to Brooklyn, and the Broadway-Fifty-ninth Street subway, running from the Queensboro Bridge to Seventh Avenue and down Seventh Avenue and Broadway to lower Manhattan and by tunnel under the East River to Brooklyn. There are also the tunnel under the East River at Fourteenth Street and its extension through the Eastern District of Brooklyn; the cut in Thirty-eighth Street, Brooklyn, and the new tracks in Flatbush Avenue necessary to connect the South Brooklyn lines of the Brooklyn Rapid Transit system with the Fourth Avenue Subway and Centre Street Loop Subway, now about completed.

The Board of Estimate and Apportionment has approved the construction contracts awarded by the commission for the building of the main portions of the new rapid transit lines in Queens. These are the elevated roads projected from the Queensboro Bridge to Astoria and Corona, over which both the Interborough and Brooklyn companies will operate. The contractors for the Astoria line are Cooper & Evans and the contractor for the Corona line is the E. E. Smith Contracting Company.

Cincinnati Company Makes Proposal to City

W. Kesley Schoepf, president of the Cincinnati (Ohio) Traction Company, sent a communication to Mayor Hunt and the City Council on March 6, 1913, in which he declined to accept the proposal of the city to surrender the fifty-year franchise of the company on the terms proposed. He made a counter offer for the consideration of the authorities. Mr. Schoepf's principal reason for refusing the city's proposal is that adequate provision was not made to secure the interest of the stockholders.

One of the features of Mr. Schoepf's proposition is that the operating company, in the event of the exchange of the franchise for an indeterminate grant, shall receive as a minimum the amount which it now pays for rental, interest and dividends. The largest items are the rental paid the Cincinnati Street Railway and the interest on the bonds of the Ohio Traction Company.

In regard to the operation of the proposed loop, the letter suggests that the city prepare to issue bonds to cover any loss in the operation of the loop line, the company to pay the interest of 5 per cent per year as a part of the rental.

The fare is to remain as it is until the city authorizes a reduction. This can be done by the city allowing its half of the earnings above the actual expense of operation and payment of fixed charges to be used for the purpose of reducing the fare. Mr. Schoepf shows in his communication that it would be inadvisable to agree to operate for less than 5 cents. He presented a statement showing the average rate per passenger received in 1912 and the average cost of carrying passengers.

By giving two years' notice in writing the city may purchase the property at any time after ten years from the date of the indeterminate franchise by paying in cash the par value of the outstanding securities plus 10 per cent, except for the common stock and bonds of the Ohio Traction Company, for which other provisions are made.

In making this proposal Mr. Schoepf discussed each point in the city's proposition and cited his objections. Attached to the proposal is a statement from the Cincinnati

Street Railway stating that the plan will be approved, provided the lease to the Cincinnati Traction Company remains in full force during the term of the indeterminate permit.

As a result of conferences since the receipt of the letter from President Schoepf, the city's representatives have agreed to allow 6 per cent on the $18,000,000 of stock of the Cincinnati Street Railway, and it has been practically settled that a board of arbitration shall fix the value of the improvements and extensions made within the last ten years by the Cincinnati Traction Company. The company estimates these expenditures at $11,000,000. The city is to continue to receive 6 per cent of the gross revenue, including income from the proposed loop line, while the company will maintain the sinking fund and pay the interest on the bonds to be sold for its construction. If in any one year the receipts fall below the expenditures the city's 6 per cent of the gross receipts may be used to make it good, but this stands as a lien against the company, to be paid at a future time. Of the surplus earnings the city is to receive 55 per cent and the company the remainder.

First Employees' Store Opened in New York

The first of the employees' stores of the New York Railways and the Interborough Rapid Transit Company, New York, N. Y., was opened to customers at 7 a. m. on March 12 at 816 and 818 Eighth Avenue, between Forty-ninth and Fiftieth Streets. There are to be five other stores for the use of employees, which it is proposed to operate in accordance with the plans outlined in the ELECTRIC RAILWAY JOURNAL for Feb. 1, 1913. About 4000 men are employed at the carhouse in which the Eighth Avenue store is located, and the employees themselves and members of their families will be permitted to make purchases on the presentation of a card or pass properly certified. It cost approximately $20,000 to equip and stock the first store, and it is expected that the receipts will be from $500 to $800 a day.

Over the entrance to the store is the sign "New York Railways' Employees' Store No. 1." Both the exterior and the interior are finished in white. At the left of the entrance, occupying the entire side of the store, are the butter and egg counter and the dry groceries. The entire right side of the store is taken up with the meat counter. In the middle of the store is an inclosed cashier's desk, and immediately back of this in the center are the green goods. Still farther back of this and just in front of the refrigerator are the fruits and green groceries. The store has started with twelve clerks and two cashiers and all sales will be for cash. There will be no home deliveries. Everything has been arranged for dispatch and ease of access. There are computing scales and two tracks lead from the carhouse to either side of the store so that deliveries in bulk from wholesalers can be made readily.

The store is in charge of F. H. Garde with the title of superintendent of stores. Mr. Garde has had considerable experience in the management of retail stores and is thoroughly familiar with the chain idea as applied to retailing. The goods will all be sold at cost, but the prices that will be charged will, of course, vary with the market quotations. An idea of the difference between the prices which will be charged employees and those elsewhere is furnished by the quotations made by the company's store for butter, eggs and meat for the opening. Butter sold at the company's store for 35 cents a pound fetched at least 40 cents a pound in chain stores, which sell for even less than the single or isolated store; eggs sold at the company's store for 20 cents a dozen fetched 28 to 30 cents a dozen elsewhere; hindquarters of lamb sold at the company's store for 16 cents fetched 24 cents elsewhere; broilers sold at the company's store for 17 cents fetched in the neighborhood of 27 cents elsewhere.

Transit Commissioner Taylor's Views

The Philadelphia *Public Ledger* contained an interview with A. Merritt Taylor, city transit commissioner of Philadelphia, in a recent issue, in regard to the plans to be suggested for a perfected transportation system for Philadelphia. Mr. Taylor, who is at Atlantic City recuperating from an attack of typhoid fever, is reported to have said that the transit report will probably not be ready for three months. The *Ledger* said in part:

"Mr. Taylor's plans will link subway and elevated lines with parts of the present steam railroad branches into the suburbs in a way that will wipe out geographical divisions by bringing sections close together by the power of swift transit and make Philadelphia a metropolis instead of being a confederacy of wards or a mere collection of units.

"Broad Street, said Mr. Taylor, which offers unparalleled opportunities as the center of a great system of railways, has, for some reason which he considers inexplicable, been permitted to lie unused in the very period of expansion when it has been most needed. Until it is used for a subway, he declares, the growth of the city will be retarded.

"Essential to the scheme of Transit Commissioner Taylor is the proposed legislation, and the bills that have been prepared were drawn largely upon his suggeston. He considers the right of eminent domain as absolute for a transportation plan for Philadelphia, for it will involve not only the present system in Philadelphia but the electric railways that now reach terminal stations at the borders on the north, west and south. This will mean that freight can be carried into any part of Philadelphia from adjoining counties without the cost of rehandling at the electric railway terminals and thus make real one of the schemes which the Mayor and Director Cooke have decided shall be brought to pass during this administration, if possible.

"The proposed legislation is also needed, Mr. Taylor believes, to determine the right to run cars through the Market Street subway if the city should operate the Broad Street underground system or lease to some operator other than the Philadelphia Rapid Transit Company. In either event, the enlargement of the Market Street tube east of the City Hall to four tracks will be the inevitable need, it is declared, when the Broad Street system has been constructed."

Mayor Jost of Kansas City Submits Franchise Draft

Mayor Jost of Kansas City, Mo., made a tentative franchise offer on March 6, 1913, to the receivers of the Metropolitan Street Railway of that city, based on the par value of outstanding bonds and mortgage obligations of the company to the amount of $20,000,000. His proposal eliminates the stockholders of the company from consideration. He has suggested that "the light company," which he describes as a "twin corporation," take care of the $5,600,000 of stock of the Metropolitan Street Railway which is outstanding. Following the presentation of the Mayor's proposal, the conference at which it was made adjourned to consider the matter. In the course of his statement the Mayor said:

"I appreciate the situation of the company and its need for assistance. This contract ought to guarantee the integrity of the bonded debt—anything else would be indefensible."

Commenting on the proposal of the Mayor, the Kansas City *Post* of March 7 said in the course of an editorial:

"Mayor Jost says the important thing in these negotiations is that his conscience shall be kept beautiful, clean, clear and intact. Other people of Kansas City have consciences too. It is no new thing to them. Strangely enough they have been able to go along the ordinary paths of life, living and letting live, and yet kept their consciences clean and sweet. Mayor Jost hasn't, after all, the only conscience in Kansas City. He hasn't discovered an entirely new thing in life."

Catalogs and Bulletins Desired.—Catalogs and bulletins of electric railway supplies are desired by G. W. Dunlap, mechanical engineer of the International Railway, Cold Spring shops, Buffalo, N. Y.

New Texas Road Opened.—The Riviera Beach & Western Railway has been placed in operation between Riviera and Riviera Beach, which are 10 miles apart. The line is equipped with McKeen motor cars.

Order in Regard to Paving in Detroit.—Corporation Counsel Lawson has notified the Detroit (Mich.) United Railway that it must pave the strip between its tracks on Jefferson Avenue from Hillger Avenue east to the city limits, in pursuance of a resolution of the City Council.

Electrification of Buffalo & Fort Erie Line Proposed.—The Buffalo & Fort Erie Railway & Ferry Company, Fort Erie, Ont., which operates 4 miles of standard-gage steam railroad, is reported to be considering plans to electrify the line and extend it to connect with the Niagara, St. Catharines & Toronto Railway, which operates a 50-mile combined steam and electric railway.

Progress of Southwest Missouri Railroad Reviewed.—The Joplin *Daily Globe*, Joplin, Mo., in its annual mining and industrial edition, dated Sunday, March 2, 1913, reviewed briefly the progress of the Southwest Missouri Railroad, which operates an interurban electric railway system that connects the cities of the Missouri mining district. The artcle was illustrated with halftone engravings of the power house of the company, the main office building, one of the substations, the employees' club house and carhouse and one of the cars built at the Webb City car shops of the company.

Rapid Transit Matters Before the Pittsburgh Council.—The resolution introduced into the Council of Pittsburgh to ask the Pennsylvania House of Representatives to appoint a legislative committee to conduct an inquiry into the affairs of the Philadelphia Company, which controls the Pittsburgh Railways, has been referred to the law department of the city for an opinion as to whether the city has the right to appropriate money to finance an investigation by the Legislature. The public service and surveys committee of the Council has laid on the table the ordinance to grant the Pittsburgh District Railroad a franchise to construct a subway in Pittsburgh.

Ticket Suggestion in Cleveland.—H. E. Seidl, of the Metropolitan Engineering Company, in a letter to Street Railway Commissioner Witt, of Cleveland, has suggested that season tickets be sold by the Cleveland Railway as a means of relieving the situation during the rush hours in Cleveland. The proposed crosstown line in the East End will follow East Seventy-ninth Street from the St. Clair to the Woodland Avenue line, with the exception of a short distance where it will run over East Eighty-second Street, on account of difficulty in securing property on the former street. It is probable that a loop will be built from St. Clair Street to Gordon Park and that eventually the line will be extended from the present southern terminus to Broadway.

Review of Iowa Syndicate's Operation.—The Des Moines *Leader* contained recently an article by its correspondent in Cedar Rapids in regard to the Dows-Smith-Reed syndicate and the probable plans of this syndicate and the Harris interests of Chicago with regard to connecting the systems in Cedar Rapids and Des Moines. The article contained portraits of W. G. Dows, I. B. Smith, John A. Reed, A. W. Harris and N. W. Harris, together with views of the exterior of the power station of these interests and a map showing the lines of the Iowa Railway & Light Company, the proposed interurban railways of this company, its proposed high-voltage transmission lines, the cities served by high-voltage lines and the location of the power plants of the company.

Negotiations for Franchise Extension in Akron.—The Council of Akron, Ohio, has decided to retain A. B. DuPont, Cleveland, in an advisory capacity in connection with the negotiations for the extension of the lines of the Northern Ohio Traction & Light Company in Akron. Following a recent meeting with Will Christy, vice-president; Charles Currie, general manager, and other representatives of the company, the Council addressed a letter to the company in regard to the extensions. This letter it concluded with the suggestion that the company appoint a committee with authority to agree on the terms for the proposed extensions and that this committee, together with an engineer representing the company, meet the railroad and bridge committee of the City Council and its expert to determine the means for securing extensions on terms reasonable to both the company and the city.

Strike in Binghamton.—A number of employees of the Binghamton (N. Y.) Railway went on strike on Saturday, March 8, 1913, at 7 p. m., to enforce their demand for the reinstatement of five or six men who had been discharged for cause. There was no other grievance. About one-third of the cars finished the runs that night with loyal men. The next day the company operated more than half the cars and since then has been operating on schedule. The patronage is excellent. The first of the year the company raised the wages of its men 10 per cent and announced that it expected the men to obey all of the rules which the company laid down for their guidance. The effort to enforce strict discipline met with some opposition and the attempt was made to organize a union by the few men who resented being held strictly accountable for their shortcomings.

Storage Battery Car for Service Between Waterbury and Meriden.—The New York, New Haven & Hartford Railroad is planning to place Beach-Edison cars in service between Waterbury and Meriden running on a combination of electric street railway and steam railroad tracks. The cars are to be of the standard double-truck type of the Federal Storage Battery Car Company, 50 ft. long over all, with combination express and passenger body and a seating capacity of forty passengers. They will be charged while running on the trolley lines at each end of the road, namely, at Waterbury and Meriden, and will be operated from the batteries while on the steam tracks between these points. The proposed use of this type of car in this class of service by the New York, New Haven & Hartford Railroad is a departure from methods adopted elsewhere for similar service.

The Electric Railway at Panama.—It is expected that the electric railway which is under construction in Panama City will be ready to be placed in operation about May 15, 1913. The system will extend from Balboa on the west nearly to the Zone boundary line, in the summer resort of Las Sabanas, on the east. The line is owned by the Panama Tramways Company, of which Minor C. Keith, an official of the United Fruit Company, is president. Fourteen cars have been ordered. Power will be supplied from the Canal Commission plant at Miraflores. The company proposes eventually to erect its own power house. On Oct. 22, 1892, an English company, registered in London, was organized. It was named the United Electric Tramways and was capitalized at $150,000. It began work of construction in 1893, and in October of that year a part of the line was placed in operation. From 1893 to 1896 the line was gradually added to, until in the latter year there was a total length of about 5000 ft. in operation. Service was suspended in 1898. Up to and including 1896 the company had expended the sum of $182,656.25. When the Americans came in 1904 the only remaining evidence of this line was the old rails. These were removed when paving was begun in 1905. The contract for the construction of the line which is now nearing completion is held by R. W. Hebard & Company.

Public Utility Measure in Washington, D. C.—The session of Congress which lasted from Dec. 2, 1912, until March 4, 1913, resulted in the passage of thirteen new laws affecting the District of Columbia. Most important and far-reaching in effect of this legislation is the District appropriation bill. It creates a public utilities commission composed of the District Commissioners to supervise and regulate the public utility corporations in the District other than steam railroads. The public utilities commission and anti-merger laws, which were appended to the appropriation bill, became effective with the President's signature. Inasmuch as the public utilities clause goes into effect immediately, the District Electric Railway Commission no longer legally exists. It is provided that the duties of the railway commission shall be taken over by the new commission, which will maintain headquarters in the Municipal Building. The new commission will be provided with a chief clerk, or executive officer, and official appraiser and other assistants. One of the first duties of the commission after it has organized will be to value the properties of local public service corporations. Besides Secretary Marble, who will be a member of the Interstate Commerce Commission to succeed Franklin K. Lane, now the Secretary of the Interior, the District Electric Railway Commission was composed of Henry L. West, former commissioner of the District, and Thomas W. Smith, a lumber merchant of Washington.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MICHIGAN

The amended Verdier home rule bill was passed by the House on March 6. Most of the amendments relate to the municipal ownership of public service properties. It is provided that the measure shall go into effect at once. The bill had been passed by the Senate, but the amendments added in the House will make it necessary to resubmit it to that body. Municipal ownership of public utilities is provided for in the bill and municipalities may create operating commissions to have charge of all transportation, including proposed subways in some of the cities. One amendment makes definite the language of that portion of the bill which will allow cities to construct public utility properties and still another changes a hazy provision for payment of bonds to a clear expression requiring that a sinking fund be established for that purpose. Another amendment makes it legal for cities to acquire and operate street railways in suburbs and outlying villages and towns within a distance of 10 miles.

Senator Ogg has introduced a bill which provides that motormen and conductors shall work not more than ten hours out of each twenty-four and that this labor shall be performed within a period of twelve hours.

MINNESOTA

Garfield W. Brown, of Glencoe, has introduced a new public utilities bill in the House. The measure would place all public service corporations, whether owned by individuals or otherwise, under the control of a state commission of three members to be appointed by the Governor, respectively for two, four and six years, and after the first appointment for six years.

NEW YORK

A bill has been introduced to amend the rapid transit law so that the same provision is made regarding acquisition of easements by corporations organized under the rapid transit law as now exists regarding easements acquired by the city. The bill would prevent an encumbrance upon property which would militate against it as security for a loan when an easement is obtained in the property for subway purposes.

OHIO

The House has approved the Bigelow bill, which repeals the law making it necessary for a company to secure the consents of owners of abutting property along streets where it wishes to build a street railway. Should the bill pass the Senate and be signed by the Governor owners of property will have no legal right to object to the construction of a railway in front of their properties.

PENNSYLVANIA

The rapid transit measures drafted at the instance of Mayor Blankenburg of Philadelphia, mention of which was made in the Electric Railway Journal of March 8, 1913, page 434, have been introduced in the Legislature.

There has been another postponement of the public hearing in the hall of the House on the three Public Utilities Commission bills now in committee of that branch of the General Assembly. This hearing is now announced for Tuesday, March 18, at which time, it is expected, the committee will finally hear arguments for and against the bills in question.

Among measures introduced in the Legislature recently are the following: Empowering counties to construct, or acquire by purchase, condemnation or lease, street railways and other public utilities, and to operate them; permitting all cities to enact ordinances relating to repairs to streets in cases where the obligation to repair rests upon corporations, such as electric railways, gas and electric companies, with a penalty of 25 per cent added to the actual cost of said repairs for non-compliance with the ordinance; requiring individual drinking cups in all passenger coaches under penalty of a $100 fine; creating a bureau of public utilities in second-class cities; providing that a right obtained under an extension of a street railway shall not be exclusive until local consent is granted.

It is stated that an agreement has been practically reached between the state administration men and the Republican state convention's legislative committee whereby the two parties will unite on one of the two bills providing for a public utilities commission.

RHODE ISLAND

An act to incorporate the Boston & Providence Interurban Electric Railroad has been introduced in the House. This company seeks the right to construct a railroad through Woonsocket, Central Falls, Pawtucket, Providence and Cranston, using a portion of the roadbed and the right-of-way of the Southern New England Railway, a subsidiary of the Grand Trunk Railroad. The company plans to run steamers from Providence to New York, and arrangements have already been made to build two steamships to ply between the ports.

Two bills intended to further the extension of the lines of the Rhode Island Company from their present terminal at Centerdale to Chepachet, a distance of more than 10 miles, are under consideration. The measures are rather unusual. They provide that Smithfield and Gloucester, the towns through which the proposed extension would pass, shall meet any deficiency which may accrue to the operating company as a result of extending the road. The bills are before committees and an early report is expected.

UTAH

The Senate committee on railroads held a public hearing on March 5 on the railroad and public utilities commission bill. No one appeared before the committee to advocate the measure. George H. Smith, assistant general counsel of the Oregon Short Line, said that the expenses of the commission would not be compensated by any benefits that might accrue. The House made the bill a special order of business for March 7.

WASHINGTON

A bill has been introduced in the House to amend a provision of the present street railway law to read as follows: "Every street railway shall, upon such terms as may be just and reasonable, furnish to its passengers transfers entitling such passengers to one continuous trip over and upon portions of its line within the same city or town not reached by the originating car." Under the law as it now stands a company cannot charge more than 5 cents for one continuous ride within the corporate limits of the city.

PROGRAMS OF ASSOCIATION MEETINGS

New England Street Railway Club

The thirteenth annual meeting and banquet of the New England Street Railway Club will be held at the Hotel Somerset, Boston, Mass., on March 27, 1913. The business meeting will be held at 3 p. m., the reception at 6 p. m. and the banquet at 6.30 p. m. The committee of arrangements has planned for a "club night" on this occasion. The program, which is in course of preparation, will provide for a few short speeches. The tickets for members of the club will cost $3 each, and for guests who are not members the price will be $4 each. Each table will seat six persons, and as the capacity of the banquet hall is limited H. A. Faulkner, secretary of the club, requests that reservations be made promptly.

American Railway Engineering Association

The program for the convention of the American Railway Engineering Association, which is to be held at the Congress Hotel, Chicago, Ill., on March 18 to 21, inclusive, provides for the presentation on March 18 of the report of the committee on signals and interlocking, the committee on track and the committee on rail. It provides for the presentation on March 19 of the reports of the committees on wood preservation and on ties. On March 20 the report of the committee on electricity will be presented. The annual dinner of the association will be held in the gold room of the Congress Hotel on the evening of March 19. The speakers at the dinner will include B. A. Worthington, president of the Chicago & Alton Railroad; George A. Post, president of the Railway Business Association; Rev. R. W. Dickie, Montreal, Can., and P. G. Rennick, Peoria.

Financial and Corporate

Stock and Money Markets

March 12, 1913.

A feature of the trading on the New York Stock Exchange to-day was the decline in a number of the newer industrial issues. The contrast between the state of the stock market and the condition of general business remains as marked as ever. The money market showed the effect of Europe's urgent demand for gold. Call money rose to 6 per cent to-day and it is thought that further considerable amounts of gold will be taken for export before the end of the month. Rates in the money market were: Call, 4¼ @ 6 per cent with a last loan of 5 per cent; sixty days, 5½ @ 6 per cent; ninety days to six months, 5½ @ 5¾ per cent.

The Philadelphia market was broad and active. There was a good demand for bonds.

The Chicago market was broad, but the volume of sales was not large. The bulk of the bond transactions was in the railway issues, the sales of Chicago Railways 5's totaling $50,000.

In the Boston market the railroad issues were dealt in more freely to-day. There was little demand for bonds.

The Baltimore market for stocks was narrow and extremely dull. The demand for bonds continued good.

Quotations of traction and manufacturing securities as compared with last week follow:

	Mar. 5.	Mar. 12.
American Brake Shoe & Foundry (common)	90½	90¼
American Brake Shoe & Foundry (preferred)	131¼	131
American Cities Company (common)	47½	47½
American Cities Company (preferred)	76½	76⅞
American Light & Traction Company (common)	380	370
American Light & Traction Company (preferred)	107	107
American Railways Company	39¾	39⅝
Aurora, Elgin & Chicago Railroad (common)	44	44½
Aurora, Elgin & Chicago Railroad (preferred)	86½	87
Boston Elevated Railway	108½	108¼
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	65	63
Boston & Worcester Electric Companies (common)	6	7¼
Boston & Worcester Electric Companies (preferred)	40	43
Brooklyn Rapid Transit Company	90⅝	87
Capital Traction Company, Washington	120	121
Chicago City Railways	150	150
Chicago Elevated Railways (common)	30	25
Chicago Elevated Railways (preferred)	91	88
Chicago Railways, ptcptg., ctf. 1	90	90
Chicago Railways, ptcptg., ctf. 2	24	22¼
Chicago Railways, ptcptg., ctf. 3	6½	6⅞
Chicago Railways, ptcptg., ctf. 4	3½	3½
Cincinnati Street Railway	111	111
Cleveland Southwestern & Columbus Ry. (common)	*6	a5½
Cleveland Southwestern & Columbus Ry. (preferred)	*30	a30
Cleveland Railway	103¼	102¾
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69	69½
Columbus Railway (preferred)	88½	82½
Denver & Northwestern Railway	117	108
Detroit United Railway	85	85
General Electric Company	139	138
Georgia Railway & Electric Company (common)	122	120
Georgia Railway & Electric Company (preferred)	84	83¾
Interborough Metropolitan Company (common)	18	16⅝
Interborough Metropolitan Company (preferred)	61⅛	58
International Traction Company (common)	42	35
International Traction Company (preferred)	95	a95
Kansas City Railway & Light Company (common)	20	15
Kansas City Railway & Light Company (preferred)	38	30
Lake Shore Electric Railway (common)	6½	6½
Lake Shore Electric Railway (1st preferred)	91	a91
Lake Shore Electric Railway (2d preferred)	25½	a25½
Manhattan Railway	131	130
Massachusetts Electric Companies (common)	16⅞	16½
Massachusetts Electric Companies (preferred)	75½	74⅝
Milwaukee Electric Railway & Light Co. (preferred)	102	100
Norfolk Railway & Light Company	*26	25¾
North American Company	79	77
Northern Ohio Light & Traction Company (common)	75	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	46	45¼
Philadelphia Company, Pittsburgh (preferred)	41	40
Philadelphia Rapid Transit Company	25⅝	25⅜
Portland Railway, Light & Power Company	67	67
Public Service Corporation	115	115
Third Avenue Railway, New York	37½	35½
Toledo Railways & Light Company	2½	2½
Twin City Rapid Transit Co., Minneapolis (common)	106	104
Union Traction Company of Indiana (common)	*4½	4½
Union Traction Company of Indiana (1st preferred)	*81	81
Union Traction Company of Indiana (2d preferred)	*34	34
United Rys. & Electric Company (Baltimore)	*23¼	23½
United Rys. Inv. Company (common)	27½	26
United Rys. Inv. Company (preferred)	51⅞	49
Virginia Railway & Power Company (common)	54	55
Virginia Railway & Power Company (preferred)	92½	89
Washington Ry. & Electric Company (common)	84	84½
Washington Ry. & Electric Company (preferred)	88¼	87⅞
West End Street Railway, Boston (common)	78	78
West End Street Railway, Boston (preferred)	*97	95
Westinghouse Elec. & Mfg. Company	70½	68½
Westinghouse Elec. & Mfg. Company (1st preferred)	118	116

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*Last sale. a Asked.

ANNUAL REPORTS

Cleveland, Painesville & Eastern Railroad

The following is a comparative statement of the results of the operation of the Cleveland, Painesville & Eastern Railroad, Cleveland, Ohio, for the years 1912 and 1911:

	1912	1911
Gross earnings	$386,967	$366,143
Operating	190,005	189,195
Net earnings	$196,962	$176,948
Interest and taxes	138,787	113,045
Surplus	$58,175	$63,903

E. W. Moore, the president, says in part:

"Four thousand five hundred and fifty-seven feet of track on Euclid Street, through Wickliffe, was relaid with 7-in. 80-lb. T-rail on treated oak ties with 9-in. crushed stone ballast. This section of track was also paved. We relaid 2 miles of track between Euclid and Stop 17 with 70-lb. A. S. C. E. rail, and 12,000 6-in. x 8-in. x 8-ft. oak ties were put under the track, and of these 3000 were treated with wood preserver.

"A new telephone line was built from Willoughby to Euclid, a distance of 8½ miles. The new transmission and telephone line between Painesville and Willoughby, 11½ miles, was completed and put in operation in July, 1912.

"The installation of new machinery and general repairs of the old machinery in the Painesville power house was completed during the year. The plant now has a normal generating capacity of 3720 kw, with a normal boiler capacity of 2200 hp. The boilers have 50 per cent overload rating, which is equal to 330 hp in boiler capacity. The Willoughby substation was put in operation on July 15, 1912, having 1000 kw converting capacity in railway converters. This station furnishes power for both lighting and railway service.

"There are at present 247 lighting customers and 190 100-watt series tungsten street lamps. In addition to this we furnish the village of Willoughby current at the switchboard. Willoughby village has at present 235 lighting customers and 165 series tungsten street lamps.

"One electric locomotive was built to take care of the switching of coal and other carload material from our connection with the steam road in Painesville to the power house and other points on the line. Two passenger and two baggage cars were rebuilt.

"Twenty-five-year franchises and ten-year street lighting contracts were granted to the company by the villages of Fairport and Richmond."

Statistics of traffic compare as follows:

	1912	1911
Per cent of operation	49.10	51.67
Car miles	931,328	935,952
Income per car mile	41.55c	39.12c
Operating per car mile	20.41c	20.20c
Net earnings per car mile	21.16c	18.92c
Passengers carried	2,609,117	2,491,235
Earnings per passenger	11.51c	11.71c

Dominion Power & Transmission Company, Ltd.

The report of the Dominion Power & Transmission Company, Ltd., Hamilton, Ont., for the year ended Dec. 31, 1912, and the profit and loss account of the company follow:

EARNINGS AND EXPENDITURES

Gross earnings	$2,563,371	
Operating expenses	1,359,459	
		$1,203,912
Bond interest and interest		352,152
Surplus earnings		$851,759

PROFIT AND LOSS ACCOUNT

1912			
Jan. 2	Balance from 1911		$764,606
Dec. 31	Surplus earnings, 1912		851,759
Dec. 31	Transferred to replacement	$15,727	
Dec. 31	Bad and doubtful accounts written off	2,446	
Dec. 31	Dividends declared	362,301	
Dec. 31	Reserve for deferred dividend	230,176	
Dec. 31	Balance	1,005,715	
		$1,616,365	$1,616,365

J. R. Moodie, the president, says in part:

"There is nothing very special to comment upon in connection with the report for the year ended Dec. 31, 1912, beyond pointing out that the year was a good one and that our prospects for 1913 are also good. The sales of power exceed those of any previous year. The physical condition of the properties is excellent and continues to improve, large sums having been expended to that end, particularly on the power house and the street railway. A third transmission line has been built from Hamilton to the power house on our own right-of-way. Brantford and Welland have passed by-laws committing the municipalities to competition with us in the power and lighting business. Application has been made to Parliament for an extension of the charter of the Brantford & Hamilton Railway to enable us to extend that railway to the town of Galt. Before this report comes to your hands your directors will have declared and paid all deferred dividends on the preference stock, and they can say that this was warranted upon a most conservative basis. This action of the board will afford, without doubt, great satisfaction to the preference shareholders."

Toronto Railway

The income account of the Toronto (Ont.) Railway for the year ended Dec. 31, 1912, and the profit and loss account of the company follow:

INCOME ACCOUNT

Gross earnings		$5,448,050
Operating, maintenance, etc.	$2,866,550	
Interest on bonds, etc.	190,992	
Percentage on earnings	798,959	
Pavements, taxes	143,090	
		3,999,592
Surplus earnings		$1,448,458

PROFIT AND LOSS ACCOUNT

Balance from last year		$3,125,894
Surplus earnings, after payment of all expenses, interest, taxes, etc.		1,448,458
		$4,574,352
Dividends, four of 2 per cent each, on the paid-up capital		$879,595
Balance from 1911	$3,125,894	
Surplus carried forward	568,863	
		3,694,757
		$4,574,352

William Mackenzie, the president, says in part:

"The increase in gross passenger earnings is most gratifying, showing as it does the amount of $567,035, when compared with the previous year, the earnings being $5,367,502, while those for 1911 amounted to $4,800,467. Notwithstanding the large increase in gross earnings referred to, said surplus was reduced largely by the operation of additional cars placed in service, a higher rate of wages paid to our conductors, motormen and other employees, and also from the cost of material of all classes having advanced in price. The charges for the year amounted to $2,866,550. When compared with the previous year, when they were $2,653,361, they show an increase of $213,188. The operating cost amounted to 53.4 per cent of the passenger earnings.

"The payments made to the city of Toronto in accordance with the agreement between the company and the city amounted to the sum of $942,048, which shows an increase of $119,815, or 14.6 per cent, over the amount which was paid in the previous year.

"In addition to renewing the battery plant at Frederick and Front Streets, there was expended during the year on capital account the sum of $591,484 in building additional rolling stock and procuring electrical equipment for same, the construction of new tracks and erection of overhead work in various sections of the city, additions to buildings and other improvements.

"On March 25, 1912, a fire occurred at the King Street East division, completely destroying the car storage house in rear of the main building, together with about 150 cars, practically all of which were of the open, or summer type. The property was insured.

"The company's agreement with its employees having expired on June 15, 1912, your directors are pleased to report that, after a number of conferences, all differences were amicably adjusted and an increase in wages was granted and a new agreement was entered into with the men for three years.

"The second drawing of the company's currency and sterling bond issues, under the terms of the mortgage deed dated Sept. 1, 1892, took place on June 27, 1912, the company being obliged under the mortgage deed to redeem by drawing annually 5 per cent of the amount of bonds issued, same to be redeemed on Aug. 31, following the date of drawing, from which date no interest is payable. The full number of bonds drawn in June, 1911, amounting to $168,693, have been presented and paid, and of the bonds drawn during 1912 $159,500 have been presented and redeemed. The total amount of bonds so drawn for redemption aggregates $339,386.

"Careful attention has been paid to the maintenance of the plant, rolling stock equipment and other properties of the company.

"Your directors declared out of the accumulated surplus earnings of the company four quarterly dividends of 2 per cent, all of which were paid on the several dates set for payment."

Chicago Elevated Railways

The income statements of the Metropolitan West Side Elevated Railway, the Northwestern Elevated Railroad and the South Side Elevated Railroad for the eighteen months ended Dec. 31, 1912, follow:

METROPOLITAN WEST SIDE ELEVATED RAILWAY

Earnings:		
Passenger	$4,268,862	
Other earnings	201,459	
Miscellaneous income	21,672	
		$4,491,993
Operating expenses:		
Maintenance of way, structure and buildings	$116,829	
Maintenance of equipment, including power plant	155,071	
Conducting transportation, including cost of power	1,659,081	
General expenses	169,927	
		2,100,908
		$2,391,085
Charges:		
Interest	$908,922	
Taxes and car licenses	287,052	
Rentals, etc.	471,220	
		1,667,194
		$723,891
Deduct:		
Dividends	$675,478	
Reserves, etc.	25,000	
		700,479
Surplus		$23,412

NORTHWESTERN ELEVATED RAILROAD

Earnings:		
Passenger	$3,681,418	
Other earnings	161,753	
Miscellaneous income	62,750	
Union Loop net earnings	883,848	
		$4,789,769
Operating expenses:		
Maintenance of way, structure and buildings	$106,264	
Maintenance of equipment, including power plant	160,546	
Conducting transportation, including cost of power	1,591,795	
General expenses	144,041	
		2,002,646
		$2,787,123
Charges:		
Interest	$2,176,185	
Rentals, etc.	49,850	
Taxes and car licenses	438,730	
		2,664,765
		$122,358
Deduct:		
Dividends	$98,888	
Reserves, etc.	15,000	
		113,888
Surplus		$8,470

SOUTH SIDE ELEVATED RAILROAD

Earnings:		
Passenger	$3,545,771	
Other earnings	132,962	
Miscellaneous income	26,440	
		$3,705,173
Operating expenses:		
Maintenance of way, structure and buildings	$88,679	
Maintenance of equipment, including power plant	171,756	
Conducting transportation, including cost of power	1,246,504	
General expenses	133,409	
		1,640,348
		$2,064,825
Charges:		
Interest	$679,620	
Taxes and car licenses	229,628	
Rentals, etc.	359,206	
		1,268,454
		$796,371
Deduct:		
Dividends	$690,579	
Reserves, etc.	25,000	
		715,579
Surplus		$80,792

Union Traction Company of Indiana

The Union Traction Company of Indiana, Anderson, Ind., has made public the report of all the properties comprised in its system for the twelve months ended Dec. 31, 1912, and not merely for the period since the consolidation of the Union Traction Company of Indiana and the Indiana Union Traction Company, which became effective on May 13, 1912. This course was adopted as best calculated to facilitate comparison with results of former years. The income account of the company for the year follows:

Revenue from transportation:	
Passenger	$1,944,480
Baggage	10,498
Parlor, chair and special car	8,723
Mail	643
Express	80,580
Milk	13,827
Freight	187,337
Total	$2,246,088
Revenue from operation other than transportation:	
Station and car privileges	$6,528
Parcel room receipts	972
Storage	11
Car service	8
Rents of tracks and terminal	12,033
Rent of equipment	1,070
Rent of buildings and other property	5,719
Power	28,393
Miscellaneous	3,957
Light and power	3,870
Total	$62,560
Total operating revenue	$2,308,649
Operating expenses:	
Way and structures	$269,942
Equipment	184,401
Traffic	15,169
Conducting transportation:	
Superintendence	23,361
Power	184,982
Operation of cars	390,188
General and miscellaneous	266,721
Light and power	1,075
Total operating expenses	$1,335,841
Net operating revenues	$972,808
Taxes	88,612
Net operating revenue less taxes	$884,195
Other income	8,108
Gross income	$892,303
Deductions from gross income (bond and other interest, discount and rentals)	765,711
Net income	$126,592
Dividends paid:	
Union Traction Company of Indiana preferred, April 1, and first preferred Consolidated Company, Oct. 1	37,500
Surplus for year	$89,092

Note.—From the above surplus of $89,092.10 there should be deducted $12,500 to be applied on April 1, 1913, together with earnings from Jan. 1, 1913, to March 31, 1913, to the payment of the dividend on the first preferred stock due on that date.

No dividends have been declared or paid to date on the second preferred stock of the consolidated company. A 1 per cent dividend on this stock is cumulative from and after Jan. 10, 1913.

Revenue ($28,553.66), expenses, etc., on account of the Indianapolis-Newcastle line from Oct. 25, 1912, are included in the foregoing statement.

The annual report calls attention to the installation of automatic block signals over practically 18 miles of the line between Anderson and Indianapolis at a cost of $17,953.07. The report further shows that during the year the Union Traction Company had enlarged its operations by furnishing light and power in Pendleton, Middletown, Summitville, Bunker Hill, Selma, Yorktown, Atlanta, Carmel and Walton. It is also stated that contracts were made in June, 1912, for ten all-steel interurban cars and for six steel cars for the Broad Ripple line at a total cost of $150,342.

Traffic statistics of the company for the year ended Dec. 31, 1912, follow:

Passengers carried, interurban lines	8,834,655
Passengers carried, city lines	8,233,495
Total passengers carried	17,068,150
Freight handled, tons	69,261
Express handled (exclusive of United States express), tons	5,635
Mileage of cars, interurban lines	5,819,486
Mileage of cars, city lines	1,642,409
Total mileage of cars	7,461,895
Coal consumed at all plants, tons	74,833
Power generated (a. c.) at all plants, kva.	39,766,250
Power generated (d. c.) at all plants, kva.	26,035,936

At the annual meeting of the stockholders of the company held on March 4 Frank C. Ball, Arthur W. Brady, John P. Frenzel, Harold D. Hibben, J. Levering Jones, Randall Morgan, Philip Matter, W. Kesley Schoepf and R. K. Willman were re-elected directors.

London Street Railway

A statement of earnings of the London (Ont.) Street Railway for the year ended Dec. 31, 1912, compares with the previous year as follows:

	1911	1912
Earnings:		
Passengers	$274,887	$301,196
Miscellaneous	4,718	5,034
Gross earnings	$279,606	$306,231
Expenses:		
Maintenance:		
Way and structures	$22,325	$23,743
Equipment	30,337	28,516
Transportation:		
Power plant	35,556	40,015
Car service	74,985	86,367
General	29,530	31,635
Total operating expenses	$192,736	$210,278
Net earnings	$86,870	$95,952
Deductions:		
Interest on bonds	$28,750	$28,911
Interest on overdraft	93	......
Total deductions	$28,843	$28,911
Net income	$58,026	$67,041

Henry A. Everett, the president, in his statement to the stockholders under date of Feb. 5, 1913, after calling attention to new track construction and other improvements, says in part:

"The expected increases in gross earnings and surplus during the past year have been exceeded, and as general business prospects in the city at present are unusually good, our anticipations for the coming year are that it will be by far the best year in our history. Your directors are pleased to state that our relations with the public continue very satisfactory and that no litigation of any consequence appears against the company."

Statistics of traffic for the last two years compare as follows:

Year ended Dec. 31	1911	1912
Expenses, per cent of earnings	68.9	68.5
Net income, per cent of capital	10.51	12.06
Passengers carried	7,582,120	8,353,230
Car earnings, per revenue passenger, cents	3.67	3.64
Transfers	1,178,885	1,292,705
Total passengers	8,761,005	9,645,935
Car earnings, per passenger, cents	3.13	3.12
Car mileage	1,440,611	1,476,738
Gross earnings, per car mile, cents	19.10	20.40
Operating expenses, per car mile, cents	13.37	14.24
Net earnings, per car mile, cents	6.03	6.50
Number of miles of track	33.25	33.25
Gross earnings per mile of track	8,409.23	9,209.95

Organization of Eastern Power & Light Corporation

The Eastern Power & Light Corporation has been incorporated under Virginia laws to take over and operate a number of electric light and electric railway properties in New England, Pennsylvania, West Virginia and Indiana. The officers of the company follow: W. S. Barstow, president; Joseph B. Taylor, of W. S. Barstow & Company, 50 Pine Street, New York, and G. H. Walbridge, of William P. Bonbright & Company, New York, vice-presidents; A. P. Taliaferro, secretary and treasurer. Directors include the officers and F. V. Henshaw, of William P. Bonbright & Company; Henry E. Cooper and A. Ludlow Kramer, of the Equitable Trust Company, New York. The authorized capital of the new company will consist of $10,000,000 of preferred stock, of which $2,350,000 is to be issued immediately, and $10,000,000 of common stock, of which $5,000,000 is to be issued at once. The preferred stock is to receive dividends at the rate of 6 per cent until March 1, 1916, and then at 7 per cent and is also to be redeemable after that time at 125. In addition, $2,350,000 of five-year 5 per cent convertible gold bonds have been authorized, all of which are to be issued at once.

The New England properties which have been taken over by the Eastern Power & Light Corporation are the Claremont (N. H.) Power Company, the Claremont Railway & Lighting Company, the Clarendon (Vt.) Power Company and the Colonial Power & Light Company of Vermont, which includes the Manchester Light & Power Company, Manchester, Vt., and the electric department of the manufacturing concern at Springfield, Vt., now serving that community with electrical energy. The Pennsylvania properties taken over by the new company are the Reading Transit Company, including the United Traction Company, the Lebanon Valley Street Railway, the Edison Electric

Illuminating Company, Lebanon, and the Schuylkill Valley Traction Company, together with the twenty-four subsidiaries of the last four companies. In West Virginia the Eastern Power & Light Corporation will control and operate the West Virginia Traction & Electric Company, Wheeling, W. Va. The Indiana properties taken over are the City Electric Lighting Company, Vincennes, Ind., and the Vincennes Electric Company.

The construction requirements of the Eastern Power & Light Corporation for 1913 call for a total expenditure of $1,386,000. With $350,000 of this the company is to install a hydroelectric station rated at about 3000 hp at Clarendon, Vt., on the Mill River, and energy will be supplied from this plant to Clarendon, Cavendish, Springfield and Manchester, Vt., and to Claremont, N. H., as well as to intervening communities. It is also planned to spend $786,000 on the system of the Reading Transit Company and $250,000 on the properties in West Virginia.

Prospects of Illinois Traction System

T. B. Macaulay, Montreal, Can., managing director of the Sun Life Assurance Company and secretary of the Illinois Traction System, Peoria, Ill., has addressed a circular in part as follows to the holders of the common stock of the Illinois Traction Company, reviewing the progress of the company and the future prospects of the property:

"In view of the increased prices being offered for the common stock of the Illinois Traction Company, it has been suggested that the shareholders would welcome a word of advice on the subject. What follows expresses my personal opinions as one of the largest stockholders, familiar with all the circumstances, but is not written in my capacity as an officer of the company.

"The following considerations have great weight with me:

"1. The Illinois Traction Company is probably the greatest corporation of its kind in the world. It has more than 560 miles of street railway and interurban railway mileage. It is located in the richest section of central Illinois, with grand agricultural soil on the surface and coal fields beneath. It serves Peoria, Bloomington, Springfield, Danville, Urbana, Champaign, Decatur, Jacksonville, Edwardsville and St. Louis, in addition to a host of smaller places in Illinois. It serves also Des Moines, the capital of Iowa, and Topeka, the capital of Kansas.

"2. Besides its interurban lines, the company owns some or all of the local utilities in most of the cities served by it. The combination of street railways, interurban railways, electric light and power companies, gas companies and steam-heating companies is indeed a strong one. The prosperity of the Illinois Traction Company is not dependent on any one kind of public utility, or on any one city, or even on any one State.

"3. The revenue grows wonderfully.

	1906	1907	1908
Gross revenue	$3,013,107	$3,779,187	$4,098,620
Net revenue, deducting operating charges and taxes	1,361,952	1,650,699	1,744,496

	1909	1910	1911	1912
Gross	$4,752,082	$6,218,037	$6,902,221	$7,379,182
Net	2,003,013	2,498,226	2,768,580	3,025,968

"4. The common stock of the company bears an unusually small proportion to the underlying securities. In connection with the system, and its numerous controlled companies, there are outstanding bonds of more than $30,000,000 besides the preferred stocks. All of this immense sum is earning not merely interest but profit. The underlying securities, however, receive no part of that profit; they get only their stipulated interest or fixed dividend. All the enormous funds and magnificent properties of the company are working to earn dividends for the $10,000,000 of common stock.

"5. The company has already attained marked prosperity. After providing for all interest and preferred stock dividends there remained last year a balance equal to almost 7½ per cent on the common stock.

"6. The policy has hitherto been to strengthen the company by re-investing in the properties all the surplus earnings year after year, but it is felt that those earnings are now so large, and the company's position so strong, that the shareholders may rightly expect to have their patience at last rewarded. Quarterly dividends at 3 per cent per annum are expected to begin on May 15, 1913. Some consider that the rate should be 4 per cent, but ultra-conservative policy suggests that a beginning be made at the lower rate, leaving the question of an increase or a bonus to be considered a year later. I fully expect that as the years roll round the dividends on my stock will be increased to 4, 5, 6 per cent, or even more. It is a mere question of time.

"7. The company's system is practically complete. No large extensions or purchases are contemplated. A company which serves such progressive cities must, of course, grow with the population, and new capital will always be needed, but the requirements should hereafter be comparatively small."

Athol & Orange Street Railway, Athol, Mass.—The Athol & Orange Street Railway has petitioned the Railroad Commission for authority to increase its capital stock by the issuance of 905 shares of common stock and 1500 shares of preferred stock at $100 a share, the proceeds to be used to pay indebtedness incurred in the purchase of the Templeton Street Railway.

Central Arkansas Railway & Light Corporation, Hot Springs, Ark.—The Central Arkansas Railway & Light Corporation, the incorporation of which was noted in the ELECTRIC RAILWAY JOURNAL of March 1, 1913, page 395, has taken over the property of the Hot Springs Street Railway and the Hot Springs Water Company. The company has an authorized capital stock of $10,500,000, of which $7,000,000 is common stock and $3,500,000 is 7 per cent cumulative preferred stock. Of this stock $2,500,000 of common and $1,200,000 of preferred are outstanding. The company has authorized an issue of first lien fifteen-year 5 per cent gold bonds due in 1928, and of this amount $2,000,000 is outstanding. The preferred stock is guaranteed as to dividends by the Federal Light & Traction Company and it has no voting power unless two of the quarterly dividends are in default, in which case it will have the entire voting control.

Colorado Mines, Railways & Utilities Corporation, Colorado Springs, Col.—The Colorado Mines, Railways & Utilities Corporation, the incorporation of which was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 22, 1913, page 349, proposes to bring under one control the El Paso Consolidated Gold Mining Company, the Golden Cycle Mining Company and the properties of other companies. The company is said to be negotiating to lease the property of the Colorado Springs & Cripple Creek District Railway. Joseph Walker & Sons, New York, N. Y., are interested.

Columbus, Marion & Bucyrus Railway, Marion, Ohio.—Judge Daniel Babst lifted the dual receivership of the Columbus, Marion & Bucyrus Railway on March 8, 1913, in the litigation started by the Cincinnati Trust Company in 1909. He had intended to fix the date for selling the property, but postponed this to give the bondholders more time in which to arrange their affairs. George Whysall was appointed general manager of the road until it is sold. Fred E. Guthery, receiver, was allowed $2,000 and George B. Scofield and D. R. Crissinger were allowed $1,000 each as counsel.

Harrisburg (Pa.) Railways.—The holders of the first mortgage bonds of the Central Pennsylvania Traction Company, the property of which has been taken over by the Harrisburg Railways, have been notified that the bonds will be paid on May 1, 1913, at par, accrued interest and a premium of 2½ per cent at the office of the Harrisburg Trust Company, Commonwealth Trust Company, Dauphin Deposit Trust Company or the Mechanics' Bank. The Harrisburg Railways has organized as follows: H. D. Walbridge, Edward Bailey, J. M. Cameron, S. I. Dunkle, F. B. Musser, B. F. Meyers, George W. Reily, Dr. W. H. Siebert and E. Z. Wallower, directors; H. D. Walbridge, New York, president; F. B. Musser, vice-president and general manager; John O'Connell, secretary and treasurer; A. Spickler, assistant secretary and treasurer.

Interstate Traction Company, Duluth, Minn.—R. R. Dunn, president of the Interstate Traction Company, is quoted as follows in regard to the affairs of that company: "It is simply a question of improvements. Many of the stockholders are unable to meet an assessment to make them. For this reason and no other the property will be turned over to the bondholders. There will be no change in the officers nor in the policy of the company."

Manhattan & Queens Traction Corporation, New York, N. Y.—Upon application of the Manhattan & Queens Traction Corporation, the Public Service Commission of the First District of New York has fixed March 24 for a public hearing on a request for permission to issue $1,500,000 of stock and $1,500,000 of bonds, and for the approval of a first mortgage of $10,000,000 on all the properties, franchises and rights of the corporation. The corporation now owns the surface lines from the Queensboro Bridge to Jamaica, L. I., for which the franchise was originally granted to the South Shore Traction Company. The road is being constructed by MacArthur Brothers Company. The company is now operating a local service over the Queensboro Bridge and for 2 miles on Greenpoint Avenue toward Jamaica.

Manila Electric Railroad & Lighting Corporation, Manila, P. I.—A regular quarterly dividend of 1¾ per cent has been declared on the $5,000,000 of stock of the Manila Electric Railroad & Lighting Corporation, payable on April 1, 1913, to holders of record of March 19. This increases the regular rate to 7 per cent yearly.

Montreal (Que.) Tramways.—The stockholders of the Montreal Tramways have approved an increase in the common stock of the company from $2,000,000 to $5,000,000. The new issue will be offered pro rata to common stockholders at not less than par. Harris, Forbes & Company, New York, N. Y., are offering at 99 and accrued interest $2,000,000 of first and refunding mortgage 5 per cent gold bonds of the company.

New York State Railways, Syracuse, N. Y.—The Public Service Commission of the Second District of New York has authorized the New York State Railways to issue its first consolidated fifty-year mortgage bonds to the amount of $2,748,000, the bonds to be sold at not less than 91½ per cent and the proceeds to be used for the discharge of notes and matured bonds outstanding of the New York State Railways, the Rochester & Eastern Rapid Railway, Oneida Railway, Rochester & Suburban Railway, Syracuse Rapid Transit Railway and the Utica & Mohawk Valley Railway.

Otsego & Herkimer Railroad, Hartwick, N. Y.—The Public Service Commission of the Second District of New York has authorized the Otsego & Herkimer Railroad to make a mortgage for $2,500,000 and issue subject to the security thereof bonds of a par value of $1,200,000. On May 17, 1911, the commission authorized the company to issue capital stock to the amount of $500,000 and mortgage bonds to the par value of $400,000—$900,000 in all—to acquire the property formerly operated under the name of the Oneonta, Cooperstown & Richfield Springs Railroad, which was sold at foreclosure. Since the date of that order the company has expended considerable sums for additions and betterments and the rehabilitation of its property, including additional cars. At the time the former order was made the property sold at foreclosure was divided into two parcels, the right-of-way and rolling stock of the electric railroad being taken by the Otsego & Herkimer Railroad and the steam and hydroelectric power plants being acquired by the Hartwick Power Company, which then sold electricity to the railroad. The railroad has found it difficult to market its securities owing to the fact that it did not have its own source of power, and the power company has had similar difficulty because its business depended upon the good will of a single consumer, the railroad. A part of the proceeds of the bonds just authorized are therefore to be used to acquire all the property of the Hartwick Power Company, so that these two properties will be reunited. Bonds to the amount of $1,036,000 are to be expended for property or the cancellation of liabilities at par. The balance are to be sold at 80 for cash.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—The property of the Pittsburgh, McKeesport & Westmoreland Railway was sold under foreclosure recently to Andrew Peck, I. I. Robertson and William Chilvers, who have called a meeting of those for whom they acted to be held in McKeesport on March 14, 1913, to organize a new company to take over the property.

Union Railway, Gas & Electric Company, Rockford, Ill.—Hodenpyl, Hardy & Company, New York, N. Y., are offering for subscription at 97¼ and interest, to yield more than 6 per cent, $1,500,000 of three-year 5 per cent gold notes of the Union Railway, Gas & Electric Company. These notes are dated March 1, 1913, and are due March 1, 1916. The total authorized issue is $4,000,000 and of this amount $1,500,000 is outstanding. The present issue of notes is secured by deposit of $2,000,000 of bonds of constituent companies having a present market value of $1,750,000. The proceeds of the present issue of notes are to be used to pay for several small properties recently acquired and for extensions, betterments and improvements. The common stock of the company has been placed on a dividend basis by the declaration of a dividend of 1 per cent payable on April 1, 1913.

Woodstock, Thames Valley & Ingersoll Electric Railway, Woodstock, Ont.—The stockholders of the Woodstock, Thames Valley & Ingersoll Electric Railway have directed Gibbons, Harper & Gibbons, London, Ont., to move at the next court of competent jurisdiction for the appointment of a receiver for the company.

Dividends Declared

Chicago (Ill.) City Railway, quarterly, 2½ per cent.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1¾ per cent.

Philadelphia (Pa.) Traction Company, $2.

Toronto (Ont.) Railway, quarterly, 2 per cent.

United Traction & Electric Company, Providence, R. I., 1¼ per cent.

West Penn Traction & Water Power Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Dec.,	'12	$14,384	*$7,651	$6,733	$1,734	$4,999
1 "	"	'11	12,453	*6,059	6,394	1,729	4,665
12 "	"	'12	147,381	*87,907	59,475	20,768	38,707
12 "	"	'11	119,476	*75,886	43,590	20,687	22,903

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m.,	Dec.,	'12	$7,849	*$7,469	$370	$1,076	†$697
1 "	"	'11	8,040	*6,706	1,334	1,046	288
12 "	"	'12	120.008	*90,872	29,136	12,554	16.582
12 "	"	'11	119,301	*90,434	28,766	12,920	15,846

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m.,	Dec.,	'12	$34,387	*$16,124	$18,264	$5,682	$12,582
1 "	"	'11	31,417	*15,798	15,620	5,653	9,967
12 "	"	'12	360,177	*194,881	165,296	68,105	97,191
12 "	"	'11	337,555	*181,764	155,791	67,830	87,961

DALLAS (TEX.) ELECTRIC CORPORATION

1m.,	Dec.,	'12	$174,240	*$99,374	$74,866	$24,635	$50,231
1 "	"	'11	152,927	*96,049	56,878	19,657	37,221
12 "	"	'12	1,821,562	*1,092,794	728,768	290,257	438,511
12 "	"	'11	1,632,291	*1,103,449	528,842	245,699	283,143

DETROIT (MICH.) UNITED RAILWAY

1m.,	Dec.,	'12	$1,037,460	$645,795	$351,664	$177,681	$173,982
1 "	"	'11	913,503	570,324	343,178	180,138	163,040
12 "	"	'12	11,904,387	7,730,409	4,173,978	2,123,513	2,050,465
12 "	"	'11	10,431,947	6,580,042	3,851,905	2,123,398	1,728,507

PORTLAND RAILWAY LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	Dec.,	'12	$586,857	*$278,683	$308,174	$151,403	$156,771
1 "	"	'11	556,397	*256,733	299,664	132,750	166,914
12 "	"	'12	6,642,308	*3,328,911	3,313,397	1,760,991	1,552,406
12 "	"	'11	6,336,703	*3,069,897	3,266,806	1,510,280	1,756,526

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.

1m.,	Dec.,	'12	$110,874	*$57,373	$53,501	$19,710	$33,791
1 "	"	'11	101,401	*55,966	45,435	19,708	25,727
12 "	"	'12	1,179,839	*669,023	510,816	236,060	274,756
12 "	"	'11	1,099,285	*681,327	417,958	231,608	186,350

UNION RAILWAY, GAS & ELECTRIC COMPANY, ROCKFORD, ILL.

1m.,	Dec.,	'12	$438,168	*$243,324	$194,844	$93,348	$101,496
1 "	"	'11	325,314	*183,505	141,809	64,168	77,641
12 "	"	'12	3,992,134	*2,327,901	1,664,233	964,148	700,085
12 "	"	'11	3,190,110	*1,829,651	1,360,459	744,167	616,292

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*Includes taxes.
†Deficit.

Traffic and Transportation

The Utility of the Commerce Court

Notwithstanding the fact that the recent Congress provided for the further existence of the Commerce Court only until June 30, 1913, it is not likely that the court will go out of existence at that date. At least, this is the opinion of Democratic leaders in the Senate and the House who will sit in the new Congress to be called on April 8 in extra session. President Wilson is stated to have expressed his desire to have Congress at the coming session provide for the continuance of the court. Ample provisions were made by Congress for the carrying out of all work before the court, and the court is going ahead, confident that legislation will be passed during the coming few months for its continuance.

It is considered necessary to the validity of the principle of administrative regulation embodied in the interstate commerce law that somewhere in the federal judiciary, subordinate to the Supreme Court, shall be reposed original jurisdiction to hear and determine legal objections to the affirmative orders of the administrative agency—the Interstate Commerce Commission.

So far as any opposition to the continuance of the Commerce Court is based upon an opinion that the orders of the Interstate Commerce Commission ought not to be subject to judicial review, suspension or control, it is apparent that it rests upon preference for a system of regulation that cannot be adopted under the Constitution as it now reads. The moment the Commerce Court should cease to exist, without a previous transference of its substantial powers to some other federal court or courts, the constitutional validity of the whole regulative system would depend upon the successful performance of the difficult task of reading into the statutes the essential provision for recourse to some judicial forum capable fully to protect the rights of every citizen or corporation that the commission might command to act. The only logical ground for a desire for the abolition of the Commerce Court would be the belief that the jurisdiction it exercises would be more satisfactorily exercised by some other court or courts. The dividing line is thus seen to be between the present plan and the one that it replaced, in which the jurisdiction of the Commerce Court was distributed among the inferior federal courts of general jurisdiction, whose time and attention is much occupied by other matters.

The objections to the Commerce Court have rested mainly upon its disagreements (a) with the Interstate Commerce Commission and (b) with the Supreme Court. Regarding the former, the apparent objection is due only to the centralization of responsibility that has been noted. In fact, the Commerce Court has reversed the commission in a much smaller proportion of the cases presented to it, proportionately, than, under the old system, was the case regarding reversal by the circuit courts. Statistics show that less than one in one hundred of the commission's orders is contested. The rule of railway counsel is to recommend obedience to every order of the commission which is not, in their opinion, at once intolerable in substance and indefensible in law.

Such disagreements with the Supreme Court as have occurred were the natural and almost inevitable consequence of an experimental jurisdiction and an uninterpreted statute. To a large extent these possibilities of difference have been removed and their recurrence in the future has been made impossible by the authoritative decisions of the court of last resort. The appellate jurisdiction exists primarily for the correction of error and not for the purpose of sanctioning that which would need no sanction if error were impossible. Reversals of the Commerce Court have been rather less than those of other courts of original jurisdiction. If such courts were able to establish unimpeachable records of correct decision, all reasons for the exercise of appellate jurisdiction would disappear. Neither shippers nor carriers would be likely to be satisfied with a statute that would deny the right of appellate review in the Supreme Court of the decisions of any court or courts on which might be conferred the present jurisdiction of the Commerce Court.

Connections at Intersecting Lines in Brooklyn.—A regulation has been in force in Brooklyn for a long time past that cars on all lines of the Brooklyn (N. Y.) Rapid Transit Company shall wait at intersecting points during the hours when the schedule calls for a considerable headway. In the daytime and in the evening rush, of course, with a very short headway, this is not practicable, but after 8 p. m., and particularly between 12 p. m. and 5 a. m., the company strives constantly to enforce this requirement.

Ohio Electric Railway Employees Insured.—W. Kesley Schoepf, president of the Ohio Electric Railway, Cincinnati, Ohio, has arranged to insure 1500 employees of the company with the Travelers' Insurance Company under the group insurance contract of that company. The total amount of insurance involved is upward of $1,500,000, and the plan provides life insurance as well as accident benefits. The premiums are to be paid by the Ohio Electric Railway and a portion charged to the employee in monthly installments.

Decision in Regard to Elimination of Stops in Cleveland.—Judge Vickery of the Cuyahoga County Common Pleas Court has dismissed the case of George D. Hile against the Cleveland Railway, Street Railway Commissioner Witt and the city of Cleveland, to compel the company to restore stops which were eliminated some time ago. The court held that the elimination of some of the stops is necessary in order to care for traffic and that the City Council has a right under the Tayler franchise to make these changes. The case will be appealed to the Circuit Court.

Protest Against "Dead" Cigars on Cleveland Cars.—The civic committee of the Cleveland Council of Women has protested against the practice of men in carrying "dead" or smoking cigars or cigarettes into street cars. They say that the rules of the Cleveland Railway forbid this practice and that they will have the rules printed in connection with the ordinance forbidding the use of long hatpins. This committee will also endeavor to have all vehicle traffic barred from the Public Square during rush hours. This was done for many months, but some weeks ago the rule was abrogated.

Tidewater Railroad Held to Be Street Railway.—Romaine Boyd, city attorney of Birmingham, Ala., has rendered an opinion to the effect that the Birmingham, Ensley & Bessemer Railroad, familiarly known as the Tidewater line, is a street railway and is therefore entitled to profit by the provisions of the statute which requires street railways to permit other street railways to operate over constructed lines. He says that in any event it is within the power of the board of city commissioners of Birmingham to grant the Birmingham, Ensley & Bessemer Railway a street railway franchise, and thus remove all doubt about its being a street railway.

Report of Ohio Public Service Commission.—The annual report of the Ohio Public Service Commission shows that in 1912 steam, interurban and street railways carried 686,000,000 passengers and collected $59,949,289 fares. The steam roads carried about 43,000,000 passengers an average distance of 35.7 miles and at an average fare of 66½ cents. The interurban railways carried 188,000,000 passengers at an average fare of 8.3 cents and the street railways hauled 455,000,000 passengers at an average fare of 3.9 cents. The number of transfers issued was 13,000,000. The net profit of the steam roads was $50,196,058; that of the interurban railways, $6,756,723, and that of the street railways, $6,237,379.

Progress in Equipping Cars with Fenders in Portland, Ore.—According to F. W. Hild, general manager of the Portland Railway, Light & Power Company, Portland, Ore., all of the cars of that company subject to the city fender ordinance will be equipped with the prescribed fender by July 31, 1913. Already 159 cars have been so equipped, leaving 342 others to be supplied with fenders within the time specified. The total cost of installing the fenders is estimated at $62,000. The automatic fender cannot be installed on the Portland Heights cars of the company, and it is prescribed by ordinance that the Hunter fender shall be used on these cars. Nearly all of these latter cars have been equipped in accordance with this requirement.

Destination Signs in Milwaukee.—J. D. Mortimer, president of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., made a statement recently in part as follows in regard to car route and destination signs: "The development of a system of signs for properly and clearly designating the route upon which, and the destination to which, cars run has been under consideration for a long time past. The installation of the Hunter illuminated roof signs formed a part of the general plan for the improvement of the car sign system. The illuminated glass deck signs formerly in use were abandoned as a standard on account of the expense of maintaining them and their lack of flexibility. In lieu of route numbers we are providing for the installation of dash signs which will designate the route upon which cars operate. The illuminated roof sign will indicate the destination."

Progress of Safety Movement in New York.—More than 175,000 school children of New York City are wearing the green and red button of the Safety League and a thousand or two more become members of the league every school day. A children's safety crusade has been carried on in New York since last December by the American Museum of Safety with the co-operation of the Board of Education. Its object is street safety for children, and the basis of the campaign is daily classroom talks to the school children, both of public and parochial schools, by lecturers from the Museum of Safety. These talks are followed by the distribution of pamphlets containing "safety fairy tales," which the children are encouraged to take home and discuss with their parents. The lectures are illustrated by models, which enable the speaker to point out graphically the dangers in public streets and how to avoid them.

"Safety First" Movement of an Ohio Company.—W. R. W. Griffin, general manager of the Tri-State Railway & Electric Company, East Liverpool, Ohio, has inaugurated a campaign of publicity which includes a determined effort to insure the safety of the public. Charles W. Murphy, the general passenger agent of the company, has secured a number of illustrations which show various phases of the company's work, and these together with easily understood descriptions are being published in the papers along the upper Ohio valley. In connection with the "safety first" movement the company is inserting advertisements in the newspapers each week calling attention to preventive measures. These apply especially to children and women and to drivers of automobiles and horse-drawn vehicles. More than 50,000 blotters, on each of which is reproduced a picture of some accident caused through personal carelessness, have been distributed to the school children of various cities.

Order in Regard to Continuous Ride.—The Public Service Commission of the Second District of New York has directed the New York State Railways, as successor to the Utica & Mohawk Valley Railway, to provide transportation between the Blandina Street and South Street lines in Utica at a 5-cent fare for a continuous ride, or if in operating practice passengers riding from one line to the other are required to change cars, such passengers must be transferred at a single fare under suitable regulation, confining the use of the transfer practically to the next car moving from the point of intersection, except as such rule may be necessarily varied to provide adequate transportation facilities for transferred passengers. The lines referred to parallel each other for the greater distance and are about 1360 ft. apart. The complaint was occasioned by the fact that the company refused to issue transfers between the lines. The commission holds that under Section 181 of the railroad law it is the duty of the company to provide transportation between the lines as indicated. The opinion quotes the regulating provision of the law and states: "The carrier is not compellable under the statute to afford two rides instead of one continuous ride or to permit a stop-over on a transfer from one line to the other which would accomplish that result. Its right to run a through car over both lines with a 5-cent fare between the termini must be conceded. Its right to require a passenger at the intersecting point to take immediately a waiting car upon the other line is not to be denied. Its authority to put a time limit upon the use of the transfer sufficient to enable the passenger at all times to use the next car over the line shown upon the transfer must be recognized."

Personal Mention

Mr. E. Smith, heretofore assistant secretary of the Toronto (Ont.) Railway, has been appointed secretary to the general manager, Mr. R. J. Fleming.

Mr. Herbert S. Balliet, engineer of the maintenance of way of the Grand Central Terminal and signal engineer of the electric division of the New York Central & Hudson River Railroad, with headquarters at New York, has been appointed assistant manager of the Grand Central Terminal. He continues to perform the duties of signal engineer of the electric division and engineer of the maintenance of way of the terminal.

Mr. Richard McCulloch, vice-president and assistant general manager of the United Railways, St. Louis, Mo., presented a paper on "Electric Railway Problems" at the luncheon of the Jovian Chapter, St. Louis League of Electrical Interests, on March 4, 1913. He dealt with track and car construction, the scarcity of efficient laborers and supervision of traffic. Figures were quoted which showed the ratio of transfer passengers to total passengers as 46 per cent. According to Mr. McCulloch, the taxes paid by the company amount to 5.5 per cent of the gross receipts. The average revenue per passenger for 1912 was 3.31 cents.

Mr. Frederick L. Hubbard, former secretary to the general manager of the Toronto (Ont.) Railway, has been appointed assistant to the general manager of the company. The position is a new one with the company and was created by reason of the increased responsibilities devolving upon Mr. R. J. Fleming, the general manager, as head of the Toronto Electric Light Company and Toronto & Niagara Power Company. Mr. Hubbard entered the service of the Toronto Railway in 1904 as secretary to the manager. He was subsequently placed in charge of the executive offices of the company and the organization of timetable and traffic and transportation departments. For several years Mr. Hubbard has been assisted in his secretarial duties in order that he might devote more time to the operation of the road and relieve the general manager of executive details. Mr. Hubbard is a member of the American Electric Railway Transportation & Traffic Association and served on the schedule and timetable committee in 1911 and is a member of the committee on fares and transfers for the current year. Previous to entering the service of the Toronto Railway Mr. Hubbard was for five years secretary to the commissioner of assessment and property for the city of Toronto.

M. E. Sampsell

Mr. Marshall E. Sampsell, president of the Central Illinois Public Service Company and the Central Illinois Traction Company, was elected president of the Illinois Electric Railways Association at its annual meeting held in Chicago on March 7. Mr. Sampsell was born in Marshall, Tex., on Feb. 28, 1874. He attended the public schools in Marshall and was graduated from the University of Chicago in 1896. He attended the Chicago College of Law and was graduated from that institution in 1899. From 1903 to 1910 he served as receiver of the Chicago Union Traction Company and the North & West Chicago Street Railway and took a prominent part in the settlement of the Chicago street railway ordinances of 1907 and 1910. In 1910 he was elected president of the Central Illinois Public Service Company and the Central Illinois Traction Company, which office he now holds. Mr. Sampsell is also a member of the bondholders' committee of the Chicago & Milwaukee Electric Railway and a director of the Middle West Utilities Company. He was a member of the executive committee of the Illinois Electric Railway Association for 1912.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Tuscaloosa Railway & Utilities Company, Birmingham, Ala.**—Application for a charter has been made by this company in Alabama to operate electric railways and other public utilities. Capital stock, $3,000. Incorporators: C. R. Gannon and W. S. Adams.

***Mexico & San Diego Railway, San Diego, Cal.**—Application for a charter has been made by this company in California to build an interurban railway from National City to South San Diego. Capital stock authorized, $215,000. Incorporators: E. S. Babcock, president; R. B. Talbott, L. M. Brown, A. Goodrich and Thomas M. Leevey. All are officials of the Los Angeles & San Diego Beach Railway, San Diego, Cal.

***Richmond, Portland & Fort Wayne Interurban Railroad, Portland, Ind.**—Application for a charter has been made in Indiana by this company to build an interurban railway to connect Portland, Fort Wayne, Decatur, Monroe, Berne, Ceylon, Geneva, Bryant, Winchester, Lynn, Fountain City, Richmond and other intervening points. Capital stock, $100,000. Directors: G. B. Staub, W. F. Harbison, R. J. McCarty and C. H. Frank.

***Iowa Northern Railway, Clinton, Ia.**—Chartered in Iowa to build an interurban railway from Clinton to Turkey River in Clayton County. S. G. Durant, president.

***Cincinnati & Northern Kentucky Traction Company, Newport, Ky.**—Incorporated to build an electric railway in Kentucky. Capital stock, $10,000. Incorporators: J. M. Dawson, R. C. Green and E. J. Green.

***Oregon Railway, Salem, Ore.**—Application for a charter has been made by this company in Oregon to build an interurban railway between Salem and Bend. Capital stock, $500. Incorporators: J. F. Mounce, A. L. McLeod and G. A. Kylwand.

***Fayette Traction Company, Fayetteville, W. Va.**—Incorporated in West Virginia to build an electric railway from Fayette Station, about 40 miles east of Charleston, to Oak Hill, via Fayetteville. Capital stock, $50,000. Incorporators: George Love, Robert H. Dickinson, C. W. Dillon, E. L. Nuckolls, A. W. Hamilton, R. L. Carter and M. M. Malcolm, all of Fayette.

FRANCHISES

Birmingham, Ala.—The Kelly Company has received a franchise from the Council over Twenty-first Street in Birmingham.

Contra Costa, Cal.—The San Ramon Valley Railroad, a subsidiary corporation of the Oakland & Antioch Railroad, has received a permit from the Contra Costa County Board of Supervisors to build and operate the following electric lines: From Walnut Creek via Danville to Green Valley; from Danville through San Ramon to Sycamore Valley; from Danville to the Alameda County line. The branch to the Alameda County line will probably be extended to Livermore and Pleasanton later. The construction of the lines will be begun at once.

***Orange, Cal.**—Sealed bids will be received up to April 1 by the Board of Supervisors for a fifty-year franchise in Orange.

***Redding, Cal.**—Albert C. Agnew has asked the Board of Supervisors for a franchise on the highways of Shasta County for an electric railway and power line. A similar application has been asked of the City Trustees of Redding. The board has ordered the sale of the franchise advertised. Oakland capitalists are supposed to be interested in this proposed electric railway.

Sacramento, Cal.—The Oakland, Antioch & Eastern Railway has applied to the Railroad Commissioners for authority to construct crossings in Sacramento under franchises granted on June 26, 1912, by the Sacramento Board of Trustees.

San Francisco, Cal.—The Supervisors have passed the ordinance ordering the construction of the Van Ness Avenue extension of the Geary Street Municipal Railway. They have directed the Board of Public Works to prepare plans and specifications. The Supervisors have also prepared the way for the construction of a municipal short line from the Geary Street line through the Fillmore Street tunnel and on to the fair grounds. [E. R. J., Jan. 18, '13.]

Upland, Cal.—The Pacific Electric Railway has received a fifty-year franchise from the Board of Trustees over certain streets in Upland.

Woodland, Cal.—The Sacramento & Woodland Railway, Sacramento, has received permission from the Railroad Commissioners to construct its tracks at grade on Second Street, Woodland, crossing seven intersecting streets between the north and south boundary lines in Woodland.

Hastings, Fla.—The Palatka-Hastings Interurban Railway, Palatka, has received a franchise from the Council to use the Boulevard, St. John's Avenue, Lattin Street and Dancy Avenue, Hastings. This 10-mile line will connect Palatka and Hastings. T. R. Byrd, treasurer. [E. R. J., Feb. 22, '13.]

***Miami, Fla.**—J. E. Lummus, J. N. Lummus, John C. Gramling, H. F. Atkinson and others have asked the Council for a franchise to build a 4-mile electric railway in Miami. A reinforced concrete bridge will be built from the foot of First Street across Biscayne Bay, over which the line will run. From Miami the line will be built to Fort Lauderdale, passing through Buena Vista, Lemon City, Little River, Arch Creek, Ojus, Hallandale and Dania. To the south the line will pass through Cocoanut Grove, Larkin, Kendal, Benson, Rockdale, Perrine, Peters, Goulds, Naranja and Modello to Homestead. The government will be asked for a permit to build the proposed bridge over Biscayne Bay.

Albany, Ga.—The Albany Transit Company has received an extension of time until Aug. 1, 1913, on its franchise in which to complete its 2 miles of new track in Albany.

Atlanta, Ga.—The Georgia Railway & Power Company has asked the County Commissioners of Fulton County for authority to double-track the river line on Mason and Turner's Ferry Avenue, from the point where the double track now ends 6000 ft. along the avenue to Chapel Street.

Lewiston, Idaho.—A. L. Strum has received a franchise from the Board of County Commissioners for the construction of a line from Clarkston, Wash., to Asotin, Wash., and from Clarkston to the Clarkston Heights section.

Jerseyville, Ill.—The Alton, Jacksonville & Peoria Railway has asked the Council for a franchise along State Street to Pearl Street in Jerseyville.

Taylorville, Ill.—The Decatur, Sullivan & Mattoon Transit Company has asked the Council for a franchise over Franklin Street in Taylorville.

Paducah, Ky.—The Kentucky Southwestern Railway, Light & Power Company has asked the McCracken County Commissioners for a franchise through McCracken County.

***Crowley, La.**—The Crowley Board of Trade is considering plans to build an electric railway from Crowley to some available point in the State.

Springfield, Mass.—The Springfield Street Railway has received a franchise from the Council for an extension west on Franklin Street in Springfield.

Cushing, Okla.—The Cushing & Oil Field Electric Railway has received a franchise from the Council to build an electric railway in Cushing. This line will connect Cushing and Perry. John B. Queen, Perry, is interested. [E. R. J., March 8, '13.]

Henryetta, Okla.—C. H. Kellogg and associates have received a twenty-five-year franchise from the City Council in Henryetta. [E. R. J., March 8, '13.]

Portland, Ore.—The Portland Railway, Light & Power Company has received a franchise from the Council for an extension of the Hawthorne Avenue line through South Mount Tabor, a distance of 1 mile.

Bridgeport, Pa.—The Phoenixville, Valley Forge & Stafford Street Railway has asked the Council for a franchise in Bridgeport.

Harrisburg, Pa.—The Valley Railways will ask the City Council for a franchise to construct and operate a belt line on Market and Front Streets via Walnut and Second Streets and Market Square in Harrisburg.

Nashville, Tenn.—The Nashville Railway & Light Company will ask the County Court for a franchise to extend the Buena Vista line to the new Hyde's Ferry Road, Nashville.

Port Townsend, Wash.—The Key City Light & Power Company has received a fifty-year franchise from the Council to build an electric railway in Port Townsend.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company, Seattle, has received a franchise from the Council for an extension of its Kinnear Park line in Seattle.

Huntington, W. Va.—The Ohio Valley Electric Railway will ask the Council for a franchise to double-track all of its lines in Huntington, W. Va.

TRACK AND ROADWAY

Edmonton (Alta.) Radial Railway.—About 32 miles of new track will be built by this company during 1913.

Northern Electric Railway, Chico, Cal.—Plans are being made by this company to build another line to Redding from Chico.

Glendale & Eagle Rock Railway, Los Angeles, Cal.—Work has been begun by this company on the extension to Montrose.

Pacific Electric Railway, Los Angeles, Cal.—Work will soon be begun by this company rebuilding the main line between Redlands and San Bernardino from San Bernardino Avenue to Citrus Avenue. The company proposes to lay 90-lb. rails.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has placed in operation its line between Oakland and Antioch.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—This company has awarded contracts to Twohey Brothers, Portland, to build the extension from Oakland to San José.

Geary Street Municipal Railway, San Francisco, Cal.—This company has awarded the contract to F. Rolindi, San Francisco, to build the extension of its line from its present terminus at Kearny Street and Geary Street to the corner of Market Street and Sansome Street, San Francisco.

Tidewater & Southern Railroad, Stockton, Cal.—During the year this company plans to build 15 miles to complete its line from Stockton to Turlock.

Springfield (Ill.) Consolidated Railways.—Plans are being considered by this company to build a new crosstown line to connect the Hill sections of Springfield and to relieve the congested traffic conditions on Main Street.

Arkansas Valley Interurban Railway, Wichita, Kan.—Work will be begun at once by this company on a 2-mile extension from Newton terminus to Bethel.

Louisville (Ky.) Railway.—This company is asked to consider plans to extend its Brook Street line in Louisville past the present crosstown terminal to Hill Street or possibly Shipp Street, where a connection might be made with the Second Street line serving southeastern residential territory.

New Orleans Railway & Light Company, New Orleans, La.—Plans are being made by this company to improve its Villere Street line in New Orleans.

North Louisiana Electric Railway, Shreveport, La.—The citizens of Arizona, 5 miles east of Homer, have agreed to vote a tax to aid in extending this proposed railway from Homer to Arizona. This line will extend from Shreveport to Monroe, via Minden and Homer. A. B. Blevins, Jefferson, president. [E. R. J., March 1, '13.]

Fryeburg (Maine) Horse Railroad.—Plans are being made by this company to build the section of its line from Fryeburg to Chatham via North Fryeburg, crossing the Saco River at Swan's Falls, with a branch running to Lovell Center and Lovell.

Union Street Railway, New Bedford, Mass.—This company has been asked to consider plans to extend its line from the present terminus near the head of Coggeshall Street, Fairhaven, to the Parting Ways in Acushnet, thence west on the line leading to Lunds Corner to connect with the Acushnet Avenue line.

Berkshire Street Railway, Pittsfield, Mass.—Work has been begun by this company on the big cut on the right-of-way between North Blandford and Gore.

Cape May, Delaware Bay & Sewell's Pont Railroad, Cape May City, N. J.—This company plans to build about 1 mile of new track during 1913.

Morris County Traction Company, Morristown, N. J.—Surveys have been made by this company in connection with a reported plan to operate between Boonton and Paterson.

International Railway, Buffalo, N. Y.—Surveys have been begun by this company at Pendleton on the Buffalo and Lockport line. It is reported that the company plans to double-track the railway between Lockport and Paynes Avenue in North Tonawanda.

Hornell (N. Y.) Traction Company.—Plans are being made by this company to begin work in the spring rebuilding its lines in Hornell. The Canisteo line will also be rebuilt. The company has just closed a contract for 4000 ties to build this line. The North Hornell line will also be reconstructed.

New York Central & Hudson River Railroad, New York, N. Y.—During the year this company plans to build 9.5 miles of new track, to be electrified in Grand Central Station only.

Columbus Railway & Light Company, Columbus, Ohio.—Extensive improvements are to be made at once by this company on its line extending to Westerville.

Toledo & Indiana Railway, Toledo, Ohio.—Work will be begun by this company in the spring on its extension from the present western terminus at Bryan to Montpelier.

Oklahoma Public Service & Interurban Lines, Stillwater, Okla.—Work has been begun by this company on the interurban lines to Morrison, north of Stillwater, and Perkins, south, Louis J. Lampke and Charles Gresser, New York, N. Y., being in charge. Rails have been purchased from the Illinois Steel Company for the 15 miles from Stillwater to Morrison. A sum of $13,000 has been pledged by the farmers living in the Cimarron River Valley and Wild Horse Valley for an interurban railway to connect Stillwater and Guthrie, via Perkins, Ripley and Coyle.

Hamilton (Ont.) Street Railway.—Plans are being made by this company to build a 5-mile extension with 70-lb. rails in the eastern section of Hamilton.

London (Ont.) Street Railway.—Plans are being made by this company to double-track several of its lines in London.

Niagara, Welland & Lake Erie Railway, Niagara Falls, Ont.—At a recent meeting of this company T. R. Cummings was engaged as engineer and plans were decided on to carry out the construction of the whole line during the coming summer. There will be about 36 miles of track running from Niagara Falls to Welland and Port Colborne, and then east along the lake short to Fort Erie. The extensions in Welland on North Main Street to Parkway Heights, on East Main Street to Rosedale, and south into Crowland, will also be built during the summer. Material is now on hand for these extensions and construction will begin as soon as the weather will allow.

Forest Hill Electric Railway, Toronto, Ont.—Plans are being considered by this company to build a line from the northern limit of the city of Toronto at Dunvegan Road north to Forest Hill, and thence out through the Eglinton Avenue and Dufferin Street district in Toronto. [E. R. J., March 9, '12.]

Humber Valley Railway, Toronto, Ont.—The plans for this railway have been presented to the Ontario Railway and Municipal Board by James and R. Home Smith, engineers. The railway will parallel the old Belt Line from the Lake Shore road to Bloor Street, and east along Bloor to the riverside. The highest grade will not be more than 2 per cent, with a minimum of 150 ft. radius at the subway on Queen Street. Plans for that section of the line to cross Queen and College Streets and the section to go north of Bloor have still to be filed, and Herbert Price, the com-

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pany's solicitor, stated that these will be presented shortly. The city was not represented at the hearing. The board approved the plans, subject to the indorsement of its engineers, the right being reserved to make its orders about level crossings. The construction of the railway will be proceeded with at once.

Rogue River Valley Railroad, Medford, Ore.—Plans are being made by this company to electrify its entire line between Medford and Jacksonville.

***Portland, Ore.**—The East Seventy-second Street Improvement Club is back of the movement to have the Rose City car line extended to East Eighty-second Street and Barr Road. All but $7,000 of the construction cost has been subscribed, and property owners along the proposed route have signified their willingness that the work should be done.

Bloomsburg, Millville & Northern Railway, Bloomsburg, Pa.—During the year this company plans to build 9 miles of new track to connect Bloomsburg, Mordanville, Eyers Grove and Millville.

Philadelphia & West Chester Traction Company, Philadelphia, Pa.—This company has placed in operation its new line from the Sixty-ninth Street terminal to Media.

Montreal & Southern Counties Railway, Montreal, Que.—During the year this company will build from 30 to 40 miles of new track to connect St. Lambert, La Prairie, Richelieu, St. Cesaire, Abbottsford and Granby.

Regina (Sask.) Municipal Railway.—This company will build 24½ miles of city track during the year.

Bristol, Tenn.—Right-of-way is being obtained to build an electric railway between Bristol and Johnson City, via Austin Springs. It is the intention of the promoters to build the railway over the old C., C. & O. grade as far as Austin Springs and there cross the Watauga River and after crossing the Holston River at the Devault bridge follow Muddy Creek by way of Blountville over the proposed turnpike to Bristol. James B. Cox, Knoxville, and B. L. Dulaney, Bristol, are interested. [E. R. J., Feb. 8, '13.]

Lake View Traction Company, Memphis, Tenn.—This company plans to extend its line to Clarksdale, Miss., in the near future.

Nashville Street Railway & Light Company, Nashville, Tenn.—Work will soon be begun by this company on the extension of the Fatherland Street line to Shelby Park.

Riviera Beach & Western Railway, Riviera, Tex.—This company has placed in operation its 10-mile line from Riviera to Riviera Beach. It is expected soon to extend this line to Kingsville.

Yakima Valley Transportation Company, North Yakima, Wash.—During the year this company plans to build 12 miles of new track between North Yakima, Selah and Moxee.

Kirkland-Redmond Railway, Light & Power Company, Seattle, Wash.—Preliminary surveys are being made by this company for its line between Kirkland and Monroe, and it is expected to begin construction shortly. W. P. Perrigo, Redmond, vice-president. [E. R. J., Nov. 9, '13.]

Seattle, Wash.—The Rainier Valley Commercial Club is working to have the proposed interurban railway between Portland and Seattle, via Olympia, to be built by the Northwestern Electric Company, enter Seattle through Dunlap Canyon, Rainier Valley.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company has purchased the northeast corner of Pandora Avenue and Douglas Street, Victoria, B. C., for its new terminals. It is the intention of the company to erect at an early date a ten-story building to house the various departments of the company. In the rear of the office building the terminal station for the Saanich & Suburban System will be erected. The cars will reach the building from Douglas Street, via Cormorant Street, on three tracks, running through the station to Pandora Avenue.

Union Traction Company of Indiana, Anderson, Ind.—Plans are being made by this company to build a new passenger and freight station at the corner of Main Street and Fourth Street in Jonesboro.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company has purchased the Masonic block, at College and Clinton Streets, in Iowa City, on which it plans to build soon a new depot.

Winnipeg (Man.) Electric Railway.—It is reported that this company has purchased 10 acres of land in Portage la Prairie on which it plans to build new carhouses and repair shops.

Detroit (Mich.) United Railway.—This company has authorized its architects, Smith, Hinchman & Grylls, to complete plans and specifications for the second building in its general shop layout so that the building may be contracted for and completed during the current year. The general shop layout includes four large buildings of reinforced concrete construction, namely, a paint shop, a carpenter shop, a machine and truck shop and a storehouse. The paint shop has been completed and is now ready for occupancy, and the building to be completed this year will house the machine and truck shop. It will be 244 ft. x 310 ft. in plan, with a second floor over a portion of the building, 155 ft. x 150 ft. in plan.

Interurban Railway & Terminal Company, Cincinnati, Ohio.—This company's carhouse and depot in Cincinnati were destroyed by fire on March 6. The loss on the building and contents is unofficially estimated to be about $200,000.

POWER HOUSES AND SUBSTATIONS

Detroit (Mich.) United Railway.—This company has ordered a 7500-kw Curtis horizontal turbine from the General Electric Company. The order for the condenser and switchboard equipment to go with this turbo-generator was placed with the Westinghouse Electric & Manufacturing Company. The new unit will be installed in station B, at the foot of Riopelle and Atwater Streets.

Piedmont Electric Railway & Power Company, Charlotte, N. C.—It is reported that this company has bought the Burlington electric plant and the Graham Electric, Ice & Water Company and has made contracts for the installation of a central plant near Burlington which will involve an initial expenditure of approximately $1,000,000.

Carolina Light & Power Company, Raleigh, N. C.—This company plans to enlarge the capacity of the local steam plant in Raleigh to 5000 hp and the Gaston Shoals plant will be enlarged to a capacity of 12,000 hp. The company is reported to be considering the construction of a new power plant on Broad River.

Columbus Railway & Light Company, Columbus, Ohio.—Plans are being made by this company to build a new substation at Milo.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—This company announces improvements aggregating $2,500,000. The work includes a new $2,000,000 power house at East Liverpool and a new 3200-kw turbine for the Fallston power house, Beaver, Pa., to cost $60,000.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—This company plans to abandon the present steam power plant at the Lake Shore and build an addition to its substation west of Geneva.

Ottawa (Ont.) Electric Company.—This company will soon build a new substation in Ottawa. The structure will be of brick construction with concrete and pine floors and felt and gravel roofing. The cost of building and equipment is estimated to be about $75,000.

Rhode Island Company, Providence, R. I.—Improvements at the Manchester Street power station of this company that will cost about $750,000 and eventually give the plant about 75,000 hp are under way, and it is said also that the New York, New Haven & Hartford Railroad is to erect a separate power plant or else make additions to the Manchester Street station, giving the plant 150,000 hp. The improvements now under way will comprise the erection of two additions to the present power house and will mean the installation of two 15,000-kw steam turbines.

Blue Ridge Interurban Railway, Spartanburg, S. C.—This company plans to construct a dam at the mouth of Big Hungry River, near Hendersonville, N. C., 164 ft. high, to develop 50,000 hp and transmit electricity to Spartanburg and other South Carolina towns.

Manufactures and Supplies

ROLLING STOCK

West Penn Railways, Pittsburgh, Pa., expects to build six 56-ft. steel passenger cars in its own shops.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa., is asking for prices on two cars.

Pottstown & Phoenixville Railway, Pottstown, Pa., expects to purchase six semi-convertible cars and two freight cars.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has specified the following details for the ten combination passenger and smoking cars which are being built by the Jewett Car Company:

Seating capacity	59
Weight (car body only),	42,000 lb.
Length of body	44 ft. 4½ in.
Length over vestibule,	52 ft. 6¼ in.
Length over all	53 ft. 8½ in.
Width over sills	8 ft. 7¾ in.
Height, rail to sills	41 11/16 in.
Body	wood
Interior trim	mahogany
Headlining	composite
Car trimmings	bronze
Couplers	Van Dorn
Curtain fixtures	Cur. S. Co.
Curtain material	Pantasote
Fare boxes	International
Seats	H & K
Seating material	split leather
Step treads	Stanwood

Northern Texas Traction Company, Fort Worth, Tex., reported in the ELECTRIC RAILWAY JOURNAL of Feb. 15, 1913, as having ordered four closed interurban cars from the St. Louis Car Company, has included the following details in the specifications for this equipment:

Seating capacity	54
Bolster centers, length,	30 ft. 5 in.
Length of body	40 ft.
Length over vestibule,	51 ft.
Width over sheathing,	8 ft. 10 in.
Width over all	9 ft.
Height, rail to sills	43 in.
Sill to trolley base,	9 ft. 4 15/16 in.
Body	wood
Interior trim	mahogany
Headlining	Agasote
Roof	monitor
Underframe	semi-steel
Air brakes	Westinghouse
Bumpers	Hedley anti-climb.
Car trimmings	St. L.
Couplers	Van Dorn
Curtain fixtures	Forsythe
Curtain material	Pantasote
Gongs	Dayton
Hand brakes	St. L.
Heaters	Consolidated
Headlights	Wagenhals
Sash fixtures	Edwards
Seats	H. & W.
Seating material	leather
Step treads	Universal
Trolley catchers	Knutson
Trolley base	Knutson
Trucks	Baldwin
Ventilators	St. L.

TRADE NOTES

Camden Forge Company, Camden, N. J., after several years of experimental research, is enlarging its steel heat-treatment plant by the installation of annealing furnaces and quenching facilities. The first unit of this installation is now in operation.

W. H. Smith Electrical Engineering Company, Portland, Ore., has been incorporated by W. H. Smith and associates to undertake the installation of electrical machinery, the building of power plants and the electrical equipment of buildings. The office of the company is in 1003 Spalding Building, Portland.

Industrial Works, Bay City, Mich., have recently established a Chicago agency in charge of Burton W. Mudge & Company, in the People's Gas Building. This office will handle in the Chicago district the Industrial Works line of wrecking, locomotive and freight station cranes, pile drivers, transfer tables and grab buckets.

Mead-Morrison Manufacturing Company, Boston, Mass., manufacturer of coal-handling machinery and steam and electric hoists, has purchased 10 acres of land on the Boston & Albany Railroad at East Boston, and will erect a large plant at this location to take care of its manufacturing business. The plant will consist of a plate shop, erection shop, machine shop, power plant, pattern shop, foundries and general offices. The company will employ about 1000 men in the new plant.

Electric Service Supplies Company, Philadelphia, Pa., has placed on the market a line of panelboard lightning arresters for d.c. and a.c. service in railway, lighting, mine and industrial plants. These boards are built on the well-known law that no matter how efficient a lightning arrester may be, it will never carry off every bit of a lightning discharge from a given line. These panelboard arresters effectually take care of this leakage by interposing additional choke coils between the line and the apparatus to be protected and by connecting lightning arrester units ahead of these coils. By the addition of extra arrester units and extra choke coils the protection to apparatus has been increased ten times by a double panelboard, a hundred times by a triple panelboard and a thousand times by a quadruple board. The boards are made in station types, mounted on heavy impregnated oak framework, and are furnished complete with insulators for attaching to any suitable supporting means. The arrester units are furnished with highly polished and lacquered metal work. The choke coils are of copper, black-enameled and baked. They are designed especially for the protection of apparatus up to 6600 volts a.c., up to 2500 volts d.c. for railway circuits and up to 6000 volts d.c. or a.c. for arc circuits, and are furnished in any ampere capacity for voltages within this range.

ADVERTISING LITERATURE

Harold R. Wilson Machinery Company, St. Louis, Mo., has issued List No. 10 of second-hand electric and steam apparatus which the company has on hand for immediate shipment.

Hoppes Manufacturing Company, Springfield, Ohio, has issued a booklet in which the various types of steam specialties manufactured by the company are briefly described and illustrated.

Electric Service Supplies Company, Philadelphia, Pa., has issued the *Keystone Traveller* for March, 1913, which contains much interesting information regarding the company's products. The increase in the adoption of prepayment car operation is shown clearly with figures in one section of the publication.

George Herman Anger, Strand Road, Preston, England, has issued a bulletin which fully describes and illustrates the Anger improved automatic brake adjuster and its method of operation. This type of adjuster is manufactured for either single or bogie trucks with any type of platform brake gear.

Trussed Concrete Steel Company, Detroit, Mich., has issued two new folders on Trus-con armor plate for protecting expansion joints in concrete roads and the Trus-con curb bar steel protector of concrete curbs, in which these two recent additions to the Kahn building products, with their applications, are fully described.

Canton Culvert Company, Canton, Ohio, has just published a most interesting booklet on the subject of "Acme" nestable corrugated metal culverts and other products. A brief history of the corrugated culvert is given, followed by a discussion of corrosion. Numerous illustrations with explanatory text are then shown to prove the strength, lightness, compactness, ease of shipment and simple installation of this type of culvert. Another feature which shows the great care given to the subject is the table of culvert diameters, gages, thicknesses, weights and water-carrying capacity. The publication includes illustrated descriptions of corrugated metal sheets and of the Imperial corrugated metal culverts with hints as to the methods of installation.

An opinion in regard to franchises issued recently from the office of Attorney General T. S. Hogan of Ohio has been explained partially. The opinion, which was prepared by Assistant Attorney General Charles Marshall, contained the statement that franchises, which must be considered as contracts between municipalities and corporations or individuals, cannot be impaired by acts of the Legislature. This, of course, was in a measure the same as saying that the proposed Bigelow bill, which is intended to revoke all fifty-year franchises, would be invalid. Mr. Hogan has explained that the opinion related to the authority of the Public Service Commission to intervene between municipalities and public service corporations and decide whether the ordinance has been complied with. Personally, he had always hesitated to make so broad an assertion as is contained in the opinion because the matter to be contracted may not always be a proper subject for contract.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MARCH 22, 1913 No. 12

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office.............................1570 Old Colony Building
Philadelphia Office.......................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal 8000 *copies are printed*

INDUCTIVE DISTURBANCE STUDIES In last week's issue an account of the preliminary work of the joint committee on inductive disturbances organized under the auspices of the California State Railroad Commission was given. The causes of neither electromagnetic nor electrostatic disturbances are by any means well understood notwithstanding their practical interest to electric railways on account of the rapidly increasing use of signal and telephone systems. Yet there must be considerable information on this subject stored in the archives of telephone, telegraph and power companies. The failure of the commission to find any considerable amount of data in accessible form indicates also that an effort should be made to collate the records now in existence and to encourage research which will bring out additional facts. Hence the commission's plan of getting together the various branches of public service interests which are concerned in the matter is a logical one. A public service commission furnishes most desirable auspices for the conducting of such tests as are outlined; in fact, no other body is in a position to bring out unbiased information so efficiently. The result can but conduce to harmony among otherwise conflicting interests.

SURPLUS AND DEFICIT IN CLEVELAND The student of the reports of financial operations of the Cleveland Railway can consider them in either one of two ways. He can take the statement of income account based on the actual disbursements, which showed for the calendar year 1912 a net deficit of $38,935, or he can take the results based on the car-mile allowances prescribed in the ordinance for operating expenses and maintenance and discover a surplus of $110,418. Thus there exists a difference of $149,353 between the results of the two methods. The reason for the discrepancy indicated is that the Tayler ordinance names the specific rates per car mile which the company shall be allowed to deduct from earnings and use for operating expenses and for maintenance. The actual expenditures for these purposes exceeded the ordinance allowances in 1912 by $149,353. In 1911 a deficit was shown under both methods of accounting, but the actual deficit resulting from the disbursements was larger than the bookkeeping deficit which the accounts showed when compiled according to the ordinance allowances. As between the two methods it is, of course, the actual results which measure accurately the operations of the property. An arbitrary car-mile allowance of expenditure is an end toward which a company can aim. If it does not reach this end, its results of operation are not those which were prescribed for it, but those which its actual disbursements show.

THROUGH ROUTES AND RATES IN ILLINOIS The Illinois Traction System, seeking through routes and rates with the Peoria & Pekin Union Railway, has secured an opinion from the Interstate Commerce Commission directing that its request be acceded to. The opinion of the commission shows that the position of the electric railway was reasonable and the position of the terminal company was unreasonable. The electric line has ample terminal facilities in Peoria, passenger as well as freight, but it needs facilities for the interchange of traffic with steam lines and needs, furthermore, to be able to reach the various industries in the city, more than half of which have private switch connections with the tracks of the terminal company only. The terminal company is controlled by ownership of stock by steam railway companies and took the ground that its property was private, but that the electric railway system could make use of that relatively small part which it desired by a payment calculated on the same basis followed in the cases of those railways which use all of the property of the terminal company, including passenger and freight stations, storage yards, etc. In other words, the Illinois Traction System could use a small part by paying for the whole. This, of course, was equivalent to a denial because no line could afford such an arrangement. It imposed too heavy a terminal charge on the business. The position of the electric railway was sound and entirely tenable. If it had sought the use of already overcrowded passenger and freight terminal buildings to avoid the construction of facilities of its own, its argument would have been less likely to succeed. But it sought merely the use, in common with other carriers likewise engaged in interstate commerce, of the track and interchange facilities of the company which, in the language of Commissioner Meyer, "practically controls the use of Peoria as a gateway for interstate traffic." The increase in the number of through route and rate arrangements which are in operation between electric railways and steam carriers in various sections of the country is slow, but it is a tendency that is amply justified on economic grounds and by the decisions of both courts and commissions. The order of the Interstate Commerce Commission in the Peoria terminal case will benefit the Illinois Traction System directly and materially. It will also strengthen the hands of other electric railways which are trying to secure through routes and rates with steam railways.

EDUCATION OF PUBLIC SERVICE COMMISSIONERS

When the first public service commissions were created by New York and other states many corporations feared the consequences of granting almost autocratic powers to men who came into office with no practical knowledge of the properties they were to administer. It would be fatuous optimism to assert that no public service commissions have subjected the corporations under their control to needless expenditures and impracticable orders, but there is evidence in plenty that time and experience are gradually bringing the commissions and public service corporations to a better understanding of each other's viewpoints and responsibilities. This happy tendency is clearly indicated by the recent addresses of Messrs. Hale and Olmsted, as reported in this issue, and in a recent statement of F. W. Stevens, chairman of the New York Public Service Commission, Second District, noted in the ELECTRIC RAILWAY JOURNAL for March 1. Mr. Hale, who is a member of the Connecticut Utilities Commission, took occasion to point out in a specific case the incompatibility of lower fares with good service.

Mr. Olmsted, in his address, frankly confessed that he had entered office as a commissioner of the Public Service Commission, Second District, New York, with anti-corporation views. Experience had taught him, however, that most corporations were willing to give the public all that was possible within their financial means. The fact that less than one-quarter of the public service companies in his territory could pay dividends was a significant contradiction of the general impression that they were mines of Golconda and Kimberley combined. Finally, the commission had found that it could do more good by bringing the public and the corporations together than by brandishing the "big stick" of its tremendous powers. Mr. Stevens' address, which was delivered before the New York Electric Railway Association, laid particular stress on the endeavors of the commission to be patient and just with each side in controversy.

In this connection, it is a matter of deep regret to note that the curse of political rotation in office has already led to the retirement of Mr. Olmsted, while the end of Mr. Stevens' service is expected at an early date. Surely it is a great injustice to the public and the corporations alike to refuse reappointment to public officers at the very stage when they have become thoroughly acquainted with their duties. The late retirement of Chairman Willcox of the New York Public Service Commission, First District, just before he was ready to sign a transit contract involving more than $300,000,000, was a most flagrant example of the disregard of public welfare which is imposed by the American party system. The present duty of public service corporations, therefore, seems to be not so much a matter of protesting against the principle of state supervision by commissions as one of advocating that public service commissioners should be appointed under somewhat the same conditions as Supreme Court judges, namely, for long terms or with life tenure subject to good behavior.

WHEN A REDUCED RATE OF FARE SHOULD NOT BE MADE

One of the unjustifiable theories of electric railway rate-making in the early days of the industry was responsible for a reduction in the fare during the rush-hour periods in one or two cities. A similar illogical method of rate-making is illustrated in the temporary arrangement now prevailing in Toledo. If a company departs from the flat rate of fare principle, it ought not to depart in any such way as this. It ought to maintain its rate of fare during the rush-hour periods because it has all it can do in these periods anyway to handle the inevitable heavy movement of traffic between homes and places of work. When it offers a low rate of fare during rush-hour periods it simply encourages the crowd; it lessens the traffic during the non-rush periods and increases the traffic during the rush periods. If a company wants to differentiate in its fares between the rush periods and the non-rush periods, the reduced rate of fare should fall in the non-rush hours.

Variable rates at different hours of the day for the same haul are perfectly logical and may be adopted generally when the ideal system of electric railway rate-making is developed; but, if so, they should be made on a justifiable basis. They should correspond in principle to the rates of the steam railroad for twenty-eight-hour and twenty-hour service, respectively, between New York and Chicago, and to those of the central station for off-peak business. That is to say, the passenger who wants to use the facilities at the time when the greatest demand for their use naturally exists should pay more than the one who is willing to ride when the demand is light. The passenger who rides during the periods of heavy demand does so because his convenience is served thereby; but this is the same motive that leads nearly all of the passengers to ride during the same periods. The passenger who travels when the cars carry light loads uses the facilities of the company when the total capital investment is at a low point of productiveness and when an extra inducement to ride can best be afforded, if it can be afforded at any time. In city railway management it has not appeared practicable to vary the facilities for service and to introduce a form of graded fares therefor, corresponding to the rates charged for Pullman or for ordinary coach transportation on steam railroads. Nor has a city company the trackage necessary to introduce the equivalent of limited trains to meet a greater degree of convenience for the passenger at the price of an excess fare. The possibilities in the direction of variable service and variable rates of fare for an unlimited haul are restricted to variation in the time of day when the service is used.

It is for the reasons outlined that we conclude that there ought not to be a higher rate of fare to discourage riding during the middle of the day, when the demands on the facilities are reasonably light, and a lower rate of fare to encourage riding during the busy period of the day, when the demands are all that the average company can meet with the trackage available in the congested centers of the city. In fact, if there is to be any divergence whatever from the uniform rate of fare principle, the most logical course is a complete new fare scheme having as its primary basis rates proportioned to the distance traveled.

PROPER RECOGNITION FOR "GOING VALUE"

Those who have difficulty in realizing the expenses of developing a public utility business or the hazards which are encountered during the early history of an electric railway can have a practical illustration of the situation in the rapidly developing communities in the Far West. When "going value" is studied in the older and more stable cities of the East, it often seems to theoretical students of financial values that the ultimate growth and its rapidity and direction in each city, as well as the need for transportation facilities, must have been obvious from the beginning.

There is no reason, however, to believe that such was the case, and the testimony of those railway men whose experience dates back to the times when the Eastern cities were much smaller than they are now furnishes corroborative evidence of this fact. But in the Far West cities are still in their making, and one may now see there in one year a duplication of the events which the more slowly growing cities of the East have taken years to accomplish. As under a microscope, the various steps in the development of a city are unfolded, and a new conception may be had of the great opportunities for errors in judgment and the hazards of the transportation business.

One of these hazards, of course. is the future of the city itself. Given a certain population at a certain time, will that population grow 10 per cent or 100 per cent during the next year, as many cities in the Far West have done, or will it diminish in perhaps the same ratio? After a city has reached a certain size its permanence and the certainty of its growth are fairly assured, but local transportation enterprises cannot be held in abeyance until that time arrives. If the conservative financier waits, more venturesome promoters will have entered the field with the hope of large returns.

Still another hazard, even in an established or rapidly growing community, is the direction of growth. This cannot be positively foreseen. If it could, real estate investments in each city would be as safe as government bonds. Surrounding each community, large and small, in the Far West, in every direction, are real estate enterprises, all demanding rapid transit service and all holding forth the promise of a large population in the early future. Some are destined to succeed, while others will surely fail. An investment in any public utility enterprise in such a community runs the same risk as does an investment there in real estate. If the expected results fail to materialize for reasons which cannot be predicted in advance, the cost of establishing the public utility is lost, either in part or entirely, as has been the case in many instances. If the venture should happen to be a fortunate one, the real estate operator reaps a large profit, and the public utility investor should be entitled to like return.

It may be argued that such gain for some reason is proper to the speculator in real estate, but not to the railway promoter; that it is against public policy that the public utility promoter in successful ventures should earn more than 6 per cent or 10 per cent or 15 per cent on his investment, and that because he uses the streets he, in some way, forfeits his opportunity to profit with others who run equal or less financial hazards in developing town sites. If this is to be the settled policy of the future, it is needless to say that it will greatly retard, if not absolutely prevent, the establishment of the kind of communities of which we are speaking. Their development, not to say their existence, depends upon easy communication with other towns as well as upon a supply of light and water. If the installation of these utilities is prevented by a limitation upon the possible return, the home seekers will remain in the established cities or will seek other states where a more liberal policy prevails. It was the belief on the part of the builder of local railways that he would profit with the real estate operator which led to his investment in such enterprises in the past, and a denial of this claim is already being seen in the diminishing rate of railway extensions and new enterprises in all parts of the country. This will inevitably be followed by a corresponding retardation of the development of new towns.

The Far Western roads show, also, frequent examples of railway equipment outgrown before it is worn out. Obsolescence was brought about in part by the development of the art and in part by municipal enactments forced by public opinion. The smaller cars are physically as good to-day as ever, but they are of little value for practical use. In some cases, indeed, ordinances have been passed prohibiting their use. Similar conditions prevail in the power and generation and transmission systems and in other departments of a railway plant. The results could not have been foreseen, any more than one can predict at the present day the type of car or prime mover which will be used ten years from now, in spite of the belief of some persons that railway equipment is now standardized. The fact is that the electric railway is still in the formative stage, and no one knows how long this period will last. Hence the cost of obsolescence is and will be for some time to come a serious charge on railway operation. There is no escape from the purely accounting deduction that this charge must be met in the future in one of two ways, namely, either in the capital account or by its recognition as an extra hazard in railway enterprises for which there should be a correspondingly large return on the capital invested in the undertaking. As regards the past, we have always felt that as obsolescence has been until recently considered as a proper capital charge, and as various obligations have been assumed by railway companies upon this basis, past charges to capital account due to obsolescence of the equipment should be permitted to remain unchallenged.

The question of the past is one which concerns all companies, but that of the immediate future is particularly pressing on the Pacific Coast, on account of the demands of the public for an expansion of rapid transportation facilities. However, but little can logically or fairly be done by the companies in this direction until this question of a definite and adequate recognition of going value is settled.

The Washington & Old Dominion Railway

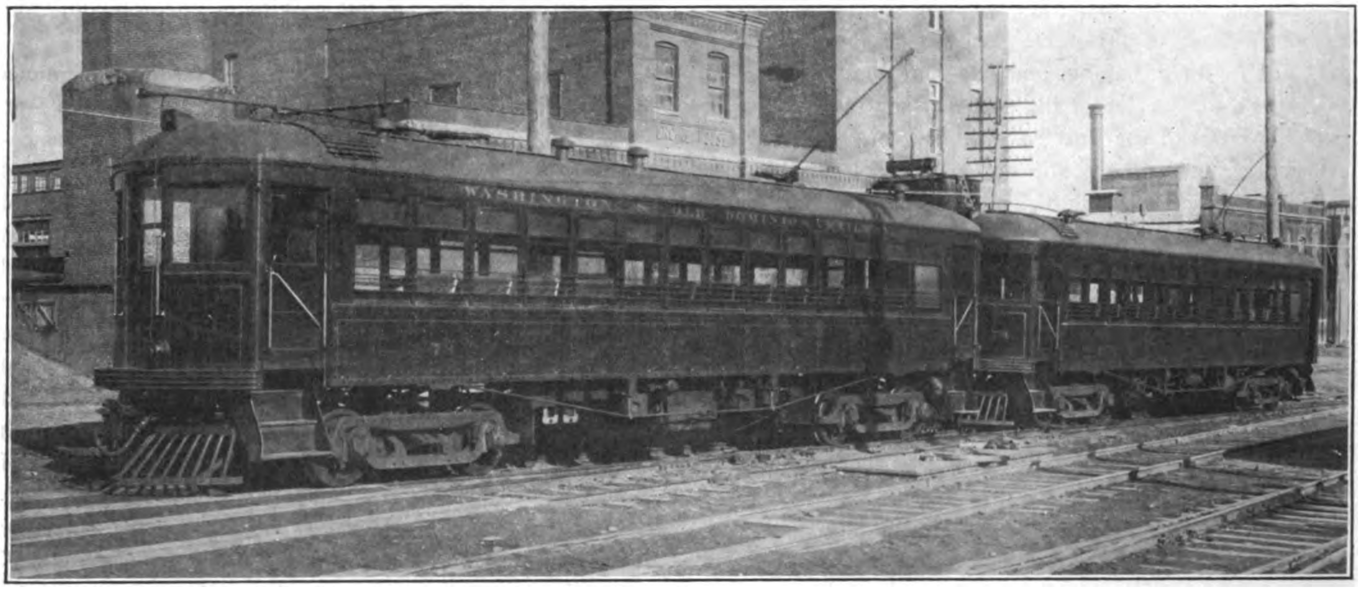
A Typical Suburban Steam Road in Northern Virginia, with a Single-Track Length of About 60 Miles, Has Been Electrified and Its Entrance Into Washington Has Been Changed

BY W. N. SMITH, CONSULTING ENGINEER OF THE COMPANY

The latest example of the change in motive power from steam to electricity is the Washington & Old Dominion Railway, now extending from Washington, D. C. (Thirty-sixth and M Streets, N. W.), to Bluemont, Va.

This company, formed in 1911, took over from the Great Falls & Old Dominion Railway the double-tracked trolley line from Washington to Great Falls, 14.1 miles; leased from the Southern Railway the single-tracked steam line extending from Alexandria to Bluemont, 54 miles, and connected the two with a new double-track cut-off 3 miles long, extending from a point 2 miles out from Washington on the Great Falls line to Torrison station, now called Bluemont Junction, 7 miles out from Alexandria on the Bluemont line.

The original Great Falls & Old Dominion Railway was built in 1905-6 and double-tracked several years later. When built, it traversed virgin territory with no villages or community development of any kind along its route. But the suburban development which it made possible was rapid, and in the first six years of its existence it created a permanent and growing suburban community and more than doubled its original equipment, in order to take care of it. The grades are heavy, from 2 to 3½ per cent.



Washington & Old Dominion Railway—Two-Car Train with Multiple-Unit Equipment

The steam railroad to Bluemont was built from Alexandria to Purcellville in the fifties. The heaviest grade is 1½ per cent, and though there is considerable curvature, all the curves are easy. The rails are 60-lb., but will gradually be superseded by a heavier section.

The cut-off connecting the two lines was built last winter and spring and was placed in service June 30. It is a typical example of standard present-day railroad construction, with 70-lb. A. S. C. E. rails, ties 7 in. x 8 in. x 8 ft. 6 in. on 2-ft. centers, with 6 in. of stone ballast under the ties. The joints have six-bolt angle bars, and are bonded with single No. 0000 concealed bonds compressed terminal type.

PRESENT SERVICE

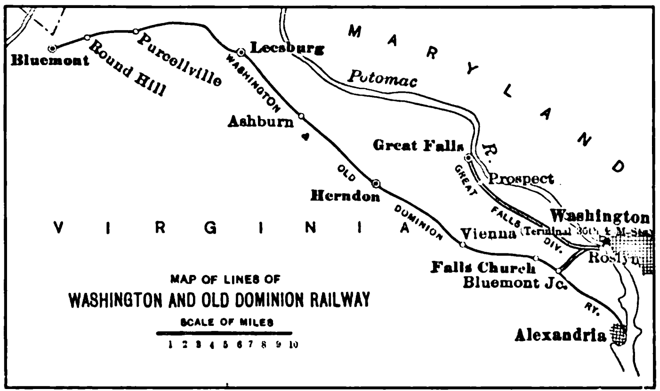
Mention has been made above of the creation and rapid growth of suburban traffic on the Great Falls line. For the past two or three years it has required a ten-minute schedule of cars for the first 7 miles out from Washington in the morning and evening rush hours. There is every indication that the newly accessible region along the cut-off will develop into an equally attractive and popular residence section and the tendency of the Washington residents, particularly those employed in the government departments, to build modest homes in the beautiful country immediately adjacent in Virginia will be further encouraged by the facilities afforded by the newly combined system, which not only embraces a number of towns with a commuter traffic already existing but makes it much easier than formerly for these residents to circulate to and from the metropolis.

A considerable area in Alexandria, Fairfax and Loudoun Counties is now provided with more convenient suburban traffic facilities than ever before. Formerly all the steam railroad traffic from these northern Virginia counties entered Washington by the Union Station, the location of which is not convenient to many of the government offices. The traffic arrangements between the Union Station and the railroads entering it were not such as to encourage short-haul, low-fare suburban traffic and a real need existed for a new means of bringing the beautiful and healthful countryside of northern Virginia close enough to the administrative center of Washington to make the former readily accessible as a home for the workers in the latter. This want is now filled by the Washington & Old Dominion Railway, whose city terminus is at least 5 miles nearer the suburban district than is the Union Station. This enables its passengers to step out of its own cars and into the Pennsylvania Avenue city cars without loss of time, saving the additional time and fatigue of walking through the magnificent distances of the Union Station between railroad and trolley cars.

At its Thirty-sixth and M Streets station the railway has completed the erection of a steel-frame train shed, 50 ft. x 100 ft., remodeled the waiting rooms, ticket offices, baggage facilities, etc., and established its trainmaster's and train dispatcher's offices.

In like manner the entrance and exit of express, package freight and milk traffic will be facilitated as soon as a suitable rearrangement of the Thirty-sixth and M Streets terminal can be made.

This business, like the passenger traffic, will all be handled with electric motive power. For the present, however, the regular carload freight traffic of the Bluemont division will be handled by steam locomotives and will be interchanged with the other railway systems at the Potomac yards near Alexandria, as heretofore. Ultimately it is probable that electric locomotives will be employed for all freight train service. The freight business increased appreciably in the last year, requiring two regular trains each way every day instead of one.



Electric Ry Journal

Washington & Old Dominion Railway—Map

The passenger train service on the Bluemont line, with steam motive power, consisted of four trains each way a day, one of which ran to and from Leesburg and three to and from Bluemont, schedule speeds being from 20 to 25 m. p. h. Since the change in motive power there are now run five trains a day each way to Herndon, five to Leesburg and five to Bluemont, some being of one and some of two cars per train. There are also twenty-four trains each way between Washington and Bluemont Junction.

Traffic still being very light on the 7 miles between Bluemont Junction and Alexandria, this section has not yet been electrified, but a steam shuttle service is maintained at sufficient intervals to make all necessary connections between Alexandria and the upper end of the line. Before describing the electrical equipment it may be well to dwell upon some of the conditions which governed the development of the system employed.

It was not considered necessary or desirable to attempt high speed. It was believed that all purposes would be better served by increasing the frequency and reliability of the service than by attempting to shorten the time.

The presence on the Great Falls line of a considerable quantity of 600-volt d.c. electrical equipment in good condition, and the desirability of having equipment that could operate on city tracks in Washington, influenced the decision to retain that system for the electrification of the Bluemont division. In this way the company was able to insure uniformity of equipment and a higher degree of reliability than could be guaranteed for a high-voltage d.c. system in the state of the art at the time.

The ownership of a power station fundamentally good, though with a few defects that could readily be corrected, influenced the decision to continue to generate power rather than to purchase it, thus maintaining the entire property on a perfectly independent basis.

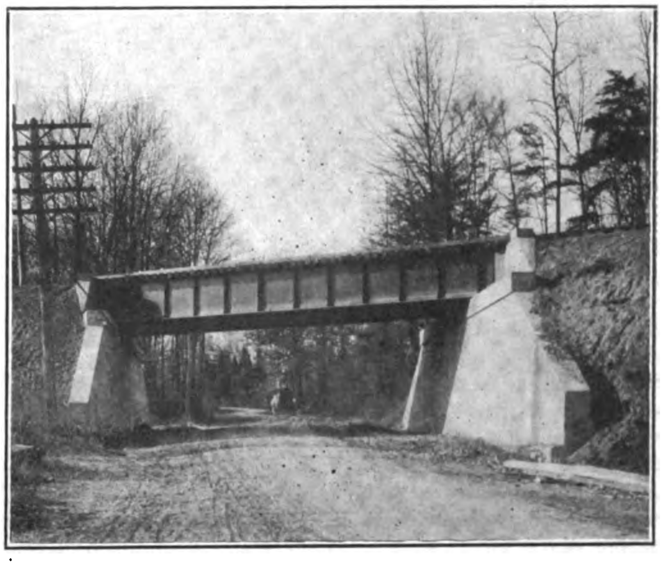
The question of handling freight trains by electric power was left open for the present, as certain future possibilities are bound up with it which have not reached the stage of active development.

EQUIPMENT PLANS

The electrical equipment of the Great Falls line consisted of a power station at Rosslyn, Va. (opposite Washington), on the Potomac River, containing one 500-kw and one 750-kw turbo-generator, with two 500-kw rotary converters and three 125-kw raising transformers, which last supply 22,000-volt, three-phase current to a transmission line feeding one rotary converter substation at Spring Hill, 10 miles distant. The substation contained two 300-kw rotaries, with one bank of 110-kw transformers, one rotary only being used at a time except on summer holidays. The rolling stock comprised twelve large and two small passenger cars and one freight motor car. The larger cars are about 42 ft. long over all, the smaller ones about 30 ft. long and used only for traffic over the Aqueduct Bridge between Thirty-sixth and M Streets, Washington, and Rosslyn. There were several second-hand steam locomotives and trailer coaches that had been used occasionally but were in bad repair and were not taken into account in providing for the new arrangements.

The three newest passenger cars were fitted with multiple control, but all the other cars were provided with the old type of platform controller. As all of the passenger cars enter Washington, they are of necessity equipped with conduit trolley plows, though the stretch of track on which they are necessary is hardly more than a quarter of a mile long.

A careful weighing of the above conditions, including as they did the important matter of utilizing the existing conditions of entrance to the city of Washington and the disposition of operating equipment by no means obsolete and representing an investment of several hundred thousand dollars, combined with the greater cost, delayed delivery and indefinite operating cost of high-voltage equipment, resulted in the decision to adhere to the 600-volt d.c. system for equipping the Bluemont division. The same reasons led the company to retain and improve the existing power generating station at Rosslyn and to enlarging its equipment to suit the increased requirements. This conclusion was only reached after about a dozen different schemes and estimates had been made and compared, covering a variety of combinations of voltage and of substation location. The final layout, upon which were drawn the specifications calling for all new apparatus, included for the power station one new 1250-kw turbo-generator, with auxiliaries; three 300-kw raising transformers, 390 to 33,000 volts, with oil circuit-breaker, electrolytic lightning arrester and suitable switchboard panels; four new rotary converter substation



Washington & Old Dominion Railway—Embankment Bridge on New Cut-Off equipments for fixed stations and one portable substation, all of 300 kw capacity, and twelve car equipments of four 60-hp motors each, with automatic air brake and multiple-unit control.

The spare rotary at Spring Hill substation was utilized in one of the new substations, but in other respects all the apparatus was new.

POWER STATION

The power station presented several interesting problems in civil and mechanical engineering, owing partly to its location upon a rocky ledge on the edge of a mud flat of river silt and partly to the fact that the condensing water intake channel was too wide and shallow and the chimney of insufficient height.

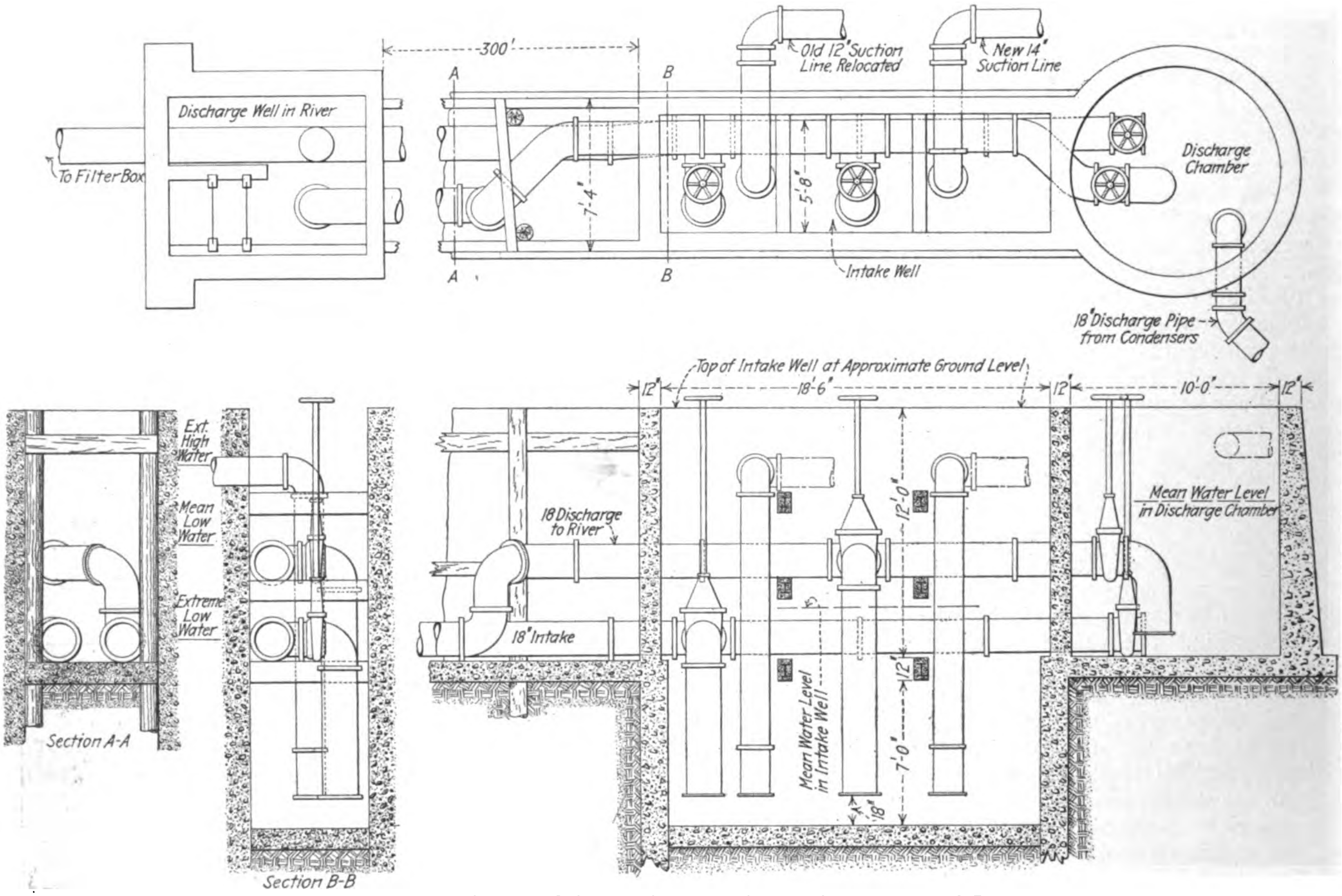
The original intake channel, built of sheet piling, would probably have given little trouble either if the Potomac River had been free from silt or if the power station had been large enough to require a quantity of condensing water sufficient to produce a rate of flow that would have kept the silt from settling in it. The intake was about 7 ft. wide, its bottom being about 5 ft. below mean and 2 ft. below extreme low water, the latter occurring when a northwest wind is simultaneous with low tide. As the condenser suction from the original plant consisted of but one 12-in. pipe and as the usual flow through this pipe was only about half its capacity, the current in the intake at ordinary tide levels was imperceptible, and the plant had run only a few months before the intake channel became effectively banked with mud at the river end. A few hundred dollars properly expended for lumber and labor would probably have overcome the silting, but after several years of intermittent shutdowns a cooling pond was created on the adjacent flat alongside the intake, in which could be stored a quantity of water that would carry the plant over one or two extra low tides by letting the pond water flow back into the intake and circulate through the condenser over and over again, the 4-ft. embankment of mud at the outer end of the intake effectually preventing access of cold water from the river at such times. This makeshift arrangement had to be watched closely by the plant engineer at times of low tide, in addition to his other duties, and even then was not always effective, as the injection water would reach a temperature of 100 deg. or more.

The intake channel was of wooden sheet piling, and after six years' exposure to the elements was rapidly decaying. It was about 300 ft. long from the river end to the circular concrete well (about 200 ft. from the plant), from which the condenser injection pipe was laid to the circulating pumps. The intake well was of the same depth as the intake, and at low water considerable air and solid trash was sucked up into the condensers.

The obvious remedy was to provide a conduit for condensing water that would be of such size that the flow would tend to prevent sedimentation, of a depth that would be effective regardless of the wind and the tide and that could be flushed if necessary by reversing the flow. At the same time due regard was had to possible increase in plant capacity and to eliminating the cost of maintaining the rapidly decaying timber intake, and most of all to reducing the cost of the improvement to a minimum.

Accordingly, about 20 ft. of the inner end of the old timber intake channel, next to the old circular concrete suction well, was blocked off by a cofferdam (temporary injection piping being run around it) and the excavation deepened 6 ft. to form a new intake well in front of the old well. The new well was built of reinforced concrete, with walls about 1 ft. thick, and a concrete floor resting on piles, with several sets of horizontal struts or cross braces to prevent collapse of the sides, the braces being composed of I-beams incased in concrete and forming supports for the piping.

This new well is connected with the river by two independent lines of 18-in. cast-iron pipe in 12-ft. sections, flanged, faced and bolted, which rest on the concrete bottom of the old intake channel. Both lines run through the

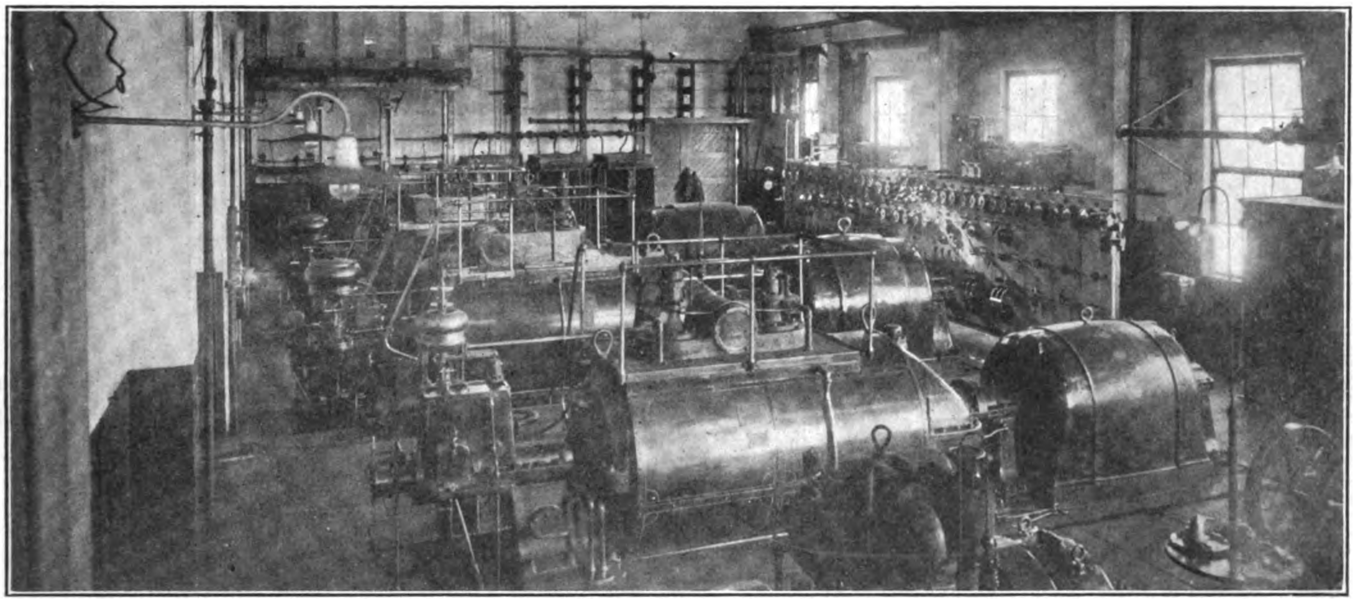


Washington & Old Dominion Railway—Plan and Sections of Intake

new well into the old well (the two wells being otherwise separated), and each pipe line can be connected to either well independently by an 18-in. gate valve, with hand wheel on the valve stem extending above the ground level. The old well is to receive all the condenser discharge water from the plant, through a line of 18-in. glazed terra cotta pipe.

The method of operation will therefore be to use one of the 18-in. lines as an intake pipe connecting the river to the new well, whence the condenser injection pipes lead into the plant, and to use the other 18-in. line as a discharge line from the old well to the river, all by proper manipulation of the four 18-in. gate valves.

The 18-in. line that will be generally used for the intake is extended about 100 ft. out into the river, ending in a steel box, 5 ft. x 10 ft. x 5 ft., in the upper part of which is formed a filter bed of gravel and broken stone, which will prevent trash from entering the pipe. The other 18-in. line terminates in a concrete crib at the river end of the present intake channel and will ordinarily be used as a discharge, but by lowering trash racks into position across the discharge opening this pipe line can also be used as an intake when it is desired to reverse the flow for flushing the other pipe, or for any other reason. The two pipes together will furnish an ample supply for a plant of more than double the capacity of the present one, should its size ever be increased. The old wooden intake can decay and fall to pieces without in the least interfering with operation. The amount of wet excavation, in quicksand, was by this plan reduced to a minimum. The scouring effect of the discharge water is also utilized to prevent or retard the formation of a sandbar adjacent to the intake.



Washington & Old Dominion Railway—Interior of Power Station

The progress of construction work on the new well was slower than had been estimated, because of the behavior of the underlying quicksand, the difficulty of securing suitable working equipment in Washington and the impossibility of working more than a few men at a time in a small excavation. The well is now completed, and the heavy pipe work along the old intake bottom, which requires a submarine diving outfit, is now under way.

RECONSTRUCTION OF BOILER PLANT

The boiler plant presented the problem of getting 100 per per cent to 150 per cent of rating out of 1428 hp of Stirling boilers served by a stack 7 ft. in diameter and 125 ft. high. The prime difficulty was that the available draft of about 9/16 in. to 5/8 in. was insufficient to burn coal enough on the existing hand-fired grates to evaporate their rated amount of water. After making comparisons of various methods, such as forced draft, induced draft, balanced draft, a new stack and several types of mechanical stokers, and taking into account the extremely limited space in the boiler room, the uncertainty of the extent of future enlargement of the plant, the short time available for installation, the first cost and the guarantees of operating economy which would be backed up by responsible manufacturers, together with the ultimate value of the method adopted as a future asset, the company decided to adopt the Roney type of mechanical stoker, made by the Westinghouse Machine Company. The guarantees obtained with these stokers were that they would generate steam to the extent of 150 per cent of boiler rating, with coal averaging 14,500 b.t.u. and with the existing conditions of chimney draft. This postponed the building of a new stack until the plant should be further increased, obviated the necessity for changing the flue connections or adding fan apparatus and air ducts, for which it would have been difficult to provide room and which would not, *per se,* have improved the economy of operation. Further, it offered possibilities of reducing the coal consumption by anywhere from 10 to 20 per cent, it required but a comparatively short time to install and involved but a single responsibility and a small force of men.

The lack of draft above mentioned had worked a serious hardship to the boilers in this respect, that it had not been possible to get more than two-thirds to three-fourths rating out of any of them, and consequently made it less easy to shut down the boilers for cleaning. Under the initial operation, the load on the two original 276-hp boilers had called for more steam than one boiler could ever furnish, with the insufficient draft, and consequently the two boilers were worked for a considerable time without being out of service long enough to have their tubes cleaned. The result was that the two back rows of tubes in these two boilers were incrusted with more than 1/2 in. of very hard scale. The subsequent addition, first of another 276-hp boiler and, later, of a 600-hp boiler, relieved the situation somewhat; but the scale was so nearly indestructible that it was decided to remove and replace about fifty tubes in each boiler. This was done during the progress of the stoker installation.

Another improvement in the boiler room was the removal of the feed pumps to a separate pump room, built for the purpose alongside the boiler room, in which the pumps were placed at a level several feet below that of the boiler room to reduce their suction lift, and a new pump was added. A disused feed water heater was repaired and added to the system; a small auxiliary steam header was installed to provide more flexibility in the use of the main steam header, and the pumps were fitted with independent hot and cold water suction connections and so connected that they could be used on house service lines also. The main 8-in. steam header was sectioned by inserting a gate valve in the middle of it. Six 36-in. galvanized Star type ventilators were placed in the concrete slab roof of the boiler room, which had hitherto been without adequate outlet for hot air. Provision was also made for covering all steam piping, which had been omitted from work done subsequent to the original installation.

CHANGES IN ENGINE ROOM

In the engine room the two elevated jet condensers had been so piped that it was impossible to run more than one of them at a time, although each had its own circulating pump and dry vacuum pump. The piping of these pumps was changed to remedy this defect, making it possible for the first time to run the 500-kw and the 750-kw units in parallel. The principal work in the engine room was, of course, the installation of the new 1250-kw generator, with its condenser, the additional raising transformers, switchboard panels and motor generator exciter.

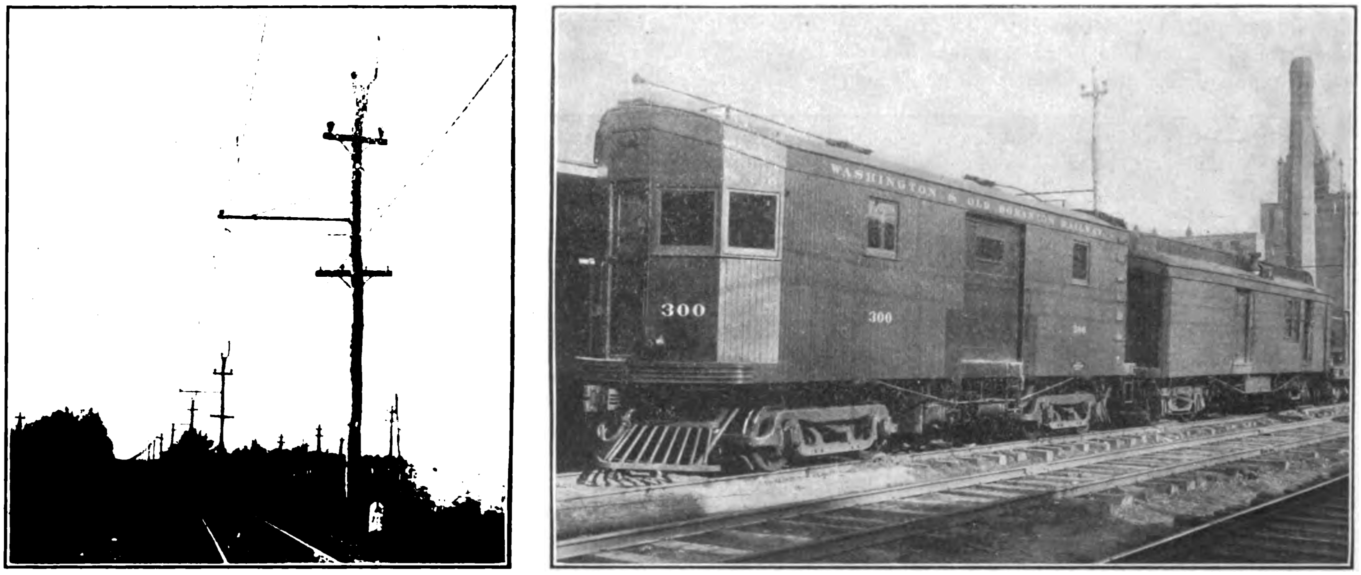
There was barely room in the engine room for the new apparatus, but the only difficult part of the work was the excavation and lining of the pit that was required to accommodate the new condenser. The contract for the new turbine had, with all the other electrical apparatus, been placed with the Westinghouse Machine Company, which furnished a Le Blanc condenser with the turbine. This necessitated a pit nearly 7 ft. deep below the engine room basement floor level, which was solid rock and of a particularly refractory kind of granite. It had to be blasted, but of course with very small charges to prevent damage to the building and contents. It took nearly four weeks of constant labor to make an excavation about 10 ft. x 15 ft. to the proper depth.

The new condenser was so connected that it could be used on either the new 1250-kw or the old 750-kw unit, as it is a more economical machine than that originally attached to the latter. A new hot well was constructed outside the building to which the discharge from all the condensers is led and from which the boiler feed is ordinarily drawn. This hot well overflows through a line of 18-in. terra cotta pipe to the old well next the intake, as above described.

As may be inferred from the foregoing, much of the engineering in the power station was concerned with the design and construction of steam and water piping. The piping material was nearly all furnished and the construction of nearly everything besides the intake piping was executed by the Benj. F. Shaw Company, of Wilmington, Del. This work included the steam, exhaust and water piping, also oil-cooling and gland water supply for turbine and condenser, the new system of piping for the feed pumps, auxiliary steam header, house service lines and suction piping as far as the new well. From this point the 18-in. piping, though furnished by the Shaw company, was installed by the railway company's own force.

ELECTRICAL EQUIPMENT IN POWER STATION

The electrical details of the power station are simple and in accordance with standard practice and need no special description. The new 300-kw transformers are of the oil-insulated, self-cooling type, delta-connected. The 33,000-volt outgoing circuit is controlled by a hand-operated automatic circuit-breaker, mounted near the switchboard in the usual cell structure of pressed brick. The electrolytic lightning arresters are on the roof. The generator voltage is 390, twenty-five cycles, feeding directly into rotary converters placed in the engine room, which supply the adjacent parts of the line, as well as into the old and new sets of raising transformers.



Washington & Old Dominion Railway—Overhead Construction and Freight Motor Car with Standard Railroad Baggage and Mail Car

The new 33,000-volt transformers are placed alongside the old bank of 22,000-volt transformers, which are still used to supply the substation on the Great Falls line.

A new motor-driven 15-kw exciter was added to the former exciter equipment. Sundry improvements were made in the building, including two ventilators in the engine room roof and a complete new roof covering of Ehret four-ply tar, felt and slag roofing over the entire building.

OVERHEAD CONSTRUCTION

The overhead construction of the new line is of the single-bracket type, on wooden poles, which carry the high-tension line also. The catenary type of trolley construction was adopted and was made as simple as possible in all its details. Wheel trolleys being used on the cars, there is no special necessity for a very tight trolley wire. The normal pole spacing is 150 ft. on tangents and on curves up to 3 deg. The total amount of new construction erected is 47 miles of single track, 3 miles of double track and 4 miles of sidings for passing and freight tracks.

The poles are of chestnut, mostly cut in the region adjacent to the line. They average 22 in. circumference at the top and 44 in. 6 ft. from the butt for the standard 40-ft. pole required for combined trolley and three-phase transmission construction.

At curves all poles on the outside of the curve are guyed to permanent guy anchors. Poles on the inside are cross-guyed to guy poles set directly opposite, which are also permanently back-guyed.

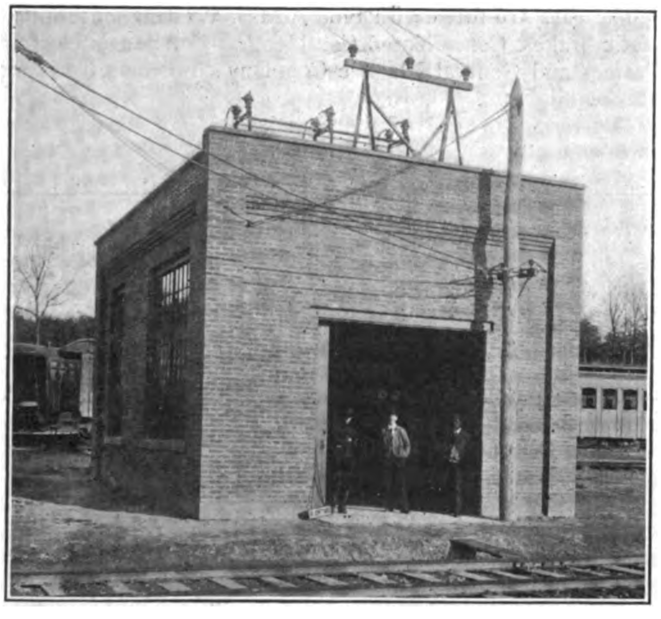
The characteristic features of straight-line construction are shown in the accompanying halftone. The spacing of the 33,000-volt wires is 48 in. and a 5/16-in. galvanized steel ground cable is stretched over the high-tension wires throughout their full extent. The insulators are Pittsburgh porcelain, triple-petticoat, with a dry flash-over test voltage of 100,000 and a wet flash test of 70,000. By reason of the lightness of the conductor section no special construction of strain insulators is needed, beyond the doubling of cross-arms, pins and insulators on curves and such few dead ends as are required. The transmission conductors are of No. 3 B. & S. solid hard-drawn copper. Burke type high-tension outdoor sectionalizing switches have been installed on the 33,000-volt line, allowing the high-tension line to be cut off west of any substation, which in case of trouble with high-tension line enables the operation of a line car directly to the seat of any trouble and eliminates the use of hand cars or gasoline cars and the delay incident thereto.

The trolley wire is of No. 0000 B. & S., carried by a 7/16-in. Siemens-Martin steel messenger, the hangers being spaced at 30-ft. intervals and of the Westinghouse drop-forged type. On curves up to 2 deg. no pull-offs are employed between poles. One 300,000-circ. mil copper equivalent aluminum feeder is run the full length of the line.

The poles were furnished by L. A. Clarke & Son, of Washington. The steel and copper cables and wires were furnished by the American Steel & Wire Company, and the overhead catenary trolley and high-tension details by the Westinghouse Electric & Manufacturing Company. The work of erecting all poles, high-tension and trolley construction was let to Smethurst & Allen, contractors, of Philadelphia.

RAIL BONDING

Rail bonding presented an unusual problem, because the 60-lb. rails on the Bluemont line had splice bars that afforded no room for concealed bonding and because the management proposed to replace these rails gradually with heavier ones. This track was therefore bonded with the twin-terminal type of bond, which was installed by the American Steel & Wire Company. On the new cut-off, where standard 70-lb. rails and splices were used, the protected type of compressed terminal bond was employed.

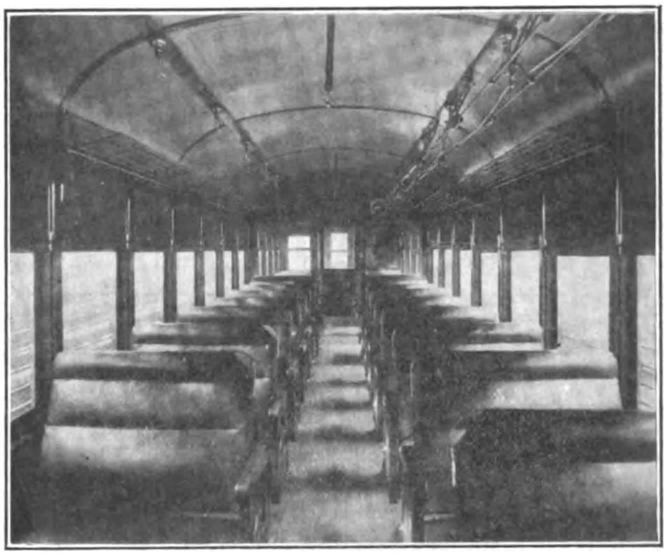


Washington & Old Dominion Railway—Substation at Bluemont Junction

SUBSTATIONS

There are four new permanent substations located, respectively, at Bluemont Junction, Herndon, Leesburg and Round Hill. There is also a portable substation, intended to be used for the most part at Vienna, between Bluemont Junction and Herndon, at all times except when needed elsewhere as a relay.

The substation buildings are of uniform pattern, built of brick, with concrete floor structure and roof of thin reinforced concrete slabs laid on steel I-beams and covered with Ehret four-ply felt, tar and slag roofing. The window frames are of the steel Fenestra type. The buildings are each designed to contain one 300-kw rotary converter, with transformers, 30,000-volt oil-switch structure and switchboard. The high-tension choke coils are hung on insulators supported from the ceiling and the lightning arresters, of the aluminum type, are on the roof. The buildings are so designed that they can be readily enlarged when it becomes necessary to increase their capacity.



Washington & Old Dominion Railway—Interior of Passenger Motor Car

The Bluemont Junction substation is shown in an illustration on this page.

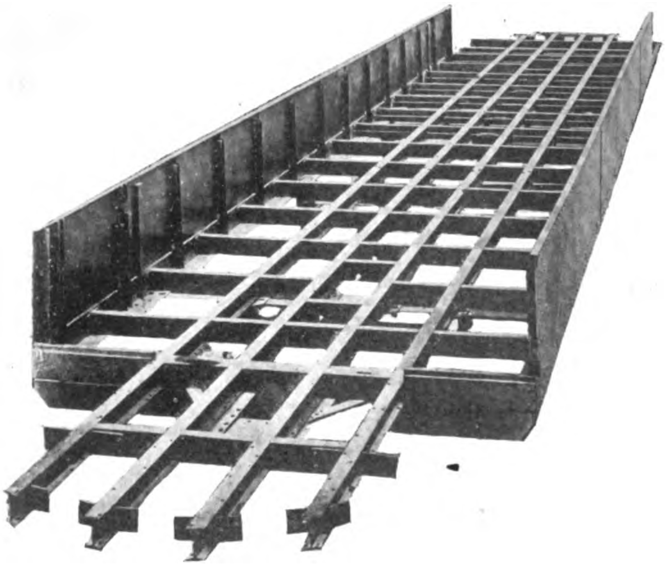
ROLLING STOCK

The new rolling stock of the company, purchased particularly for use on the Bluemont division, consists of ten passenger motor cars, six passenger trailers and two freight motor cars. Of the first ten cars mentioned six are straight passenger with smoking compartment and four are combination passenger and baggage cars, with mail-handling furniture so arranged that it can be readily installed or removed and the compartment changed from ordinary baggage to a United States railway post office. All ten cars are 50 ft. long over bumpers, 8 ft. 6½ in. wide over sheathing and 9 ft. high from bottom of sill to top of roof. They are of composite steel and wood construction but built somewhat differently from the usual mixture of steel and wood so often found in an interurban car body. The side girders and underframing are almost entirely of steel, while the superstructure and interior finish are of wood.

The load-carrying parts of the car framing comprise the side girders, the longitudinal sills, the needle beams, bolsters and cross sills. These are all of steel without wooden fillers or reinforcement. The side girder consists of a 30-in. plate girder, whose bottom flange is a 6-in. x 6-in. side-sill angle and whose top flange is a belt-rail angle about 1½ in. x 2 in. The web is of 3/16-in. steel plate, there being three sections of it, butt-strapped together, in its total length of 39 ft. These are the main load-carrying members of the car. The center and intermediate sills are continuous between buffers and are of 6-in. I-beams. The floor load is transferred to the side girders through steel needle beams, steel angle cross-sills at the ends of the body framing and bolsters of the usual built-up steel type. The cross-blocking or bridging pieces in the floor structure are of oak, fitted into pockets formed against the sides of the longitudinal sills by iron angles riveted thereto. This cross-blocking is at no time in tension but is held in compression by one turnbuckle rod at each crossing, reaching across the car from girder to girder, its prime function being the foundation for the car floor. It is, therefore, unnecessary to provide longitudinal railing strips or fillers in the sills, and the weight of a large amount of timber, entirely useless except for railing strips, is eliminated. The absence of fillers, besides saving in weight, was found to facilitate the work of installing the car equipment. The floor was further stiffened by diagonal bracing of flat steel placed between the bolsters and the needle beams.

The platform buffer timbers are of oak, finished off with Hedley anti-climbers and reinforced with oak blocking.

The side girders are stiffened on the inside with vertical angles, so arranged as to form side-post pockets, into which are fitted side posts of ash, spaced 2 ft. 8 in. between centers. The car body and vestibule and posts are of oak and the side plates that rest upon them are of yellow pine. The roof is of the single-arch type, with eight Globe ventilators per car. The interior headlining is of agasote, painted light green with plain gold striping. The interior finish of the sides and ends of the car, doors, sash and partitions is of cherry.



Washington & Old Dominion Railway—Floor and Part of Side Framing of Composite Steel and Wood Car

The cars are full-vestibuled, and for convenience in train operation end doors are provided in the vestibules.

The straight passenger cars were each fitted with two toilets, and the combination cars and trailers with one each. The partitions between compartments are glazed so that the conductor has a full view of the car from either end. The seats are of Hale & Kilburn make, with pressed-steel arm rests. They are upholstered in Spanish leather in the main compartments, with rattan in the smoking compartments. With the steel side girder construction adopted the thickness of the side walls of the car is only about 2 in. instead of 4 in. or 5 in., as would have been the case with wooden side-truss construction. Consequently it was possible to use a seat cushion 39 in. long and still have a center aisle 20½ in. wide.

The baggage and mail compartments were so designed as to enable conformity to the government requirement that the mail clerk be completely isolated from train crew and passengers. The motorman's cab in that end of the car, and the 5-ft. baggage side door on that side are so arranged that the cab, when opened out for use, can be entered through the smaller swinging section of the side door, while the larger or sliding section of the side door still gives ample service to that side of the compartment. The motorman is thus separated by his folding partition from the mail compartment and at the same time has ingress and egress independent of it.

The mail furniture in the compartment is made in accordance with dimensions specified by the United States Post Office Department and is readily removable, so that the car can be easily changed from mail to baggage service or vice versa.

To supplant the regular baggage service and to provide general express, light freight and milk transportation there are provided two freight motor cars. These are built entirely of wood, excepting the center sills. They are 41 ft. long over all, 9 ft. wide inside and 10 ft. from bottom of sill to top of roof, with cab in each end.

All motor cars are equipped with four No. 306 Westinghouse motors and Type HL multiple-unit control. The motors are of 60 hp at 600 volts and have sufficient capacity to maintain a schedule speed of 25 m.p.h. with stops averaging 2 miles apart, or 30 m.p.h with stops 4 miles apart. While this is lighter equipment than has been usual for interurban service, the cars weigh equipped less than 30 tons, the schedule speed is moderate and the stops are not very frequent.

It is intended that the combination cars and freight cars shall haul trailers when required. Consequently the motor gearing is different from that on the passenger cars, 15:69 for the former and 22:62 for the latter.

There are six passenger trailer cars built like the motor cars in all respects except that they are 8 ft. shorter, have open platforms with gates but without vestibules, only one toilet and rattan seats. Connectors are provided on the trail cars to receive heat and light current from the motor cars.

The cars are fitted with type A.M.S. Westinghouse automatic brakes, Consolidated Car Heating Company's electric heaters and General Electric Company's Form D luminous arc headlights.

The trucks are all of the Standard Motor Truck Company's C-50-P pressed-steel frames with 4¼-in. x 8-in. journals, 5-in. axles and M.C.B. 36-in. rolled-plate wheels and a wheelbase of 6 ft. 4 in.

The car bodies were built by the Southern Car Company, of High Point, N. C., at whose works the electrical equipment was mounted and connected up. The bodies so equipped were mounted upon their trucks by the railroad company after being received from the manufacturers.

DISPATCHING

The usual telegraphic train-order dispatching system has been used for handling the electric trains in the same way as with steam power, but it is being supplemented by a telephonic dispatching system now being installed by the Western Electric Company which consists of its latest type of selective apparatus working over two telephone wires. This will enable the dispatcher to call up any agent and transmit train orders or, at stations where there are no agents, to set a semaphore against a train that will stop it for orders, a telephone booth being installed at every such semaphore. At the outset there will be about twenty-one telephone instruments. The telephone wires are run on the same crossarms as the low-tension feeder.

RECORDS OF CONSTRUCTION WORK

Work on the 3-mile cut-off was begun early in the fall of 1911. In January, 1912, the engineering work involved in the selection and purchase of the equipment was undertaken. Choice was made and contracts for material and apparatus were let in March. The 3-mile cut-off was completed ready for train service so that the first electric train ran over it on June 30, and on July 1 the lease of the Bluemont line from the Southern Railroad went into effect. Steam operation was continued between Alexandria and Bluemont, but electric service was started on that date between Washington and Bluemont Junction, passengers changing between the steam and electric cars until about Oct. 6, when electric service was extended to Leesburg and in December to Bluemont.

The entire work was planned and carried out under the personal direction of W. B. Emmert, general manager. The surveys, location and construction of the cut-off, the design and construction of the overhead lines, the substation buildings and the installation of the substation equipment, the signal system, etc., were in charge of O. H. Bundy, chief engineer, who on Sept. 1 was also placed in direct charge of engineering construction, maintenance of roadway and structures, maintenance and operation of power plant, overhead lines, substations and electrical equipment.

The equipment engineering, covering the selection of the system, plans and specifications for power station improvements, substation apparatus and car bodies, trucks and car equipment and the supervision of power house and car construction, in collaboration with the chief engineer, was in charge of the writer of this article in the capacity of consulting engineer.

HEARING ON RULES FOR INTERLOCKING PLANTS IN INDIANA, ILLINOIS, WISCONSIN AND MINNESOTA

The engineers for the Railroad Commissions of Indiana, Illinois, Wisconsin and Minnesota have drafted a set of rules and regulations to govern the construction, reconstruction, maintenance and operation of interlocking plants in these States. The signal engineers of the roads affected were invited to attend a preliminary hearing at Springfield, Ill., a short time ago. At the conclusion of this hearing the engineers requested more time to study the rules and appointed a committee to consider all the requirements.

On March 12 a second hearing was held at the offices of the Railroad & Warehouse Commission in Chicago. This hearing was also attended by the members of the signal committee of the Illinois Electric Railways Association. Objections were raised in regard to the design, maintenance and operation of interlocking plants as specified by the commissions' engineers in their relation to both steam and electric roads. Besides being required to conform to all the rules to which objections were raised it is proposed to require the electric railways to provide suitable guards on their trolley wires to prevent the trolley from leaving the wire at crossings.

John Leisenring, signal engineer Illinois Traction System, Peoria, said that this special provision was a burden upon the electric railways and was not in conformity with modern overhead trolley construction. It increased the strains on the overhead work at the crossings. The accumulation of sleet on this wide guard area in special instances would be so great that it would be almost impossible to maintain the line properly under the ordinary methods of construction.

The purpose of the interlocking plant was to protect the crossing and it appeared unreasonable to require the electric railways to take an additional precaution which at times might cause more delay than the remote one of having to replace the trolley wheel on the wire. The best modern overhead construction, as approved by the joint committee drafting specifications for overhead line crossings, required the simplest construction arrangement.

The engineers for the commissions have taken the question under advisement and will redraft this clause along with others which were opposed. They will then submit the revised rules at a future and final hearing.

EQUIPMENT TRUSTS FOR ELECTRIC RAILWAYS

Since the publication in the Electric Railway Journal (July 8, 1911) of W. B. Brockway's admirable article on "Equipment Trust Securities" as applied to the financing of electrical railways there has been a steady increase of interest in this method of providing for additions to rolling stock.

The following list of equipment issues made by electric railways is probably incomplete, but it is as comprehensive as it could be made in view of the fact that such issues are not recorded with the care and attention that are given by bankers to steam railroad issues of the same description. It is not improbable, however, that with the increase that now appears likely in the volume of such securities the financial markets will soon have to take more serious account of them.

Electric Railway Equipment Trusts

Fort Wayne & Wabash Valley Traction Company	$85,000
Indianapolis Traction & Terminal Company	300,000
Northwestern Electric Railway of Chicago	185,000
Chicago & Oak Park Elevated Railroad Company	217,000
United Railways & Electric Company, of Baltimore	1,590,000
Public Service Railway of New Jersey	1,700,000
Coney Island & Brooklyn Railroad	30,000
Pittsburgh Railways	400,000
Norfolk & Portsmouth Traction Company	25,000
International Traction Company	850,000
Virginia Railway & Power Company	25,000
United Railway of San Francisco	350,000
Philadelphia Rapid Transit Company	1,500,000
Market Street Elevated Passenger Railway	325,000
Hudson & Manhattan Railroad	2,414,500

All of these issues are not outstanding, and in the case of the United Railways & Electric Company of Baltimore the unpaid portions of its B and C equipment issues, originally amounting to $1,240,000, were redeemed with three-year 5 per cent collateral trust convertible notes. This action was taken under a redemption clause, not unprecedented but somewhat unusual in car trust agreements, which provided that the railway company might at any time anticipate the payment of any or all of the outstanding certificates upon any instalment date by giving thirty days' notice of its intention so to do and paying a premium of 2½ per cent upon the face value of the certificates so taken up.

CLASSES OF EQUIPMENT ISSUES

As a rule the provisions of equipment trust agreements follow essentially the outline given by Mr. Brockway in the article already referred to, but the obligations may be divided as to details into three general classes in the following way:

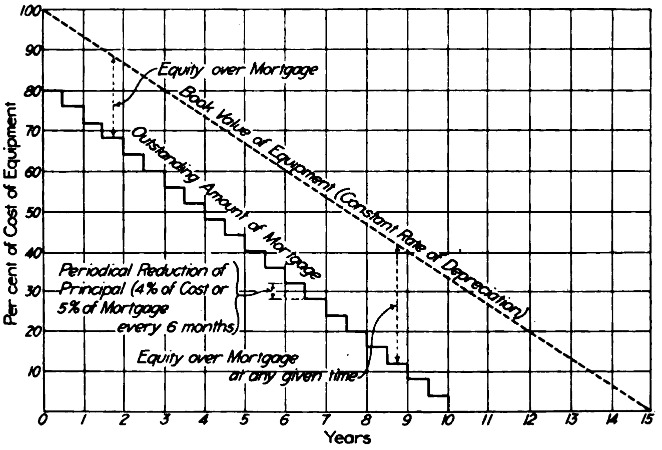
First—Where the bond is a direct obligation of the railroad, being secured by pledge upon the equipment purchased by the trustee and by it sold or leased conditionally to the railroad. In such cases the railroad is liable for any deficiency that might exist should the sale of the equipment itself be found insufficient to cover principal and interest of the securities issued. This is a very simple contract which binds the railroad to protect the equipment obligations at all hazards.

Second—Where an association is formed to purchase the rolling stock and leases it to the road, which ultimately becomes owner after the full purchase price has been paid. The contract embodying these provisions is then deposited with a trust company, as trustee, which issues certificates based thereon. Under these conditions the equipment may be leased or sold, and in the event of default the railroad must make good any deficiency.

Third—An association is formed to lease or to sell conditionally the equipment to the railroad company. The association then sells shares of its own capital stock to the public. These certificates, although not direct obligations of the railroad, are guaranteed by it and to all intents and purposes offer the same protection. The guarantee makes the railroad specifically liable in case of default in principal or interest.

COMPANY FORMED TO FINANCE ELECTRIC EQUIPMENT PURCHASES

Quite lately a company has been formed in Philadelphia especially to handle electric railway equipment issues. According to this company's plan of operation it will, before undertaking the purchase of an issue of car trust certificates, require a satisfactory statement of the earnings and resources of the railway company, obtaining evidence that the purchase of new cars is warranted and that the railway company is in a position to provide for their maintenance. The securities company will also have a voice as to the specifications of the cars to be bought. These preliminaries being settled, the company will create car trust certificates to the amount of about 75 per cent of the cost of the cars to be financed, the railway company paying down the difference between the amount of the certificates and the cost of the equipment to be bought. The remainder is distributed in semi-annual instalments over a period of ten years, together with interest also payable semi-annually on the outstanding certificates, which are guaranteed by the railway company. The title to the entire number of cars against which certificates are issued remains in the hands of the trustee until all instalments are paid in full. It is evident that this plan overcomes the difficulty heretofore experienced by electric railways in obtaining a market for small amounts of equipment notes, the company referred to being constantly in the market for such issues, which it plans to deposit with a trustee and then to issue and sell to investors its own serial bonds.



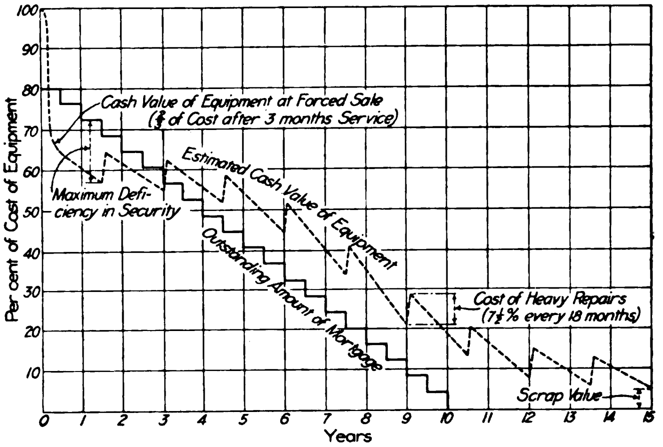
Equipment Trusts—Security Given to 80 Per Cent Mortgage. Based on Book Value of Equipment

ESSENTIALS OF EQUIPMENT ISSUES

The diagrams herewith presented show the characteristics of equipment issues, from the viewpoint of railway, banker and investor, and the working out of a typical car trust. The investor, of course, must be satisfied that an equipment note affords good security or there will be no receptive market for such issues and their volume will be correspondingly small. It is therefore necessary that the cost of the equipment shall be sufficiently in excess of the original amount of the mortgage to insure the investor an ample margin of security at all times during the life of the car trust, the earlier as well as the later years of its term. One of the diagrams herewith shows that the security may under some conditions be insufficient during the first years of the trust.

There is hardly any investment, however, which has a better record for safety than the equipment issues of steam railroads, and electric railway car notes are of course essentially the same in nature and security. The equipment issue has always been placed in the category of preferred claims by the courts, decisions to this effect being based usually on the theory that equipment is essential to the life of a transportation company. On this theory the holders of equipment obligations have been protected, even as against the holders of first mortgage bonds. In a decision of the United States Circuit Court in the case of the Denver & Rio Grande Railway equipment bonds, after the reorganization of 1886, the court ruled that equipment obligations constituted really preferred claims, and that they ought to rank ahead of the mortgage claims, being paid out of revenues the same as wages. The effect of this decision was actually to place these obligations ahead of the first mortgage bonds.

As long ago as July, 1898, the STREET RAILWAY JOURNAL printed a note to the effect that Messrs. Tate & Jones, of Pittsburgh, "have made an arrangement with trust companies whereby they are enabled to extend to electric railways the service of a car trust in financing the purchase of rolling stock." This was fourteen years ago, and the slow progress of equipment trust financing since then is due, no doubt, not to any essential difference between electric railway and steam railway equipment bonds, but to the difficulty of interesting bankers in small issues. If this difficulty has now been removed, the electric railway equipment trust certificate may be expected to be found in largely increased amounts in the investment market with great advantage to the electric railways of the country.



Equipment Trusts—Security Given to 80 Per Cent Mortgage. Based on Probable Cash Value of Equipment

MILEAGE MAINTENANCE SYSTEM ON THE SYRACUSE LINES, NEW YORK STATE RAILWAYS

The lines of the New York State Railways in the city of Syracuse have recently introduced a mileage maintenance system. This has been adopted with the expectation that the procedure of making inspections and applying lubrication upon a strict mileage basis will effect improved economy and in addition will add to the reliability of the rolling stock. The accompanying table shows the mileages which have been adopted as standard between inspections of the different parts of the equipment as well as for the lubrication of the various classes of motors and of gears.

MILEAGE MAINTENANCE SYSTEM, NEW YORK STATE RAILWAYS, SYRACUSE LINES

INSPECTION

Part Inspected	Mileage	Class of Equipment
Air brakes	1200	All cars
Controller	600	All cars
Journals	3000	All cars
General	300	St. Louis
General	600	All others
Gears	1200	All cars

LUBRICATION

Part Lubricated	Mileage	Class of Equipment
Motors	300	GE-54
Motors	600	GE-67
Motors	2500	GE-216
Motors	300	GE-1000
Motors	2000	West. 101
Gears	8000	All types

All journals, axles and armature bearings are repacked every 25,000 miles.

Convention of the American Railway Engineering Association

Many Subjects of Interest to Electric Railways Were Considered by This Association at Chicago—Those of Special Importance Include Effect of Metal and Treated Ties on Signal Operation, Specifications for Track Fastenings, for Rail Composition, for Metal, Composite and Concrete Ties and for Fence Material—An Account of the Proceedings Is Also Given

The fourteenth annual convention of the American Railway Engineering Association was held in Chicago March 18 to 21. From March 15 to March 21 the National Railway Appliances Association gave its annual exhibition in the Coliseum and the First Regiment Armory.

Conforming to the established custom, the proceedings of the association included reports from twenty-one standing committees and also several papers describing the results of special tests to determine the efficiency of various materials and construction methods. As the long life of this association has enabled it to prepare numerous standard specifications, the work of the different committees during the past year was largely confined to collecting data with a view to the improvement of the quality of standard railway materials as well as the methods employed in their manufacture and application. Some changes were recommended in the specifications for carbon steel rails and additional instructions were drafted governing maintenance-of-way employees. One of the most important recommended additions to the manual of this association was a complete set of specifications governing the design and manufacture of track fastenings and their accessories.

RAIL COMMITTEE REPORT

Briefly, the report of the rail committee included some unimportant revisions of the specifications for carbon steel rails, statistics of rail failures and conclusions drawn therefrom and detailed reports of special investigations of rails. M. H. Wickhorst, engineer of tests for the committee, reported on the following subjects: abrasion tests of rails on revolving machine, influence of titanium on Bessemer ingots and rails, pipeless ingots, transverse ductility of base of rail, influence of silicon on open-hearth ingots and rails. In addition to the work of the engineer of tests the report of this committee contains the results of investigations on the effect of transverse or internal fissures in rails, method of producing sound ingots, new method of revealing segregation in steel ingots and the results of stremmatograph tests of track under service conditions.

RULES AND ORGANIZATION

In accordance with instructions the committee on rules and organization recommended that a number of rules be added to the "Instructions" which were presented and adopted by the association at its convention of last year. Among them were the following:

"27. Tie plates must be used wherever ties wear out faster than they fail by ordinary decay. They must be put on so as to get a full and level bearing on the tie and against the rail.

"29. The standard gage is 4 ft. 8½ in. Curves 8 deg. and under should be standard gage. Gage should be widened ⅛ in. for each 2 deg. or fraction thereof, 8 deg. to a maximum of 4 ft. 9¼ in. for tracks of standard gage. Gage, including widening due to wear, should never exceed 4 ft. 9¼ in.

"30. The installation of frogs upon the inside of curves is to be avoided wherever practicable; where this is unavoidable the gage of the track at the frog should be standard.

"35. Switch points must fit closely and accurately to the stock rail, which must be bent to suit the angle of the switch. The bend in the stock rail shall be at such distance ahead of the switch point as will make the gage line continuous.

"37. All main track switches leading to sidings or branch lines should be protected by switch-connected derails.

"38. Switch ties must be used for all permanent turnouts, cross-overs and railroad crossings and placed as shown on the standard plans.

"39. Frogs must be protected by guard rails, constructed and placed in accordance with standard plans. The tops of the guard rails must be level with the tops of the main rails and must be securely held in place.

"40. Guard rails must be so placed that the distance from the gage side of the head of the frog wing rail to the flangeway side of the guard rail shall be exactly 4 ft. 6¾ in., and great care must be taken to preserve this distance.

"43. Tools must not be left standing within 6 ft. of the nearest rail of the track on which a train is approaching.

"50. Cattle guards must be kept in regular repair and at all times free from dirt, rubbish and other obstructions.

"51. Track jacks must not be used between the rails of main tracks, except in unavoidable cases; the track must then be properly protected as with other obstructions.

"53. The track must never be obstructed without first displaying stop signals not less than twenty telegraph poles in each direction from the point of obstruction. Stop signals must be in the hands of reliable men. Flagmen must stop all trains and explain to the engineman the nature of the obstruction and its exact location.

"57. Except in case of emergency, no work that will obstruct the track shall be done during fogs or storms.

"60. In using signals on double track, each track must be considered as a single-track railroad upon which trains are likely to be run in either direction at any time.

"61. Care must be exercised by foremen and other employees in the use of hand, push, motor and velocipede cars. In order to avoid accident, they must protect themselves with the proper signals when the view is obstructed. On moving hand cars at least one man must face the rear to look out for approaching trains.

"63. Hand cars must never be used or left on the main tracks or sidings unprotected. Loaded hand or push cars on the track are obstructions and must be protected by the proper signals.

"64. Hand cars must not be attached to trains. When following trains or other moving cars they must not run closer than ten rail lengths.

"66. Switches must not be thrown for such cars, unless loaded, and then only under the supervision of the foreman."

SIGNALS AND INTERLOCKING

On the subject of the effect of treated and metal ties on track circuits, the committee on signals and interlocking submitted a report which is given in part as follows:

"The effect of metal ties is self-evident. Each rail must be completely insulated from its ties to prevent a short-circuit (similar to the action of the wheels and axle of a train). Defective insulation at any point will cause leakage and defective insulation at both ends of only one tie will throw the track circuit out of service. The effect of creosoted ties is not serious and, with alternating-current track circuits, is negligible. The effect of zinc-treated ties is more problematical.

"In response to a circular sent to all members, 126 replies were received, representing ninety-two railroads—many of them trunk lines. Sixty-nine of these use no zinc-treated ties; four use them to such a limited extent as to render a report valueless, including two which are making the first installation this year; seven use them extensively but not where track circuits are in service; only twelve use them with track circuits, showing that while the subject is decidedly important to these roads, it does not at the present time, in view of this small percentage, appear to be of great general interest, although if it could be shown that this treatment did not affect circuits seriously, its use might be extended.

"The consensus of opinion, based upon the experiences of the roads using track circuits, is:

"(1) That track circuits a mile in length are rendered inoperative by the extensive use of zinc-treated ties.

"(2) That track circuits 2000 ft. in length may be operated successfully even with 50 per cent or more of ties so treated.

"(3) That 10 per cent to 15 per cent renewals a year will not materially affect such length circuits.

"(4) That where renewals are made of fifteen or twenty adjacent ties the leakage is much greater than where they are made singly at uniform distances, i. e., with 15 per cent renewals (every sixth or seventh tie).

"(5) That while the surface salts are present more leakage occurs during wet weather than with untreated ties, as these wet salts form a better conductor than ordinary wet wood.

"(6) That in dry, hot weather the salts are drawn to the surface and constitute a more or less perfect conductor.

"(7) That after a period varying from three months to a year these salts disappear and subsequently no interference is noticeable."

TRACK COMMITTEE REPORT

The report of the committee on track contained a set of general specifications to be followed in the design and manufacture of tie plates, track bolts and anti-creepers. Under these heads the following detailed specifications were drafted: steel tie plates, malleable tie plates, wrought-iron tie plates, track bolts, spiral spring lock, ordinary track spikes and screw spikes. Under the subject of general principles to be followed in the design of tie plates, the following outline was recommended:

General Principles to Be Followed in the Design of Tie Plates

The plates shall not be less than 6 in. in width and as much wider as consistent with the class of ties to be used.

The length of the plates shall be not less than the safe bearing area of the ties divided by the width of the plate and when made for screw spikes shall be so shaped as to provide proper support for the screw spikes.

They shall be not less than ⅝ in. thick along either edge of the base of the rail.

The thickness of the plate shall be properly proportioned to the length.

The plates shall have a shoulder at least ½ in. high. The distance from the edge of rail base to the end of the tie plate on the outer side must be uniform and in excess of the projection inside of the rail base.

Where treated ties are used or where plates are for screw spikes a flat bottom plate is preferable. Where ribs of any kind are used on base of plate these shall be few in number and not to exceed ¼ in. in depth.

The punching must correspond to the slotting in the splice bars and where advisable, may be so arranged that the plates may be used for joints. Spike holes may be punched for varying widths of rail base where the slotting will permit such punching without the holes interfering with each other and when the plate is of such design that the additional holes will not impair the strength of the plate.

WOODEN BRIDGES AND TRESTLES

The report of the committee on wooden bridges and trestles contains conclusions as to the use of guard rails for wooden bridges and trestles. These conclusions follow:

Recommendations for the Use of Guard Rails and Timbers

1. It is recommended as good practice to use guard timbers on all open-floor bridges, and same should be so constructed as properly to space the ties and hold them securely in their places.
2. It is recommended as good practice to use guard rails to extend beyond the ends of the bridges for such a distance as required by local conditions, but that this length in any case be not less than 50 ft.; that guard rails be fully spiked to every tie and spliced at every joint, the guard rail to be some form of a metal guard rail.
3. It is recommended that the guard timber and guard rail be so spaced in reference to the track rail that a derailed truck will strike the guard rail without striking the guard timber.
4. The height of the guard rail to be not over 1 in. less than the running rail.

SIGNS, FENCES AND CROSSINGS

As a result of correspondence with a number of roads in the United States, as well as with the manufacturers of the material, the committee on signs, fences and crossings made a report on the different kinds of fence posts in part as follows:

"There are certain species of woods that are not suitable for fence posts but which doubtless must be used because they are cheap and native to the locality. In reviewing the replies of the various roads it was found that the consensus of opinion, based upon the experience of the users, is that the different classes of timber have an average life as indicated below:

	Years		Years
Red cedar	18	White oak	10
White cedar	15	Bois d'arc	25
Chestnut	12	Catalpa	15
Yellow locust	20	Juniper	15
Black locust	20	Mulberry	15

"Climatic influences have an important bearing upon this phase of the case and may lengthen or shorten the life of a particular kind of wood, dependent upon the locality in which it is used. It is not feasible in most cases to recommend any particular kind of timber for a given territory, as the source of supply may be so distant as to preclude its use economically. It is the prevailing practice to use such timber as is native to the country and thus most easily obtainable. According to information received, the cost of the various kinds of wood posts is:

	Range, Cents	Average, Cents
Red cedar	15 to 25	22
Cedar	7 to 20	14
White cedar	12 to 15	14
Chestnut	10 to 27	20
Locust	15 to 40	25
Yellow locust	20 to 38	30
Black locust	15 to 25	20
White oak	11 to 40	20
Bois d'arc	13 to 17	15
Catalpa	15 to 25	20
Juniper	6 to 10	8
Mulberry	13 to 17	15

"It will be observed that the relative cost to life of post ranges from ½ cent to 2 cents per year of life, the bois d'arc and the juniper being the cheapest posts, but so rare that a more general use is impossible."

CONCRETE FENCE POSTS

Under the subject of concrete fence posts, the committee compiled considerable information concerning the design and methods of manufacture of eleven different types ranging in price from 12.8 cents to 25 cents per post, and as the result of this investigation the following conclusions were drawn:

Recommendations for the Construction of Concrete Fence Posts

1. Concrete posts are practical, economical and a suitable substitute for wood.
2. Reinforcement should be placed as near to surface of post as possible; ½ in. from surface is best location.
3. Post should taper from base to top.
4. Post should not be less than 5½ in. at base and 4 in. at top.
5. Concrete mixture should consist of one part cement to four of run of pit gravel, or one part cement, two parts sand and four parts crushed rock or screened gravel. Gravel or crushed rock not to be smaller than ¼ in. in size nor larger than ½ in. Concrete should be of a quaking consistency.
6. Molds should have a jogger or vibratory motion while concrete is being introduced to compact it and smooth up surface of post.
7. Posts should not be made out of doors in freezing weather. They should not be exposed to sun and should be sprinkled with water the first eight or ten days after being made to aid curing.
8. Molds should be carefully oiled or soaped to provide a smooth finish and to prevent concrete sticking to mold.
9. Posts should be cured for not less than ninety days before being set or shipped.
10. Posts should be carefully handled and be packed in straw, sawdust or other suitable material for shipment.

TIES

The report of the committee on ties stated that an exhaustive study of stresses in cross ties had been made covering a period of two years and that the committee had come to the conclusion that experiments to determine the size of cross ties were impracticable.

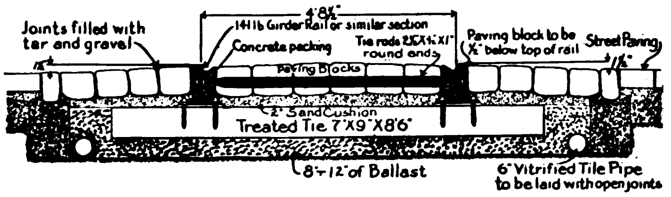
The committee was unable to obtain any definite information bearing on the relative effect of the different designs of tie plates and spikes on the life of ties. It was thought that the experiments which were being conducted would throw some light on this subject in the near future and permit definite recommendations to be made.

TRACK CONSTRUCTION AND FLANGEWAYS AT PAVED STREET CROSSINGS AND IN PAVED STREETS

Specifications for the best form of track construction and flangeways at paved street crossings and in paved streets were submitted. They stated that treated ties should be used and should be laid on a bed of crushed rock, gravel or other suitable material, not less than 8 in. nor more than 12 in. in depth, placed in about 3-in. layers, each to be thoroughly rammed to compact it.

Vitrified tile drains were recommended to be not less than 6 in. in diameter, with open joints and leading to nearest point from which efficient drainage might be obtained or with sufficient outlets to reach sewers or drainage basins. These should be laid on either side of and between tracks, parallel with ballast line and outside of ties.

It was recommended that a 141-lb. girder rail of 9-in. depth or one of similar section, with suitable tie plates and screw spikes, should be used. The track should be filled in with crushed rock, gravel or other suitable material, allowing for a 2-in. cushion of sand to support the finished pavement.


4'8½"
Joints filled with tar and gravel
141 lb Girder Rail or similar section
Concrete packing
Tie rods 2½"X½"X1" round ends
Paving block to be ½" below top of rail
Street Paving
1½"
Paving Blocks
2" Sand Cushion
Treated Tie 7"X9"X8'6"
8"-12" of Ballast
6" Vitrified Tile Pipe to be laid with open joints

Recommended Track Construction for Steam Railroads at Paved Street Crossings

Ballast for paving foundation should be well rammed as it is installed. Two inches of good sharp sand should be placed on top of the ballast. Paving should conform with municipal requirements, granite or trap rock blocks preferred. Hot tar and gravel should be poured into joints as a binder.

The accompanying illustration shows the recommended arrangement.

INVESTIGATION OF MEANS FOR OBTAINING NON-CORROSIVE FENCE WIRE

The committee reported that it had endeavored to obtain all available information as to the most recent practice in the matter of non-corrosive fence wire but that developments had been very few. It had investigated several foreign operations in the hope that they would indicate progress in the matter, but thus far these operations had not been applied to any large extent in the manufacture of fencing wire.

It was the opinion of one of the large manufacturers that the most practical solution of the problem of securing greater durability was what was known as the "special galvanizing" process. The fence was made from wiped wire which would withstand four one-minute immersions in the standard copper sulphate solution for both the horizontals and stays.

It was asserted that such a galvanized wire should compare favorably with unwiped wire which would pass the same test. The committee thought, however, that this was open to question, although it was understood that large tonnages of this special galvanized wire were being supplied according to specifications prepared by foreign railway companies.

It was the impression that the English railway companies were not satisfied with wire supplied by the United States manufacturers, and in taking the matter up with the latter it was learned that one of them was compelled to install such machinery in England that the fabric might be made of English wire in order to satisfy the trade of the United Kingdom.

It was also stated that English galvanizing was greatly superior to that of this country and that it was very largely done by the cold process of what was termed "electro-galvanizing." So far as could be learned, no machinery or process had been developed in this country for that purpose that had proved satisfactory.

It was claimed that during several years past more attention had been given here to the proper cleaning of the zinc before it was introduced into the zinc bath and that the spelter had been more carefully scrutinized. One of the Canadian railroads in its specifications called for a superior galvanized stock, which was run without wiping and lifted from the spelter bath at an angle of about 90 deg., being drawn through a charcoal flux on top of the bath, instead of being pulled through asbestos wipers as in ordinary practice.

This process permitted the maximum amount of spelter to cool upon the wire and at the same time prevented it from gathering in globules on the bottom of the strand, distributing it evenly over the surface in a smooth, heavy coating. It was claimed that cracking or peeling of the coating in the process of fabrication was very infrequent. It was also stated to be desirable to make further study of the influence exercised by the character of the underlying metal.

In the 1911 report reference was made to a test on fence material that was being conducted by a certain railroad, commenced on April 1, 1909. An up-to-date report on this as of Nov. 14, 1912, was given as follows:

TEST A.—*Galvanized after weaving:* This was found to be in perfect condition, with no indication of rust anywhere.

TEST B.—*Ordinary dip process:* The corrosion in this fence had been rapid during the past year; the galvanized coating had entirely disappeared and the entire section of fence was covered by red rust.

TEST C.—*Special galvanized:* This was found to be in excellent condition; no corrosion was apparent.

TEST D.—*Sherardized:* This showed corrosion in an advanced stage; the preventive of rust infusion had largely disappeared.

The conclusion was that the last-named method of treating wire as a rust preventive had proved less satisfactory than any of the others. The advanced stage of corrosion in this fence was about the same as that of Test B. It may be said, however, that there were no means of knowing that the sample fence was sherardized in the best manner, as the best facilities for sherardizing could not be obtained at that time. It was possible, therefore, that more perfect sherardizing would give better results.

REPORT OF COMMITTEE ON BALLAST

The report of the committee on ballast included a proposed test to determine the proper depth of ballast of various kinds to insure uniform distribution of loads on the roadway. The test as outlined is given in part in the following recapitulation:

TEST FOR DETERMINATION OF PROPER DEPTH OF BALLAST

1. Select a stretch of track on clay roadbed, under heavy traffic, where trouble has been experienced with clay working up between the ties.
2. Excavate roadbed to a uniform depth of 30 in. below the bottom of the ties for a space of two rail lengths; prepare the adjacent rail lengths in the same manner, decreasing the depth 3 in. under each successive two rails until the bed is 12 in. below the bottom of the tie (14 rail lengths).
3. Place on this bed a thin layer of fibrous material, such as hay, to make a well-defined separation between roadbed and ballast.
4. Place stone ballast on bed to the above-mentioned depths, tamp well and put track in good line and surface.
5. Make note of tie spacing, width of ties, keep accurate levels and record of amount of time spent on surfacing various parts of track, also keep record of axle loads and amount of traffic. Take photographs at regular intervals to show deformation of roadbed.
6. Make similar test for gravel and similar for ballast section, having a sub-ballast of gravel equal to one-half the total depth and a top ballast of stone equal to one-half the total depth of ballast.
7. The estimated cost of this test is as follows:

(a)	Cost of material (stone), 500 yd., at 80 cents	$400
(b)	Labor preparing track and widening bank, where necessary, at $30 per rail (fourteen rails per test)	420
(c)	Labor, inspecting, six inspections at $2 per rail	170
(d)	Line and surface to be paid for by railway owning track, at regular maintenance charge	00
	Total for one test	$990
	Three tests	3,000

A compilation which was made to determine the physical properties of gravel ballast was based on samples from nineteen different roads in as many different localities in the United States. The results showed that the weight of gravel per cubic yard, as received, varied from a minimum of 2543 lb. to a maximum of 3411 lb., and the material, after being dried, varied from a minimum of 2532 lb. to a maximum of 3403 lb. The percentage of moisture varied from a minimum of 0.23 per cent to a maximum of 1.60 per cent; the percentage of gravel varied from a minimum of 19 per cent to a maximum of 94 per cent; the sand varied from a minimum of 5.3 per cent to a maximum of 61.8 per cent, and the dust from a minimum of 0.7 per cent to a maximum of 22.1 per cent.

Another test which may be of interest to electric roads was one on cleaning stone ballast by the use of screens. The results of this test tended to show that a gang of twelve men, properly equipped with tools, would cover about 165 ft. of double track per day of ten hours, making the cost per mile of double track $640. This cost included the work of cleaning the ballast, dressing the track and disposing of the dirt. The labor charge included a foreman at $2.40 and eleven laborers at $1.60 each.

The report of the committee on buildings included detailed descriptions of various roofing materials and was accompanied by a specification considered as good practice for felt, pitch and gravel or slag roofing over boards. A brief report on the advantages and disadvantages of various types of freight house floor construction was also included. This is given in part as follows:

FREIGHT HOUSE FLOORS

"Freight house floors should ordinarily be built to carry a uniformly distributed load of at least 250 lb. per sq. ft. Except for small houses, a filled-in floor, considering the cost of maintenance, is ordinarily cheaper than joist construction. It is also advantageous, because it will carry the unusually heavy loads that sometimes occur.

"The usual method of construction consists of filling up to the required level with sand or gravel, thoroughly flushed and compacted. To insure a dry floor, on this filling is laid a bed of cinders about 6 in. thick, thoroughly compacted. In the cinders are bedded sleepers, preferably about 4 in. x 6 in., laid flat, about 2-ft. 6-in. centers. These and the plank above them should be thoroughly treated with creosote of zinc chloride where there is to be an additional wearing surface applied. With untreated timber renewal is sometimes necessary within four years, though under favorable conditions a life considerably greater is usually obtained. When no cinders are used on top of the sand the decay seems to be hastened.

"In place of cinder filling and sleepers a layer of coal-tar pitch spread upon a layer of sand over a course of concrete is being quite extensively used. This is durable and is said to give good results. Specifications for this method are obtainable from the coal-tar producers.

"Either on the sleepers, laid in cinders, or on the pitch are laid planks about 2 in. thick. With the pitch sub-floor the plank should be laid with broken joints toenailed and embedded in the pitch by hammering until the proper stability is obtained. Care should be taken to see that they are brought to an exact grade. The plank need not necessarily be toenailed with the wooden sleepers.

"To get a smooth-wearing surface on top of the plank hard maple is generally preferable. It does not splinter and it wears evenly. It has a short life when exposed to the weather. It is growing scarce and getting expensive. Beech is often sold for maple, they being difficult to distinguish. It is somewhat darker in color and it splinters more. Birch is softer than beech or hard maple but does not splinter so readily as beech.

"Gum, especially tupelo, is recommended as a substitute for maple and it probably will, to some extent, displace it. It is darker in color and somewhat softer, but it wears evenly and it does not splinter much more than maple. Thorough seasoning is particularly essential. There is a large supply of gum in the South and its use for floors should be extensive.

"Under most conditions, the best floor can be had by laying the top floor diagonally, putting the plank lengthwise and the sleepers crosswise of the house, without any bearing on the side walls. Inequalities in settlement of the floor are then less liable to make trouble, the plank can be laid with minimum expense, and the top floor gives the best results after considerable wear. This costs for the top slightly more for laying and more for repairs. Where there is a pronounced amount of trucking in one route it is sometimes thought desirable to put the flooring parallel to this trucking, but where the amount of traffic warrants it would seem best to put a runway of steel plates.

"Wood block pavements may be used in place of the board floor. They are best used on top of a concrete sub-floor, with a 1-in. sand cushion between. With wood blocks care should be taken to obtain sufficient expansion joints, as many floors have failed from a lack of this precaution. One inch for 50 ft. is about the correct amount. Care should also be taken to avoid the use of creosoted blocks where flour or similar articles which are easily damaged by odors are handled. There is also a chance of such damage from tar used in the expansion joints. Zinc chloride is for this reason recommended as a preservative for wood blocks when used for freight house floors. Zinc chloride is cheaper than creosote, and in a freight house the blocks will not suffer from the leaching which takes place when they are exposed to the weather, the main objection to the use of zinc chloride for treatment of cross ties and paving blocks. It is almost impossible to get this kind of floor as smooth as a maple floor, but if properly laid it tends to wear smooth. It is adapted to points where wear is especially severe, such as are due to the handling of castings and heavy machinery. Its main advantages are in the ease with which it can be repaired. The blocks are ordinarily made of pine. It would seem that gum blocks would be better. Maple blocks are also used but are expensive.

"Concrete has been used successfully where the wear is not too severe. There is a good deal of chance of damage by falling freight, and its use must be restricted to places where there is little chance of castings and similar articles being handled, unless the top surface is carefully made of the best of hard aggregates. Under such conditions excellent results have been obtained.

"A concrete sub-floor protected by a layer of asphalt mastic will give excellent results. It will cost more than the concrete floor, but it will not chip and scars made in its surface soon disappear. It is not so cold as the concrete floor and has been used for this purpose with success.

"Asphalt blocks properly made would seem to have some advantage for this purpose. They should make a smoother floor than the wood blocks and can be more easily repaired than the mastic floor."

ELECTROLYSIS

Following the acceptance of an invitation extended by the American Electric Railway Association to unite with it in jointly considering the subject of electrolysis, a joint committee composed of D. J. Brumley, George Gibbs and G. B. Katte, representing the steam roads, and Martin Schreiber, W. I. Trench and H. U. Wallace was appointed.

The report of this joint committee stated that the matter was receiving the careful consideration of electrical engineers in conference with structural engineers and representatives of various municipal departments, but up to the present time there had been no unanimity of opinion as to the best methods of preventing electrolysis or of protecting metal structures adjacent to the path of grounded return circuits. For this reason the committee could not recommend any standards or preferred practice, but it compiled, as information, a statement of methods pursued and a description of the research work of particular interest to railway engineers which was now under way at some of the more important localities. The descriptions were prepared to cover locations as follows: Brooklyn Bridge, Brooklyn Traction System, Grand Central Terminal in New York City, Pennsylvania Terminal in New York City, Chicago Traction System, Bergen tunnels of the Delaware, Lackawanna & Western Railroad, and Baltimore & Ohio Railroad Terminal in Baltimore, Md.

In addition to this brief description of actual conditions there was submitted a short explanation of the phenomenon of electrolysis and the more common methods of preventing its action.

PROCEEDINGS OF THE CONVENTION

The first session of the fourteenth annual convention of the American Railway Engineering Association was opened by President Charles S. Churchill, chief engineer Norfolk & Western Railway, more than 350 delegates being in attendance.

Following the reading of the minutes of the last convention, which were approved as printed, President Churchill made the annual address. This included a forceful discussion of the necessity for the skilful and economical direction of labor in the handling of railway materials. He said that this should also apply to the manufacture of railway materials, for it was the only guarantee of uniform quality as evidenced by the experience of the association's rail committee. He then referred to the beneficial results obtained by the tests and investigations of the rail committee, which had shown that while rail failures in the past have had as many explanations as there were manufacturers, with no means of proving or disproving any of them, the general causes were now known and the remedies were being worked upon. The amount of discard from the top of ingots did not set a gage on either the high standard of the rail produced or the number of rail failures, but rather indicated the relative skill of some mills in controlling the chemical content, casting ingots and rolling rails. Some mills continuously produced better or more uniform material than others and this uniformity was largely the result of greater care and skill at the mills, which had been considerably developed by the publications of the association. It was being found that the use of thick base rails of the A. R. A.—"B" type was reducing base failures to an insignificant number, and also that care in handling and using rails was productive of both longevity and safety; in fact, that careful labor should follow the treatment of rails until they were removed from main tracks. In concluding, Mr. Churchill said: "The American Railway Engineering Association can aid in the development of skill in labor efficiency just as it has developed and must continue to improve the standards of materials and specifications."

The annual report of the secretary and treasurer showed cash on hand Jan. 1, 1913, of $3,183 in excess of what it was at the same date in 1912. Following the address of the president and report of the secretary and treasurer, the report of the committee on rules and organization was presented. As a result of a lengthy discussion Rules 36 and 37 were eliminated and the rest of the report adopted as read. The committee report on signals and interlocking was received next. The most important part of this report was the final adoption of a uniform system of signals, which included three schemes, one for one-blade signals and the others for two and three-blade signals. This subject had been under discussion for a number of years and the members of the association were of the opinion that no definite conclusion could be reached. This same report had been approved by the Signal Association through letter ballot, the vote standing 574 for to 10 against. The adoption of this report by the engineering association has now enabled it to be referred finally to the American Railway Association.

The report on the effect of treated ties on the operation of signals was approved as presented and the subject of possible economies in labor of signal maintenance was referred to the committee for report next year.

Continuing the program, the committee on track reported specifications for track fastenings and accessories which were adopted with slight changes. The report of the committee on rail was received and adopted with brief discussion.

The recommendations of the committee on wooden bridges and trestles brought out considerable discussion, particularly along the line of the necessity of inner and outer guard rails on all bridges. The conclusion recommending as good practice the use of guard timber on all open-floor bridges was approved, but the use of guard rails for all bridges was referred back to the committee for further consideration. Some members objected to this stand of the association, saying that guard rails on all bridges were an unnecessary expense and that results did not bear out the benefits supposed to be derived from their use. The other recommendations of this committee's report were adopted with minor changes.

The report of the committee on signs, fences and crossings developed discussion, particularly on the manufacture and curing of concrete posts, but the committee's conclusions were adopted for publication in the manual. The specifications for track in paved streets were adopted as read by the committee.

ANNUAL BANQUET

The annual banquet was given in the Gold Room of the Congress Hotel Wednesday night, March 19. President Churchill acted as toastmaster, and the speakers of the evening were B. A. Worthington, president Chicago & Alton Railroad, whose subject was "Looking Into the Future;" Rev. R. W. Dickie, of Montreal, Canada, who spoke on "Internationalism"; George A. Post, president of the Railway Business Association, whose subject was "The Effect of Music Upon Railways," and C. J. Rennick, of Peoria, Ill., who concluded the program with an address entitled "The Twentieth Century Pattern."

ELECTION OF OFFICERS

The new officers of the American Railway Engineering Association were announced by President Churchill to be as follows: President, E. F. Wendt, assistant engineer Pittsburgh & Lake Erie Railroad, Pittsburgh, Pa.; first vice-president, W. B. Storey, Jr., vice-president Santa Fé System, Chicago; second vice-president, Robert Trimble, chief engineer maintenance of way Northwest System, Pennsylvania Lines, Pittsburgh, Pa.; treasurer, George H. Bremner, engineer Illinois District, Chicago, Burlington & Quincy Railroad, Chicago, and secretary, E. H. Fritch.

The Thursday morning session of this association opened with the committee's report on yards and terminals. The report of the committee on electricity, including electrolysis, was received as information. The report of the committee on ballast brought forth some discussion as to the method of testing the quality, but the revised specifications for tests of this character were adopted for publication in the manual as recommended practice. Under the subject of buildings the recommendations as to design and construction of freight house floors were adopted and the committee was requested to include reference to the concentrated loads coming from electric trucks which are now being introduced in the larger freight houses. This committee's conclusions regarding metal roofing were adopted, and it was also instructed to abstract the descriptive material on prepared roofing contained in its report for publication in the manual. The report of the roadway committee was received as information, and the committee was requested to proceed along similar lines, reporting at the next convention.

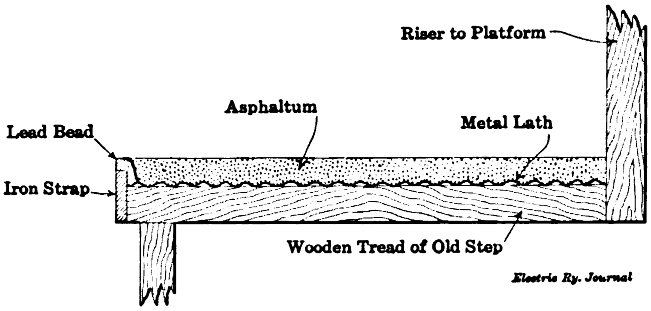
The program of the convention was completed at noon on Thursday, March 20, and the association adjourned, Friday, March 21, having been assigned for the inspection of the exhibit of the National Railway Appliances Association. A partial list of the exhibitors is published on page 553 of this issue.

ANNUAL MEETING OF THE RAILWAY APPLIANCES ASSOCIATION

The annual meeting of the National Railway Appliances Association was held in Chicago on March 18, with President A. P. Van Schaick presiding. After the president had made his annual report to the association, which included comment of an optimistic nature on the increased interest in exhibits from year to year and the excellent financial condition of the association, the report of the nominating committee was presented and adopted. The officers for the ensuing year are as follows: President, T. R. Wyles, Detroit Graphite Company, Detroit; vice-president, N. M. Hench, Carnegie Steel Company, Pittsburgh, and treasurer, J. N. Reynolds, *Railway Age Gazette,* Chicago. The new members of the board of directors for the next three years are: J. A. Brown, *Pocket List of Railroad Officials,* New York, and E. H. Bell, Railroad Supply Company, Chicago. E. E. Hudson, of Thomas A. Edison, Inc., Orange, N. J., was appointed to serve as director for one year. The report of the treasurer for the fiscal year ended April 30, 1912, showed that the association's assets amounted to $13,225 with no liabilities.

HOME-MADE SAFETY TREAD

The mechanical department of the Cedar Rapids & Marion City Railway Company, Cedar Rapids, Ia., has devised a very serviceable yet economical tread consisting of a section of metal lath tacked to the old wooden tread over which is spread a mixture of asphaltum saturated with sand. The asphaltum wearing surface is approximately ½ in. thick and the metal lath acts as a bond between it and the 1¼-in. oak tread. In order to provide for equal wear and also to protect the edge of the tread against excessive rate of wear, a 3/16-iron strap is screwed to the edge of the wooden tread. This strap projects about ¼ in. above the top of the wooden tread and the edge is then brought to the same level as the asphaltum by pouring a lead bead in a mold which brings the edge of the tread ¼ in. above the iron strap. The bead is held firmly in place by extending it downward in back of the strap, thus giving it a bond to the metal lath. The wearing qualities of the lead and the asphaltum mixture are about the same so that step wear will be uniform over the entire surface. This lead bead and iron strap are applied before the asphaltum mixture. A section of this tread is shown in the illustration.

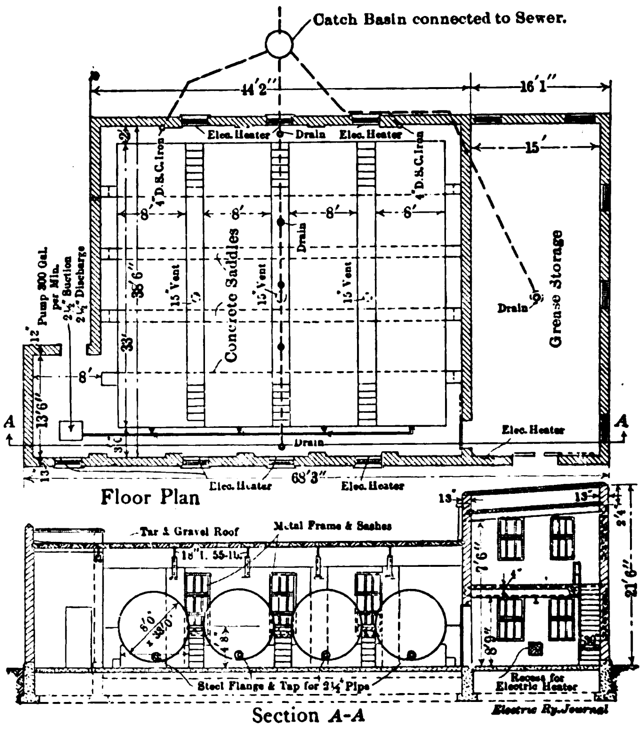


Home-Made Safety Tread for Surface Car Steps

Seats are being provided for conductors on pay-as-you-enter cars in Los Angeles, Cal.

NOVEL OIL HOUSE AND OIL DELIVERY CAR FOR THE CHICAGO RAILWAYS

The engineering department of the Chicago Railways Company has completel plans and specifications for a new fireproof oil house and an oil delivery car. The oil house will be equipped with tank capacity sufficient to store oil to supply all the cars, carhouses, repair shops, generating stations and substations owned and operated by this company for a period of six months. This will require four tanks of 12,600 gal. capacity each and additional space for storage of oil in barrels. The building is so located that oil will be drained by gravity from steam railway tank cars in warm weather, an elevated track on a wooden trestle extending along one side of the building. The various kinds of oil will be pumped from the storage tanks into the company's oil delivery car by an electric pump of 300 gal. per minute capacity. By the installation of meters in the pipe lines from the tank cars to the oil house, in the pipe line from the oil house to the delivery car and in the delivery car lines to the local supply tanks, an accurate record will be obtained of all the oil which is received and consumed.

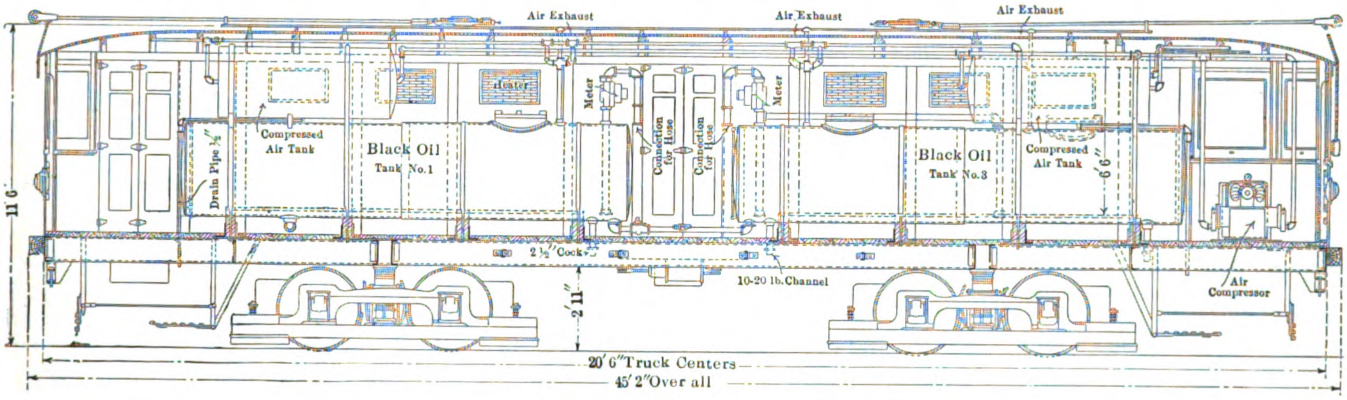


Chicago Oil Distribution—Plan and Elevation of Oil House

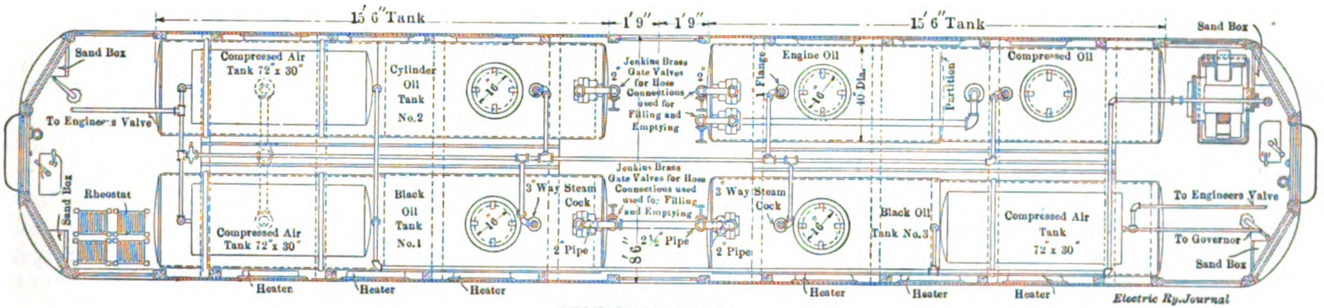
The system, a description of which follows, is the result of the experience of the mechanical department in buying and receiving oil in quantities at all times of the year. By purchasing a six months' oil supply during summer the expense of handling oil received in large tank cars is materially reduced as the necessity for heating the cars to make the oil flow in cold weather is obviated. By the purchase of oil in large quantities a minimum price is obtained and the expense of carrying the large quantity of oil in storage is more than offset by the reduced cost of handling. In addition, accurate records of the amount of oil used will be available when heretofore they have been almost impossible to obtain from all departments using oil.

BUILDING CONSTRUCTION DETAILS

The oil house will be 40 ft. 8 in. x 60 ft. 3 in. in plan, with a small annex 9 ft. x 15 ft. 8 in. in size, which will furnish space for the 300-gal. pump. The main building will consist of one large room arranged to receive the 12,600-gal. oil-storage tanks and a smaller room, 15 ft. x 38 ft. 6 in. in plan and two stories high, where oil and grease in barrels will be stored. The building will be constructed wholly of brick, concrete and steel. The 13-in. brick walls will be supported on 15-in. concrete foundations and the roof, which was designed to cover the building without supports other than the walls, will be carried on 18-in., 55-lb. I-beams. These beams will span the building in the 38-ft. 6-in. direction and will be supported on the pilasters built in the building walls. They will have a pitch of 2 ft. 4 in. in the width of the building so as to provide roof drainage. The roof is to be constructed of 3-in. x 12-in. x 17½-in. book tile, supported on 2½-in. x 2½-in. x ⅜-in. tees 18 in. on centers. A tar and gravel roof coating will surmount the book tile and is to be sloped to drain to four 4-in. downspouts. These down-spouts are to be carried to the sewer system underneath the building by way of the inside of the building walls. Four 15-in. Kernschen type ventilators will be installed at uniform intervals along the center line of the roof.


Air Exhaust
Air Exhaust
Air Exhaust
Heater
Meter
Meter
Compressed Air Tank
Black Oil Tank No. 1
Drain Pipe ½"
Connection for Hose
Connection for Hose
Black Oil Tank No. 3
Compressed Air Tank
6' 6"
11' 6"
2½" Cock
10-20 lb. Channel
Air Compressor
2' 11"
20' 6" Truck Centers
45' 2" Over all

SECTIONAL ELEVATION


15' 6" Tank
1' 9"
1' 9"
15' 6" Tank
Sand Box
Sand Box
Compressed Air Tank 72" x 30"
Cylinder Oil Tank No. 2
16"
2"
Jenkins Brass Gate Valves for Hose Connections used for Filling and Emptying
2"
1" Flange
Engine Oil
16"
40" Dia.
Partition
Compressed Oil
To Engineers Valve
Sand Box
Rheostat
Compressed Air Tank 72" x 30"
Black Oil Tank No. 1
16"
3" Way Steam Cock
Jenkins Brass Gate Valves for Hose Connections used for Filling and Emptying
3 Way Steam Cock
2" Pipe
2½" Pipe
2" Pipe
8' 6"
16"
Black Oil Tank No. 3
Compressed Air Tank 72" x 30"
To Engineers Valve
To Governor
Sand Box
Heater
Heater
Heater
Heater
Heater
Heater
Electric Ry. Journal

SECTIONAL PLAN

Chicago Oil Distribution—Plan and Elevation of Special Oil Car

As there is more liability of fire in the barrel storage room than in the large tank storage room and provision had to be made to carry the second-story wall over the roof, a 13-in. brick fire wall will separate the two, and the single opening will be provided with an automatically closing steel door. All sashes and frames are to be built of pressed steel, glazed with wire glass.

The large oil tanks will be cylindrical, being 8 ft. in diameter and 33 ft. long. They are to be supported in saddle bearings provided in four 16-in. x 4-ft. 8-in. concrete walls spaced at 7-ft. 2-in. centers. Each tank is to be provided with a steel flange and a 2½-in. tap for connecting to an oil-pipe line. In order to provide a runway over the tanks, reinforced concrete steps will be provided in the space between the tank ends and a 2-in. x 24-in. plank walkway will be constructed. Sufficient radiation will be installed to maintain the temperature in the building near 70 deg., thus assuring a free flow of oil at all times.

OIL DELIVERY CAR

As a part of the new oil-storage and delivery system the Chicago Railways Company is building a double-end car designed especially for oil delivery service. The general dimensions of this car are 45 ft. 2 in. over-all length, 8 ft. 6 in. over-all width. The body is of segmental-arch, semi-steel construction, allowing a 6-ft. 6-in. clear head room. The total weight of the complete body with the tanks filled will be 83,000 lb. The body is mounted on St. Louis type trucks with a 4-ft. 6-in. wheelbase and 20-ft. 6-in. truck centers. The electric equipment will include four Westinghouse 319-B 40-hp motors with K-35 control.

Four 950-gal. cylindrical tanks will be installed in the car body. Two tanks will be used for the transportation of black oil, one for cylinder oil, and the fourth will be divided into two compartments, one for engine oil and the other for compressor oil. Each tank is mounted on four timber supports which rest directly on the underframe. The tanks are held in position by straps, the ends of which are bolted to the supporting timbers. The car body will be equipped with a sufficient number of electric heaters to assure a temperature near 70 deg. These heaters will be installed on the sides of the cah slightly above the tanks.

The oil will be kept under an air pressure ranging from 65 lb. to 85 lb. per square inch by a motor-driven compressor installed at one end of the car. This compressor will also serve the air-brake equipment. Air reservoir capacity will be provided by three cylindrical tanks, 30 in. x 72 in., supported on the tops of the oil tanks. As will be noted in the sectional elevation of the delivery car, the air piping is carried overhead upon hangers attached to the roof carlines.

The delivery and receiving valves to the oil tanks are situated in the aisle at the center of the car body. These valves are 2 in. in diameter and are provided with hose-coupling attachments. By tapping the tanks at the top and extending the discharge pipes into them to a point near the bottom, the oil is forced by compressed air through a screen at the bottom of the pipe to the outlet valves and thence through a hose connection conveniently located at the center of the car body. In order to remove any collection of sediment at the bottom of the tank two 2½-in. outlets and valves have been installed in the bottom near the ends of the tanks. These drain through the car floor. A 16-in. manhole has been provided in the top of each tank. The car will also carry a supply of saturated waste in cans.

MEETING OF THE COMMITTEE ON BLOCK SIGNALS

The joint committee on block signals of the American Electric Railway Engineering Association and the Transportation & Traffic Association met in the Green Room of the Congress Hotel, Chicago, on March 18, 1913. Those present were: J. M. Waldron, signal engineer Interborough Rapid Transit Company, New York, chairman; C. D. Emmons, vice-president and general manager Chicago, South Bend & Northern Indiana, vice-chairman; John Leisenring, signal engineer Illinois Traction System; Gaylord Thompson, chief engineer Ohio Electric Railway; B. E. Merwin, general superintendent Aurora, Elgin & Chicago, and C. H. Morrison, signal engineer New York, New Haven & Hartford.

The committee took up one by one the progress reports on each of the eight subjects which had been assigned to sub-committees.

The first of these, that of bringing the progress report on signaling up to date, had been assigned to Messrs. Waldron and Conn. Mr. Waldron reported that his report depended upon the data sheets, which had not yet been sent out. These were being handled by Mr. Morrison and Mr. Doyle, who had been appointed as a sub-committee to take care of that part of the work and to bring the bibliography of signaling up to date.

Mr. Morrison reported that he had taken up the matter of the data sheets with H. C. Donecker and had suggested that the form should be the same as that used last year. He had also suggested that Mr. Donecker should send out the data sheets, and with this suggestion the committee concurred. The committee also decided to send out with the data sheets a supplementary circular asking for information on cab signals and automatic train stops in connection with the work which had been assigned to Messrs. Waldron and Morrison as a sub-committee. It was decided to include in this supplemental circular the following list of questions, these being the same questions which the American Railway Association is seeking to have answered by the steam railroads of the United States:

(a) Have you had any practical experience in the use of automatic train stops?

(b) Have you had any practical experience in the use of cab signals or similar accessory signals?

(c) Have you had experience with accessory signaling devices (such as torpedoes), automatically placed or otherwise, operated when the signals were displayed against train movements?

Mr. Emmons suggested that requests for information should state clearly that they covered only the work installed between July 1, 1912, and July 1, 1913. In conclusion, Mr. Morrison stated that the data sheets would be sent out in the near future.

Mr. Doyle, to whom had been assigned the collection of data regarding the rules of the various commissions—state and interstate—was unable to be present. Mr. Emmons read a letter from him stating that he had written to all state commissions and had thus endeavored to find out what had been done by the legislatures of the various states. It was decided by the committee that it would be better for this sub-committee to postpone its complete report until the various state legislatures had adjourned, on account of the possibility that some bills might be passed which would affect the commission requirements. The information sent by Mr. Doyle was accepted as such, and the committee concluded that it ought to be returned to him to be embodied in his later and more complete report. This report will be taken up at the next meeting of the committee.

On the subject of standards, Mr. Waldron said that he did not see any reason why the signal companies and the committee could not get together on the design of spectacle castings, semaphore masts and other material so as to secure a uniformity in dimensions and in principles. G. K. Jeffries, in reply to a question by Mr. Emmons, said that the signals on the Terre Haute, Indianapolis & Eastern and on the Union Traction Company of Indiana were interchangeable. They were of the same height and built to practically the same specifications. Mr. Leisenring said that the Illinois Traction System signals were interchangeable so far as that road was concerned but did not conform to those on the other electric lines using the semaphore type of automatic block signals. The question as to whether or not the mast on which the light signal was mounted was the same as that used for semaphore signals was answered in the affirmative by Messrs. Howe and Day, of the General Railway Signal Company.

The discussion developed that it was the sense of the committee that standards should be adopted as speedily as possible both for city and interurban lines. It was finally agreed that Mr. Leisenring would co-operate with a committee of manufacturers on the question of standards and make a report at the next meeting. The manufacturers' committee is to be composed of Mr. Griffin, Union Switch & Signal Company; Mr. Howe, General Railway Signal Company; Mr. Gammons, United States Signal Company; Mr. Nachod, Nachod Signal Company; Mr. Ward, Automatic Signal & Appliance Company, and representatives of manufacturers who are interested.

The discussion then turned to aspects, and Mr. Leisenring said that he thought it would be desirable for the committee to recommend all-light indications for slow-speed signals in preference to disk signals or combination disk and light signals. This would lead to the trolley contact companies being requested to conform to adopted light signal aspects in the design of their apparatus.

Mr. Morrison told about a case where an accident had occurred on his road as the result of inability to see clearly a light signal after a heavy train on a grade had pulled down the voltage, thus resulting in dimming the signal lamp. In this case a supplementary disk was considered by the state authorities who investigated the accident as a necessary part of the indication. He stated that the light signal was of the old type and that the newer light signals, which were visible at greater distances, would undoubtedly eliminate the necessity for supplementary disk indications.

At this point the discussion was devoted for a few moments to the effect of decreasing the voltages of light signals and to the general subject of the placing of light signals in city streets. Mr. Gammons said that it was his experience that a hood 18 in. deep was the proper size for best results. He had found that a hooded light could be seen at a distance of 500 ft. The discussion brought out the fact that the majority of the committee were in favor of establishing 500 ft. as the minimum requirement for a distance at which light signals could be clearly distinguished.

There was considerable discussion on the necessity for additional indications in connection with the use of trolley contact signals. Mr. Gammons said that he had experimented with an 8-in. lens for light signals under varying conditions and that he could see the red light clearly at 500 ft. with half voltage.

The sub-committee appointed to consider the subject of the recommendations for signals for suburban and interurban railways under various conditions held an informal meeting the night before the committee meeting, and at this time proposed recommendations were taken up one by one and discussed at length. In reporting for the sub-committee, Mr. Leisenring suggested that the subject be left open for further consideration, that another meeting of the sub-committee be held and that further co-operation with the manufacturers be secured, after which a more complete report would be presented.

The committee members were very much interested in an analysis of railway accidents for the past four years which was made by P. J. Simmen, of the Northey-Simmen Company. This appears on another page of this issue.

After considerable discussion Mr. Waldron decided that it would be desirable to appoint a sub-committee on records and statistics, assigning this work to Mr. Emmons. This was added to the committee's list of sub-committees' assignments.

The manufacturers' representatives who were present were C. P. Nachod, Nachod Signal Company, Philadelphia; R. F. Gammons, United States Electric Signal Company, West Newton, Mass.; Ralph Mosher, United States Electric Signal Company; K. Howe, General Railway Signal Company; F. E. Ward, Automatic Signal & Appliance Company, Cleveland; P. J. Simmen, Northey-Simmen Company, Indianapolis; H. W. Griffin, Union Switch & Signal Company; D. R. Day, General Railway Signal Company, and A. D. Cloud, *The Signal Engineer*. G. K. Jeffries, general superintendent Terre Haute, Indianapolis & Eastern, was present and participated in the general discussions.

After a short discussion on the best place to hold the next meeting it was decided to meet on Friday, June 13, following the June meeting of the Signal Association, and New Haven was agreed upon as the place.

ANALYSIS OF THE CAUSES OF RAILWAY ACCIDENTS

At the meeting of the joint committee on block signals of the American Electric Railway Engineering Association and the Transportation & Traffic Association which was held in Chicago March 18, P. J. Simmen, consulting engineer Northey-Simmen Signal System, presented the accompanying analysis of the causes of important steam railway accidents. This information is based on the reports of the Interstate Commerce Commission for four and a half years and covers all accidents on interstate railways which resulted in damage of more than $10,000 to motive power, rolling stock and track.

Mr. Simmen emphasized the importance of considering statistics of this kind in relation to proposed signal installations, saying that if a record of accidents on electric roads and their causes were compiled it would serve as a basis from which important conclusions could be drawn and it would show the phases of operation which were in greatest need of protection.

Analysis of Causes of All Noted Steam Railroad Accidents, from July 1, 1908, to Jan. 31, 1913

Cause of Accident	No. of Accidents	Percentage of Total
Preventable by a complete signal system:		
Open switch	38	10.5
Disregard of semaphore signal at danger	46	12.8
Disregard of caution signal under permissive movement	6	1.7
Head-on collisions due to neglect of orders by train crew	97	26.9
Head-on collisions due to neglect of orders by operator	48	13.4
Head-on collisions due to error in order by dispatcher	14	3.8
Rear-end collisions due to flagman (no signal system)	38	10.5
Collisions due to excessive speed	15	4.1
Side-swiping accidents, cars not in clear at sidings	0	0.0
Derailments—due to broken rail	19	5.3
Derailments—due to excessive speed	29	8.1
Dead engineer	1	0.2
Broken train	0	0.0
Unknown causes (estimated)	10	2.7
Total	361	100.0
Not preventable by any signal system:		
Unknown causes (estimated)	29	
Derailments—due to bad track	49	
Failure of air	24	
Miscellaneous—not preventable by any signal system	49	
Defective rolling stock	44	
Total	195	

Accidents preventable by a complete signal system, 361; 64.8 per cent.
Accidents not preventable by any signal system, 195; 35.2 per cent.

The tabulation indicates that approximately 43 per cent of the 361 accidents recorded were due to the crew and dispatching system, and that open switches were the cause of more than 10 per cent of all preventable accidents, thus emphasizing the importance of protection for such conditions. Another illuminating result of the analysis is that showing the important part rolling stock and bad track play in the unpreventable accidents with any signal system. From this tabulation it would appear that signals of the maximum obtainable efficiency would prevent only 65 per cent of all accidents.

After carefully considering the contents of this analysis of steam railroad accidents the committee decided to undertake the compilation of similar data for electric railroads. Mr. Simmen suggested that probably the best way to obtain complete as well as prompt replies would be to classify the accidents in the manner shown in the table and then to enter the number of accidents of each class for each year covered by the analysis. The committee accepted this suggestion as the proper method of procedure.

CHICAGO MEETING OF RAILWAY SIGNAL ENGINEERS

The March meeting of the Railway Signal Association, which is an organization of steam railroad signal engineers, was held March 17 at the Congress Hotel, Chicago, Ill. The program consisted of reports of six regular committees and one special committee. The report on power interlocking included specifications for annunciator bells, push buttons for bells, train drops, etc., also floor pushes, fuses, steel-pipe conduit and wrought-iron pipe conduit, the two latter subjects being handled by a sub-committee. All of the specifications except those for annunciator bells and push buttons were accepted with a few slight changes. The excepted specifications were referred back to the committee for further revision.

The committee on manual blocks submitted rules for the operation and maintenance of interlocking plants and block stations. One or two of the proposed rules brought out considerable discussion. The proposed rule permitting displacing hand signaling through defective interlocking plants by the use of a caution card authorizing movement of trains against interlocking signals displaying stop indications was very vigorously opposed by a few engineers. At the close of the discussion, however, the report of the committee was accepted and the committee was retired.

Specifications for apparatus and material were submitted for alternating-current automatic block signal systems for use on steam roads, and these were accepted as a whole. Revised specifications for wires and cables were submitted by the committee to which was assigned this particular subject, and the revisions were accepted by the association.

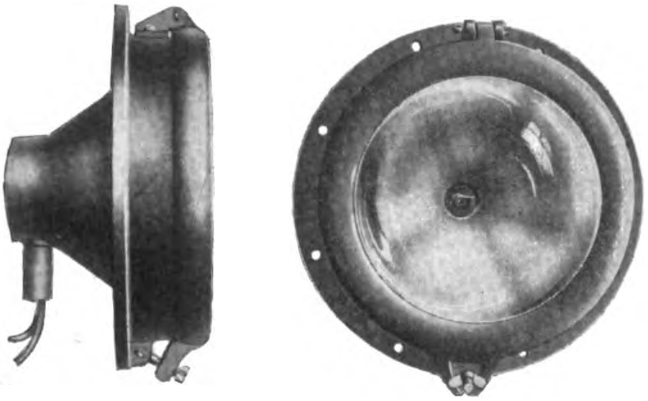
The committee on storage battery and charging equipment submitted as information a discussion on the use of Edison storage batteries for automatic signaling. This report was accepted. The report of the special committee on the method of recording signal performance, which recommended three forms of reports, was adopted, and after a brief discussion of the various factors included in the methods of computing efficiency of signal performance the committee was instructed to continue its work.

ELECTRIFICATION CONSIDERED FOR INDIA

C. H. Merz, consulting engineer for the Melbourne electrification, has been in consultation with the Bombay and Calcutta railway authorities concerning traffic congestion in those cities. The principal projects which the Indian authorities are said to have under consideration are: The electrification of the Bombay suburban lines of the Great Indian Peninsula and Bombay, Baroda and Central India Railways, involving from 50 miles to 100 miles of track; Calcutta suburban lines of the Eastern Bengal State Railway, beginning with 20 miles to 40 miles, and the Ghats (main line) section of the Great Indian Pensinsula Railway, involving some 30 miles. The Ghats electrification will be of special interest on account of the severe grade conditions on this important line.

A NEW FORM OF HEADLIGHT

The Esterline Company, Lafayette, Ind., manufacturer of fog-penetrating lamps for marine service, familiarly known as the "Golden Glow" lamps, has recently brought out a lamp of similar construction for electric railway headlights. The design and construction of this lamp differs radically from other existing types in that the reflector, instead of being a metallic or an enameled surface, consists of a molded plate glass parabola ground accurately to size and shape, then polished and silvered like a French-plate mirror.



Fog-Penetrating Headlight with Parabolic Glass Reflector

The glass has a greenish-yellow color which is about that of molten gold. It has long been recognized in lighthouse and marine work that a golden-yellow light will penetrate fog and mist to a much greater degree than a white light, and many recent tests on the Great Lakes and the seacoast show this principle to be correct. Experience shows the light to be much less dazzling to pedestrians and less fatiguing to the motorman than that of standard headlights. The reflectors, being made of glass, do not tarnish, but retain their luster indefinitely, and they can be cleaned without scratching the reflecting surface.

The lamps for street railway, interurban and electric locomotive service are built in two types. One, the hood type, is designed for mounting on top of the car or locomotive; the other, in which a part of the lamp is recessed into the surface on which it is mounted, is intended for mounting on the dashboards of street cars.

The housings for the reflectors are of metal and the glass parabola is securely held in place with no possibility of its becoming loose or damaged. The illustration shows the dash type of lamp with the bulb removed.

A standard spherical incandescent bulb is used with a standard Edison base. The front, or door, of the lamp is hinged at the top. The upper hinge is made adjustable so that all the play can be taken up and the front cover pressed tight against a gasket, rendering the lamp practically water-tight and dust-tight. The front glass is held in by means of spring clips which, while they hold the glass securely in place, distribute the strain in such a manner as to render cracking of the glass very unlikely. The lower clamp for the cover is of the thumb-screw type with the screw turned back in order to keep it out of the way. In the design of the lamp all unnecessary projections which would be likely to catch wires or trolley ropes have been omitted.

On account of the great efficiency of the reflector, the heat as well as the light is reflected so that the front glass will not remain coated with snow or ice in even the coldest weather.

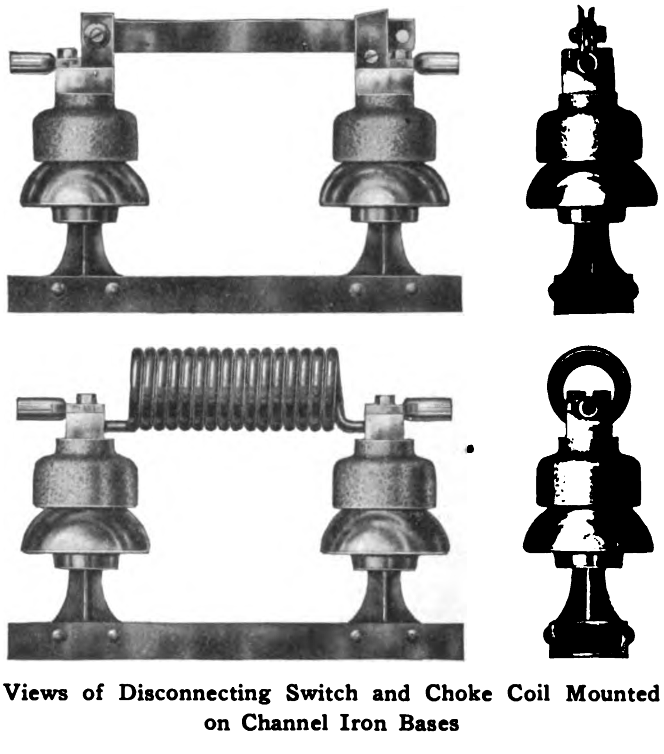
In deciding a suit between the Union Gas & Electric Company and the Cincinnati, Newport & Covington Traction Company, Judge Dickson, of Cincinnati, Ohio, ruled on March 3 to the effect that the franchise of a public service company cannot be revoked by the Legislature.

CHOKE COILS AND DISCONNECTING SWITCHES

The choke coils and disconnecting switches shown in the accompanying illustrations are typical of a new line of such apparatus recently brought out by the Electric Service Supplies Company. The bases of both the coils and the switches are of standard 3-in. channel iron. These bases permit the apparatus to be installed either inside or out, to be attached to switchboards direct, to cross-arms, to poles, to pipe or to any other suitable supporting means. Iron pins are riveted to this channel and insulators cemented to these pins support galvanized-iron tops which are cemented to them. In turn, these tops support brass terminal blocks for either the choke coil or the switch mechanism. The choke coils are sweated into these blocks and in every case are provided with separable terminals. The coils are air-insulated between turns so that if arcing should occur between turns the insulation (air) is immediately re-established after the passage of the discharge.

The company asserts that these choke coils possess great electrical and mechanical strength and that they afford great protection to electrical apparatus when used with its standard types of Garton-Daniels lightning arresters.

In the disconnecting switch the clips are sweated into the brass terminal blocks and are made of machine-finished, hard-drawn copper. The blades are hung in the clips as shown, and tension screws are provided at each end to secure proper contact. Separable terminals are provided on these switches for all capacities. These switches are designed and intended for use not only as lightning arrester disconnecting switches to disconnect arresters from the line for purposes of inspection, repair, etc., but also as switches for disconnecting and controlling high-voltage lines, branch feeders, emergency feeders, etc., and for numerous other purposes for which such switches are required.



Views of Disconnecting Switch and Choke Coil Mounted on Channel Iron Bases

Both choke coils and switches are made for ratings up to 23,000 volts and of suitable ampere capacities to meet any operating conditions.

The National Assembly of Panama has passed a law granting free admission for material and supplies for the construction and maintenance of the Panama Street Railway.

EXHIBITS AT AMERICAN RAILWAY ENGINEERING ASSOCIATION CONVENTION

The annual exhibition of railroad apparatus given in Chicago during the past week by the National Railway Appliances Association was the largest in its history. In fact, the large number of exhibits made it again necessary to make use of the First Regiment Armory in addition to the Coliseum.

Following is a partial list of the exhibits which were of especial interest to electric railways:

Adams & Westlake Company, Chicago.—Signal lamps, lanterns and other railway specialties.

Ajax Forge Company, Chicago.—Manganese steel, one-piece guard rails, frogs, guard-rail clamps and switch accessories.

American Guard Rail Fastener Company, Philadelphia, Pa.—"Vaughan" rail anchors, guard-rail clamps, tie plates and guard-rail fasteners.

American Lock Nut Company, Chicago.—Lock nuts.

American Rail Joint Company, Niagara Falls, N. Y.—Reinforced angle bars.

American Rolling Mill Company, Middletown, Ohio.—American ingot iron, corrugated culverts and plate. Link from Newburyport (Mass.) Bridge, made of pure iron, 100 years old.

American Steel & Wire Company, Chicago.—Steel fence posts, wire fencing, cables, switch ropes, telegraph and telephone wire.

Asphalt Ready Roofing Company, New York.—"Protection" brand of prepared roofing.

Associated Manufacturers' Company, Waterloo, Ia.—"Jerry Boy" gasoline motor section car.

Atlas Preservative Company of America, New York. —Literature and photographs of effect of "Atlas" weed killer.

Barrett Manufacturing Company, New York.—Waterproofing, damp-proof paint and "Barrett" specification roofing.

Beaver Dam Malleable Iron Company, Beaver Dam, Wis.—Tie plates, rail and braces.

Lewis Blessing, Jackson, Mich.—Noiseless joint and reinforced concrete tie with rail fasteners.

Blocki Brennan Refining Company, Chicago.—"Carboxide" elastic metal preserver.

S. F. Bowser & Company, Fort Wayne, Ind.—Sample oil-tank storage system.

L. S. Brach Supply Company, New York.—Automatic flagman, lightning arresters and volt-meters.

Bryant Zinc Company, Chicago.—Crossing signals, bells and signal department supplies.

The Buda Company, Chicago,—Gasoline motor section and inspection cars, bumping post and crossing gates.

The Phillip Carey Company, Cincinnati, Ohio.—"Carey" roofing, waterproofing and veneer.

Carnegie Steel Company, Pittsburgh, Pa.—Steel switch ties, sheet piling, wheels, gears, axles, "Duquesne" rail joints and splice bars.

George B. Carpenter & Company, Chicago.—Cordage, pulleys, chain hoists and pumping outfit.

Chicago Pneumatic Tool Company, Chicago.—"Rockford" gasoline motor car, gasoline motor air compressor, portable electric drill and air drills, hammers and chisels.

Chicago Steel Railway Tie Company, Chicago.—Steel railway ties, installed in section of standard track.

Cleveland Frog & Crossing Company, Cleveland, Ohio. —Frogs, switches, switch stands, manganese steel rail crossings.

Commercial Acetylene Railway Light & Signal Company, New York.—Flashing signals, acetylene headlights and signal lighting.

Conley Frog & Switch Company, Memphis, Tenn.—"Conley" frogs in several designs.

Cook Railway Signal Company, Denver, Col.—Automatic a.c. and d.c. block signals, automatic railway crossing gates and dry storage batteries.

Cook's Standard Tool Company, Kalamazoo, Mich.—Track jacks, cattle guards, track drills and tool grinders.

The Curtain Supply Company, Chicago,—Car curtains, ring curtain fixtures, "Rex" all-metal rollers and sash balances.

Detroit Graphite Company, Detroit, Mich.—Paint samples and views of structures painted with Detroit graphite.

Eugene Dietzgen Company, Chicago.—Surveying instruments and civil engineers' supplies.

Dilworth, Porter & Company, Pittsburgh, Pa.—Railroad spikes and tie plates.

Joseph Dixon Crucible Company, Jersey City, N. J.—Samples of natural graphite as taken from mine.

The G. Drouvé Company, Bridgeport, Conn.— Window-operating devices and skylights.

Duplex Metals Company, Chester, Pa.—Copper-clad steel wire and line accessories.

The Eastern Graphite Roofing Company, Chicago.—Samples of "Eastern Graphite" prepared roofing.

Edison Storage Battery Company, Orange, N. J.—Storage batteries for general railway use.

The Elyria Iron & Steel Company, Elyria, Ohio.—Tie plates, compromise rail joints and spikes.

Fairbanks, Morse Company, Chicago.—Gasoline motor section cars, jacks and gasoline engines.

Fairmont Machine Company, Fairmont, Minn.—Motor section and inspection cars.

Federal Signal Company, Chicago.—Interlocking plant apparatus, both mechanical and electrical, signal mechanisms.

The Frictionless Rail, Boston, Mass.—Sample of frictionless rail section and views of installations.

General Electric Company, Schenectady, N. Y.—Motors, switchboards, lamps, portable air compressors and mercury arc charging set.

General Railway Signal Company, Rochester, N. Y.—Light signals, semaphore signal, switch box and indicator, electric interlocking machine, signal accessories.

Gordon Primary Battery Company, New York.—Crossing bells and signals, potash batteries.

Lawrence Griffith, Yonkers, N. Y.—Griffith shoulder tie plate, insulated rail joint.

Grip Nut Company, Chicago.—Grip nuts, dust guard and "Monogram" boat fastener.

Hall Switch & Signal Company, New York, N. Y.—Automatic block signals, interlocking machines and signal accessories.

Hayes Track Appliance Company, Richmond, Ind.—"Hayes" derails.

Hobart-Allfree Company, Chicago.—"Smythe" derails.

Hubbard & Company, Pittsburgh, Pa.—Tools and accessories for track and line.

Indianapolis Switch & Frog Company, Springfield, Ohio.—Solid manganese frogs and crossings, Indianapolis portable electric welding outfit.

Inland Steel Company, Chicago.—Corrugated iron culverts and siding, tie plates, non-corrosive steel fence posts.

International Interlocking Rail Joint Manufacturing Company, Chicago.—Interlocking rail joint.

International Steel Tie Company, Cleveland, Ohio.—"International" steel railway and crossing ties.

Iowa Gate Company, Cedar Falls, Ia.—Right-of-way and stockyard gates.

H. W. Johns-Manville Company, New York.—Prepared roofing, fiber conduit, insulating material.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.—Gasoline motor cars, jacks, track tools.

The Kennicott Company, Chicago.—Filters and water softeners.

Kerite Insulated Wire & Cable Company, New York. —Insulated wire and cable.

Keuffel & Esser Company, New York.—Drawing materials, surveying instruments, and accessories.

Keystone Grinder & Manufacturing Company, Pittsburgh, Pa.—Portable grinding tools.

Lackawanna Steel Company, Buffalo, N. Y.—Sheet steel piling, hook shoulder tie plates, rail and rail joints.

The Lehon Company, Chicago.—Waterproof roofing and insulating paper.

Lorain Steel Company, Johnstown, Pa.—Crossing frogs, switches of both rolled and cast manganese, switch stands, rail braces, switch points and guard-rail clamps.

The Lufkin Rule Company, Saginaw, Mich.—Tapes and rules.

David Lupton's Sons Company, Philadelphia, Pa.—Steel sash, partitions and window-operating devices.

Maryland Steel Company, Philadelphia, Pa.—Track specialties.

C. F. Massey Company, Chicago.—Reinforced concrete battery wells, culvert pipe and telephone booth.

McGraw Publishing Company, New York.—Exhibit of copies of current issues of Electric Railway Journal, *Electrical World, Engineering Record,* and *Metallurgical and Chemical Engineering.*

Morden Frog & Crossing Works, Chicago.—Solid manganese railroad crossings, track specialties.

Burton W. Mudge & Company, Chicago.—"Au-Tra-Kar" section cars and electric generating units.

M. & W. Supply Company, Philadelphia, Pa.—"Vaughan" rail anchors.

National Carbon Company, Cleveland, Ohio.—Dry batteries.

National Electric Specialty Company, Toledo, Ohio. —Lightning arrester and signals for automatic blocks.

National Indicator Company, Long Island City, N. Y. —Destination signs for stations.

National Lock Washer Company, Newark, N. J.—Nut locks.

National Malleable Castings Company, Cleveland, Ohio.—Track specialties.

George P. Nichols & Brother, Chicago.—Electric turntable tractor.

Northey-Simmen Signal Company, Ltd., Indianapolis, Ind.—Cab signal system, including car mechanism and dispatcher's signaling and recording board.

The Okonite Company, Chicago, represented by the Central Electric Company, agents.—Insulated wires, cables, tape, etc.

Spencer Otis Company, Chicago.—Automatic platform scales, tie plates and screw spikes.

The P. & M. Company, Chicago.—Anti-creepers and rail anchors.

C. F. Pease Company, Chicago.—Automatic blueprint, washing and drying machines.

Pennsylvania Steel Company, Philadelphia, Pa.—"Manard" anvil face frogs, "Mayari" steel bolts and other track equipment.

Pocket List of Railroad Officials, New York.—Pocket lists.

Positive Rail Anchor Company, Louisville, Ky.—Rail anchors.

Potter-Winslow Company, Chicago.—Reinforced concrete telephone booths, battery wells and posts.

Protective Signal Manufacturing Company, Denver, Col.—Highway crossing signals, annunciators, telephone selector.

The Q. & C. Company, New York.—Bonzano joints, anti-creepers and compromise joints.

The Rail Joint Company, New York.—Various types of rail joints.

The Railroad Supply Company, Chicago.—Crossing signals, bells, signal accessories, tie plates, and derails.

Railway Traction Supply Company, Chicago.—"Hercules" steel bumping posts.

Ramapo Iron Works, Hillburn, N. Y.—Switch stands, switch points, frogs and steel ties.

The Reliance Manufacturing Company, Massillon, Ohio.—Nut locks.

Rhineland Machine Works Company, Chicago.—Ball bearings.

Richards-Wilcox Manufacturing Company, Aurora, Ill.—Railroad door hangers.

Sellers Manufacturing Company, Chicago.—"Sellers" anchor bottom, wrought-iron tie plates and angle bars.

Signal Accessories Company, New York.—Triple-lock switch machines, signal material.

Southern Railway Supply Company, St. Louis, Mo.—"Saunders" corrugated car stopper.

Standard Asphalt & Rubber Company, Chicago.—"Sarco" waterproofing for concrete floors and other purposes.

Standard Underground Cable Company, Pittsburgh, Pa. —"Davis" cable terminals, insulated wire and cable.

Stark Rolling Mill Company, Canton, Ohio.—Non-corrosive iron, corrugated culverts.

Steel Railway Tie & Appliance Company, Denver, Col.—"Shane" steel railway tie and safety fastener.

Templeton Kenly & Company, Ltd., Chicago.—Complete line of ratchet jacks.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y.—Samples of titanium steel products.

Toledo Pipe Threading Machine Company, Toledo, Ohio.—Pipe-threading and cutting tools.

Union Draft Gear Company, Chicago.—"Cardwell" friction draft gear and rocker side bearings.

Union Switch & Signal Company, Swissville, Pa.—Electro-mechanical interlocking machine, electro-pneumatic motion plate switch and lock movement, "B" and electric signal mechanisms, three-position signal, electric light signal, mechanical dwarf signal, relays, switch indicators and "Keystone" insulated rail joints.

Universal Metallic Tie Company, Salt Lake City, Utah.—Metal cross ties.

Verona Tool Works, Pittsburgh, Pa.—All kinds of track tools.

Western Electric Company, Chicago.—Telephones, selectors, lamps, meters and wire.

William Wharton & Company, Inc., Philadelphia, Pa. —Manganese steel crossings, track specialties.

Winans Approved Patent Rail Joint Company, Portland, Ore.—Rail joints.

Worth Wire Works, Kokomo, Ind.—"Cinch" fence stays for right-of-way fence.

Wyoming Shovel Works, Wyoming, Pa.—Shovels for track work and overhead construction gangs.

News of Electric Railways

Mayor Jost's Ideas on New Franchise

Brief mention was made in the ELECTRIC RAILWAY JOURNAL of March 15, 1913, page 517, of the ideas advanced by Mayor Jost, Kansas City, Mo., at the meeting in that city on March 6, 1913, to consider the question of the extension of the franchises of the Metropolitan Street Railway. Mayor Jost is quoted in part as follows in regard to the terms which he advocated at that meeting:

"I have some crude ideas perhaps about financial matters, but viewing the matter from a moral standpoint it is not to be measured solely between the city and the owners of this property. No man coming into this community and venturing his money has any right in the event of loss to expect to have it returned out of the city treasury. Still, there may be some reason from a moral standpoint not to examine too closely the whys and wherefores, but to stand ready at all times to protect the man who relies on the prosperity of the community and the assumption that capital invested here will be fairly treated. Therefore, I think that so far as bonds, notes and mortgage obligations are concerned it is a matter of municipal honor not to see them wiped out when the investment was made in good faith for a venture which has built up the community. I am not so liberal about your stock or your other obligations, but I am disposed to be extremely liberal about the outstanding bonds and mortgages regardless of their relation to the value of the physical properties. It is my disposition to protect the interests of those obligations. You have of that about $29,000,000 representing borrowed money which went into this company and was expended.

"I should not like to see any man who holds a single dollar of notes or bonds lose 5 cents of his claim. What I have said with reference to reduced fares was with the thought that I would be the last man to press a reduction of fare to the obstruction of those claims. I do not say I yield on the question of reduced fares, for I am convinced that the proposed reduction will not strike at the integrity of those obligations. I cannot yield on this question of reduced fare, for I feel in honor bound even to the point of refusing to agree on a contract. At the same time I would not want to be a party to any contract that would contain within its four corners the poison that might destroy it. It is of no credit to make a bargain here and have it fail—better to make none.

"This contract ought to guarantee the integrity of the bonded debt—anything else would be indefensible. It must also carry with it the power of the city to prevent a recurrence of these trials by supervision of operation, holding the expense to a legitimate basis. It must carry absolutely the right to control service. It must be a contract to provide amortization of the property, which I call retiring obligations. For this purpose there must be a sinking fund and this fund must belong to the city. And when the obligations are retired, to that extent the city should become an owner of the property—equal to the obligation retired from the sinking fund. If we can work out a plan to maintain the integrity of these mortgage debts, I think that is all that reasonably can be expected. I am trying to satisfy myself, and if I do satisfy myself and it pleases, it is all right, and if it does not please, it is all right. My personal peace of mind is worth more than anything else.

"Inasmuch as you have no practical experience as to the effect of six tickets for a quarter and your arguments here are matters of theory, and as the company once offered six tickets for a quarter, I suggest that this shall be the rate of fare for a period of three years, definite, fixed and certain. If at the end of that time it develops that the fare has not produced a sufficient return to yield 6 per cent on an amount equal to the present mortgage indebtedness, plus a like return on the amount expended to rehabilitate the property, as outlined in the Arnold report, and to create a sinking fund for amortization, then let the fare automatically return to 5 cents for a sufficient time to recoup any losses of the three-year period and until such time as the earnings show ability to return to the 4-cent fare.

"While you say your company has not prospered here, I think it has prospered. But if it has not prospered it has not been because the field has not been a good one. You have failed because of the rapid growth of the city, demanding extensions of your property into temporary unprofitable territory. You have had to replace equipment to keep pace with a rapid change of motive powers. You have had to rebuild lines because of seepy ground as on Troost Avenue, where the rails were laid three times. These conditions have made your investment unprofitable if it has been unprofitable. Somebody has got to lose something.

"While this is the condition of the Metropolitan Street Railway there is the twin corporation, the light company. It has been very, very prosperous. I suggest that the light company take care of the stock of the Metropolitan Street Railway so not a stockholder need lose a cent. I also suggest that you turn over to the electric light company with a view to reducing the capitalization of your company the power house at Second Street and Grand Avenue. Let the company buy its power and pay for it no more than commonly is paid for power and let it be understood that the city is a party to that contract to protect against any excessive rate.

"I want the city to have a hand in the operating of this property because I know that abuses can grow up so as to make utterly ineffective the six tickets for a quarter provision and the company might be so operated as to make a 5-cent fare inevitable. I would want a supervisor and not one appointed by the Mayor alone. I would not want him to change with administrations or be the subject of political fortunes. If he were appointed by the Mayor your company every year would be a figure in political campaigns. I suggest a nomination to this position by the Mayor or some suitable and qualified person, to be examined by a representative of the company, the presiding judge of the Circuit Court and a third chosen by the two. I suggest power to the Mayor to remove subject to approval by the Circuit Court after a hearing or some such plan."

Public Service Commissioners Hale and Olmsted on Their Work

J. H. Hale, a member of the Public Utilities Commission of Connecticut, was the guest at a recent luncheon of the members of the Hartford Business Men's Association. He addresed the members of the association on the subject "Practical Workings of the Public Utilities Law." He put the matters that came before the commission under three heads, those which the commission took up of its own initiative, those resulting from individual petitions from people throughout the State and those that came from the corporations themselves. After referring to the work of the commission in connection with the steam railroads Mr. Hale said that one of the most important matters that had come before the commission was the Manchester rate case. The people of Manchester desired a reduction in fare over the lines of the Connecticut Company between Hartford and Manchester. A searching investigation had been made by the commission and at one time it was thought that the fare could be reduced, but it was finally found that if the rate was lowered the railroad would not receive sufficient compensation to permit it to give good service and the commission believed that good service was the first essential to be considered. Mr. Hale also referred to the petition to the commission in regard to the lowering of car steps and to the order issued by the commission in this respect. He concluded his remarks in part as follows:

"It has been very easy to rail at and complain about the public service corporations, but we should consider that their officers are our fellow-men and that they are business men themselves. We have been at fault in not going before them and talking it out with the heads of the companies on a business basis. We complain to a conductor of an electric car and blame the railroad because the trouble is not corrected. When we go into a store and are not treated right, we do not complain to the porter or to the errand boy, but we seek the manager and talk it out man fashion, and usually get satisfaction. All that these public service corporations have to sell is service, and good service sells better than poor service, for no man ever made money out of dissatisfaction."

John B. Olmsted, formerly a member of the Public Service Commission of the Second District of New York, spoke somewhat along the same lines as Mr. Hale in an address which he made at Amsterdam, N. Y., just before his retirement from the commission. Mr. Olmsted said in part:

"I came into office with decided leanings toward the anti-corporation view of public utility questions. Want of knowledge as to the precise point involved I have found in many cases to be the principal cause of the prejudices I then entertained. Experience has taught me that there is another side to these questions, and one not lightly to be dismissed. I have changed my mind also as to the attitude of most corporation managers toward the public. I had expected to find it recalcitrant and objurgatory. I have found it almost uniformly, when expressed in the presence of the commission, conciliating and willing to abide by the results of a fair hearing. The difficulty with me has been not so much in getting the corporation to do what I thought was right as to determine in my own mind what under all the circumstances of certain cases was right.

"I am fully aware that this is not the popular view of public service corporations. I say that a better knowledge of the conditions under which their business is carried on brings one to a more just appreciation of some of the difficulties under which they labor. I know well that there are many—very many—particulars in which the service which they are rendering may be improved. Let us be reasonable as well as critical. Let us realize that the management of 1000 men on a street railway is no less difficult than the management of an equal number in a factory, and that there are times when you have to do the best you can with the material with which you have to work.

"The up-to-date railway or electric light official stands ready to listen to any reasonable complaint that may be brought to his attention. I am not innocent enough to believe that all the dark, devious and easy ways of 'getting there' have been wholly abandoned; but I do hold the view that the street called 'Straight' is a much more popular thoroughfare than it used to be, and that the directors and agents of the corporations over which we have control are walking it with much clearer consciences and with great gain to their self-respect.

"I have intimated that one great difficulty with certain corporations is the lack of means to carry out the improvements to service which their operating men admit would be advisable and desirable. On this point some figures from our last annual report may be illuminating. Out of seventy-eight steam railroads reporting to the commission in this State, only twenty-seven paid any dividends for the current year. Out of 364 electric railroads, light, heat and power and gas corporations, 237 paid no dividends. In 1909 it was 237 out of 310, so that conditions are improving; but the figures are significant. They are contradictory to the general impression that dividends are the foundation upon which all public service corporations are erected.

"The Public Service Commission is organized to hand out justice, as nearly as it can determine it, both to shippers and to carriers, to consumers and to producers, and if it has attained some success in its work of the last five years it has done so by a strict adherence to that view, and not by spectacular brandishings of the 'big stick.' It has accomplished more good by getting both parties before it, pointing out the strength or weakness of opposing views, and then appealing to that sense of fair play which is inherent in every man, than it ever has by a display of the tremendous powers which the law undoubtedly confers upon it."

Mr. Mullaly on Transportation for the San Francisco Exposition

At the ninth annual banquet of the Transportation Club of San Francisco, held recently at the Palace Hotel in that city, Thornwell Mullaly, assistant to the president of the United Railroads of San Francisco, speaking on the subject "Transportation for the Exposition and for San Francisco," said in part:

"The subject I have been asked to speak on is 'Transportation for the Exposition and for San Francisco.' I have been asked to speak in the capacity of the acting head of the principal street railway of the city. I am speaking to the Transportation Club, whose members are mostly transportation men. You are connected with the principal railway and steamship lines running to this city. Your companies are going to spend large sums of money in bringing people here. You are inviting the people of the world to come and tacitly agreeing that they will be properly received and cared for when they arrive.

"In view of all this it is incumbent upon me to state to you truthfully one fact. I am not stating this by way of a threat. I am not stating it for the purpose of gaining any advantage for the company with which I am connected. It is simply a fact which I should state at this time in order that you and others may know the truth in time and hereafter relieve us from responsibility in the matter. That fact is this: It is not possible for private capital to compete in street railroading with the city. If the city operates at a loss the taxpayers must pay. If a private company runs at a loss it goes into bankruptcy and out of business. Private capital cannot compete with a competitor which may take such streets as might be profitable and relegate private capital to unprofitable extensions, and which has the power if it so desires to pass ordinances in seeking to incommode. We go into the financial markets of the world and get the money with which to build lines, just as the city must do. We cannot get people to put their money into the building of unprofitable lines and it would not be right to do so if we could. Therefore, if the city wishes to establish a municipal street railroad system it, of course, may do so. But if it does it will render it impossible for us to build new lines or extensions, either to the Exposition or throughout the city.

"We regret this, but we cannot help it. It is not of our doing. The company, however, desires to be reasonable and fair with the city. It desires to do all it can to aid the Exposition and San Francisco. If the city desires municipal ownership, there is a plan in accordance with which the company will work in harmony, and municipal ownership can be brought about at any time the city wishes, and that, too, with a saving to it of hundreds of thousands of dollars.

"The company is willing to enter into a contract with the city called a franchise, under which it will obtain the money, build the necessary lines and extensions and turn them over to the city when it wishes. All it asks is fair protection for its investment and a reasonable return upon it. This the city must give by bonding itself if it builds its own lines. Private capital can build the lines at a saving to the city of many thousands of dollars. Of course, the city must get itself into a position to make such a contract by amending its present charter.

"There are two ways of increasing transportation facilities to the Exposition. One is by constructing extensions to the existing lines, the other is by constructing new lines. Two years ago at Washington I worked for the World's Fair bill. Our company is the second largest subscriber to the Exposition fund and we shall continue to do all in our power for its success and for the success of San Francisco."

Provisions of Missouri Public Service Commission Bill

Governor Major of Missouri on March 18, 1913, signed the Public Service Commission bill, which abolishes the elective State Railroad Commission and all municipal utility commissions in Missouri. The new measure creates a commission of five invested with full power to fix and regulate the rates of all public service corporations. It repeals the law by which the Municipal Assembly of St. Louis and similar bodies of other cities are empowered to create a local utilities commission by ordinance. It gives the commission exclusive jurisdiction in the abolition of grade crossings and the right to distribute the cost. It requires new railroads or street railroads to get a permit from the commission before beginning construction work. It prohibits the issuance of stocks and bonds by any utility corporation without the permission of the commission.

The measure also compels utility corporations to set aside a certain amount of their earnings as a depreciation fund, upon determination by the commission. It empowers the commission to ascertain the physical value of utility property for the purposes of taxation and to determine a fair profit on the money invested. It prohibits the issuance of passes by railroads except to physicians, lawyers, agents and shippers and not to exceed two bondsmen in each county. It makes the commission virtually a court, from which appeal is by certiorari to the courts. It provides that the commission must hand down decisions upon all orders affecting service or rates. It provides for a salary of $5,500 for the five commissioners, $4,500 for an attorney, $3,600 for chief clerk, $1,800 for all other clerks and $1,200 for stenographers. The commission is empowered to appoint all necessary examiners, accountants, agents, experts, engineers, inspectors, etc.

The law strips the Legislature of further necessity to deal with railroads and other utility corporations. The commission will have full power to have three brakemen employed on all freight trains, if three are necessary; to compel the installation of electric headlights and construction of depots; to require additional switching facilities, improvement of track bed or rolling stock, and to regulate the expedition with which stock is handled. The commission is empowered to fix express rates within the State and to create free zones of delivery in incorporated cities. It is vested with power to compel the railroads and other utilities to produce their books and papers and to adopt a uniform system of accounting and to force the railroads to run their trains on time and furnish plenty of cars. Delay in the utilization of franchises is obviated by the bill. If a utility corporation gets a franchise from a municipality to construct a gas plant or street railroad or water works, it must within two years make substantial preparations to use its franchise. The law confers on the commission power to investigate interstate rates, and when these are deemed too high, to apply to the Interstate Commerce Commission for relief.

Development of Plans to Connect Pittsburgh and Wheeling

The representative of the West Penn Traction Company, Pittsburgh, Pa., secured franchises recently in Washington, Pa., under the names of the Washington Traction Company and the East Washington Traction Company, but the applications for charters to operate the lines as part of the proposed Wheeling-Pittsburgh system were denied by Governor Tener. W. E. Moore, general manager of the company, says in this connection:

"While we were disappointed in being forced to relinquish our immediate intention of building into Washington by reason of Governor Tener's action, we have not abandoned the project. The West Penn Company will connect with its Pennsylvania and West Virginia systems at an early date and within a comparatively short time will be running cars from Wheeling to Pittsburgh by way of Washington and the Monongahela Valley. The West Penn interests not only control the system of the Wheeling Traction Company but have also acquired the City & Elm Grove Railroad. We have the most feasible route surveyed from the Monongahela Valley to West Alexander, where we will connect with the Wheeling lines. The route is shorter than any other that has heretofore been surveyed between Washington and Wheeling."

Municipal Bus Line in Detroit

The first municipal motor bus line in Detroit was placed in operation recently between West Jefferson Avenue and Warren Avenue over Junction Avenue, Thirty-fourth Street, Buchanan Street and Scotten Avenue. The schedule provides for a bus each way every twelve minutes, and the fare is 3 cents. It is proposed to give this plan a thirty-day trial as a cross-town service. The vehicles seat twenty-eight passengers. The cars were patronized the first day largely by women and children. The number of passengers carried in the eight hours' operation the first day was 2405 and the receipts were $61.35.

Manufacturers in the West Detroit River district are opposed to any step that will cause a cessation of operation of the Fort Street line, since this would interfere with the transportation of their employees and injure their business. Some Councilmen favor ordering the company to cease operations in Fort Street.

Alderman John Lodge, who has charge of the preparation of the municipal ownership amendment to the Detroit city charter, has expressed himself in favor of the creation of a commission of non-salaried citizens to superintend railway transportation in the city.

Detroit's Municipal Ownership Charter Amendments

The municipal charter amendments for Detroit were presented to the City Council on the evening of March 13, and will lie on the table for fifteen days, as provided by the Verdier home rule law, preparatory to being submitted to a vote of the electors on April 7, the regular election day. Before being presented to the Council the amendments were changed by the Mayor's special counsel, at the request of the Mayor, but Corporation Counsel Lawson and Attorney Lucking, who prepared the amendments originally, refused to take part in the revision, They thought the matter should have more extended consideration. One of the principal changes made in the plan is that there shall be a board of three citizens in charge of the street railways instead of one, as originally provided.

As a check upon the board, another change in the amendments provides that all money received from any source in relation to the street railway shall be paid into the city treasury and disbursed only on vouchers signed by the president and secretary of the board and countersigned by the city comptroller. The portion relating to the sinking fund was amended so that the board may set aside from time to time such sums as it sees fit to retire the general bonds, but it must pay the mortgage bonds.

The charter amendments provide in brief for municipal ownership and maintenance and operation of street railways beneath, upon and above the surface of the streets of Detroit. There is to be a board of three street railway commissioners to be appointed by the Mayor, the members to serve without salary and be subject to removal at the will of the Mayor. Section 6 says that the board shall "proceed promptly to purchase, acquire or construct and to own and operate a system of street railways in and for the city of Detroit and as soon as practicable to make said system exclusive." The street railway board is empowered to purchase, lease or condemn all or any part of the existing street railway properties in the city of Detroit, and "said board shall construct, own, maintain and operate in said city, for said city, and within a distance of 10 miles from any of its limits, a system of street railways in and through and upon such streets and other places in Detroit and outside as the Common Council shall from time to time elect."

The Common Council is to bond the city of Detroit to the amount of 2 per cent of the assessed value of the real and personal property of the city on the request of the street railway board to provide funds for a public street railway in Detroit. Provision is also made for the issue of additional bonds to be secured by the property and revenues of the street railway system, including a security franchise stating the terms upon which in case of foreclosure the purchaser may operate the lines for a period not longer than twenty years from the date of purchase. This security franchise is to be submitted by the street railway board to the City Council and is then to be submitted to the electors for approval. The street railway board is to have control of the municipal street railway system "as fully and completely as if said board represented private owners."

The section covering the rate of fare follows:

"The rate of fare on said street railway system shall be sufficient to pay, and the said board shall cause to be paid: (a) Operating and maintenance expenses, including paving and watering between tracks; (b) taxes on the physical property of the entire street-car system, the same as though privately owned; (c) fixed charges; (d) a sufficient per cent per annum so as to provide a sinking fund to pay the principal of the mortgage bonds issued at their maturity and such other additional per cent per annum to provide, in the sound discretion of the board, a sinking fund to pay the principal of the general bonds issued as soon as practicable to the end that the entire cost of said street railway system be paid eventually out of the earnings thereof."

The question to be submitted to the electors of Detroit at the election on April 7 follows:

"Do you favor authorizing the city of Detroit to acquire by purchase or condemnation or construction and to own and maintain and operate street railways within the city of Detroit and within a distance of 10 miles from any portion of its limits, and to provide for the cost thereof by an issue of bonds of the city of Detroit to the amount of 2 per cent of the assessed valuation of the real and personal property of the city, and other bonds upon the property and revenues of the street railway, including a security franchise?"

New Haven Railroad Electrification Progress

The following very interesting statements in regard to the progress of the New York, New Haven & Hartford Railroad with the work of electrification of its lines are attributed to Timothy E. Byrnes, vice-president of the company:

"The electrification from Boston to Providence is complicated and to some extent delayed by the four-tracking of the road, which is going on at the same time. Once the electric system is completed to Providence, the gap between that city and New Haven, to which the electric system is now practically completed from New York, will speedily be closed.

"Then we will put on the four-and-one-half-hour trains from Boston to New York. We could easily make the running time between the cities less than four hours, all depending on the number of stops. The time of our electrically operated trains will be chiefly determined by the arrangements of the national government with regard to the drawbridges on the route. In any case we will better the time of our present five-hour trains.

"It looks to me as if there is a real chance that something will be done about the electrification of all railroads in the metropolitan district in the Massachusetts Legislature this winter. That this plan has been held up is not due to the roads but to a question of financing. Whatever is done in this case, I think the New York, New Haven & Hartford Railroad will be operating its trains by electricity as far as Providence in less than two years. Our dream has been the four-hour train between Boston and New York. I think it may soon be realized. In any case we will better the five-hour running time."

Commissioner Clark on Interstate Valuation Work.

Chairman Clark of the Interstate Commerce Commission was quoted in part as follows on March 18, 1913, in regard to the work of carrying out the law authorizing the commission to fix the value of the physical property of the common carriers:

"The work will be approached and proceeded with in a businesslike, impartial and thorough way. It is desirable that it should be done with accuracy and thoroughness. Necessarily it will take some time. Just how long no one knows. The valuation will comprehend securing reliable, authentic and exhaustive information upon which to base a determination of the original cost, the present and the productive value of these properties that exist under public franchises and perform public functions. When these have been ascertained, the commission will find the values of the several carriers, and the values so fixed will be prima facie evidence in the courts. Who knows the value of the property of a single carrier? One expert would say that its value is to be measured by the original cost, another by outstanding indebtedness, and another by reproduction value. The law requires that rates of carriers shall be reasonable. The courts have held that carriers are entitled to a fair return upon the value of their property. Manifestly the fair return cannot be determined until the value is known. The courts also hold that other factors must be taken into consideration."

Mr. Clark admitted that many difficulties presented themselves for solution in the work of valuing the railroads, but said that Congress would furnish funds for thorough work, which will proceed with dispatch. He is reported to have cited cases in which voluntary valuations which had been furnished to the commission by the railroad companies were questioned in court.

New York Rapid Transit Contracts Executed

The contracts with the Interborough Rapid Transit Company and the New York Municipal Railway Corporation (Brooklyn Rapid Transit) for equipping and operating the dual system of rapid transit, which will give New York City a subway and elevated system having 629 miles of single track and costing for new work and equipment upward of $300,000,000, were signed in behalf of the Public Service Commission of the First District of New York on March 19, 1913. The commission adopted the contracts with the operating companies on March 4 and sent them to the Board of Estimate and Apportionment, which acted upon them at a special meeting and then returned them to the commission for execution. A digest of the eight different instruments involved in the new agreement was published in the ELECTRIC RAILWAY JOURNAL on March 15, 1913, and a summary of the terms of the operating contracts as approved by the commission was published in the ELECTRIC RAILWAY JOURNAL of March 8, 1913.

The contracts bind the city and the Interborough Rapid Transit Company and New York Municipal Railway Corporation to an agreement for forty-nine years dating from Jan. 1, 1917. They were signed in the assembly room of the commission in the Tribune Building. All the members of the commission were present, as were also Theodore P. Shonts, president of the Interborough Rapid Transit Company; Frank Hedley, vice-president and general manager of that company; Col. Timothy S. Williams, president of the Brooklyn Rapid Transit Company; George D. Yeomans, of that company, and other officers of the companies involved in the negotiations. Ex-chairman William R. Willcox of the commission had the honor of attesting the signature of his successor on the commission, Mr. McCall.

At the meeting of the Board of Estimate on March 19, at which the contracts were approved by that body and $88,200,000 appropriated for the construction of the new lines, Borough President McAneny read the report of the board's conference committee on pending transit proposals, of which he was chairman. This report rehearsed the proceedings of the committee since its report of May 24, and said that the contracts as now presented for approval were "little more than the expression in exact contractual terms of the general transit plan to which the board has already subscribed." The financial side of the settlement was set forth as follows:

"The estimates submitted in May covering the contributions of both the city and the companies, whether for construction or equipment, and including also the item of real estate, reached a total of $301,860,000. The third-tracking and extension of the Manhattan elevated system adds approximately $25,000,000 more. The estimates as they have since been carefully revised and as now resubmitted are but $67,000 beneath this figure. They are distributed as follows:

INTERBOROUGH SYSTEM.

City funds	$63,335,637
Company, for construction	56,260,000
Company, for equipment	21,000,000
Total	$140,595,637

BROOKLYN SYSTEM.

City funds for new work	$72,005,991
City funds for Fourth Avenue and Centre Street loop lines	28,496,000
Company funds for the construction of city-owned lines	13,695,000
Company funds for improvements to its existing system	21,000,000
Company funds for equipment	26,000,000
Total	$161,196,991
Interborough system	$140,595,637
Brooklyn system	161,196,991
Grand total	$301,792,628

"The sum total of the required investment of the city is, therefore, $163,837,628. Deducting the cost of the Fourth Avenue and Centre Street loop lines, the city's share for the new work will be $135,341,628. This is $1,030,572 less than the estimates of the city's share on account of both systems presented in May."

The system of rapid transit lines which will now be completed and placed in operation had its beginning with the old Rapid Transit Commission, which adopted a plan for a Manhattan-Brooklyn loop line from the Brooklyn Bridge north through Centre Street and east through Delancey

Street to the Williamsburg Bridge. The proposals and counter-proposals made following this beginning have been referred to from time to time in the ELECTRIC RAILWAY JOURNAL as the negotiations have proceeded, and are dealt with at considerable length in a sketch reviewing the entire situation prepared by the commission.

Electrification of Line Between Spokane and Seattle Reported.—It is reported that the Great Northern Railway is considering plans to electrify its main line between Spokane and Seattle.

Complete Signal System for Mesaba Railway.—The Mesaba Railway Company, Virginia, Minn., has contracted with the Northey-Simmen Signal Company, Ltd., Indianapolis, Ind., for a complete equipment of the Simmen signal system for its 36 miles of road. The work of installing the system will be started and completed during the coming summer.

New California Road Placed in Operation.—The Easton Railroad has been completed and placed in operation between the station of the Southern Pacific Railroad in Easton, Cal., and a point 4 miles back in the foothills. Service is being furnished with Edison-Beach storage battery cars. The company intends to extend the road to Burlingame.

New Office Building in Savannah.—The Savannah (Ga.) Electric Company's new office building, located at Bay and Whitaker Streets, Savannah, has been turned over to the company by the contractor, who has remodeled it into a most commodious and modern office edifice. By reason of re-routing of the cars last December, practically every car on the system passes the new office.

Progress of the Oakland & Antioch Railroad.—The Oakland & Antioch Railroad, Oakland, Cal., has completed its line from Oakland to Bay Point and Walnut Creek and expects to begin service between Bay Point and Oakland on April 7. The main line of the company from Bay Point through Antioch to Sacramento is nearing completion and the operation of trains between Oakland and Sacramento will probably be begun by July 1.

Act in Interest of Buffalo & Fort Erie Company Advanced.—The act in the interest of the Buffalo & Fort Erie Railway & Ferry Company, Fort Erie, Ont., has been reported to the Ontario Legislature by the railway committee. The company is authorized to electrify the road and make certain changes which will involve an expenditure of about $300,000. The company is to be permitted to increase its capital from $500,000 to $1,000,000 and to issue bonds to the extent of $600,000.

Decision in Toronto Deviation Case.—The Court of Appeal has handed down a decision in the city's appeal from the order of the Ontario Railway & Municipal Board, which approved the plans of the Toronto & York Radial Railway for the deviation of its line at Farnham Avenue on Yonge Street north. The Court of Appeal decided that the company had no right to cross the streets without the consent of the city. The company has already purchased the right-of-way and laid part of the track.

Referendum in San Francisco.—A referendum election has been called for April 22, 1913, on the traffic agreement between the city and the United Railroads, San Francisco, Cal., for the use of lower Market Street. The calling of the election by the supervisors was made necessary by the filing of a petition circulated by the Public Ownership Association. The United Railroads insists that no work be done by the Municipal Railroad under the terms of the proposed agreement until the result of the election shall be known.

New Operating Proposal in Norfolk.—The Virginia Railway & Power Company, Richmond, Va., has submitted to the Board of Aldermen of Norfolk, Va., a proposal for the complete rearrangement of its lines in that city and their operation under new franchise provisions. The plan contemplates making the gage of all tracks uniform, the issuance of universal transfers, the abolition of 3-cent fares and the sale of tickets for 2½ cents on certain lines at specified hours. It also provides for the sale of six tickets for a quarter on cars and at fixed stations. The proposal has been referred by the Aldermen to the finance committee. An interesting feature of the proposal is the one that provides for a graduated tax on gross earnings in lieu of the multifarious taxes now paid by the company.

Seattle Condemnation Case to Supreme Court.—Argument will be heard before the Supreme Court of the State of Washington on May 12, 1913, to determine whether the city of Seattle has the right to condemn the Seattle, Renton & Southern Railway and to operate it as a municipal street railway. It is stated that this is the first time the particular questions at issue in this case have ever been raised. At the trial before the lower court Judge Gilliam held the city had a right to maintain the action and to condemn the property but intimated he would like to have the Supreme Court pass upon the case. Therefore the writ was asked for, and in the event that the lower court is upheld it will be merely a matter for the jury to settle the question of damages.

Review of Progress of Springfield (Mass.) Street Railway.—The Springfield *News* of March 11, 1913, contained a review of the progress of the Springfield (Mass.) Street Railway. The *News* said that there was no better illustration of the growth of Springfield during the last thirty-three years than the remarkable changes that have taken place in the Springfield Street Railway during that period. The history of the company was briefly reviewed from the beginning in 1868 through the absorption of the system by the New York, New Haven & Hartford Railroad. Mention was made in particular of the improvements carried out under the present management. The article was accompanied by a portrait of Edgar J. Dickson, manager of the company.

East Boston Tunnel Tolls Bill Declared Unconstitutional.—Attorney-General Swift of Massachusetts has sent an opinion to the House of Representatives at its request regarding the constitutionality of the Giblin bill providing that the city of Boston may assume payment of tolls for the use of the East Boston tunnel. The opinion states that previous decisions of the Supreme Court and former Attorney-Generals have well established that any legislation which affects or impairs the security afforded by the collection of the tolls as required by the bill to the holders of the bonds to meet the principal and interest for which such tolls are pledged would clearly be unconstitutional, and that this would be true notwithstanding the fact that some other form of security was substituted therefor.

Plans of the St. Louis & Western Traction Company.—James D. Houseman, president of the St. Louis & Western Traction Company, St. Louis, Mo., is reported to have an option to purchase or lease the property of the St. Louis & Hannibal Railroad. The St. Louis & Western Railroad is projected from St. Louis to Wentzville. The latter city is 2½ miles distant from Gilmore, the present southern terminus of the St. Louis & Hannibal Railroad. Mr. Houseman and his associates plan to build between Wentzville and Gilmore so as to connect the St. Louis & Western Traction Company's line with the St. Louis & Hannibal Railroad and to equip the latter for operation by electricity. The St. Louis & Western Traction Company has graded its line as far as Kirkwood. It proposes to begin active work of construction shortly and to complete the line to Kirkwood by Aug. 1. The road is to be operated with power obtained from the new Mississippi River development at Keokuk.

McKinley Corn-Growing Contest.—W. B. McKinley, president of the Illinois Traction System, Peoria, Ill., has decided to repeat his offer made a year ago of a series of prizes for boys making the best showing in a corn-growing contest. Thirty-five prizes will be awarded to the members of the boys' corn clubs of Champaign, Coles, De Witt, Douglas, Platt, Moultrie, Macon and Shelby Counties. The boy who makes the best record in the corn-growing contest will be taken to New York, Philadelphia, Washington and Niagara Falls, with all expenses paid. To one boy in each of the eight counties who makes the best record there will be afforded a trip to Washington, D. C., and return. To the eight boys who make the second best record there will be afforded a trip to St. Louis and return. To the eight boys who make the third best record there will be afforded a trip to the University of Illinois. Any boy between the ages of ten and eighteen is eligible. Entries close May 15.

Shore Line Headquarters Established at Norwich.—It has been decided to establish the headquarters offices of the Shore Line Electric Railway, otherwise known as the Plant system, of eastern Connecticut at Norwich, Conn. With the probable exception of the lines west of the Connecticut River, which are operated from Saybrook, Conn., the main offices of the principal electric railways east of the river will be at Norwich, and the general administration of the system will be conducted at the latter point. Simultaneously with the taking over of the lines leased by the Plant system from the New York, New Haven & Hartford Railroad, the Norwich & Westerly Traction Company, the Connecticut & Westerly Traction Company and the Pawcatuck Valley Street Railway Company are to be turned over to the Shore Line Electric Railway Company. Arrangements have been made with the New York, New Haven & Hartford Railroad for the use of terminal facilities adjoining its new passenger station in Westerly, R. I. A bill validating the merger of the Plant lines, some of which were taken over under foreclosure, is pending in the Rhode Island Legislature.

Report Presented on Montreal Traffic.—John P. Fox, who has been engaged by one of the Montreal papers to inquire into the local electric railway situation in that city, has made a preliminary report in which he recommends the abolition of the cross seats, the removal of the heavy partitions between the rear platform and the body of the car, the installation of sliding or folding doors at the steps of all cars to protect against dangerous overcrowding of the rear platform, the scrapping of single-truck cars or their operation in pairs or connected together after the Boston model, the operation of every car available for service, the double-tracking of St. James Street and of Notre Dame Street and the provision of a reserve of cars near the center of the city for rush-hour needs. Mr. Fox thinks that a new type of double-truck car is needed in Montreal. The latest Montreal cars have seats for forty passengers, while a lighter type of car used in Pittsburgh has seats for sixty-seven passengers. Double-deck cars seating from ninety to a hundred passengers could be operated without difficulty on most of the important lines in Montreal, according to Mr. Fox, who regards this type of car as worthy of consideration.

To Test Automatic Stops.—The New York, New Haven & Hartford Railroad is preparing to experiment with two of the many automatic stops that were submitted to the company in response to the offer of $10,000 made by President C. S. Mellen for one that would meet the requirements of the peculiar conditions governing the operation of a railway system such as the New York, New Haven & Hartford Railroad. Under the conditions of the competition the company agreed to assist a competitor by contributions of money or use of tracks, or both, provided his device appeared, in the judgment of C. H. Morrison, signal engineer, to have sufficient merit or promise to justify more extended consideration. Should a device be accepted and the prize awarded, the patent remains the property of the competitor, the company making the sole reservation of a right of use on all its lines without further payment. The device must have the approval of the Interstate Commerce Commission, the Railroad Commission of Massachusetts and the Public Utilities Commissioners of Connecticut, and must be adopted for general use by the Pennsylvania Railroad, the New York Central & Hudson River Railroad or the New York, New Haven & Hartford Railroad within the year 1913, 1914 or 1915.

Decision in Seattle Franchise Case.—The Washington State Supreme Court has affirmed the decision of the Superior Court of King County holding void the section of the Seattle city charter which purports to give to the voters the right, by initiative and referendum, to grant or regulate franchises or to set them aside. The electors under this section voted in favor of an amendment of the franchise previously granted to the Puget Sound Traction, Light & Power Company to provide that the right to build extensions should be exercised only under certain conditions named in the amendment. The company objected particularly to the provision which would permit the city to take over the property of the company at any time at its physical valuation, without any allowance for the franchise. The city contended that the Gandy act of 1911, authorizing cities to legislate by the initiative and referendum, gives the voters all the powers heretofore held by the City Council. The Supreme Court holds "that the power to grant franchises is a sovereign right. It may be delegated by the State, but it is not within the powers of cities unless expressly delegated by the State." This sovereign power, it is stated, has been granted to city councils, but never to the people by direct vote, and the right to pass or cancel or regulate franchises by direct vote, cannot be acquired unless specifically given by the Legislature.

Growth of Street Car Habit in Newark.—The *Newarker*, which is published monthly by the Free Public Library of Newark, N. J., devoted its entire issue for February, 1913, to a complete exposition of the transportation problem in Newark and a careful statement of a proposed solution of the problem made by J. L. O'Toole, of the publicity department of the Public Service Corporation of New Jersey, at the request of J. C. Dana, librarian of the city. The cover of the *Newarker* was given over to a summary showing the growth of street railway traffic in Newark since 1893. Comparisons were made between 1893, 1903 and 1912. In twenty years the population of Newark has increased 85 per cent, while rides in street cars have increased 330 per cent. During this period the "street car habit grew 233 per cent." The article is illustrated with a halftone of the exterior of the proposed terminal building for the Public Service Railway in Newark, which was the subject of an article in the ELECTRIC RAILWAY JOURNAL of Feb. 8, 1913, page 246, and with line cuts and reproductions from wash drawings showing details of the proposed traffic plan. Maps were presented of the center of Newark showing track changes suggested for carrying out the terminal plan. There was also a map showing track extensions under consideration for the near future. Advantage was taken by Mr. Dana of the opportunity to present a list of the publications in the Newark Public Library dealing with the rapid transit matters and with traffic conditions. These he arranged under the headings "Rapid Transit in Cities," "Magazine Articles on Rapid Transit in Cities" and "Books, Pamphlets and Maps."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

IDAHO

The Senate has passed the bill to create a public utilities commission in Idaho and the measure is now before the Governor for signature. The workmen's compensation bill introduced by Senators Fairchild, Defenbach and Johnson has been killed in the Senate.

ILLINOIS

Representative Hollenbeck has introduced into the Illinois Legislature House bill No. 186, which provides for special taxation up to a legal limit for payment of bonds for electric light and street railway systems and other improvements where a city or village is about to forfeit such improvement through inability to meet payments due. Representative Rinehart has introduced House bill No. 201, a publicity franchise law requiring public hearing and advertisement before the confirmation of utility franchises. Senator Harris has introduced Senate bill No. 236, one of the Chicago charter measures to provide a public utilities commission for the city of Chicago.

OHIO

On March 12 a conference took place between Governor Cox and Mayor Newton D. Baker of Cleveland as to whether the proposed administration public service bill shall govern municipally owned utilities and those operating within municipalities. Mr. Baker has argued that such utilities should be exempted from the operation of the law, while the Governor has taken the opposite stand. It has been agreed that the bill shall be drawn to give the Public Service Commission the right to regulate such utilities, with the reservation of the rights granted municipalities by the home rule amendment to the constitution, and that the courts shall be called upon to fix these rights. This bill will require the value of the physical property of all public service properties to be ascertained as a basis on which to fix proper rates for service.

The House has passed to second reading the Bigelow bill to revoke fifty-year franchises held by street railway companies.

PENNSYLVANIA

The introduction of new measures into the House ended with the session of March 17, when 312 bills were presented, bringing the total number for the House alone up to 1802, thus establishing a record. The total for both Senate and House is more than 2000. Among the bills presented March 17 was one by Martin of Dauphin, prohibiting street railways from issuing passes except to officers and employees. The same representative also introduced a measure authorizing the State Highway Department to construct a bridge across the Susquehanna River at Middletown, at a cost not to exceed $200,000. Should this bill become a law it would probably mean the construction of another electric railway connecting Middletown with the west shore of the river, which is about 1 mile wide at this point. Among the revenue-raising bills introduced is one taxing the bonds of corporations 4 mills, which would increase the income of the State about $10,000,000 annually. At present the corporations are required to pay such a tax only upon bonds of persons residing in the State, and there is no definite means of ascertaining the identity of bondholders. Both the State administration and Republican State Convention "blue-sky" bills have been introduced. The former embraces all such companies, except public utilities companies, as are included in the public utilities commission bill, while the latter embraces all stock and investment companies. The bill licensing the sale of liquors on dining cars passed the House March 17, after having been placed on the calendar notwithstanding a negative report from committee.

As a result of the joint hearing for the public extended by the Senate and House committees on the public utilities bills on March 18 important amendments have been made to the State administration bill, which is now expected to receive the support of Republicans and Progressives, the Democrats probably voting for their own measure. The vital amendments made to the State administration measure were those giving the proposed public utilities commission power to require full publicity of stock issues, to have corporations make tax returns on the value of their physical property rather than the value of their securities, and to empower the commission to aid the abolition of grade crossings and the smoke nuisance.

Another amendment was that covering the relation of municipalities to public utilities companies. The amendment provides that cities may have the right to engage in public utility service and for this right not be compelled to seek the permission of the proposed commission, but where a private corporation is doing business before the city can enter into competition a certificate must be issued by the commission stating that service by the municipality is required for public convenience. If the commission decides against the city the latter may purchase the control and property of the existing corporation at a price set by the commission.

Among the speakers for and against the bill were W. U. Hensel, former Attorney-General, who appeared as the representative of a number of corporate interests; Henry G. Wasson, Republican state chairman, and Attorney-General Bell, who appeared for the measure; E. W. Burdett, for the gas and electric light interests, and George Stuart Patterson, counsel for the Pennsylvania Railroad. Mr. Hensel urged the members of the committee to see to it that the commission received discretionary rather than mandatory powers, and called attention to the few complaints against the present commission, whose powers are limited to recommendations. Mr. Patterson favored the extension of the term of the commissioners from five to eight or ten years on the ground that the longer term would prevent frequent changes in the personnel of the commission through changes in the fortunes of the political parties.

UTAH

The Senate has voted to kill the bill to provide a public service commission. The House had previously voted against a similar measure. The action by the Senate obviates all possibility of such a commission being created at this session.

Financial and Corporate

Stock and Money Markets

March 19, 1913.

The general level of the New York market as measured by the average of fifty issues dropped to-day to a new low level for the year. The dealings, however, expanded to more than twice the volume of the previous day's transactions. Interborough-Metropolitan preferred lost a full point despite the news of the signing of the subway operation contracts. New Haven, on the other hand, made a net gain of 1½ points. Rates in the money market to-day were: Call, 2½@5 per cent; sixty to ninety days, 5¾@6 per cent; four and five months, 5½@5¾ per cent; six months, 5¼@5½ per cent.

The Philadelphia stock market to-day was broad and quite active. The demand for bonds was good.

The Chicago stock market was broad, but the volume of sales was small. There was little demand for bonds.

In Boston the railroad and electric railway issues were more in evidence in the trading than they have been for some time past. The bulk of the bond business was in American Telephone & Telegraph 4's.

The Baltimore stock market to-day was narrow and dull. The demand for bonds was fair.

Quotations of traction and manufacturing securities as compared with last week follow:

	Mar. 12.	Mar. 19.
American Brake Shoe & Foundry (common)	90¼	90¼
American Brake Shoe & Foundry (preferred)	131	131
American Cities Company (common)	47½	44
American Cities Company (preferred)	76⅞	a76¾
American Light & Traction Company (common)	370	350
American Light & Traction Company (preferred)	107	106
American Railways Company	39⅝	..
Aurora, Elgin & Chicago Railroad (common)	44½	44
Aurora, Elgin & Chicago Railroad (preferred)	87	87
Boston Elevated Railway	108¼	107
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	63	a66
Boston & Worcester Electric Companies (common)	7¼	7½
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	87	87
Capital Traction Company, Washington	121	120
Chicago City Railways	150	150
Chicago Elevated Railways (common)	25	*25
Chicago Elevated Railways (preferred)	88	*88
Chicago Railways, ptcptg., ctf. 1	90	90
Chicago Railways, ptcptg., ctf. 2	22¼	22¼
Chicago Railways, ptcptg., ctf. 3	6⅞	6⅞
Chicago Railways, ptcptg., ctf. 4	3½	3½
Cincinnati Street Railway	111	112
Cleveland, Southwestern & Columbus Ry. (common)	a5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred)	a30	*30
Cleveland Railway	102¾	103½
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	a69½
Columbus Railway (preferred)	82½	82½
Denver & Northwestern Railway	108	*108
Detroit United Railway	85	a80
General Electric Company	138	136
Georgia Railway & Electric Company (common)	120	121
Georgia Railway & Electric Company (preferred)	83¾	a83¾
Interborough Metropolitan Company (common)	16⅝	17¼
Interborough Metropolitan Company (preferred)	58	58
International Traction Company (common)	35	*35
International Traction Company (preferred)	a95	*95
Kansas City Railway & Light Company (common)	15	15
Kansas City Railway & Light Company (preferred)	30	30
Lake Shore Electric Railway (common)	6½	*6½
Lake Shore Electric Railway (1st preferred)	a91	*91
Lake Shore Electric Railway (2d preferred)	a25½	*25½
Manhattan Railway	130	127¾
Massachusetts Electric Companies (common)	16½	16½
Massachusetts Electric Companies (preferred)	74⅝	74½
Milwaukee Electric Railway & Light Co. (preferred)	100	*100
Norfolk Railway & Light Company	25¾	*25¾
North American Company	77	77
Northern Ohio Light & Traction Company (common)	80	72½
Northern Ohio Light & Traction Company (preferred)	105	a105
Philadelphia Company, Pittsburgh (common)	45¼	45
Philadelphia Company, Pittsburgh (preferred)	40	40
Philadelphia Rapid Transit Company	25⅜	25⅜
Portland Railway, Light & Power Company	67	*67
Public Service Corporation	115	115
Third Avenue Railway, New York	35½	34
Toledo Railways & Light Company	2½	2⅝
Twin City Rapid Transit Co., Minneapolis (common)	104	103
Union Traction Company of Indiana (common)	4½	*4½
Union Traction Company of Indiana (1st preferred)	81	*81
Union Traction Company of Indiana (2d preferred)	34	*34
United Rys. & Electric Company (Baltimore)	23½	23
United Rys. Inv. Company (common)	26	25
United Rys. Inv. Company (preferred)	49	47
Virginia Railway & Power Company (common)	55	51¾
Virginia Railway & Power Company (preferred)	89	89
Washington Ry. & Electric Company (common)	84½	87½
Washington Ry. & Electric Company (preferred)	87⅞	88¼
West End Street Railway, Boston (common)	78	76½
West End Street Railway, Boston (preferred)	95	a95
Westinghouse Elec. & Mfg. Company	68½	62
Westinghouse Elec. & Mfg. Company (1st preferred)	116	117

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*Last sale. a Asked.

ANNUAL REPORTS

Underground Electric Railways, Ltd.

The revenue account of the Underground Electric Railways, Ltd., London, Eng., for the half year ended Dec. 31, 1912, compared with the half year ended Dec. 31, 1911, follows:

Receipts.	1912.	1911.
Income from investments, etc.	£279,220	£110,631
Net, power house	......	45,918
Total receipts	£279,220	£156,549
Expenditures.		
General expenses	£3,889	£3,281
Commission, discount and expense	......	870
Interest on bonds and debentures	79,526	97,764
Interest on income bonds	a195,485	b52,333
Payment under guaranty on Metropolitan District Railway assented extended preferred stock	......	......
Rents, etc.	......	619
Total expenditures	£278,900	£154,867
Balance, surplus	£320	£1,682

a At rate of 6 per cent per annum. b At rate of 2 per cent per annum.

At the half-yearly meeting of the company Sir Edgar Speyer, Bart., said in part:

"The revenue account shows total receipts of £279,220, as against £156,549 for the corresponding half-year of 1911. The latter item, however, includes £45,918 income from the operation of the power house then owned by your company. Deducting this item there remains an increase of £168,589, of which £154,540 is due to our holdings in London General Omnibus ordinary shares and Associated Equipment Company shares acquired in 1912. This increase enables your company to pay for the first time the full half-year's interest (3 per cent on the 6 per cent income bonds of 1948, comparing with 1 per cent [2 per cent per annum], a year ago).

"The total net revenue available for distribution among the income bondholders for the whole year of 1912 was £328,251, as compared with £93,511 in 1911, and the rate of interest paid on the income bonds in the two years was 5 per cent and 1¾ per cent respectively.

"The fear has been expressed in some quarters that the concentration of the transport facilities of London will tend toward an increase in fares and a reduction in service. My reply to this suggestion is that a true safeguard against any possible abuse is to be found in the fact that the interests of the shareholders and the traveling public are identical. It is only by giving a thoroughly satisfactory service at reasonable fares that we can hope to retain the good will of the public and to make this great undertaking a success.

"The total capital of all the companies is £48,550,000, divided as follows: railways, £39,700,000; tramways, £5,700,000; omnibuses, £3,150,000. The total mileage is 520, made up of 60 miles of underground railways, 112 miles of tramways and 348 miles of omnibus routes.

"For the calendar year 1912 the combined undertakings carried a total of 893,000,000 passengers, of which the railways carried 247,000,000, tramways 153,009,000 and the omnibuses 493,000,000.

"We cannot hope for much better showings on the City & South London Railway until the tunnels have been enlarged to the size of our other tube railways, thus greatly increasing its capacity and efficiency. This will take at least two years after the necessary Parliamentary powers have been obtained.

"The Central London Railway is benefiting from its Liverpool Street extension, and when the Ealing extension is opened further increases in earnings should be shown. These factors, together with economies, should substantially reduce the apparent deficiency upon the guaranteed stock.

"The fusion of the interests of the London United Tramways and Metropolitan Electric Tramways, and the motor bus service which will be run in conjunction with them, should prove a source of considerable profit to the London & Suburban Traction Company, Ltd.

"In view of the considerable increase of the fleet of the London General Omnibus Company and the inauguration of new routes, which it takes some time to develop, it is natural that the earnings per bus in the interim should show a decrease, but there is nothing discouraging in this. On the contrary, the business stands on a very sound basis.

"The London Electric Railway bill provides for a physical junction (a) with the City & South London Railway at Euston, so as to permit through train service from the North to the South of London via the City; (b) with the London & Southwestern Railway at Hammersmith for through train service to Richmond. The Central London Railway bill provides for an extension from Shepherd's Bush to Gunnersbury, through a thickly populated district. The District Railway bill provides for widening a section of the Putney line, which will assist in dealing with its rapidly growing traffic, and for agreements with the Wimbeldon & Sutton Railway.

"Your company during the last six months sold £250,000 of London Electric preferred stock, £9,460 of District guaranteed stock, £6,000 of District assented first preferred stock and £20,000 consols.

"We acquired 15,000 London United Tramways preferred shares, 50,000 Associated Equipment Company shares, £14,574 London General Omnibus ordinary stock and £23,670 London Electric Railway preferred stock in exchange for 2,367 Edgware & Hampstead shares.

"The Associated Equipment Company, whose £500,000 share capital is owned by your company, owns large works at Walthamstow. It also owns the Metropolitan Steam Omnibus Company, which is now running a fleet of 100 modern petrol buses. Its revenue should prove a source of continuing profit."

Long Island Railroad

For the fiscal year ended Dec. 31, 1912, the Long Island Railroad Company's gross revenue from operation of railroad lines was greater by $668,905.08, or 6.36 per cent, than in 1911, the increase in gross being attributed to "general growth on the island and increase in both passenger and freight traffic." This increase was, however, offset to some extent by further loss in ferry earnings. The loss amounted to $54,142.10, as compared with $132,833 in the previous year, and was due to the increased facilities furnished by the electric railways which operate over the Queensboro Bridge and to the increase in the use of the tunnels to the Pennsylvania station at Seventh Avenue and Thirty-third Street, New York. The passenger revenue increased 5.48 per cent and miscellaneous revenue 5.59 per cent.

On an average more than 100,000 passengers were carried daily during the year, the total number of riders being 37,319,812, which is 3,452,584, or 10.19 per cent, more passengers than were handled in 1911. The passenger mileage increased 43,354,278, or 8.53 per cent, while the passenger train mileage decreased 12,496, or 2.22 per cent. These figures indicate that the largest passenger business in the history of the Long Island Railroad was done in 1912.

Ralph Peters, president of the company, commenting on the results of the company for the year, said:

"The statistics, particularly as they relate to passenger traffic, indicate that your company is gradually getting on a steady basis and overcoming some of the expensive conditions forced upon the operating departments by the reconstruction of the road, change of terminals, etc.

"The line to Whitestone Landing was finished and put in operation in September, and new substations were completed at Wreck Lead, Cedarhurst and Floral Park. Material for substations, third-rail, etc., is on the ground for the line to Port Washington to be completed by September, 1913, and additional machinery was placed in existing substations during the year."

The report includes two maps, one showing the Long Island Railroad system and the Montauk Steamboat Company's lines and the other showing the western portion of the island. On the latter the lines which are operated electrically are shown in red. They represent 188 miles of track.

The new station of the company at Jamaica was opened for service on March 9, 1913. The work in connection with the new terminal and the elimination of grade crossings involved in the so-called "Jamaica improvement" has been carried on for several years, and while the service will be greatly improved at once, the completion of the work is expected to increase further its efficiency and enable the company to proceed with the electrification of the Montauk division between Jamaica and Babylon.

Change in Control of Denver & Northwestern Railway

Marsden J. Perry, Providence, president of the Denver & Northwestern Railway, has disposed of the 1600 shares of stock which he held of the Denver & Northwestern Railway, which in May, 1902, purchased the capital stock of the Denver City Tramway. Mr. Perry is said to have received $2,500,000 for his interest, or more than $156 a share. The purchasers are a Denver syndicate composed of Charles Boettcher, A. V. Hunter, S. M. Perry, Horace W. Bennett, Julius A. Miers, Thomas Keely, J. C. Mitchell and W. G. Evans, some of whom are directors of the Denver City Tramway. The board of directors of the Denver & Northwestern Railway will be increased from nine members to thirteen by the addition of A. V. Hunter, president of the First National Bank; Horace Bennett, capitalist; Claude K. Boettcher, of Boettcher, Porter & Company, and one other who has not yet been decided upon. Other directors are W. G. Evans, S. M. Perry, Gerald Hughes, Thomas Keely, F. G. Moffat, Rodney Curtis and J. A. Beeler, Denver; B. A. Jackson, Providence, R. I., and W. L. Bull, New York, N. Y. The executive committee of the company will consist of W. G. Evans, president; Gerald Hughes, S. M. Perry, Claude K. Boettcher and Horace W. Bennett. Mr. Perry owned 1600 of the 6000 shares of capital stock of the company outstanding, while some 2400 shares are held in the East by B. A. Jackson and others, representing Clark, Dodge & Company, New York, N. Y.; E. W. Clark & Company, Philadelphia, Pa., and others. The remaining 2000 shares are held largely in Denver. Boettcher, Porter & Company, Denver, issued a statment in part as follows recently in regard to the completion of the transaction involving the Perry interest:

"For some time past we have endeavored to bring back to Denver a controlling ownership in the securities of the Denver City Tramway, a majority of which went to Providence, New York and other interests some years ago. We are prompted to this effort by the belief that a utility so closely identified with the welfare and development of the city should be financially, as it is physically, strictly a Denver property. As the outcome of our negotiations we have purchased for ourselves or our associates the Denver & Northwestern Railway holdings of Marsden J. Perry, Providence, whose interest amounted to about one-quarter of the ownership of the tramway company. Though the other Eastern interests are unwilling to sell, they have joined with us in plans that we have formed for the future of the property."

American Light & Traction Company, New York, N. Y.—The stockholders of the American Light & Traction Company have approved the plan to increase the common stock of the company from $15,000,000 to $40,000,000. Reference to this proposed increase in the common stock of the company was made in the ELECTRIC RAILWAY JOURNAL of Jan. 18, 1913, page 130.

Bowling Green (Ky.) Street Railway.—J. McKenzie Ross, judge of the Warren Circuit Court, of Bowling Green, Ky., has named Master Commissioner William R. Speck receiver of the Bowling Green Street Railway.

Brantford (Ont.) Street Railway.—It has been announced that the Canadian General Electric Company, which held $125,000 of first mortgage bonds of the Brantford Street Railway, has agreed to assume control of the property and operate it for a period of two years.

Fries Manufacturing & Power Company, Winston-Salem, N. C.—It is reported that the Southern Power Company, of which J. B. Duke, New York, N. Y., is president, has arranged to take over the property of the Fries Manufacturing & Power Company. H. E. Fries, president of the Fries Manufacturing & Power Company, has issued a statement as follows: "Certain changes have been made in the holdings of the capital stock of the Fries Manufacturing & Power Company, but no changes in the management or organization will be made for the present."

Geneva & Auburn Railway, Seneca Falls, N. Y.—The property of the Geneva & Auburn Railway was sold under foreclosure at Waterloo on March 14, 1913, to representatives of the West End Trust Company, Philadelphia, Pa., trustee, representing the bondholders.

Halifax (N. S.) Electric Tramway, Ltd.—Two bills have been introduced into the House and Assembly regarding the Halifax Electric Tramway, Ltd. One measure, backed by the Halifax City Council, proposes that the city acquire the property and operate it as a municipal concern, paying $170 per share or fixing the price by arbitration. The other measure provides for the organization of the Halifax Tramways & Power Company, Ltd., to merge the Halifax Electric Tramway, Ltd., and the Nova Scotia Company.

Highland Park & Lake Burien Railroad, Seattle, Wash.—The property of the Highland Park & Lake Burien Railroad has been sold at sheriff's sale for $12,000 to the McQuaid & Moore, Seattle. The road was promoted by persons who owned property near Lake Burien and to the south of West Seattle. It was completed from Spokane Avenue and West Waterway to Lake Burien and the first car was operated on July 1, 1912. For four months an intermittent service was maintained and then a slide covered the track for a mile and operation was abandoned.

Ocean Shore Railroad, San Francisco, Cal.—The Ocean Shore Railroad has applied to the Railroad Commission of California for authority to issue $700,000 of 6 per cent bonds, maturing in 1916. It is stated in the application that the capital to be thus secured is to be used to purchase land for right-of-way purposes upon which the Ocean Shore Railroad at present has only a leasehold, and to purchase property for right-of-way purposes, purchase equipment, comply with possible franchise requirements in San Francisco and make preliminary changes. The application states that these improvements will cost $250,000. The company asks authority to pledge the $700,000 of bonds as collateral security for a loan of $250,000, to be negotiated with the Union Trust Company, San Francisco.

Oskaloosa Traction & Light Company, Oskaloosa, Ia.—W. B. McKinley, president of the Illinois Traction System, Champaign, Ill., is reported to have secured an option on the property of the Oskaloosa Traction & Light Company and the Oskaloosa & Buxton Electric Railway.

St. John (N. B.) Railway.—It is said that the offer of John R. Graham, president of the Bangor Railway & Electric Company, Bangor, Me., and Henry W. Cushman, president of the Merrill Trust Company, Bangor, to purchase the $800,000 of stock of the St. John Railway at $150 a share has been rejected. According to the St. John *Daily Telegraph*, "the refusal of the committee which had the offer under consideration is apparently by no means the end of the matter, as the offer comes from interests connected with the New Brunswick Hydroelectric Company."

Stockton Terminal & Eastern Railroad, Stockton, Cal.—The Railroad Commission of California has taken under advisement the application of the Stockton Terminal & Eastern Railroad for permission to issue $378,000 of bonds to provide funds for extensions. The company is now operating 8 miles of line between Stockton and Bellota.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—Judge Day of the federal court in Cleveland, Ohio, on March 18 appointed R. E. Richards, Steubenville, Ohio, and W. R. W. Griffin, general manager of the company, receivers of the Tri-State Railway & Electric Company. This receivership will include the operation of the properties of the Steubenville & East Liverpool Railway & Light Company and the East Liverpool Traction & Light Company, which are leased by the Tri-State Railway & Electric Company. The receivership will not affect the operation of other lighting and railway companies in Pennsylvania and West Virginia which are controlled by the Tri-State Railway & Electric Company through stock ownership.

Winchester & Washington City Railway, Winchester, Va.—The property of the Cacapon Power Company has been purchased by Lewis F. Cooper, president of the Winchester & Washington City Railway. The purchase includes all the holdings of the Cacapon Power Company, represented in part by an electric water-power plant located on the Cacapon River, about 3½ miles west of Berkeley Springs, a steam auxiliary plant located in Berkeley Springs and other property and real estate in connection therewith. The property of the Citizens' Electric Company, Charleston, W. Va., has also been purchased by the same interests in behalf of the Winchester & Washington City Railway.

Dividends Declared

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1¼ per cent, common.

El Paso (Tex.) Electric Company, 3½ per cent, common.

Halifax (N. S.) Electric Tramway, Ltd., quarterly, 2 per cent.

Illinois Traction Company, Champaign, Ill., quarterly, 1½ per cent, preferred.

Louisville (Ky.) Traction Company, 2½ per cent, preferred; quarterly, 1 per cent, common.

Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.

New York State Railways, Syracuse, N. Y., 1¼ per cent, preferred; 1½ per cent, common.

Philadelphia Company, Pittsburgh, Pa., 3 per cent, cumulative preferred; quarterly, 1¾ per cent, common.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, 1¼ per cent, preferred.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., quarterly, 1¼ per cent, preferred.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent preferred; quarterly, 1½ per cent, common.

United Light & Railways Company, Grand Rapids, Mich., quarterly, ¾ of 1 per cent, second preferred; quarterly, 1½ per cent, first preferred.

West End Street Railway Company, Boston, Mass., $1.75, common.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Jan.	'13	$58,793	*$28,933	$29,860	$17,340	$12,520
1 "	"	'12	53,448	*25,993	27,455	15,762	11,693
12 "	"	'13	715,373	*323,683	391,690	201,336	190,354
12 "	"	'12	604,386	*282,597	321,789	158,230	163,559
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.							
1m.,	Jan.	'13	$95,633	*$59,241	$36,392	$24,399	$11,993
1 "	"	'12	81,004	*48,091	32,913	21,269	11,644
12 "	"	'13	1,079,302	*645,765	433,537	269,159	164,378
'2 "	"	'12	950,943	*559,029	391,914	241,870	150,044
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.							
1m.,	Jan.,	'13	$618,105	*$337,259	$280,846	$137,495	$143,351
1 "	"	'12	535,906	*302,296	233,610	115,652	117,958
12 "	"	'13	6,472,118	*3,753,259	2,718,859	1,524,415	1,194,444
12 "	"	'12	5,582,431	*3,209,163	2,373,258	1,289,956	1,083,302
EAST ST. LOUIS & SUBURBAN RAILWAY, EAST ST. LOUIS, ILL.							
1m.,	Jan.,	'13	$213,214	*$122,498	$90,716	$48,356	$42,360
1 "	"	'12	191,036	*107,954	83,082	48,055	35,027
12 "	"	'13	2,474,630	*1,368,113	1,106,517	578,772	527,745
12 "	"	'12	2,281,459	*1,275,295	1,006,164	550,345	455,819
GRAND RAPIDS (MICH.) RAILWAY.							
1m.,	Jan.,	'13	$103,986	*$59,354	$44,632	$15,727	$29,895
1 "	"	'12	97,448	*54,660	42,788	14,790	27,998
12 "	"	'13	1,240,126	*704,924	535,202	175,171	360,031
12 "	"	'12	1,174,773	*663,903	510,870	197,075	331,795
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.							
1m.,	Jan.,	'13	$185,999	*$110,876	$75,123	$36,994	$38,129
1 "	"	'12	166,135	*99,322	66,813	34,722	32,091
12 "	"	'13	2,094,855	*1,200,498	894,357	437,084	457,273
12 "	"	'12	1,968,015	*1,131,899	836,116	405,914	430,202
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY.							
1m.,	Feb.	'13	$1,775,158	$1,104,541	$670,617	$767,505	$96,888
1 "	"	'12	1,725,408	1,124,536	600,872	739,442	138,569
8 "	"	'13	15,703,350	9,419,446	6,283,903	6,097,427	186,477
8 "	"	'12	14,878,288	9,145,835	5,732,453	5,910,088	177,634
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.							
1m.,	Jan.	'13	$553,598	*$270,209	$283,389	$153,021	$130,368
1 "	"	'12	531,213	*272,961	258,252	136,695	121,557
12 "	"	'13	6,664,693	*3,326,159	3,338,534	1,777,317	1,561,217
12 "	"	'12	6,356,292	*3,072,244	3,284,048	1,523,467	1,760,581
UNION RAILWAY, GAS & ELECTRIC COMPANY, ROCKFORD, ILL.							
1m.,	Jan.	'13	$419,759	*$237,388	$182,371	$93,288	$89,083
1 "	"	'12	313,721	*184,984	128,737	65,583	63,154
12 "	"	'13	4,098,172	*2,380,305	1,717,867	991,852	726,015
12 "	"	'12	3,227,450	*1,852,263	1,375,187	750,355	624,832

*Includes taxes.

Traffic and Transportation

Regulations Restricting the Dimensions of Baggage

The Interstate Commerce Commission has summarized as follows its conclusions in the matter of investigation and suspension of certain new rules and regulations restricting the dimensions of trunks and other articles handled as baggage by carriers operating throughout the United States, and has entered an order in accordance with these conclusions:

"1. Carriers may reasonably provide for an extra charge for the transportation of pieces of personal or sample baggage, excepting whips in cases, having dimension or dimensions exceeding 45 in., such charge per inch in excess of 45 in. not to exceed the charge for 5 lb. of excess baggage.

"2. Respondents must provide for checking as baggage whips in flexible cases not exceeding 90 in. in length, or 12 in. in diameter at the base, or 100 lb. in weight.

"3. Carriers may reasonably provide that a piece of baggage exceeding 72 in. in any dimension will not be accepted for checking.

"4. Upon notice of not less than one year carriers may provide that trunks or other rigid containers with more than two bulging sides, or with two bulging sides that are not opposite to each other, will not be accepted for checking as baggage.

"5. Carriers' definition of sample baggage should permit including therein salesmen's catalogs.

"6. Where the charges for excess weight and excess dimensions do not exceed the minimum charge, the single minimum charge shall apply.

"Upon the whole record, we conclude that respondents have justified the proposed rules and regulations to the extent that they are approved of in this report. The suspended rules must be canceled. New rules in harmony with the findings and conclusions herein may be established upon statutory notice to the commission and to the public."

Progress of Safety Campaign in Brooklyn

Reference was made in the Electric Railway Journal of March 8, 1913, page 442, to the arrangement entered into by the Brooklyn (N. Y.) Rapid Transit Company with the American Museum of Safety for a six months' campaign in the public schools of Brooklyn on the subject of safety in the streets of that borough. The company has since posted in its cars a placard dealing with the subject of safety which reads as follows:

"SAFETY

"In the interests of a safer Brooklyn, the American Museum of Safety, by authority of the Board of Education of the city of New York, is giving lectures on safety and caution to the pupils in the public schools of the borough.

"The children are shown by object lessons the perils of street traffic. They are told how to play and conduct themselves in the street without risk to themselves and others.

"The red and green badge of the American Museum of Safety League (red for danger, green for caution) is a reminder to think of the principles of the league, namely.

"SAFETY ALWAYS

"Illustrated safety stories follow up the classroom talks. A specimen set will be sent to any grown-up for a 2-cent stamp.

"The Brooklyn Rapid Transit Company, solicitous for the safety of the borough's children and grown-ups, is cooperating with the Safety Museum in this children's crusade for safety, caution and self-control.

"The museum's collection of safety and health devices is displayed on the sixth floor of the Engineering Societies Building, 29 West Thirty-ninth Street, New York, free to the public daily (except holidays and Sundays) from 9 a. m. to 5 p. m."

In addition the company is distributing 600,000 copies of an eight-page brochure on the subject of safety copyrighted by the American Museum of Safety. This brochure is entitled "The Little Girl Who Didn't Think." It is illustrated with line cuts which show the right and wrong way to board cars and alight from them, and it brings out clearly the results likely to happen to children who steal rides on cars or who heedlessly pass behind a car directly in front of a vehicle coming in the opposite direction. The first page of this brochure contains a line cut showing the driver of a delivery wagon and a motorman making every effort to avoid running down a little girl who has thoughtlessly stepped off the curb directly in front of the wagon and the car.

Cars and Service in Milwaukee

R. B. Stearns, vice-president of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., testified before the Railroad Commission of Wisconsin on March 10, 1913, that while the number of cars in operation in four years had been increased more than 25 per cent the actual increase in passengers carried was only 14 per cent. In 1910 the number of cars operated was 396, he explained, while the total number of passengers carried was 88,073,000. In 1913 his estimate, based on the returns of the first two months, is that an average of 537 cars will be operated throughout the year, while the actual passenger traffic will be about 100,000,000. This testimony was presented at a hearing before the commission in which the company had an opportunity to explain why it did not obey the order of the commission on Feb. 4 to increase the number of cars in use on the Eighth Street line. Mr. Stearns testified that the order was not obeyed because of a shortage of cars. He said that part of the order was carried out, as all the south-bound cars recommended by the commission were in actual operation during the rush hours. The number of cars operated north of Grand Avenue from 5.15 p. m. to 6 p. m. could not be increased without crippling other lines. Orders for sixty new cars have been placed by the company. Thirty of these have been delivered, and thirty more are to arrive in July. Mr. Stearns said that trailers were impracticable on the Eighth Avenue line because there is no loop on the line on which to turn the double cars. Every car fit for service was in use. The average number of cars out of service was forty-four, owing to accidents and other causes.

The following statement of cars in service and passengers carried for four years was presented at the hearing:

Year.	Average No. Cars.	Passengers.
1910	396	88,073,000
1911	477	92,206,000
1912	507	96,607,000
1913	537	*100,000,000

*Estimated.

New Transfers in Salt Lake City.—The Utah Light & Railway Company, Salt Lake City, Utah, will shortly adopt a new system of transfers to correct abuses which have grown up under the present system.

Through Service Between Easton and Allentown.—Through electric railway service was established between Easton and Allentown on March 15, 1913, over the lines of the Lehigh Valley Transit Company from Allentown to Bethlehem, and the Easton Transit Company from Bethlehem to Easton. Through cars are run hourly.

Accident Prevention Work at New Albany.—The Louisville & Northern Railway & Lighting Company, New Albany, Ind., has instituted a safety campaign which, it is expected, will aid materially in reducing the number of accidents to passengers and employees. The company has adopted as its keynote "Please Help Us to Make It Safe." Special signs have been installed at dangerous points along the route by the company. Helpful literature is also being distributed periodically to the company's employees and to such of its passengers as are interested in the work.

Four-Car Train of the Monongahela Traction Company.—The Monongahela Valley Traction Company, Fairmont, W. Va., has been operating two-car trains and on one occasion during the past summer when it was necessary to transport a large number of passengers over the line to Fairmont the idea was conceived of operating four cars in a train. All of the cars are equipped with Westinghouse type HL unit-switch control, and the large crowd was transported in one four-car train without interfering with the regular schedule. Regular three-car train service is now being considered by the operating department.

Plan to Increase Service Between Providence and Fall River.—The Providence, Warren & Bristol Railroad, which is operated by the New York, New Haven & Hartford Railroad between Providence, R. I., and Fall River, Mass., has under consideration a plan to better its service between the cities this summer by increasing the length of its trains. The road is equipped with the overhead trolley system, and heretofore the longest trains have consisted of one motor car and two trailers. A six-car train consisting of two motor cars and four trailers was operated between the cities recently as an experiment. Traffic over the road on Sundays and holidays in summer is very heavy and by running trains of six cars or more it is thought that the necessity of operating double-headers can be overcome.

Complaint Filed with I. C. C. Against Washington Utilities Company.—The Interstate Commerce Commission has served on the Washington (D. C.) Utilities Company a copy of the complaint by the citizens of Falls Church, Va., who seek better rates over the railway between Falls Church and the company's terminal at Twelfth and D Streets, Northwest. The complainants want the railway to desist in its collection of a car ticket or a cash fare of 5 cents for the ride from Arlington Junction, Va., to Twelfth and D Streets. They also want the company to sell the twenty-five-trip family, the fifty-two-trip monthly and the 160-trip quarterly tickets to cover complete trips between the Virginia points and the company's terminal, and want the maximum charge for these tickets fixed at 8 cents, 7 cents and 6 cents respectively. The maximum charge for the single and round trips they want made 10 cents and 20 cents respectively, with such other relief as the commission may deem necessary.

New Service Between Alton and St. Louis.—Arrangements have been concluded between the Alton, Granite & St. Louis Traction Company and the Illinois Traction System by which early in April at least ten of the interurban cars of the former company will each day be delivered to the Illinois Traction System at the junction of the tracks of the two systems in Venice and be run to and from the terminal of the Illinois Traction System at Twelfth Street and Lucas Avenue, St. Louis, Mo. At the same time cars running via East St. Louis will be operated from the west end of the Eads Bridge without transfer at East St. Louis. There will be no change in the present rate of through fare between Alton and St. Louis via either route, but the local fare between Alton and Granite City will be increased 5 cents to harmonize with the through fare, the new rate being still less than the standard rate of 2 cents a mile in Illinois. This change in service will afford those who travel between Alton and St. Louis a choice of two central terminals in St. Louis and a continuous ride between the cities via either route without transfer.

Railway Aids in Community Development.—An illustration of the way in which an interurban railway may aid in community development, even though this improvement takes the form of a highway for horse-drawn and automobile traffic which is more or less competitive as regards the electric railway, is found in the completion of the McCullogh boulevard between Jeffersonville and New Albany, Ind., across the Ohio River from Louisville, Ky. The turnpike, one of the finest in Indiana, is 1¾ miles long and extends through territory which is considered extremely valuable because of the sites it affords for suburban homes overlooking the river. Practically all of the land necessary for the 60-ft. boulevard was donated by public-spirited property owners between the two cities on the North Side, while the Louisville & Northern Railway & Lighting Company, New Albany, paid for grading the roadway throughout, which work cost several thousand dollars. The North Side is now in possession of an improvement which will undoubtedly bring many new residents to the boulevard and which will accordingly increase the traffic of the Louisville & Northern Company between the two Indiana cities and also across the river into Louisville.

Personal Mention

Capt. Julian L. Schley, assistant engineer commissioner of the District of Columbia, has been made executive officer of the new Public Utilities Commission of the District.

Mr. Motosuke Masuda, chief engineer of the Tokio (Japan) Municipal Railway, is on a visit to the United States to study electric railway operating conditions in the principal cities.

Mr. C. W. Avery, formerly freight agent of the Puget Sound Electric Railway at Seattle, Wash., has been appointed local traffic agent of the Tacoma companies and is located at Tacoma.

Mr. W. H. Somers has been appointed general traffic manager of the Puget Sound Electric Railway and other Stone & Webster properties on the Pacific Coast, with offices in Seattle. The position of general traffic manager is a new one, and the office of general traffic agent in Tacoma has been abolished.

Mr. S. W. Barnes, general manager of the Tonopah & Tidewater Railroad in Southern California, has been appointed traffic manager of the Central California Traction Company, Stockton, Cal., to succeed Mr. L. H. Rodenbaugh, who has become traffic manager of the Oakland, Antioch & Eastern Railroad.

Mr. A. J. Sampson, auditor of the Stark Electric Railroad, Alliance, Ohio, has been promoted to the position of assistant general manager of the Stark Electric Railroad and the Cleveland, Alliance & Mahoning Valley Railroad. Mr. Sampson will supervise the auditing department along with his other position. Mr. F. L. Mowry, general manager, will divide his work with his assistant. Mr. Sampson came to the auditing department of the Stark Electric Railroad four years ago from Michigan. He has been in public service work for more than twenty years.

Mr. Joseph Davis, who has been an inspector on the Tri-State Railway & Electric Company at East Liverpool, Ohio, has been appointed superintendent of transportation of the Steubenville, Weirton & Wellsburg division, a new position with the company. Mr. Davis will have charge of all Tri-State business on the West Virginia side of the Ohio River from Wellsburg to Weirton and New Cumberland, W. Va. This work has been taken care of by Mr. W. H. Higley and Mr. H. E. Armstrong, superintendents of power and transportation of the Steubenville (Ohio) division. Mr. Davis will have headquarters at Follansbee, W. Va.

Mr. H. C. Eddy, formerly secretary of the District Electric Railway Commission, Washington, D. C., has been appointed engineer of the new Public Utilities Commission of the District of Columbia. The District Electric Railway Commission was succeeded on March 4, 1913, by the new commission, with the signing of the District of Columbia appropriation bill, which provided for a public utilities commission. The District Electric Railway Commission was organized by the Interstate Commerce Commission on July 1, 1908. Mr. Eddy was named as secretary and executive officer of the board on July 14, 1908, and served in that capacity during the life of the commission.

Mr. A. C. Harrington has been appointed manager of the Marquette County Gas & Electric Company, Marquette, Mich., to succeed Mr. W. J. McCorkindale, who has been appointed manager of the Wilmington (Del.) Gas Company, as previously noted in the ELECTRIC RAILWAY JOURNAL. Mr. Harrington entered the field of electrical construction in 1888 and later had charge of electric railway projects in London and St. Petersburg. He served as manager during the construction of the Pennsylvania & Erie Rapid Transit Railway and recently acted as supervising engineer for a large hydroelectric plant in Utah. In the operating field Mr. Harrington has served as manager of the South Covington & Cincinnati Railway, Light, Gas & Power Company.

Mr. L. H. Rodenbaugh has resigned as traffic manager of the Central California Traction Company, Stockton, Cal., effective on April 1, 1913, to become traffic manager of the Oakland, Antioch & Eastern Railroad, with offices in Oakland. Mr. Rodenbaugh was born at Plymouth Meeting, Pa., April 1, 1874. He began his railroad work in 1890 with the Philadelphia & Reading Railroad, with which he served as a telegraph operator. Since then he had held positions with different steam railroads as block signal operator, telegrapher, freight cashier, agent, train dispatcher, ticket agent and traveling passenger agent, serving in these different capacities with the Pennsylvania Railroad, New York, Chicago & St. Louis Railroad, Missouri Pacific Railway, Old Colony Railroad, New York, New Haven & Hartford Railroad and the Southern Pacific Railroad. Mr. Rodenbaugh entered the employ of the Southern Pacific Railroad in April, 1903, as assistant agent. In January, 1905, he was appointed general passenger agent and held that position until June, 1909, when he resigned to become connected with the Central California Traction Company.

W. C. Fisk

Mr. Wilbur Chapman Fisk, who was recently elected president of the Hudson & Manhattan Railroad, New York, was born in New York City on Feb. 22, 1868. He is a son of Harvey and Louisa (Green) Fisk. Mr. Fisk attended Princeton University and was graduated from that institution in 1890 with the degree of civil engineer. After his graduation he entered the banking house of Harvey Fisk & Sons, New York, founded by his father, the late Harvey Fisk, and became a member of the firm in 1898. Shortly after Harvey Fisk & Sons undertook the financing of the Hudson & Manhattan Railroad at the request of the directors and Mr. William G. McAdoo, then the president, Mr. Fisk accepted the vice-presidency of the company. His technical knowledge was of great assistance to Mr. McAdoo in the construction of the tunnels under the Hudson River, and Mr. Fisk held the position of vice-president and general manager with the company until March, 1913, when he was elected to succeed Mr. McAdoo as president. Mr. Fisk was married in New York City on Feb. 9, 1893, to Miss Julia Herrick Allen. He is a member of the Union League Club, Princeton Club, Princeton Engineering Association, New York Yacht Club, Sleepy Hollow Country Club, Chamber of Commerce and Merchants' Association, and is an associate of the American Society of Civil Engineers.

OBITUARY

John Henry Schuck died at his home in Springfield, Ill., at the age of eighty-three years. He was one of the organizers of the Citizens' Street Railway of that city and was its president for a number of years.

Thomas J. Tucker, chief engineer of the Memphis (Tenn.) Street Railway, is dead. Mr. Tucker came to Memphis from Burlington, Ia., and entered the service of the company twenty years ago when it was under the control of Mr. C. K. G. Billings and his associates.

James Bricker, superintendent of transportation of the Philadelphia (Pa.) Rapid Transit Company, died at his home in Philadelphia on March 20, 1913. Mr. Bricker was born in Cumberland County, Pa., on Sept. 1, 1843. He served in the Civil War and had been connected with the street railways in Philadelphia for thirty-five years.

Seth L. Keeney, a director of the Brooklyn (N. Y.) City Railroad, died on March 13, 1913, at his home in Brooklyn, at the age of eighty-two. He began his career at the time of the Civil War and subsequently became a contractor. He was known particularly for his work in connection with the construction of the Fulton Street elevated railroad in Brooklyn, the construction of the Brighton Beach steam railroad and the Prospect Park & Coney Island Railroad, all of which are now a part of the system of the Brooklyn Rapid Transit Company. Besides being a director of the Brooklyn City Railroad, Mr. Keeney was a trustee of the Brooklyn Bridge and the Kings County Electric Light & Power Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Mount Tamalpais & Muir Woods Railway, San Rafael, Cal.**—Application for a charter has been made by this company to build a railway from the present terminal of the Mill Valley & Mount Tamalpais Scenic Railway to Mesa Station, near Willow Camp. Capital stock, $500,000. Directors: James K. Lynch, Frank F. Bostwick, Charles H. Crocker, Charles E. Green, R. H. Pease, Jr., Kenneth C. Gillis and M. E. Fitzpatrick.

***Saluda-Hendersonville Interurban Railway, King's Mountain, N. C.**—Chartered in North Carolina to build electric railways. Capital stock authorized, $150,000. Incorporators: J. M. Torrance, Bessemer City; W. A. Mauney, C. E. Neisler, King's Mountain; U. G. Station, Hendersonville.

***Piqua & Bradford Traction Company, Covington, Ohio.**—Incorporated in Ohio to build an interurban railway. Capital stock, $10,000. Incorporators: J. H. Marlin, Hugh C. Marlin and A. W. Landis.

Middletown, Reading & Cincinnati Interurban Railway, Middletown, Ohio.—Incorporated in Ohio to build an electric railway to connect Middletown, Cincinnati, Monroe, Bethany, Reading and other towns. Incorporators: R. M. Billingslea, John Brate and Michael Klaiber, Jr. [E. R. J., Sept. 28, '12.]

***Interstate Railroad & Traction Company, Blackwell, Okla.**—Incorporated in Oklahoma with a capitalization of $50,000. Incorporators: O. L. Brown, Arkansas City, Kan.; L. A. Brown, Louisville, Ky.; R. L. Self, Louisville, Ky.; C. B. Harrold and J. M. Van Winkle, Ponca City, Okla.

***Columbia & Nehalem River Railroad, Salem, Ore.**—Application for a charter has been made by this company to build an electric or steam railway from Wood's Landing in the eastern part of Clatsop County to the Nehalem Valley. Capital stock, $1,000,000. Incorporators: J. C. Veasie, A. L. Veasie and J. H. Hendrickson.

***Williamsport, Nessle & Martinsburg Railway, Williamsport, W. Va.**—Chartered in West Virginia to build an electric railway from Williamsport to Martinsburg, a distance of 12 miles. Capital stock, $250,000. Incorporators: Alexander J. Dilrich, John P. Michael and Eugene P. Hoffman, Baltimore, Md., and William Deale, Hamilton, Md.

FRANCHISES

Little Rock, Ark.—The Little Rock & Hot Springs Electric Railway has received a franchise from the Council in Little Rock.

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the Council to double-track its line on Avenue Sixty-four in Los Angeles.

Fairhaven, Conn.—The Union Street Railway has asked the Council for a franchise for an extension in Fairhaven, so as to form a belt line to Fort Phenix.

Wilmington, Del.—The Wilmington & Philadelphia Traction Company has received a franchise from the Council to extend the Eighth Street line to reach the fair grounds in Wilmington.

Atlanta, Ga.—The Georgia Railway & Power Company has asked the County Commission for a franchise to double-track the river car line on Mayson Avenue and Turners Ferry Avenue from a point where the double track now ends along the avenue for 6100 ft. to a point near Chapel Street.

East St. Louis, Ill.—The East St. Louis & Suburban Railway has asked the Council for a franchise on Fortieth Street from Waverly Avenue to Forest Place and the northern city limits of East St. Louis.

Taylorville, Ill.—The Decatur, Sullivan & Mattoon Transit Company has received a franchise from the Council in Taylorville.

Dubuque, Ia.—The Union Electric Company has asked the City Council for a franchise on Locust Street in Dubuque. A special election will be held on April 22 to vote upon this proposition.

Iola, Kan.—The Union Traction Company, Coffeyville, has received a franchise from the Council in Iola. The company plans to build an extension from Cherryvale to Iola in the near future.

Newton, Kan.—The Arkansas Valley Interurban Railway, Wichita, has received a franchise from the County Commissioners of Harvey County for an extension through Harvey County. The company has received a franchise from the Council in Newton.

Paducah, Ky.—The Kentucky Southwestern Electric Railway, Light & Power Company will purchase a franchise from the Council to enter Graves County.

Beverly, Mass.—The Bay State Street Railway will ask the Council for a franchise to double-track Cabot Street from the bridge to Fayette Street, Beverly.

Brockton, Mass.—The Bay State Street Railway has asked the Board of Aldermen for a franchise for an extension in Brockton.

Baltimore, Md.—The United Railways & Electric Company has asked the City Council for a franchise for a line on Carey Street, from Baltimore to Columbia Avenue, and on Bush Street, from Columbia Avenue to Ridgely, in Baltimore.

Bowling Green, Ohio.—The Toledo, Bowling Green & Southern Traction Company has asked the Council for a twenty-five-year franchise over the main street in Bowling Green.

Toledo, Ohio.—The Council Committee on railroads and telegraphs has instructed the city solicitor to prepare an ordinance giving the Toledo Railway & Light Company the right to construct a double track and loop on Broadway between St. James Court and the Boulevard, about 2000 ft. in length.

St. Catharines, Ont.—The Niagara, St. Catharines & Toronto Railway has received a two-year extension of time for the construction of its line from Port Colborne to Fort Erie and Niagara Falls and also for the line to Toronto.

Altoona, Pa.—The Altoona & Logan Valley Electric Railway has received an extension of time in which to complete the construction of the Eighteenth Street branch in Altoona.

Pittsburgh, Pa.—The Pittsburgh Railways has accepted the ordinance granting it a twenty-five-year franchise over Corliss Street, Pittsburgh.

Sherman, Tex.—The Texas Traction Company has received a franchise from the Council for a line to St. Vincent's Sanitarium.

Provo, Utah.—The Salt Lake & Utah Railroad, Salt Lake City, has asked the County Commissioners for a franchise over the county road crossing Provo Beach.

TRACK AND ROADWAY

Birmingham, Ensley & Bessemer Electric Railway, Birmingham, Ala.—This company announces that it has completed its East Lake division and will place it in operation at once.

Easton Railroad, Burlingame, Cal.—This company has placed in operation its 4-mile line from the Easton station on the Southern Pacific Railroad in Easton to the foothills. The company plans to extend this line to the Burlingame station in the near future. Ansel M. Easton, Burlingame, is interested. [E. R. J., Feb. 1, 13.]

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company to build a line to East Glendale. Rapid work is being done by this company on its line between San Bernardino and Riverside.

Washington Railway & Electric Company, Washington, D. C.—This company has been authorized by Congress to build a 2-mile branch between Wisconsin Avenue and the grounds of the American University and the bounds of the District.

Chattanooga & Chickamauga Interurban Railway, Rossville, Ga.—Grading has been completed and the track is being laid by this company on its line to Chickamauga Park. Work has been begun on the bridge at Rossville.

This line will connect Chattanooga, Tenn., and Rossville, Ga., and will eventually be continued beyond Chickamauga Park to Dalton and other towns in northern Georgia. Frank Spurlock, Chattanooga, is interested. [E. R. J., Nov. 23, '12.]

Chicago (Ill.) Railways.—This company has placed an order with the Lorain Steel Company for 12,000 tons of steel rails.

People's Traction Company, Galesburg, Ill.—Plans are being considered by this company to build an extension to Galva via Wataga, Oneida and Altona.

Peoria & Galesburg Interurban Railway, Peoria, Ill.—The Peoria Engineering & Construction Company has been incorporated in Illinois to build the Peoria & Galesburg Interurban Railway, which will extend from Galesburg to Peoria, via Canton, Farmington and Lewistown. It is proposed to take over and make traffic arrangements with the Illinois Central Electric Railway. L. L. Summer Company, Chicago, will have charge of the construction work toward Galesburg. Capital stock, $15,000. Incorporators: C. B. Coffeen, James A. Fenelon and George C. Powers.

Tipton-Frankfort Traction Company, Tipton, Ind.—Right-of-way is being secured by this company for its line between Tipton and Frankfort. Franchises have been granted in Tipton and at Frankfort and it is expected that construction of the line will soon be begun. The company has opened offices in Tipton. E. Purtelle is interested. [E. R. J., Feb. 22, '13.]

Kentucky Utilities Company, Lexington, Ky.—This company is contemplating the construction of an electric line between Lexington and Winchester and is believed to be considering the establishment of an extensive system embracing Winchester, Mount Sterling, Paris and other points.

Frankfort & Versailles Traction Company, Frankfort, Ky.—Ths company is negotiating with a committee of members of the General Assembly of Kentucky with reference to the possible extension of an electric railway from Frankfort to the new Capitol. A tunnel may be constructed from the Capitol to the point nearest that edifice, which may be reached by a Shelby Street extension of the Frankfort system.

Madisonville, Ky.—Plans are being made to build a 10-mile electric railway between Madisonville and Nortonville. B. T. Robinson and W. W. Kingston, Madisonville, are interested. [E. R. J., Feb. 22, '13.]

Bangor Railway & Electric Company, Bangor, Maine.—This company has been asked to consider plans to build soon a 2-mile extension to its Hampden line. The company already has the survey for such an extension, this having been made for the old Bangor, Hampden & Winterport Railway.

Bristol & Norfolk Street Railway, Boston, Mass.—This company has asked the railroad commissioners for the right to extend its line from Randolph to Brockton.

***Tamaulipas, Mexico.**—A. V. Cole, Brownsville, Tex., has received a concession by the government of the State of Tamaulipas, Mexico, for the construction of an extensive system of electric railways in Matamoras, as well as an extension of lines in other towns in that section. Negotiations are pending for transfer of this concession by A. V. Cole to a syndicate of St. Louis men.

Tampico Light, Power & Transit Company, Tampico, Mex.—This company is asking for bids, through Carr Brothers, New York, N. Y., on track and overhead material, power and car equipment to be used in the electrification of its line.

Public Service Railway, Newark, N. J.—This company has been asked to consider plans for an extension to the Roseville section north of Orange Street and the Ampere section of East Orange.

Manhattan & Queens Traction Corporation, New York, N. Y.—This company is now building a line over Thomson Avenue, Long Island City.

New York State Railways, Syracuse, N. Y.—Improvements to cost $250,000 are authorized for the Syracuse lines of this company. About 10 miles of new wire will be strung and 7 miles of track will be relaid and built. Included in this is the double-tracking of the East Syracuse line through Shuart Avenue, Sedgwick Street and upper James Street. The University line will be extended to the Irving Avenue entrance to the stadium.

Northern Ohio Traction & Light Company, Akron, Ohio.—Business men of Akron, Barberton, Canton, Massilion and Ravenna met at Canton last week and formed an organization whose purpose will be to induce the Northern Ohio Traction & Light Company to build extensions and make improvements to local railways in those places and to improve its cars and equipment.

Cincinnati (Ohio) Traction Company.—Work will be begun at once by this company on the extension of its Avendale Street line to Bond Hill through Paddack Road.

Cleveland, Alliance & Mahoning Valley Railroad, Cleveland, Ohio.—Charles R. Morley, president of this company, has informed the business men of Ravenna, Ohio, that he will not extend this railway up into the center of Ravenna, as he had originally intended, but will build from the present terminus on the outskirts of Ravenna to a junction with the Ravenna-Akron line of the Northern Ohio Traction & Light Company. The line is in operation between Ravenna and Alliance and is being built between Ravenna and Warren. [E. R. J., Feb. 15, 13.]

Columbus Railway & Light Company, Columbus, Ohio.—This company plans to build approximately 3142 ft. of new track during the year.

***Coshocton, Ohio.**—Plans are being made by the United Service Company for the construction of a railway to connect Dennison and Zanesville, with a central power house at Coshocton. This plant would furnish current for power and light to Dennison, Uhrichsville, New Philadelphia, Canal Dover and Cambridge. S. E. Foster, New York, and J. B. Hill and L. H. Conklin, Scranton, Pa., are said to have made this announcement after a conference with C. H. Howell, manager of the plant at Coshocton.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—Plans are being made by this company to build an extension to Jackson, Ohio. The Council of Jackson will be asked to grant a franchise for the operation of the railway inside the city limits of Jackson.

Ottawa & Morrisburg Electric Railway, Ottawa, Ont.—Plans and specifications are being prepared by this company and contracts will be awarded during the month for the construction of 15 miles of track. This 47-mile railway will connect Ottawa and Morrisburg via Leitrim, South Gloucester, Ormond, Winchester, Greely, Metcalfe, Williamsburg and Glen Becker, J. G. Kilt, Citizens' Building, Ottawa, president. [E. R. J., Feb. 1, '13.]

Brownsville, Ore.—The Great Northern Railway has been petitioned to build an electric railway from the main line west of Halsey through to Brownsville.

Portland, Eugene & Eastern Railway, Portland, Ore.—It is reported that this company plans to build a new steel bridge across the Willamette River in Albany. The company is now building a line from Albany to Wellsdale.

Bloomsburg, Millville & Northern Railway, Bloomsburg, Pa.—Work will soon be begun by this company on its line between Bloomsburg and Millville.

Philadelphia (Pa.) Rapid Transit Company.—This company has completed its arrangements for the construction of a terminal loop at Forty-fourth Street and Parkside Avenue, Philadelphia.

Pittsburgh (Pa.) Railways.—This company has been asked to build an extension in the Lincoln Avenue district beginning at Lincoln Avenue and Travella Boulevard and around the hill to Shetland Avenue and Larimer Avenue, Pittsburgh. The company consents to build this line if the Council will grant it the necessary franchise.

West Penn Railway, Pittsburgh, Pa.—Surveys have been completed by this company for a line between Pittsburgh and Wheeling, W. Va.

York (Pa.) Railways.—The extension of the Prospect Street line in York to Green Hill and Elmwood was authorized at a special meeting of the stockholders of this company. The improvements will be made as soon as permission is secured from the Council for the laying of tracks on the two highways in the southeastern portion of York and from the Maryland & Pennsylvania Railroad to intersect its tracks at Yale Street. The East End extension will be in the form of a loop which will begin at the junction of Prospect Street and Albemarle Street to Ethan Street, thence north to Ethan Street and Yale Street to Third Avenue in Elmwood, returning on Third Avenue and Ross Avenue to Albemarle Street and Prospect Street.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—This company, which plans to place its line between Nashville and Gallatin in operation very shortly, may enter Nashville over the tracks of the Nashville Railway & Light Company without securing a special franchise for its operation.

Nashville Railway & Light Company, Nashville, Tenn.—This company's charter has been amended with a view to extending several of its lines in Nashville.

Dallas (Tex.) Electric Corporation.—This company plans to build about 6 miles of new track in Dallas and a 30-mile extension from Dallas to Terrell during 1913.

San Antonio, Fredericksburg & Northern Railroad, San Antonio, Tex.—This company has ordered 2500 tons of steel rails to be delivered April 1. This line will connect Fredericksburg with the San Antonio & Aransas Pass Railway, 4 miles north of Waring. R. A. Love, San Antonio, president. [E. R. J., Feb. 8, '13.]

Logan Rapid Transit Company, Logan City, Utah.—Work will be begun at once by this company on an extension from Logan to Ogden. Three routes are under consideration, one via Paradise and Ogden Canyon into Ogden, another by way of Wellsville Canyon to Brigham City, and a third by way of the old Short Line route across the divide to Collinstown and then down the valley to Brigham.

Pacific Northwestern Traction Company, Seattle, Wash.—Announcement has been made by this company that it will spend $150,000 extending and improving its lines during the year.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—It is reported that this company plans to extend its Alki Point line in Seattle during the summer.

***Bluefield, W. Va.**—Plans for the construction of an electric railway between Bluefield and Princeton, W. Va., a distance of 12 miles, are now in the hands of the Chamber of Commerce of Bluefield, C. T. Boykin secretary. Power for the line will probably be secured from the Princeton Power Company, which is to be purchased by the railway company with the view of improving the Princeton power station.

Fayette Traction Company, Fayetteville, W. Va.—This company is asking for prices on second-hand 60-lb to 70-lb rails for about 4½ miles of its line. This railway will connect Fayette, Fayetteville and Oak Hill. Robert H. Dickinson, Fayette, is interested. [E. R. J., March 15, '13.]

West Virginia Traction & Electric Company, Wheeling, W. Va.—It is reported that this company plans to build a line to Elm Grove.

Wheeling (W. Va.) Traction Company.—Plans are being considered by this company to extend the present Moundsville division line to New Martinsville, to connect later with Parkersburg and ultimately to establish a line between Cincinnati and Pittsburgh along the Cincinnati River front.

SHOPS AND BUILDINGS

Tampa (Fla.) Electric Company.—Work will be begun by this company within the next few weeks on the construction of its new office building at Tampa Street and Cass Street in Tampa.

People's Traction Company, Galesburg, Ill.—Plans are being considered by this company to build a new freight and passenger station in Galesburg.

Union Traction Company of Indiana, Anderson, Ind.—This company has awarded a contract to Charles H. Lennon, Winchester, for the construction of all stations on the new Muncie-Newcastle division of its line.

Vincennes North & South Traction Company, Vincennes, Ind.—This company will build its repair shops in Vincennes in the near future. B. M. Willoughby, Vincennes, president.

Louisville & Interurban Railway, Louisville, Ky.—Work has been begun by this company dismantling its old interurban depot in Shelbyville. The company has begun the construction of a new depot in Shelbyville, using the materials of the old building. The structure will be 35 ft. x 35 ft.

Butte (Mont.) Electric Railway.—Construction will be begun at once by this company on a new carhouse in Butte. The structure will be 32 ft. x 140 ft.

Atlantic City & Shore Railroad, Atlantic City, N. J.—Plans for the construction of a concrete building by this company on the site of the old Chute-the-Chutes Park at the Inlet in Atlantic City have been announced. The structure will occupy an entire square and will have all the necessary facilities for the repairing of old cars. The offices of the company now quartered in the Stadler Building, on South Virginia Avenue, will be transferred to this new location, where plans have been made for a suite of rooms on the second floor.

Staten Island Midland Railway, New York, N. Y.—The Public Service Commission has granted the application of this company for permission to abandon Whitlock Station and to replace it with a new station about 1400 ft. distant, which is to be known as Bay Terrace.

Western New York & Pennsylvania Traction Company, Olean, N. Y.—Plans are being made by this company to build new freight depots at Olean, Westons, Portville, Ceres, Bolivar, Shinglehouse, Allegany, Carrollton, Salamanca and other points. The company will also build a waiting room for passengers at St. Bonaventure's.

North Carolina Public Service Company, Salisbury, N. C.—Work has been begun by this company for its new carhouse located half way between Spencer and Salisbury. In the rear of this building will be a machine shop. On one side will be a storeroom, 25 ft. x 110 ft. [E. R. J., March 1, '13.]

Cleveland (Ohio) Railway.—This company has purchased a large tract of ground at Harvard and Radway Avenues, Newburg Heights, on which a carhouse will be erected to serve the Dennison-Harvard line that is to connect the South Side with Newburg. It is possible that it will also serve the East Fifty-fifth Street line and that the old carhouse on Fifty-fifth Street will be abandoned. Work on the Dennison-Harvard railway line will be begun this spring. The plan has been approved by the City Council.

Greenville, Spartanburg & Anderson Railroad, Greenville, S. C.—Work has been begun by this company on the construction of its new freight terminal station and yards in Spartanburg.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company plans to extend the Vancouver Island Power Company's plant at a cost of $650,000. The company will also build a new substation on Richmond Road. The cost is estimated to be about $75,000.

Tampa (Fla.) Electric Company.—Plans are being made by this company to build an addition to its power house in Tampa. It will install a single-unit turbine of 4000-kw capacity. The machinery for this improvement has been ordered.

People's Traction Company, Galesburg, Ill.—This company plans to enlarge its power station in Galesburg and will build a new substation on South Prairie Street in Galesburg.

Vincennes North & South Traction Company, Vincennes, Ind.—This company plans to build a new power house in Vincennes and probably one in Mooresville in the near future. B. M. Willoughby, Vincennes, president.

Philadelphia (Pa.) Rapid Transit Company.—This company has authorized the enlargement of its Beach Street power house in Philadelphia and the installation of approximately 20,000 hp in additional power-generating machinery. This increased supply of power, together with 6500 hp of additional purchased power, beginning Nov. 15, 1913, will serve to insure the continuity of the power supply and also make possible the operation of additional car service during the coming winter.

Scranton & Binghamton Traction Company, Scranton, Pa.—This company expects to build a new boiler house and has ordered three boilers.

Manufactures and Supplies

ROLLING STOCK

Union Electric Company, Dubuque, Ia., is reported to be in the market for six cars.

New York State Railways, Rochester, N. Y., expects to rebuild ten convertible cars on the Salina Street line into pay-as-you-enter cars.

Ashtabula (Ohio) Rapid Transit Company has ordered one double-end vestibule car with trucks from the G. C. Kuhlman Car Company.

Tampico Light, Power & Transit Company, Tampico, Mex., is asking prices through Carr Brothers, New York, N. Y., on several new cars.

East St. Louis, Columbia & Waterloo Railway, East St. Louis, Ill., has ordered three motor and two trail cars from the American Car Company.

Asheville (N. C.) Electric Company has ordered from The J. G. Brill Company six 20-ft. 8-in. semi-convertible car bodies with Brill 21-E trucks.

Five-Mile Beach Electric Railway, Wildwood, N. J., has ordered from The J. G. Brill Company two twelve-bench open-car bodies with Brill 27-GE-1 trucks.

General Electric Company, Schenectady, N. Y., has ordered from the Wason Manufacturing Company two steel cars with two motor and two trail trucks.

New York, New Haven & Hartford Railroad, New Haven, Conn., has ordered twenty-three multiple-unit motor cars, twenty-two multiple-unit trailers and twelve electric locomotives.

Lewistown & Reedsville Electric Railway, Lewistown, Pa., has ordered from The J. G. Brill Company three 28-ft. semi-convertible pay-within car bodies with Brill 27-GE-1 trucks and four extra Brill 27-GE-1 trucks.

Syracuse & Suburban Railway, Syracuse, N. Y., has ordered from The J. G. Brill Company two 34-ft. 4-in. semi-convertible combination passenger and smoking car bodies mounted on Brill 27-MCB-1 trucks.

Worcester (Mass.) Consolidated Street Railway has authorized the purchase of twenty-one double-truck cars. Fifteen of these cars will be used on the city lines and six on the line between Worcester and Springfield.

Phoenix (Ariz.) Railway, noted in the ELECTRIC RAILWAY JOURNAL of March 1, 1913, as contemplating the purchase of several new cars, expects to order possibly four new cars, which will be of the California type, open at each end and with closed center.

Lehigh Valley Transit Company, Allentown, Pa., has specified the following details for the six passenger, baggage and smoking cars which are being built by the Jewett Car Company:

Seating capacity	60	Air brakes	Westinghouse
Weight (car body only)	40,000 lb.	Car trimmings	bronze
		Control	A. L.
Length over vestibule,	54 ft. 10½ in.	Couplers	Westinghouse
		Curtain fixtures	Cur. S. Co.
Length over all,	55 ft. 10½ in.	Curtain material	Duplex
		Heaters	Consol. & Smith
Width over sills,	8 ft. 9¼ in.	Motors	4 West. 303
Body	composite	Motors	inside-hung
Interior trim	mahogany	Sanders	Universal
Headlining	Agasote	Sash fixtures	Edwards
Roof	steam coach	Seats	H. & K.
Underframe	metal	Trucks	M.C.B.

TRADE NOTES

Galena Signal Oil Company, Franklin, Pa., has voted to increase its common stock from $8,000,000 to $12,000,000.

Lackawanna Steel Company, Buffalo, N. Y., has elected H. G. Darton a director to succeed S. S. Palmer, deceased.

Electric Storage Battery Company, Philadelphia, Pa., has elected John R. Williams a director to succeed George D. Widener, deceased.

Standard Steel Car Company, Pittsburgh, Pa., is enlarging its New Castle plant by adding about 200 ft. to the main building of the wooden car department.

The J. G. Brill Company, Philadelphia, Pa., has received an order from the Brooklyn (N. Y.) Rapid Transit Company for 230 Brill 39-E trucks. Orders have also been received from Stone & Webster, Boston, Mass., for sixty Brill 39-E trucks for its properties in Dallas, Fort Worth and Houston, Tex.

S. R. Schaff & Company, Louisville, Ky., has been formed by Schuyler R. Schaff, consulting engineer and specialist in public utilities, and Chester B. Starbird, electrical engineer, to engage in the development, extension and operation of public utilities within operating distance of Louisville. The office of the new firm will be in the Paul Jones Building, Louisville, Ky.

Edgar N. Easton has become associated with the railroad sales department of Joseph T. Ryerson & Son, Chicago, Ill., with headquarters at New Haven, Conn. John H. Craigie, formerly connected with the mechanical department of the Boston & Maine Railroad, has also joined the railroad sales department of the company, with headquarters at Boston, Mass.

Roosevelt & Thompson, New York, N. Y., has been formed by James A. Roosevelt and Samuel B. Thompson to make investigations and reports and give practical advice on the operation of electric railway and lighting properties. Mr. Roosevelt was formerly with the Third Avenue Railway, New York, N. Y.; Stone & Webster, Boston, Mass., and various properties in the west and south. Mr. Thompson was formerly with the Consolidated Railway, Baltimore, Md.; Sanderson & Porter, New York, N. Y., and consulting engineer in connection with various Pacific Coast properties. The headquarters of the firm are in the Empire Building, 71 Broadway, New York.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., was chartered in Delaware on March 15 with a capital stock of $42,500,000 as a part of the plan for reorganizing the Allis-Chalmers Company. Of the new stock $16,500,000 is preferred and $26,000,000 common. The incorporators of the new company held an organization meeting early this week at which directors and officers were elected. Voting trustees who will manage the company for some time to come were also chosen by the reorganization committee. Directors for the Allis-Chalmers Manufacturing Company were chosen as follows: John H. McClement, chairman of the board of directors; O. H. Falk, president of the company; O. C. Fuller, J. D. Mortimer, G. G. Pabst and Frederick Vogel, Jr., all of Milwaukee; Max Pam and F. O. Wetmore, of Chicago, Ill.; A. W. Butler, C. W. Cox, O. L. Gubelman, R. G. Hutchins, Jr., Arthur Coppell and W. C. Potter, of New York, N. Y., and J. P. Winchester, of Wilmington, Del. The executive committee is as follows: Frederick Vogel, Jr., chairman; O. H. Falk, O. C. Fuller, J. D. Mortimer and G. G. Pabst. Active operation of the manufacturing plants will be started under the direction of five voting trustees as soon as the final steps in the reorganization are taken. This will probably be not later than May 1. Sale of the Illinois property is to take place on April 8 and confirmation of the sale will be given shortly afterward. A meeting of the reorganization committee will be held in the near future to determine the date for calling the remainder of the assessments on the old preferred and common stocks. There is still a payment of $8 per share on the preferred and $4 on the common stock to be made.

ADVERTISING LITERATURE

Clark Electric & Manufacturing Company, New York, N. Y., is mailing to the trade index cards showing its line of specialties.

Ross W. Harris, Madison, Wis., electrical engineer and traction expert, has issued a booklet entitled "A Traffic Survey and Twelve Reasons Why."

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued a new booklet on titanium in steel, which contains statements of steel manufacturers and scientists as to the uses and benefits of ferro-carbon-titanium.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. A4087, which illustrates and describes its direct-current motor starting panels for heavy service. Bulletin No. A4092 describes the company's type I-10 Thomson watt-hour meter.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MARCH 29, 1913 No. 13

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office............................1570 Old Colony Building
Philadelphia Office.......................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, *8000 copies are printed.*

MODEL UTILITIES LAW NEARLY READY

We shall soon see the fruits of the months of labor that the National Civic Federation's department on regulation of utilities, under the chairmanship of Mr. Emerson McMillin, has put upon a model public utilities law. The measure was discussed at the joint meeting of the public utilities committees of the National Electric Light Association and the American Electric Railway Association last month and considerable progress has been made by a joint sub-committee of these associations which has had before it the final draft of the law. Already representing an agreement of many able minds, the model utilities law will, as a result of the co-operation of representatives of the N. E. L. A. and A. E. R. A., embody the broad practical experience of such men as T. N. McCarter, who was spokesman for the railways, as well as the invaluable results of the investigations of the National Civic Federation. The enlistment of the two associations was in itself significant of the fine spirit which Mr. McMillin has brought into the framing of the law, and the helpfulness of the corporation officials who have lent their aid in this undertaking shows that an enlightened public spirit exists where, according to the yellow press, a disposition to deprecate if not to denounce was to be expected.

GIVING THE PUBLIC THE BENEFIT OF THE DOUBT

Recently we had occasion to comment on the unwisdom of attempting to suspend the operation of the laws affecting public utilities until the constitutionality of such laws has been passed upon by the courts. A way around such difficulties as cases of this kind often present is found in the plan adopted by the New York Central and New York, New Haven & Hartford Railroad companies, pending the decision as to the legality of Public Service Commission orders reducing commutation fares in New York suburban territory. The New York Central has taken this question into the courts on a writ of certiorari, but awaiting the court's decision it is selling tickets at its usual rates, giving to each purchaser a card which, if the court of last resort should decide the proceedings against the company, will have a redemption value amounting to the difference between what the traveler pays for the ticket and the price at which it was ordered to be sold by the Public Service Commission. The New Haven road is following the same plan. Such an arrangement might not be practicable in many cases for electric railways, but the effort to insure passengers against loss in the event that the low-fare orders are sustained is based on sounder public policy than is the attitude that a law affecting public service corporations shall not be enforced pending decision of the courts in regard to it. Whether or not the public is justly entitled to the benefit of the doubt in such cases, it is best, we believe, as a matter of policy to concede whenever possible that this is so.

THE PROBLEM OF ULTIMATE WAGE LIMITS

All employers have more or less reason to ponder a problem that is giving the steam railroads much concern. This problem is somewhat despairingly expressed in the query, Where is the increase of wages going to stop? One of our gifted statisticians has figured out that, at the rate railway wages have been increased since 1906, nothing will be left for dividends by 1938, ten years later all the steam roads will be in receivers' hands, and by 1958 nothing will remain for interest payments. Before these disasters happen it is probable that the cost of living will go down or carriers will be allowed to earn more money. There was a promise to this effect in the award of the board that considered the railway engineers' demands and plainly stated that if public opinion and regulative bodies supported demands for higher wages they must be willing to allow increases in earnings that would make these higher wages possible. In 1906 the steam roads paid out 37.75 per cent of their gross earnings in wages. In 1911 this percentage had risen to 42.01, and on the basis of an estimate of wage payments amounting to $1,243,677,738 for 1912, the percentage of wages to gross earnings for last year is figured at 42.95. It would be interesting to know how this rate of increase compares with that on the electric railways and their related industrial concerns. These companies know that wages are constantly going up without any corresponding increase in prices for transportation, and often accompanied by higher costs of materials and supplies. Obviously this movement cannot go on forever without some such consequences as those forecast by the statistician already quoted. This fact, fortunately, is the best reason for believing that the movement will be stopped by its own economic absurdity before very many years have passed.

USES OF THE ONE-MAN CAR

Accounts of the experiences of companies with one-man cars published elsewhere in this issue express opinions that, in general, are unqualifiedly in favor of this method of operation for lines in small communities and for outlying lines of larger property. Some of those who have written the results of their experiences to the ELECTRIC RAILWAY JOURNAL believe that a special study is warranted in each case to determine whether or not operation under this method is advantageous from every standpoint. In other words, they believe that all the advantages and all the disadvantages should be considered thoroughly before a change in the existing method of operation is made by a company which has an established system and business. This is a wise precaution.

The questions to be considered concern the revenues, the expenses and the service rendered. One-man operation usually means the prepayment of all fares, and for that reason it safeguards the revenues. The plainest fact about operation of this nature is that it reduces platform expense, because the wages of one man are less than those of two men.

While the question of the service rendered is one that has many angles, certain fundamental conditions apply in each case. The amount of business obtainable and the riding habits of a community are the best general guides to the amount of service that is warranted and to the manner in which it should be proportioned between the various hours of the day or night. In the average small community the rate of growth is not always so rapid as in the large cities. Increase in population in the small cities does not as surely mean corresponding increase of potential riders as it does in the large cities; distances are shorter, and many people walk to and from the various centers. Available houses or sites for building homes exist in plenty within short distances of the office or factory. To some extent the influence on riding habits of the existence of only a small area for all purposes of home or business is offset by the increased riding at noontime, when many workers enjoy the advantage of going to their homes for the midday meal. Where the amount of traffic is small and the rate of annual increase is slight, a company cannot build up density of traffic as easily as that is developed in a great city. It cannot lengthen headways from two to four minutes because such headways are not in its experience. If it lengthens its headways from ten to twenty minutes or from twenty to forty minutes, it may destroy the traffic.

The logical conclusion is that if a remedy for higher costs of labor and materials cannot be found by a small company in changes of headways, it may lie in the substitution of one-man cars for cars operated by two men. It is possible to give the same amount or nearly the same amount of service with one-man cars as with two-men cars at a smaller expenditure for platform expense, or it is possible to operate more one-man cars for the same platform expense than would be required for the operation of a smaller number of two-men cars.

An important factor with which the replies deal is that of accidents. A problem to be considered is the proper protection of railroad crossings. A number of the replies state that fewer accidents to passengers occur with one-man-operated cars. The reason why this has been found to be so is that the movements of both the passenger and the car are controlled so closely by the one man. There are no signals between motorman and conductor to be misunderstood. If the use of one platform and the fact of control of the movements of passengers to and from cars reduce the number or serious degree of accidents, this consideration alone constitutes the strongest kind of a recommendation for the widespread adoption of this method of operation in localities for which it is especially suited.

RECENT INTERURBAN CONSTRUCTION IN THE FAR WEST

Recognition by prominent steam railroad men of the merits of electric traction for frequent-stop service is being illustrated in a striking way at the present time in Oregon. That State, as shown by our statistical number last January, occupied a prominent place among the states for miles of electric track built and equipped during 1912. This was due almost entirely to the extensions and new construction undertaken by two roads in the Willamette Valley, the Oregon Electric Railway and the Portland, Eugene & Eastern Railroad. The first of these lines is controlled by the Hill interests and the second by the Southern Pacific Company. The activity of these two large groups of capital in electric railway construction in Oregon shows their faith in the ability of electric equipment to develop a lucrative passenger and freight business in a growing territory by means of a frequent train service with stops at approximately 2-mile intervals.

The conditions presented in the Willamette Valley were very similar to those which existed in parts of the Central States before the construction there of electric interurban railroads. That is to say, the territory was not, and at present is not, so densely populated as are some of the Eastern States, but there were cities of from 5000 to 15,000 inhabitants, 25 to 50 miles apart, with prosperous agricultural communities between, and, in Oregon, one large terminal city, Portland. With the existing steam railroad train schedules determined, as they necessarily had to be, by through-run conditions, such a territory was obviously ripe for electric railway development, either by the existing steam roads or by independent capital, and the wisdom of the former is shown by the fact that they have recognized this condition and have undertaken the work.

Under steam railroad direction the roads can be constructed at less cost because, in places, existing steam track can be electrified and the through business of the steam road benefited by the growth of the communities served.

This point was expressed in a speech made by President Strahorn of the Portland, Eugene & Eastern Railway on March 15, at the time of the completion of that line. In speaking of the facility with which each of the communities connected by the railway would be able to do business with the others and with the larger towns, he said: "In most regions to-day railroads are not seeking so much to extend their lines as they are concerned with the development of the territory they now occupy. This is because, after all, it takes large traffic to pay dividends, while idle steel only glitters in the sun or rusts."

In one important respect the promoters of all of the recent electric interurban roads in the Far West have had an advantage over the builders of the earlier interurban roads in the Cental and Eastern States. The advantages of electric transportation in frequent service and in other ways are now understood to be sufficient to warrant their bid for popular favor and patronage, and in consequence it is not necessary to cut the fare below the rate charged on parallel or neighboring steam railroad lines. The passenger rate on the Oregon electric lines mentioned, for example, is 3 cents a mile. Had this general fact been equally well recognized in the East it would have been much better for both the railways and the public. But some of the fares on the Eastern roads seem almost to have been established on the theory that passengers were entitled to a fare rebate with a bonus thrown in. The facts, of course, are that while the steam road is more convenient for the long-distance traveler, the electric interurban road is more convenient for the short-distance traveler, and neither can take many passengers from the other by cutting rates.

Whether the electrification of the through lines of the steam railroads in the Far West which operate electric interurban lines will be hastened because of this interurban activity is a question. Probably it will be to some extent. For one thing it puts the companies in possession of figures on the cost of electric operation obtained by their own transportation departments. Again, in some cases, hydroelectric propositions are being developed for the interurban lines which would be suitable for the supply of power for through-route electrification. The latter will come first in the Far West, undoubtedly, on the mountain divisions, where the limitations of the steam locomotive are most apparent.

PROPOSED TECHNICAL COMMISSION ON STEAM RAILROAD ELECTRIFICATION

All those who have at heart the advance of the electric railway industry will heartily second Mr. Sprague's proposal, made before the New York Railroad Club on Friday, March 21, that a technical commission on steam railroad electrification be formed to consider ways and means, first, to determine what systems of electrification are best suited for particular sets of conditions, and, second, how the steam railroad may be relieved of the necessity of raising capital for electrical energy supply and equipment. Mr. Sprague's proposal was not an impulse of the moment but a carefully wrought-out plan which he has been discussing for the last two years with interests whose financial aid would make such a commission possible. This technical body would be composed of engineers of recognized ability and breadth of mind whose combined experience in the technical and economic fields of steam and electric railroading and equipment would make their decisions of most influential if not binding character. Furthermore, these men would not have to take up this task as something subsidiary to their regular occupations but as a problem worthy of all their powers for an extended period. That the electrical interests have signified their willingness to bear all or part of the expenses of this research is evidence that their faith in steam railroad electrification is of the sublime kind that moves mountains.

The fact will be very generally recalled that a similar commission was organized in Germany more than a decade ago to conduct the famous Zossen high-speed tests, and that its studies did much to present an exact idea of the possibilities of electric railway equipment. But in the United States the problem is far larger and more complicated, for the mileages possible for electrification are much greater, the railroads are owned by many private companies instead of a few governments, and electrifications of widely varying character have already been made.

It is not essential that the proposed technical commission should say: "This system shalt thou use and no other." It will be doing enough if it gives accurate statements of the capacity, efficiency and maintenance costs of the different systems as determined by direct study of the data sources. The cynicism of the steam railroad man will cease when he finds that the advocates of electrification are no longer deprecating one another's pet systems. The moral effect alone of this united stand will mark a gigantic step forward toward steam railroad electrification.

The proposal to finance the electrification by furnishing energy and cars on the basis of usage should be even more effective than any decision as to system. Government regulation, labor difficulties and the rising cost of materials have made it almost impossible for steam railroads to raise new capital at former rates. If some suitable financial organization, therefore, can raise the necessary capital and guarantee such low unit energy and rolling stock rental costs as would obviously bring immediate economies, the opponents of electrification would have left few valid objections.

Similar methods of financing railway needs have already been practised successfully on a large scale by the banks which stand behind the great German manufacturers of electric railway equipment. Mr. Sprague's proposal that the power companies should have the use of the railroad right-of-way for their pole lines presents one instance of how co-operation would eliminate needless investments. In view of the figures which the Pennsylvania and New York Central railroads have made available in such a broad-minded spirit on the maintenance costs of their electric rolling stock, it should not be difficult for electric companies to offer cars and locomotives on a definite mileage basis.

In conclusion, it is worth while to point out that one most important by-product of extended steam railroad electrification will be its favorable effect on the conservation of our national resources, namely, in bringing about the tremendous reduction in fuel consumption which must follow the elimination of the power station on wheels by the hydroelectric and even by the steam central station. The increased exploitation of water powers necessarily means the conservation of the forests in the watersheds which feed them.

This fact alone shows that the problem of steam railroad electrification has far greater ramifications than the mere enrichment of the electrical interests, for by the elimination of waste this proposal discloses the possibilities of a great national service.

Express and Freight Traffic in Providence, R. I.

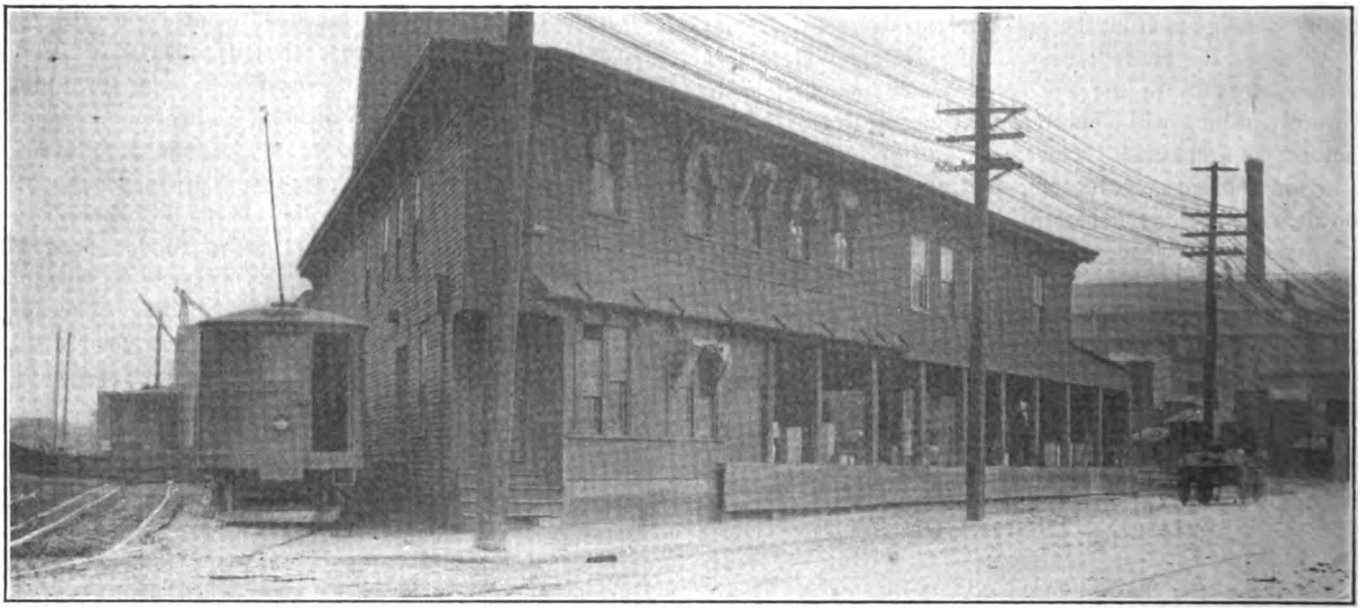
An Account of the Methods Used in Handling Express and Freight In and Out of the City, Including Descriptions of the Special Facilities Provided for This Service—A Number of the Rates for Various Commodities Are Given

The electric freight and express business of the Rhode Island Company is one of the most highly developed in New England and is the outgrowth of pioneer work by the company in this field at a time when little interest was felt in the subject except in the Middle West. The service was inaugurated at Providence by the Union Railroad Company and the Rhode Island & Suburban Railway Company in May, 1901, with three 17-ft. cars refitted from old passenger rolling stock, these making two trips daily into the Pawtuxet Valley. Freight was delivered to the cars by teams at the Crawford Street bridge in Providence and distributed by the cars in many of the villages in the valley. In July two other cars specially built for electric freight service were added, and in the early fall a storage freight house was rented near the business district, the depot having 2000 sq. ft. of working area. This terminal had two loading doors for teams and two for cars, but as the latter were obliged to pass in front of the former, necessitating constant moving of the teams, the terminal was soon found inadequate. During the summer electric freight service was begun between Providence and East Greenwich, and it was soon extended to Wakefield and Narragansett Pier by connection with the Sea View Railroad. In the fall service was begun between Providence, Warren, Bristol, Manton, Centerdale and Cranston.

In 1905 the Rhode Island Company leased the Dyer Street station, located about half a mile south of the business center of the city, and has since made this the headquarters of the service. The growth of the business necessitated the opening of an additional station in 1909 at Fox Point, on the East Side of the city, to care properly for the traffic between Providence and Fall River, Taunton, New Bedford, Phillipsdale and the Barrington district. The company now operates in its express and freight service on its lines about sixty total cars per day, including outward and inward operation, with extras as required. The rolling stock used in the freight department includes three electric locomotives, twenty-seven express box cars, twenty-six flat cars of from 10 to 15 tons capacity, twenty-three side-dumping coal cars, and seven 10-ton box cars. The work of the department requires fifteen clerks, six checkers, three collectors, two cashiers, nine conductors, two foremen, twenty-eight helpers, two messengers, seventeen motormen and two trolley tenders, or a total of ninety-three men, including five brakemen, the general freight agent and his assistant. There are also twenty-five outside freight and express agents located at points elsewhere in the State who give their time wholly or in part to the work.

FREIGHT AND EXPRESS STATIONS

The Dyer Street station occupies a lot of triangular shape at the intersection of Dyer and Dorrance Streets and includes quarters for the general freight agent and his assistants, a receiving and loading shed, delivery shed and storage yard, besides being served by two passing and three spur tracks in the adjoining streets. Two of the spur tracks shown at the left in the accompanying photograph are used by the express cars in loading and unloading freight and have a capacity of four cars each, it being customary to load or unload eight cars at a time. The third spur track has a capacity of five cars and is used only for storage service. In unloading the express cars the company endeavors to berth them as far from the Dyer Street entrance as is convenient, in order to avoid interference with the transfer of merchandise in the main portion of the building, besides shortening the distance between the cars and the loading platform for teams. The receiving and loading shed occupies the first floor of a two-story structure and has a working area of 7170 sq. ft. Four 6½-ft. by 8-ft. doors are provided for car service on the Dorrance Street side of the building, and on the Dyer Street side are nine working doors used by teams delivering goods to the station. The general offices occupy the second story. The teaming doors are about 3 ft. above Dyer Street, and on the south side of the receiving and loading shed are two other doors used by teams with low-hung bodies, carried to within 18 in. of the ground. The delivery shed is a one-story structure of 1980 sq. ft. area and extends into the teaming yard as a wing of the main station. It is provided with three 9-ft. x 7-ft. doors located with the sills about 3 ft. above the street. The

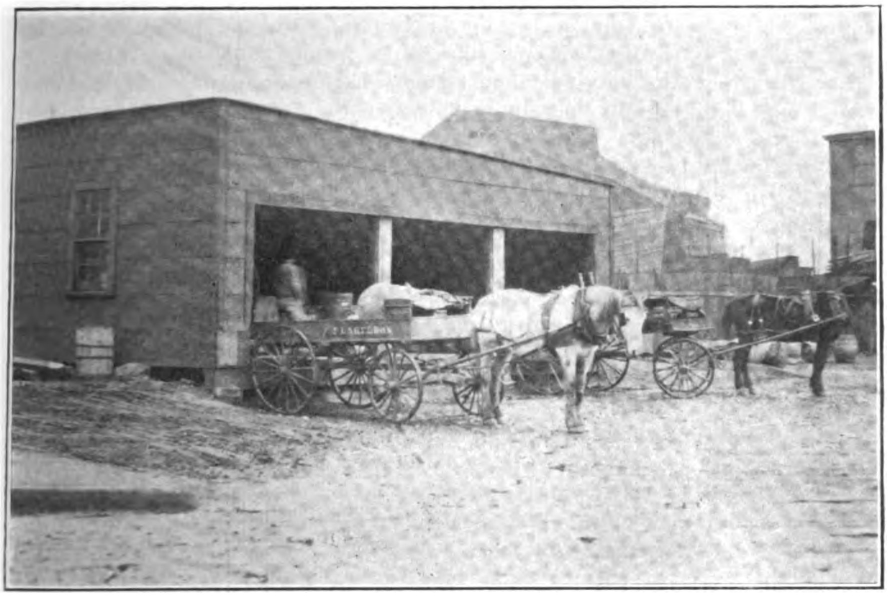


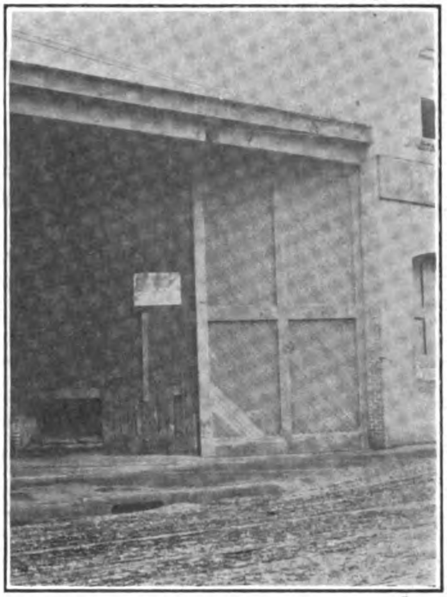
Providence Express and Freight—View of Dyer Street Station, Showing Offices and Receiving Platform exterior is covered with sheet iron to provide greater fire protection. The interior of the receiving and unloading shed is divided into areas corresponding to the geographical destinations of the shipments. A cashier's office is located on the first floor at the main entrance. The station is open from 7 a. m. to 5:30 p. m. on week-days. It is lighted by 16-cp incandescent lamps wired in series circuits of five each and supplied from the company's feeders. The doorways are lighted by a row of incandescent lamps carried on the inside and slightly above each entrance. The area of the storage yard is about 1650 sq. ft. To facilitate the loading and unloading of cars and teams the passenger traffic is handled from south to north only on this portion of Dyer Street, the further track from the station being devoted to northbound passenger traffic and necessary freight movements. The track nearer the station is used only by express cars and locomotives shifting freight. A Y-connection is provided for reversing train movements in a square at the south of the station.

The Fox Point freight station is a one-story structure built in two sections, each of which is 75 ft. long and 30 ft. wide, and is of the island type, with two service tracks on one side and a teaming thoroughfare on the other. It adjoins an abandoned passenger station of the New York, New Haven & Hartford Railroad and is in close proximity to the shipping district served by steamship lines running in and out of the city.

A maximum of five freight cars can be loaded or unloaded at once at this station, four doors being used for the car service and thirteen for the teaming. Ample storage facilities for cars are also available. The station platform is located 3 ft. 6 in. above the street, and the doors, which are 8 ft. high by 7 ft. wide, are of the upward swinging type.

Artificial illumination is provided by five-lamp clusters placed 9 ft. above the floor. The platform area, exclusive of a freight office at one end of the building, is about 3800 sq. ft.



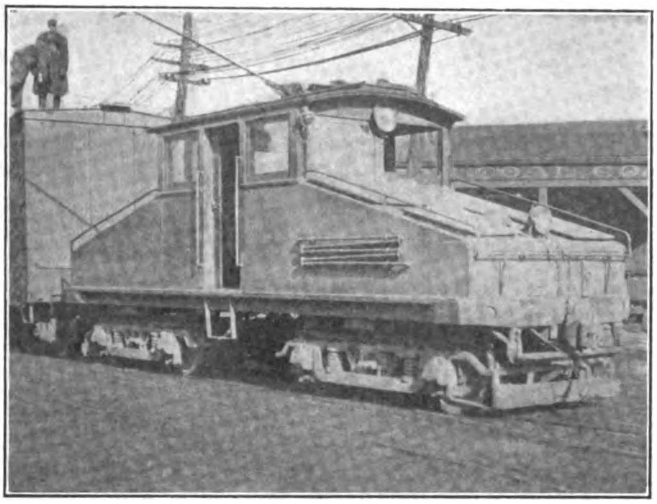


Providence Express and Freight—Delivery Platforms at Dyer Street Freight Station—Typical Diagonal Track Entrance at a Warehouse

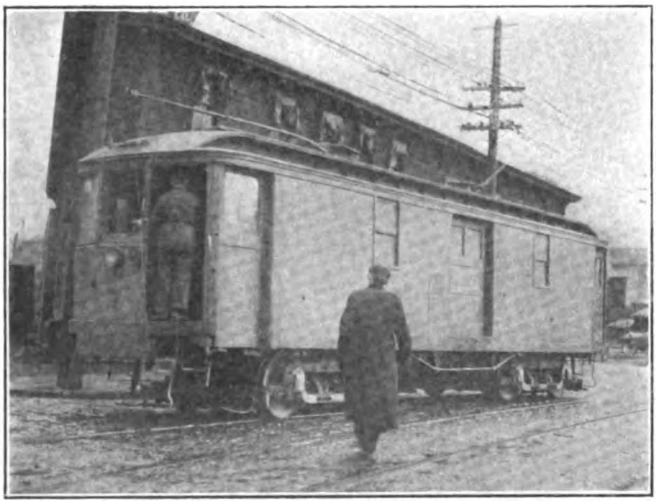
Providence Express and Freight—View of Receiving Platform at Fox Point Freight Station

EQUIPMENT FOR HANDLING FREIGHT

Between the Fox Point and Dyer Street stations a loop service including the city of Pawtucket is maintained, three round trips being run daily over this route. In this way the two terminals are brought into close operating relations and the transfer of freight is easily accomplished. The transfer of steam railroad freight cars between the New York, New Haven & Hartford Railroad and business and industrial establishments, including the local electric lighting company, a machinery house, bakery, coal pocket, grain dealers, oil wholesalers and produce merchants, is handled by the Rhode Island Company's electric locomotives over a so-called "interchange loop" or belt-line track of standard railroad construction which traverses the wholesale and trucking district. All these concerns are served by spur tracks entering their premises from the street, the trolley wire being carried into the property to facilitate switching. A typical diagonal entrance to a wholesaler's premises is shown in the accompanying photograph. This belt line is operated day and night, and the shifting is accomplished with great speed, the noise and dirt associated with the ordinary steam-driven switch engine being absent. The excellent acceleration of the electric locomotives is an important factor in the speed of the work. Two of the latter are in regular service, the third being held in reserve. The crew of an electric locomotive on shifting work includes a motorman, conductor, trolley tender and two brakemen. Coal cars are handled for out-of-town deliveries after midnight. Three times a week an electric locomotive hauls six carloads of bananas from the steamship wharf district to wholesale fruit houses.



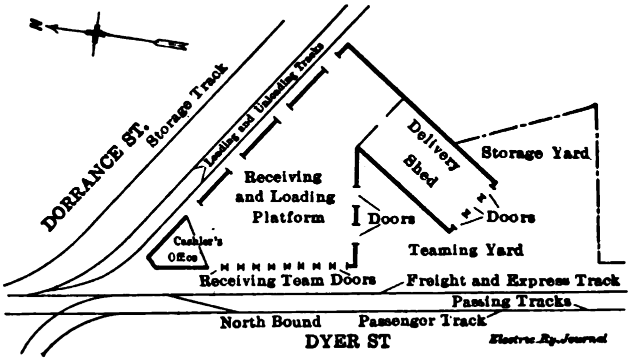
Providence Express and Freight—Electric Freight Locomotive



Providence Express and Freight—Standard Express Car

The locomotives weigh 30 tons each and are 27 ft. 10½ in. over bumpers, with 16-ft. truck centers, an over-all width of 8 ft. 3 in. and a body length of about 27 ft. The cab is 10 ft. long and is framed between ten posts usually 4¼ in. x 4½ in. in section, with the exception of the doors, whose posts are of 3¾-in. x 5⅜-in. section. The locomotive underframe is composed of four 5½-in. x 7½-in. longitudinal sills, with cross bracing, and a running board carried by an angle iron 5⅞ in. wide extends along each side from end to end. Grab handles are provided all around the locomotive, which is equipped with four Westinghouse No. 93-A 60-hp motors, 33-in. wheels, K-14 controllers, standard M.C.B. trucks and incandescent headlights. Both straight and automatic air-brake equipments are provided. A sand box surrounded by four 4.5-amp Simplex electric heaters is located in the cab and air sanders are used. The cab lighting is effected by a circuit of 16-cp incandescent lamps, including the headlight wiring and lamps. These locomotives were built several years ago and future equipments will weigh at least 40 tons per unit.

The usual type of express car is 40 ft. over all with a 32-ft. body carried on double trucks with 33-in. wheels and four 40-hp motors, the gear ratio being 19 to 67. General Electric K-6 controllers and straight-air brake equipment are used. The roof is of the arched type and central loading doors 4 ft. 6 in. wide are provided, the width of the car over the sheathing being 8 ft. 2 in. and the height from the under side of the sill to the top of the roof 8 ft. 1 in. Wooden underframing is used and the speed of the car on a level is 25 m.p.h.



Providence Express and Freight—Plan of Dyer Street Freight House

FREIGHT ROUTES AND RATES

In general the company provides express service at freight rates, and the growth of its business has been greatly influenced by the promptness of the service. Throughout many parts of the territory morning and afternoon express car trips are run to and from the city, and in some cases the cars are run through from Providence without local stops. The lines are operated under the Interstate Commerce Commission's tariff classification. The waybilling and routing are handled along the usual steam railroad lines, freight being billed through to any named destination. Special commodity rates are named for cotton bales, granite and stone in carloads, ice, milk, ties, wood and lumber in carload lots. Citing a few of the regular rates, the charges per 100 lb. from Providence to Danielson, Conn., range from 18 to 9 cents according to classification, with a minimum charge up to 25 lb. of 25 cents, the distance being 35 miles; from Providence to Putnam, Conn., the rates range from 20 to 11 cents, the distance being 41 miles; from Providence to Narragansett Pier, from 18 to 7 cents, distance 31 miles. The Providence & Fall River Street Railway, Union Street Railway Company of New Bedford, New York, New Haven & Hartford Railroad and New England Steamship Company participate in the tariff issued by the Rhode Island Company, and the Rhode Island Company acts as a delivering carrier for the Bay State Street Railway Company of Boston, Mass.

The electric express service from Dyer Street station in Providence covers one car per day to Buttonwood and way stations; Cranston, Esmond and way stations; Danielson, Putnam and way stations; Foster and way stations; North Attleboro, Plainville and way stations; Wickford, Narragansett Pier and Peace Dale; Wrentham, Franklin and Milford, Mass. Two cars per day are operated from Dyer Street to Auburn, Hope, Crompton and Anthony; Norwood, East Greenwich and way stations. A daily express car to Attleboro, Mass., and the Pawtucket service before mentioned complete the schedule. From the Fox Point station three daily trips are run to Fall River, Mass., and way points; three to New Bedford, Mass.; two to Riverside and Barrington; two to Taunton, Brockton, Middleboro, Plymouth, Quincy and Neponset, Mass., and Newport, R. I. A daily Fall River express service is also scheduled. The company also handles daily a through car from Brockton, Mass., with freight destined for New York City by the night sailings of the Hartford & New York Transportation Company and the Colonial Line. Accommodations on the pier are reserved by the steamship companies for this service. Between 5 and 7 p. m. the express cars are not permitted to operate on any of the important streets of Providence. The leaving times for the express service are listed in detail in the weekly publication of the Providence Board of Trade and in the monthly pocket manual "Red Guide" to the city.

The electric express service centering in the Providence district has increased the value of farms throughout a radius of at least 40 miles from the city; it has cut down the time of shipments from the urban stores to the villages and towns outside by one day and in some cases by one and one-half days; has reduced the size of local stocks carried; has brought the city table and the farm closer together and has stimulated the development of summer resorts on Narragansett Bay and the south shore of Massachusetts.

PUBLIC SERVICE REGULATION AS EXEMPLIFIED BY WISCONSIN COMMISSION

A joint meeting of the Chicago Section of the American Institute of Electrical Engineers and the Electrical Section of the Western Society of Engineers was held in Chicago on March 24. Halford Erickson, member of the Wisconsin Railroad Commission, read a paper, "The Regulation of Public Utilities in Wisconsin," and it was followed by an interesting discussion.

Mr. Erickson described in outline that part of the work of the commission which is involved in enforcing adequate service, reasonable rates and sound financial methods and practices. The speaker described the cost basis of making rates as adopted in Wisconsin, and the uniform accounts and reports for both privately owned and municipally operated companies, and then devoted some attention to the subject of capitalization. One of the evils of over-capitalization, Mr. Erickson said, was the unnecessary and economically unwise consolidation of public-utility plants under one management, which was encouraged by the unlimited right to issue securities. Consolidations of operated properties were sometimes prudent and economical, but the opportunity to combine two corporations and issue securities exceeding the combined value of the two was so tempting that sometimes, in the absence of regulation of security issues, the merger was concluded in a manner detrimental to the interests of the public. Another function of the commission was the prevention of duplication and waste in the establishment of public-utility plants. This was accomplished by the regulation of capital expenses in the case of privately owned enterprises and by the use of the indeterminate permit in the case of municipal utilities. On the whole, the regulation of public utilities had been of direct benefit to the public, but the operations of the state commissions had not brought about the millennium. Complaints against regulation were more frequently actuated by personal or political interests than by unselfish regard for the public welfare.

Bion J. Arnold, consulting engineer, who opened the discussion at the request of A. Reichmann, president of the Western Society, said that Mr. Erickson had laid down the fundamentals of public regulation. As to capitalization, Mr. Arnold said that his practice had been to endeavor first to find a fair valuation of the property—one upon which both the municipality and the company could agree. Almost always this figure contains some intangible value. Provision is then made for the decapitalization of the intangible value by the establishment of an amortization fund which, at a slow rate of accretion, will eventually wipe out the intangible value, so that finally the physical value will exactly equal the capitalization, and here the capitalization should be kept.

Mr. Erickson, answering some of the questions put to him, said that it was only during the last two years that the commission had entire control of capital issues. The plan was working well and the speaker believed that it had reduced the rate of interest on capital needed for utilities in Wisconsin by making the securities safer. As to capitalization of early losses, the Wisconsin method was not perhaps understood. The commission tried to find out what the early losses were, and from all the facts available it fixed the value of the plant and business. The commission had received twice as many complaints relating to discriminating rates made by municipal plants as in the case of privately owned plants. Mr. Erickson remarked that he recited these matters in regard to municipal plants because the facts existed as he stated them. The rate for "overhead" allowed in Wisconsin varied from 12 per cent to 15 per cent. However, it was to be considered that 10 per cent was allowed for contractor's profits on unit prices. This was in addition to the 12 per cent to 15 per cent for overhead, and if it were taken into account, the percentage allowed for overhead would be more than 20 per cent. As to the cost of making investigations, the commissioner explained that the utilities were seldom assessed the cost of making investigations, even when their rates were found to be too high, although the law permits this to be done. Often it was found, in the case of one utility, that some rates were too high and others too low, so that the subject was a complicated one, and the commission had never availed itself of its power to assess the cost of investigations of utilities that have been charging rates determined to be too high.

G. T. Seely, assistant general manager of the Chicago Elevated Railways, spoke of the overhead expense. In the case of an elevated railroad it took four years, perhaps, after construction was begun before final operation was accomplished. The overhead expense would surely mount up to 25 per cent or more.

Mr. Erickson, in answer to questions asked by W. B. Jackson and others, said that in relation to capitalization and overhead expense, the final standard, after all, was the figure for which money could be obtained. As to the "used and useful" phrase, it included all the amounts judiciously expended in building a plant and securing its business. There should be a fair relation between bonds and stock in financing utilities. It was difficult to determine in advance what this relation should be, but, after all, it came down to the question of the cost of obtaining capital by one method or another. The commission had not as yet granted a certificate of necessity to a competing utility, although it had the power to do so.

Experience with One-Man-Operated Cars

Letters from Railway Officials Describing the Results of Their Adoption of This Method of Operation and Recommending More General Use of This Type of Equipment

In view of the great interest in the subject of one-man-operated cars and the discussion regarding the practicability of the use of such cars to a much greater extent than has been the custom heretofore, the ELECTRIC RAILWAY JOURNAL addressed letters of inquiry to officials of companies that have had experience with this method of operation. The substance of the replies is given below, and the responses recommend strongly the adoption of this method of operation in small cities and on outlying lines of large cities.

R. B. STICHTER, GENERAL MANAGER WACO (TEX.) STREET RAILWAY

The cars were originally built with a view of one-man operation but so that, when occasions of heavy traffic demanded, they could be operated well with two men. The older types of Brill fare boxes have been in use, and the trainmen are permitted to make change only. We are at this time trying out the later types of fare boxes.

The system is so laid out that every car in service passes in front of the company office, the trainmen are supplied with $5 in nickels, and a change man remains on duty during the entire period of operation and keeps the men supplied. Twenty nickels are stacked and held together with a spring clip for the purpose, so change can be quickly and accurately made when required by the trainmen.

The hours of car operation per month will exceed 10,000, and the addition of another trainman per car hour, at 18 cents, would mean an increase of $1,800 per month. The saving does not amount to this much, however, as at present some of the lines have such heavy traffic that, the cars being of the single-truck type, it has not been found possible to operate with one man and make sufficient headway. There are other lines which during the heavy traffic period are supplied with an extra man to each car to act as motorman, the regular man during such period of heavy traffic confining his duties to acting in the capacity of conductor.

There are twenty-four cars on the system, all arranged for one-man operation. During November, however, four double-truck motor cars and four double-truck trail cars were received and were greatly praised by the Mayor and members of the City Commission and others interested in the city's welfare and development. These later cars embody the single-man, pay-as-you-enter feature, with outside closing doors operated by the motorman, are provided with cash fare boxes and are without bulkheads. The side framing consists of T-irons, extending from the floor framing up one side and down to the floor again on the other side, in one continuous piece. All of the motor cars are equipped for double-ended operation except four.

The amount to be expended to convert old-style cars to one-man pay-within cars depends on the number of car hours, the rate paid the trainmen per hour and other local conditions which are easily ascertained and secured in each particular case.

We expect trainmen to request payment of fare, cash, ticket or transfer, the same as in two-man pay-as-you-enter operation. All fares are registered on a double-fare register as cash or tickets. This is done by means of overhead straps. Transfers are issued at certain transfer points. We have not tried a transfer-issuing machine. The trainmen are instructed to announce streets and to assist only elderly persons on or off the cars. Our pay passengers per car mile average a little in excess of four.

One-man operation gives a little slower schedule than two-man operation. The schedule, however, under proper training and proper inspection, in our experience, is sufficiently rapid to please all patrons, and, in fact, is as rapid as safe conditions of operation will permit, regardless of whether the car is operated by one man or two men.

Our observation shows that a single-man car, provided with lever to operate folding doors and steps, if properly operated, is practically as safe as when operated by two men, and the number of accidents and the amount of damage resulting from one-man operation do not exceed to any perceptible degree those with two-man operation. As previously stated, however, when the traffic gets heavy, in order to make the same schedule, it is necessary to provide two men, and the results, from the accident standpoint, depend largely on the provision by the superintendent of inspectors of two men just at the time when traffic becomes sufficiently heavy to justify it.

The attitude of the public toward the one-man car seems to be very favorable. There is no objection to it whatever except in certain localities where a large proportion of the passengers are negroes, and in such cases it sometimes becomes necessary, hearkening to public opinion, to segregate the negroes in the rear of the car and permit them to enter and leave through the rear. In the case of one-man-operated cars it is ordinarily required that all passengers enter and leave by the front entrance.

Our experience with the one-man-operated car is that it very often enables the traction company to give street car service in thinly populated districts where if two-man operated cars were required such service could not profitably be maintained, and with the exception of lines blessed with quite heavy patronage the system of operation can be so laid out that very economical and satisfactory service can be given to the public.

J. W. WAGGENER, GENERAL SUPERINTENDENT ATCHISON (KAN.) RAILWAY, LIGHT & POWER COMPANY

The cars we operate are the ordinary semi-convertible single-truck cars with both rear and front platforms. The rear doors are kept closed and no fare boxes are used. We supply $5 in change to the trainmen. We have eight cars, all double-end. I think it is not necessary to spend any money in remodeling old-style cars for one-man prepayment operation if our system of closing the rear door is followed. We instruct trainmen to exact prepayment of fare in all cases on one-man cars. The fares are registered by hand. Transfers are issued when passengers leave the car and at the junctions. The motorman announces streets and assists passengers in boarding and alighting, or with heavy packages, etc., if they need assistance.

The average number of passengers per car mile on our one-man cars is 4.8. The maximum speed of the one-man cars is 8 m.p.h. The schedule speed is 7 m.p.h. There has been no effect on our schedule speed from the introduction of one-man cars. We have employed a second man when traffic is heavy; he stands inside of the car at the front end and collects and registers the fares. So far as our observation goes, the number of accidents has not been increased by one-man operation. We have never had any trouble with passengers, but many of them buy tickets to save trouble in making change when they enter the cars. All objection on the part of our public against one-man cars disappeared in a short time.

The saving in platform expense due to the use of one-man cars is not offset by disadvantages of any kind. We have received advantages from one-man operation in addition to our reduction in platform expense. All fares are apparently registered, and a saving has resulted of $2 per day on each car. This city has between 17,000 and 18,000 inhabitants. We came to the conclusion that one man could collect fares and register them practically as quickly as could be done with a conductor, and it became a question of cutting expenses; hence the adoption of the system.

I certainly recommend one-man operation for companies in small cities and for the outlying lines of companies in large cities, especially where the schedule is not too fast. For a number of years our cars were operated as one-man cars, passengers paying their fare when they left the car, but about two years ago this method was changed to payment as the passengers entered. This last arrangement has been much more satisfactory to the general public. On holidays, such as the Fourth of July and other big days, when the traffic is particularly heavy, it becomes necessary for us to put on a conductor during the congested hours only.

ATTILLO NORMAN, TREASURER FREEPORT (ILL.) RAILWAY & LIGHT COMPANY

Four of our cars were originally for one-man operation and two were reconstructed. The cars are double-end. Johnson registering fare boxes are used, and very little expense was necessary to remodel our old-style cars for one-man prepayment operation. We instruct trainmen to exact prepayment of fare in all cases on one-man cars. Trainmen register fares by hand and issue transfers in the usual manner. The motorman announces streets or assists passengers in boarding and alighting, or with heavy packages, etc., if they need assistance.

Our average number of passengers per car mile on one-man cars is about three and one-half. Our schedule speed is 8 m.p.h.; our runs are short and this includes turning time. There was no effect on our schedule speed from the introduction of one-man cars. We have never employed a second man on our one-man cars. So far as our observation goes the number of accidents has been decreased by one-man operation. Our car mileage is greater with the one-man cars than with the two-man cars operated previously. Our traffic has increased, but we are not sure that this was not due to other causes.

The attitude of our public toward one-man cars at the beginning of operation was that it was willing to have us try them out. Sentiment seems favorable now. The saving in platform expense due to the use of one-man cars is not offset by disadvantages of any kind. We have received advantages from one-man operation in increased receipts and fewer accidents. We introduced one-man operation for the purpose of economy in operation and because we expected increased receipts and fewer accidents. We recommend one-man operation for companies in small cities and for outlying lines of companies in large cities.

SAMUEL BARNES, GENERAL MANAGER CAPE GIRARDEAU-JACKSON (MO.) INTERURBAN RAILWAY

We have operated our one-man pay-as-you-enter cars for a little more than two years. We were about the first company to operate one-man cars. During this time we have had but one accident. We feel that this is due mostly to the fact that the motorman is placed in a position where he realizes that he is wholly responsible for the car operation and is not depending on the efforts of any one else to avoid possible accident. Furthermore, we have some 7 per cent grades running straight toward and within one block of the Mississippi River banks or levee. When going down this grade, if the car gets beyond the motorman's control, it is necessary for the motorman to throw off the overhead switch and reverse the controller seven or nine points to allow the motors to generate sufficient current to hold the car to a controlling point of speed. Previous to the one-man operation this effort to avoid a runaway with the car on the down grades depended on the conductor to some extent, and at such times he was liable to be inside of the car collecting fares; but under the new system the motorman has quicker access to the means of remedy. There are other instances wherein the one-man pay-as-you-enter car is far superior to two-man car operation.

We reconstructed our cars ourselves. Fare boxes of the 4-A Brill type are used. Each man has to furnish his own change, $10. There are six one-man cars on the system, or ten cars of all types. One-half of the cars are single-end and the remainder are double-end. The expenditure that a company would be justified in making to remodel old-style cars for one-man prepayment operation depends on the type of car and general traffic conditions. Our single-end cars cost $240 per car, and our double-end cars $480 per car, to reconstruct. We instruct trainmen to exact prepayment of fares in all cases on one-man cars. Fares are registered by hand and regular transfers are issued. The motorman announces streets and assists passengers in boarding and alighting, or with heavy packages, etc., if they need assistance.

The schedule speed on our one-man cars is 9½ m.p.h. We are making just as good schedule time as with the old system. We have never employed a second man on one-man cars. The number of accidents has been decreased by one-man operation. Our car mileage is greater with the one-man cars than with the two-man cars operated previously. The traffic was affected by the establishment of one-man cars on the start for about ten days. The change seemed to cause a little inconvenience to the public, but after that everything worked smoothly. Some people were not favorable to the idea of putting change in the box, but this attitude has changed. All the results of one-man car operation are advantageous. We introduced the cars to reduce the cost of operation and improve the receipts, and by all means recommend one-man operation for companies in small cities and for outlying lines of companies in large cities. During big days our one-man cars carry 1800 to 2000 passengers per day each. We have had days in which these cars have handled 900 passengers each in three hours.

JOHN A. PORTER, MANAGER PARIS (TEX.) TRANSIT COMPANY

We use cars with 5-ft. platforms with a controller on each platform. We supply the trainmen with $5 for change. We have, all told, eight cars, of which five are operated in regular service. All are of the semi-convertible type. The cars are double-end. We instruct trainmen to exact prepayment of fares in all cases on one-man cars, unless from a woman encumbered with baggage or baby, who is allowed to pass in, deposit baggage and return immediately with fare. The car remains standing until the fare is received, when it is at once registered by the motorman, the register cord being immediately overhead.

Transfers are issued as passengers leave the car. This feature is easily controlled here, as there is but one transfer point to which all cars run. No announcement is made of streets. The motorman assists passengers in boarding or alighting only from the platform and never alights upon the ground unless in some extreme cases as with a cripple, decrepit person, etc. Our average number of passengers per car mile on one-man cars is 3.87. Our maximum speed on one-man cars is 15 m.p.h. Our schedule speed is 12 m.p.h. The result on our schedule speed from the introduction of one-man cars was a loss of nearly two minutes per mile. We have employed a second man on one-man cars on big days. On double-end cars when conductors are employed the front doors are closed and conductors take the usual place. The number of accidents has been decreased by one-man operation because the motorman can see that passengers have alighted before he starts the car.

The sentiment of the public at Paris forbids obscene language on cars, and as there are no saloons in town, we rarely have disorderly behavior on our cars. Our car mileage is less with the one-man cars than with the two-man cars operated previously. The schedule is lowered at the transfer point about three minutes. The public was informed of the change by announcement of the difficulty that the line had to maintain itself with the expense involved with two men. The public now generally realizes that small towns cannot afford such a train crew. The disadvantages in the use of one-man cars are the lowered schedule and the difficulties in handling the occasional rush, but the saving justifies the change in spite of these objections. Expenses were reduced at this plant about $250 per month average on "trainmen's wages" without perceptible change in revenues.

We introduced one-man operation to save money. We recommend one-man operation for companies in small cities and for outlying lines of companies in large cities and only under these conditions.

S. R. INCH, FORMERLY MANAGER MISSOULA (MONT.) STREET RAILWAY

[As Mr. Inch has been a strong advocate of the one-man car, he was asked if he cared to say anything to supplement the paper presented by him before the American Electric Railway Association convention in Chicago, an abstract of which was published in the ELECTRIC RAILWAY JOURNAL of Oct. 11, 1912. The list of questions that was sent out generally was also sent to him. His reply is given below.—EDITOR.]

In regard to your suggestion that there might be something which I would care to say further at this time relative to one-man cars, I have only one thing to suggest. This is, that as much as possible be made of the fact that the operation of one-man cars in towns where their use is feasible represents a distinct benefit to the community affected, since the reduction in operating expenses should enable the railway company to give more frequent service for the same density of travel than would be possible with two-man cars under the same conditions. I feel that the difficulty of introducing one-man cars may be considerable in certain places unless the company affected can interest the public which it serves in the matter, and this can be done only if the public is shown that it is to its interest that one-man service be adopted.

This is a matter which I attempted to bring out in my paper, but it is one which I think has not had the prominence which it deserves in connection with one-man-car discussions. It is true that the most important point to the operating company is the saving in the platform expenses for any given number of cars. It is also true, however, that this is an item of very little interest to the general public, and it therefore becomes necessary that some argument be advanced affecting the self-interest of the public, so that it will favor the proposition. I think the argument of increased service satisfactorily fills this condition, and I think it should be made a great deal of by any company proposing to introduce one-man cars. With the public convinced that its interests will be better served with one-man than with two-man cars, the difficulties with labor organizations relative to such a change would be much simplified.

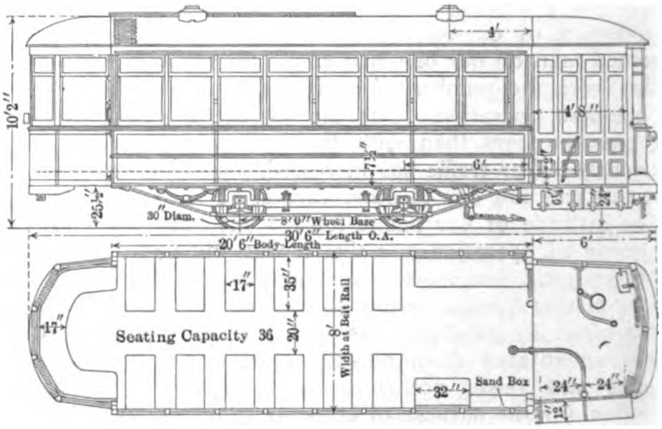
Our cars were originally built for one-man operation. Fare boxes, Brill No. 4-A, are used. We supply the trainmen with change for $15 per car. One-man operation saves us 3⅓ cents per car mile in platform expense. We have eleven one-man cars on the Missoula system, or thirteen cars of all types. Two of the cars are single-end and the remainder are double-end.

The expenditure that a company would be justified in making to remodel old-style cars for one-man prepayment operation would vary in different places, and I would suggest that an estimate of probable saving be made. We instruct trainmen to exact prepayment of fares in all cases on one-man cars. Fares are registered by means of a hand lever and transfers are issued in the ordinary way. We are experimenting on a transfer-issuing machine of our own design. The motorman does not announce streets but does assist passengers in boarding and alighting when necessary. Our average number of passengers per car mile on one-man cars is 3.76. The maximum speed on one-man cars is 20 m.p.h. The schedule speed is 8½ m.p.h. We cannot state the effect on schedule speed from the introduction of one-man cars as our system has always been "one-man," but I think the effect should be negligible or nearly so. It is not necessary in a small town to employ a second man on occasion. We have had no accidents due to one-man operation in nearly three years.

Possibly certain classes of passengers are more likely to cause disturbance on one-man cars than on a car with two trainmen, but we have had very little trouble from this cause. The attitude of the public toward one-man cars at the beginning of operation was one of suspended judgment, but this attitude has changed and it is now very favorable. We know of no disadvantages in one-man operation but have received advantages in addition to the reduction in platform expense. The additional advantages are freedom from platform accidents and ability to run more cars and so serve our territory better. I recommend very strongly one-man operation for companies in small cities and for outlying lines of companies in large cities.

E. G. CONNETTE, PRESIDENT INTERNATIONAL RAILWAY, BUFFALO, N. Y.

We are equipping our Lockport city system for the operation of one-man near-side cars. The tracks have been arranged for the operation of this type of car. The cars are here and we hope to have them equipped and in operation during January. I estimate that the saving in platform expense, together with other economies incident to this type of car, will be sufficient to pay the interest and depreciation upon the new equipment, including the track facilities and leave a substantial balance to be credited to net earnings. The proposed operation of the entire city system in Lockport, N. Y., with one-man near-side cars will fully demonstrate the efficiency and economy of this method of operation. The cars were furnished by the Near-Side Car Company of Philadelphia, Pa.



Electric Ry. Journal

One-Man Near-Side Car—Buffalo

We propose to use fare boxes of the Johnson type until we can secure a combination fare box and recorder. The collection of fares will be under the control of the motorman, who will furnish change and issue transfers. The transfers will be simple in form, requiring two punch marks, time and destination. We do not propose to use a transfer-issuing machine. The motorman will announce the names of the streets.

We have been operating cars with one man on shuttle lines in the city of Buffalo for the last year or two, but the operation is in isolated districts where the traffic is light, and it is not worth while to make any report on it.

J. T. SKINNER, MANAGER LAWRENCE (KAN.) RAILWAY & LIGHT COMPANY

In preparing cars for one-man operation we simply closed up the rear door and folded up the rear step and put a fare box on the front end of the car. Fare boxes are used, part Brill No. 4-A and part Johnson recording fare boxes. We loan the trainmen for change $10. The one-man-operated cars save approximately 40 per cent of platform labor. We operate regularly seven one-man cars on the system, but have a total of eleven double-end and three single-end cars.

A company is justified in folding up the rear step, closing the rear door, putting the fare box or register on the front end of the car and going ahead without any further changes except to adopt the near-side stop. We instruct trainmen to exact prepayment of fares in all cases on one-man cars except where the trainmen know that the person will hunt out the fare and drop it in the box before leaving the car. Old people and women with children and bundles will frequently take a seat near the front end of the car, hunt out the fare and drop it in the box after the car has started.

Trainmen ring up fares by hand as they are dropped in the box. If the car has a clear running space, the trainman punches his transfers with the car in motion; if not, the transfers are punched and handed to passengers as they leave the car. Only about 10 per cent of the passengers require transfers. Trainmen announce transfer points and streets for strangers. Our average number of passengers per car mile on one-man cars is about four. Our maximum speed on one-man cars is 20 m.p.h., and our schedule speed approximately 8 m.p.h. Since the introduction of one-man cars we have used a somewhat slower schedule. When we have large crowds to handle we open up the rear door and use two men, collecting fares at each end as passengers board cars; this allows a car to be loaded and unloaded quickly. The number of accidents has been decreased by one-man operation. We have not found that certain classes of passengers are more likely to cause disturbance on one-man cars than on a car with two trainmen.

Our car mileage has been increased somewhat with the one-man cars on account of the slower schedule. There has been no change in traffic due to one-man cars. The public thought it was a sensible thing to introduce one-man cars on a small road rather than to cut down car service to effect economies. The saving in platform expense due to the use of one-man cars is not offset by disadvantages of any kind. There are advantages in one-man operation in addition to the reduction in platform expense. One man kept busy will render more efficient service than two men partly idle. We introduced one-man operation because there is no need of two men on a small road except during a few days out of a year. I recommend one-man operation for companies in small cities, and for outlying lines of companies in large cities, where the regular riding is light, one man is better than two.

L. W. HESS, GENERAL SUPERINTENDENT NORTHERN ILLINOIS LIGHT & TRACTION COMPANY

Our one-man-operated cars are ordinary cars. We close the back doors and make all people get on the front end. In Summer we have both front doors open and in winter the right-hand front door in the direction the car is going. We supply $4 to the trainmen for change. In September, 1912, our revenues per car mile on one-man-operated cars were $0.1897 and our expenses were $0.0918. We have six cars, and all are operated by one man except on large-traffic days. All the cars are double-end. The amount which a company would be justified in spending to remodel old-style cars for one-man prepayment operation would depend on local conditions.

We instruct trainmen to exact prepayment of fares in all cases on one-man cars. The trainman records the fares on a fare register. He collects as the passenger gets off and the car is at stop or when he comes to a switch where cars pass. He steps inside at this point and collects fares. Transfers are issued by the motorman, who does not announce streets except when the passenger asks to get off at a certain place. The motorman is required to help all passengers who need it. Our average number of pay passengers per car mile on one-man cars is 3.93. Our schedule speed is 12 m.p.h. under the ordinance. One-man cars run a little faster under certain local conditions than was the practice before. On large days we have employed a second man on our one-man cars. He acts as conductor.

According to our experience the number of accidents has not been increased by one-man operation. We have never had an accident to a passenger getting on or off a one-man car. I do not think collisions are increased, as the man on the front end is the man to look out for that, anyway. I do not think disturbances are more apt to occur on one-man cars than on a car with two trainmen. Any person who wants to start trouble is usually under the influence of liquor, and the number of the crew would make no difference. Our car mileage is not greater with the one-man cars than with the two-man cars operated previously. The traffic was decreased slightly at the beginning by the introduction of one-man cars. There was some opposition toward them also at first, but this attitude has changed. I think the saving in platform expense due to the use of one-man cars is not offset by disadvantages of any kind.

There are advantages in one-man operation in addition to the reduction in platform expense. The responsibility of operation cannot be shifted to the other man, and there are fewer men to bear the responsibility. We introduced one-man operation to economize in expenses, as we cannot afford two men on a car. I recommend one-man operation for companies in small cities and for outlying lines of companies in large cities if they want to save money. We have operated our line almost fifteen years and have never had a suit entered in court because of a street car accident, although, of course, we have had a number of accidents.

DEAN TREAT, DISTRICT SUPERINTENDENT ILLINOIS NORTHERN UTILITIES COMPANY, DIXON, ILL.

At the present time we are installing the prepayment device on our city cars; that is, putting the door-control mechanism on our single-man cars. We have been operating these cars as single-man cars ever since the road started, with the exception of the first few months, when it was found that the amount of business did not warrant two-man operation. In the past our city cars have been operated as single-man cars, using the rear right-hand door for receiving and discharging passengers. The Johnson fare box was used and was placed in the forward end of the car, making it necessary for the passengers to deposit their fares, either ticket or cash, in this box.

On account of the accidents that occurred it was found advisable to put in the door-control mechanism and make the near-side stops. This allows passengers to leave the cars at the front right-hand door and deposit their fare in the fare box, which is located on the front platform.

E. E. DOWNS, FORMERLY GENERAL MANAGER BELVIDERE (ILL.) CITY RAILWAY

The cars on the Belvidere city line were built originally for one-man operation. A remodeled Johnson fare box is used. It rests on a pedestal on the platform convenient to the passengers and the motorman. The motorman supplies himself with $10 in change, but 75 per cent of the passengers have the exact fare ready. We operate two double-end one-man cars. We instruct trainmen to exact prepayment of fares in all cases on one-man cars. Fares are recorded by a hand-register card hanging directly in front of the motorman. Transfers are not issued. The motorman announces streets or assists passengers in boarding and alighting, or with heavy packages, etc., if they need assistance. Our maximum speed on one-man cars is 15 m.p.h. The schedule speed is 7.5 m.p.h. A second man is hardly ever necessary, except on special occasions, to make change and expedite loading and unloading. At such times he stands in any place not occupied by passengers. One-man operation obviates all loading and unloading accidents, but certain classes of passengers are more likely to cause disturbance on one-man cars than on a car with two trainmen.

At the beginning of operation everybody seemed pleased and took to the new order of things very kindly. The saving in platform expense due to the use of one-man cars is not offset by disadvantages of any kind. I recommend one-man operation for companies in cities of even as high as 40,000 population.

JOHN WISDOM, GENERAL SUPERINTENDENT JACKSON RAILWAY & LIGHT COMPANY

Our cars were not rebuilt. We use Coleman fare boxes and supply trainmen with $10 for change. Our revenues per car mile on one-man-operated cars are 17 cents and our expenses 10 cents. We have eighteen one-man cars on the system and twenty-one cars of all types, running three open cars with conductor on the park line during the summer. All the cars are double-end.

We instruct trainmen to exact prepayment of fares in all cases on one-man cars. Fares are not registered. Transfers are issued by the motorman as passengers leave the car. We use a transfer agent during the evening rush. Except in rare instances the motorman does not announce streets or assist passengers in boarding and alighting. Our average number of passengers per car mile on one-man cars is four. Our schedule speed is 8 m.p.h. We reduced our schedule 1 m.p.h. when we put these cars in service.

On big days we sometimes put an extra man on to make change and punch transfers. Our accidents have been reduced by the use of the one-man car. We noticed no difference in traffic from the introduction of one-man cars. The public of Jackson likes the system. The worst trouble we have is to keep passengers from wanting to ride on the front platform. The advantages received from one-man operation in addition to reduction in platform expense are in the reduction of accidents. We recommend one-man operation for companies in small cities and for outlying lines of companies in large cities.

HENRY CRITTENDEN, GENERAL MANAGER DELTA ELECTRIC LIGHT, POWER & MANUFACTURING COMPANY, GREENVILLE, MISS.

We reconstructed our platforms, one side of the platform being entirely closed. We have seven one-man-operated cars on our system and twelve cars of all types. The cars are double-end. We use the old-style T. L. Johnson fare box, one on each end of the car, and supply our trainmen with $7 each for change. We do not instruct trainmen to exact prepayment of fares in all cases on one-man-operated cars. As fares are dropped into the box they are registered by means of an overhead cord on each end of the car. Transfers are issued only when cars reach the transfer point, which in our case is only at one intersection of north-and-south and east-and-west lines. We have never tried a transfer-issuing machine. We do not find it necessary on our system to announce streets or assist passengers in getting on and off cars.

Our schedule speed is 8 m.p.h. with maximum speed of 20 m.p.h. We use only one man except when the county fair is in progress or when a circus comes to town. At such times the extra man collects the fares. We deal with both white and negro passengers, but have never had any trouble with disorder on the cars. We started operating cars with one man and have never received any serious complaint of such service. We chose one-man operation for the purpose of reducing operating expense. Two-man-operated cars would on our system result in loss. In cities of from 15,000 to 20,000 population I would recommend one-man operation, but do not know anything about outlying lines in large cities.

F. R. NEWMAN, GENERAL MANAGER GREENVILLE (TEX.) RAILWAY & LIGHT COMPANY

Our cars were built originally for one-man operation by the Cincinnati Car Company. We have seven single-end cars all of the one-man type. Johnson fare boxes are used. We do not supply any money to trainmen for change. A company would be justified in spending $500 per car if necessary to remodel old-style cars for one-man prepayment operation.

We instruct trainmen to exact prepayment of fares in all cases. Fares are registered by hand. This does not interfere with their other duties, as the cars are not started until the doors are closed. Transfers are issued in the usual manner. It is only in unusual cases that the motorman announces streets or assists passengers in boarding or alighting. Our maximum speed is 15 m.p.h. and our schedule speed is 8½ m.p.h.

We have employed extra men on rush days, but then only to attend to the trolley and open the back door for exit purposes. Judging by experience on other systems using two men to the car, the one-man system will show fewer accidents by a considerable percentage. The attitude of our public toward one-man cars has always been favorable. The disadvantages of the system are that there is nobody to attend to the trolley at railroad crossings, and the schedule is slower, as all passengers must enter and leave at the front end. On the other hand, there should be a reduction in boarding and alighting accidents, because there is no division of responsibility between motorman and conductor. Our system has been in operation about one and one-half years with one-man cars entirely. The results have been such that I feel safe in saying I know personally of many small systems that would be able to effect considerable economies if one-man cars were adopted, both from the standpoint of reduced platform expense and that of reduction in number of boarding and alighting accidents.

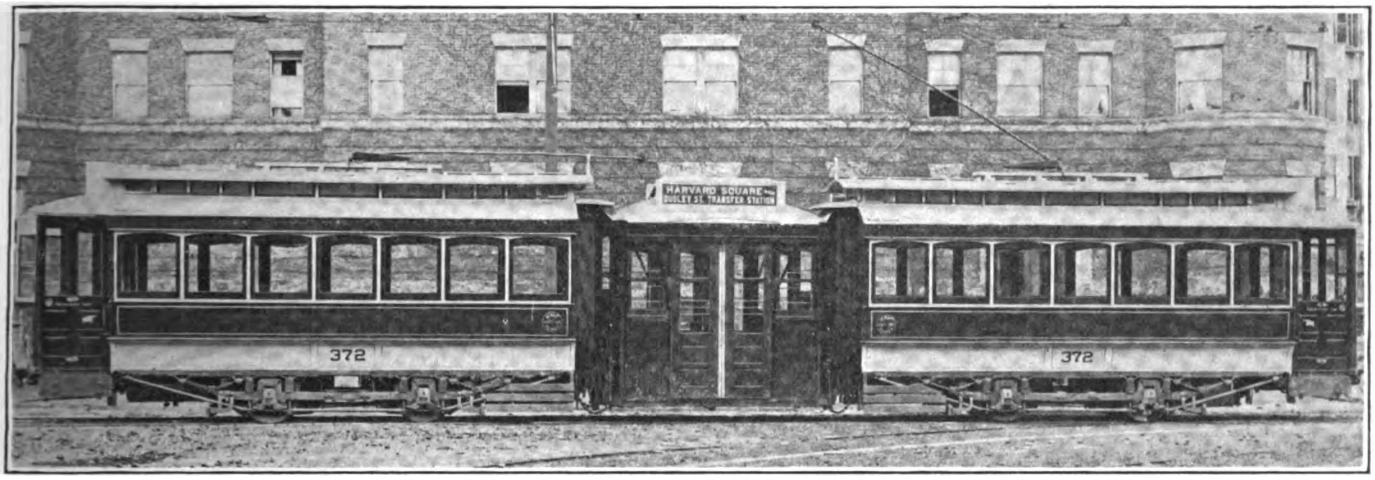
COMMITTEE ON CONVENTION LOCATION FOR 1915 LEAVES FOR SAN FRANCISCO

On the same train which carried the electric railways committee of the American Electric Railway Association, which left for San Francisco on March 25, as noted elsewhere on this page, was the joint committee on location of the 1915 convention. The convention location committee representing the American Electric Railway Manufacturers' Association is composed of E. H. Baker (chairman), James H. McGraw and Secretary H. G. McConnaughy. The American Electric Railway Association members of the committee are Messrs. Harries, Henry and Donecker, who will also act as the electric railways committee which has been invited to the organization meeting of the proposed Pacific Coast electric railway association. On reaching San Francisco the joint committee on convention location will take up the matter of available facilities for holding a convention there during 1915, the exposition year. The committee has power to act in this matter provided satisfactory facilities are found. This early action is made necessary because a great many national societies and associations have already made their plans to meet in San Francisco during 1915. Thus, if the convention of the American Electric Railway Association is to be held during the exposition, it is necessary to insure now that the members shall be taken care of properly and that due reservations shall be made for such exhibit space as may be required.

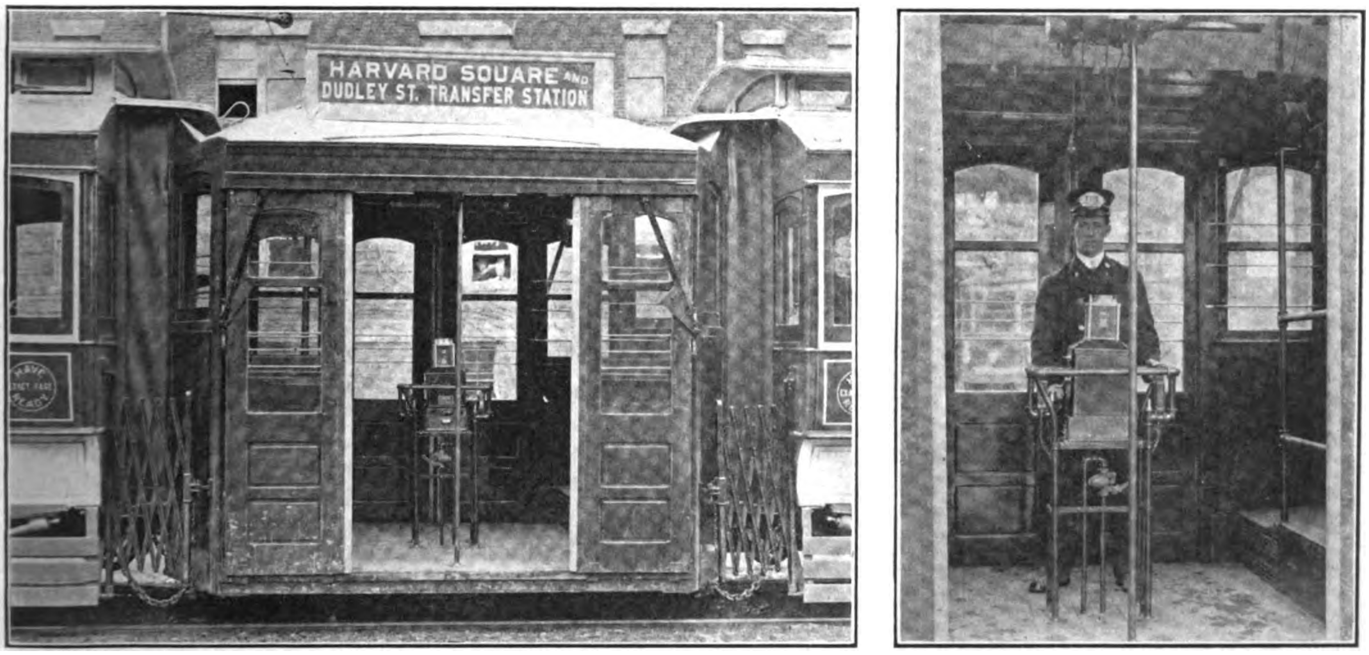
An Improved Type of Articulated Car

The Novel Design of Car Which Was Developed by the Boston Elevated Railway Last Year Has Proved So Successful That a Second Car of the Same Type Has Been Constructed—In the New Design a Number of Improvements Have Been Introduced, Including a Stepless Feature

In the issue of this paper of Oct. 5, 1912, page 606, an illustrated description was printed of the new articulated car designed by John Lindall, superintendent of rolling stock and shops, Boston Elevated Railway Company. The car represented the most novel design placed in service in urban traction work during the year and consisted in brief of two of the company's 20-ft. closed cars with one vestibule and platform removed from each, the two units being assembled into a single car 62 ft. 10¼ in. long over bumpers through the use of an intermediate compartment flexibly connected with the two end sections and serving as a center-entrance, prepayment platform. In this car access to the intermediate compartment was had by means of a folding step attached to the outside of the compartment in front of the doors and about 11 in. below them.

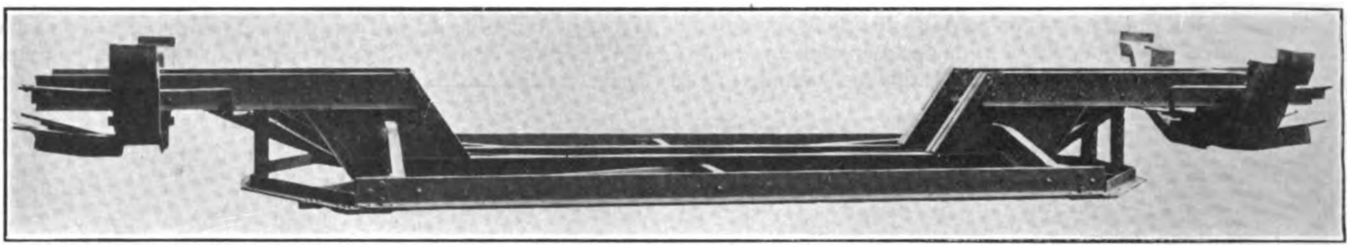


Improved Articulated Car—General View Showing New Arrangement of Central Section with Stepless Feature



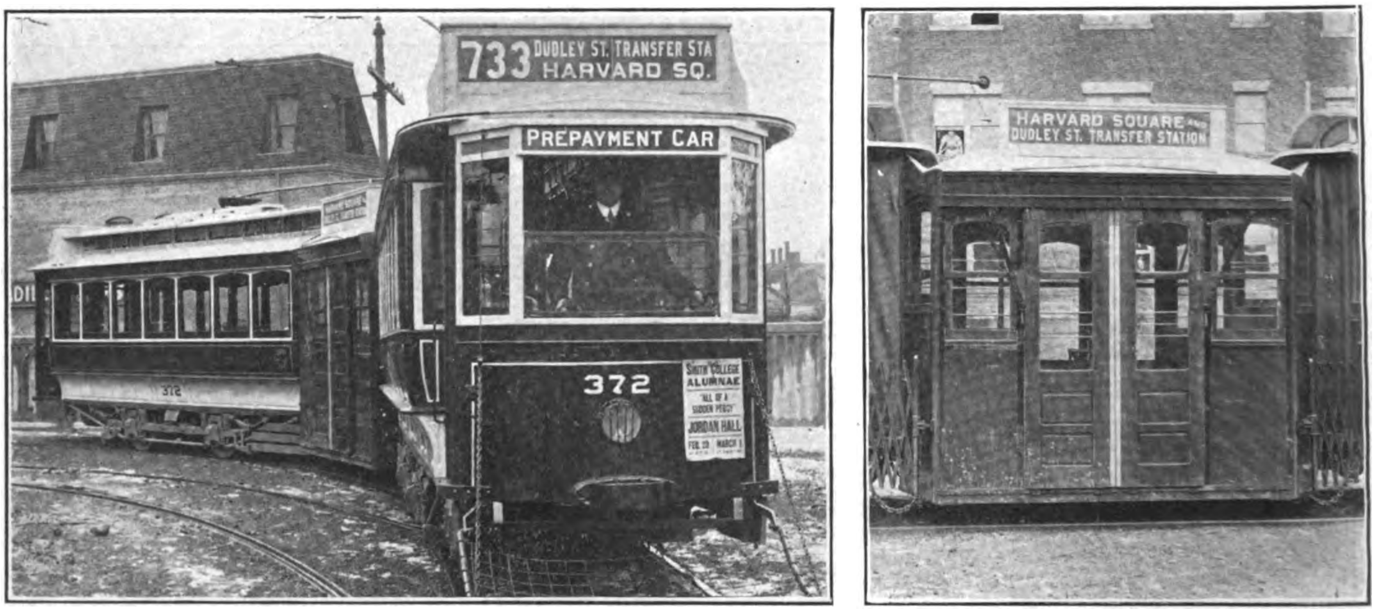
Improved Articulated Car—View of Central Section Showing Roller Curtains and Hinged Hoods—View of Interior Showing Heater Under Step at Right

The main object sought in the design of the car, aside from its effective utilization of a heavy investment in small rolling stock units of low carrying capacity, was to obtain a car capable of holding at least as many passengers as the standard semi-convertible cars owned by the company and to produce a piece of rolling stock which could be used on narrow streets and on short curves without dangerous overhang, at the same time providing improved facilities for convenience and safety to passengers when entering or leaving. The first car of this type has been in service since early in September, 1912, and has met with complete success, both from the company's point of view and from that of the public. A second car of this general type has lately been placed in commission, and a number of improvements have been effected in its design, the most notable feature being the adoption of the principle of stepless operation. In the new car the floor of the center section, where the doors are located, is arranged with a lower level than the first car of the type, so that passengers step directly from the street into the intermediate compartment, which is located 14 in. above the roadway. This is an unusually low height of step, and the car may in fact be considered stepless in the same sense as the so-called stepless center-entrance cars now operating in Manhattan and Brooklyn Boroughs, New York City.



Improved Articulated Car—View of Framing for Central Section Showing Offset in Center Sills and Method of Supporting Side Sills

The general design of the car is similar to that of the first one, but the utilization of the stepless principle made a number of changes necessary in the underframing of the intermediate compartment. After the passenger has stepped into the center compartment and deposited his fare in a Johnson fare box in the middle of the compartment, a second step of 10 in. is taken in order to approach the doorway leading into either end section, and this platform within the central compartment has a ramp with a rise of 2 in. between the outer edge and the step riser which is surmounted prior to entering the end section. As in the first car, the latter is 5 in. in height. The lowering of the center platform has been accomplished by offsetting the center sills of the central or intermediate compartment, the side sills being supported at the same height as the lower portion of the center sills by channel irons passing through center-sill reinforcing plates and resting on the bottom members of the center sill. A change has also been made in the bolster arrangement, the side-bearing plates resting on top of rollers carried on the top of the bolster support instead of on the end sills of the cars. This permits the use of a flooring about 8 in. wider for the passageway between the intermediate and end sections.


733 DUDLEY ST. TRANSFER STA HARVARD SQ.
PREPAYMENT CAR
372
JORDAN HALL
HARVARD SQUARE AND DUDLEY ST. TRANSFER STATION

Improved Articulated Car—Car on Curve—Central Section with Outside Folding Doors in Closed Position

The flexible curtain inclosing the passageway between the intermediate and end sections of the car has been materially improved, and instead of using a continuous diaphragm the bonnets carried by the end sections have been arranged with horizontal hinges permitting vertical movement of the outer end of the bonnet, which rests in each case on the top of the end wall of the intermediate section. This provides all necessary movement between the units and at the same time makes a waterproof joint, providing at all times a ceiling line parallel to the floor line of the intermediate compartment and thus enabling the sides to be closed with spring roller curtains. This arrangement is shown in the accompanying halftone views.

The car is equipped in the vestibules with electric bells operated by push buttons located on the pipe framing which carries the fare box. When the car is running only the bell in the forward vestibule and one in the center compartment are in circuit, a metallic covering being provided for the push button which controls the bell in the rear vestibule. When the car is operated in the reverse direction the push-button cover is transferred by the conductor, so that only one button can be operated at a time. Four 500-watt Consolidated car heaters are installed under the platform in the intermediate section, as shown in the accompanying halftone, and these add greatly to the comfort of the conductor and to that of passengers entering the car in wintry weather, as the payment of fares is made in a reasonably warm compartment instead of in a cold vestibule. The ends of the end sections are equipped with folding steps operated with the doors which are under the control of the motorman. Ordinarily the steps at the rear of the car are not used, but the movement of passengers is from the center toward the front end and from the rear section toward the front, as in the first car of this type. The car is equipped with four G.E.-58 motors and semi-automatic air brakes, a feature of the latter apparatus control being a conductor's emergency valve located under the fare box supporting frame in the central compartment. The doors of the central portion are operated by air cylinders in the roof. Like the first car of this type, the second unit has been built at the Bartlett Street shops of the railway company, and both are now in regular service on the route between Harvard Square, Cambridge and Dudley Street, Roxbury.

DATA ON OPERATION

The observations on passenger handling with the stepless articulated car, as noted in the accompanying table, were made on March 24 between 3:17 and 4:15 p. m. during a round trip between Harvard Square and Dudley Street:

Data on Loading and Unloading Passengers

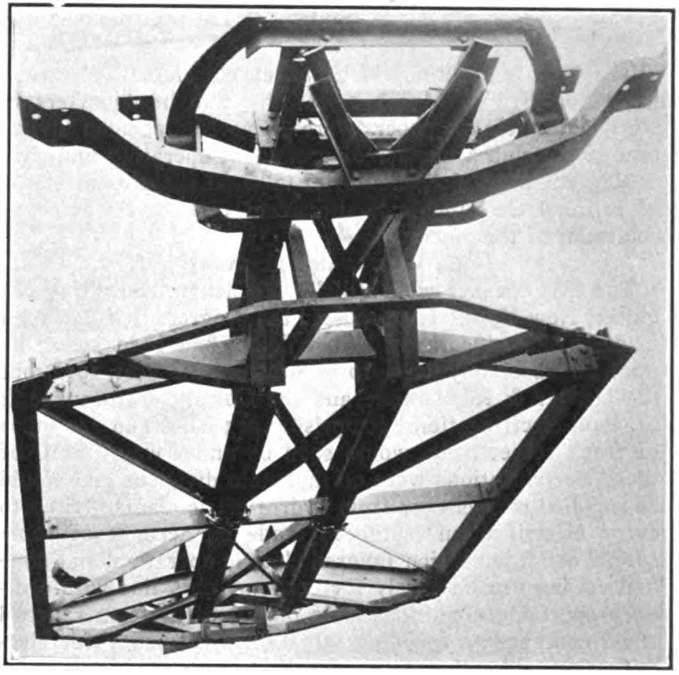
PASSENGERS ON AND OFF CAR NO. 372

Pass'r Stop No.	Seconds	Center Door On	Center Door Off	End Door (Front) On	End Door (Front) Off	Remarks
1	2	1	0	0	0	
2	9	4	0	0	0	
3	2	0	1	0	0	
4	2	2	1	0	0	
5	16	5	2	0	0	Brookline St. transfer station
6	9	5	0	0	1	
7	10	5	0	0	0	
8	5	2	0	0	0	
9	8	1	0	0	0	
10	10	3	1	0	0	
11	3	1	0	0	0	
12	3	0	1	0	0	
13	55	29	5	1	0	Mass. Ave. transfer station
14	3	2	0	0	0	
15	13	0	6	0	0	
16	5	1	1	0	0	
17	2	1	0	0	0	
18	6	0	3	0	0	
19	7	3	0	0	0	
20	9	2	2	0	0	
21	7	0	1	0	0	
22	26	1	20	0	0	Northampton St. transfer station
23	3	0	1	0	0	
24	5	0	2	0	0	
25	35	0	22	0	0	Dudley St., unloading
26	27	16	0	0	0	Dudley St., loading
27	5	2	0	0	0	
28	2	1	0	0	0	
29	13	5	0	0	0	Northampton St. transfer station
30	12	4	1	0	0	
31	6	0	1	0	0	
32	5	0	2	0	0	
33	7	4	1	0	0	
34	5	1	0	0	0	
35	10	1	2	0	0	
36	19	2	11	0	0	Mass. Ave. transfer station
37	5	0	2	0	0	
38	4	1	1	0	0	
39	5	0	2	0	0	
40	11	0	2	0	0	Brookline St. transfer station
41	10	0	7	0	0	
42	5	0	1	0	0	

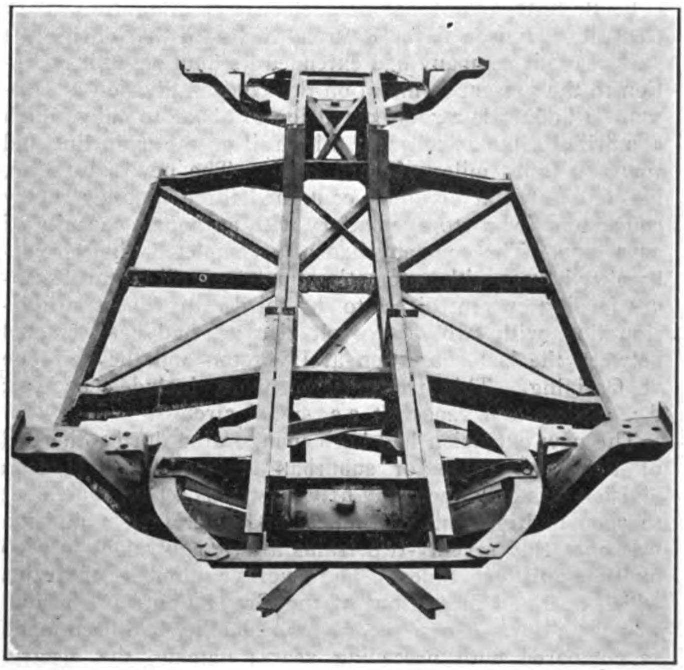
Summary of Observations, March 24, 1913

Total passenger stops	42
Length of round trip in miles	8.76
Passengers on (boarding car during trip)	106
Passengers off (leaving car during trip)	102
Total passenger movements on and off	208
Cash fares	66
Transfer passengers	28
Unregistered passengers	20
Total passengers, including those on car at the start and on at end of round trip	114
Total duration of passenger stops in seconds	406
Duration of round trip in seconds	3536
Percentage passenger stops of total time	11.5
Average length of passenger stop, seconds	9.6
Passenger stops per mile	4.8
Passenger movements per mile	23.8
Average passenger movements per stop	4.95
Average time in seconds per passenger movement	1.95

The above data show that the average time required for a passenger to board or leave the car was about two seconds, covering the total duration of the stop from the time the car came to absolute rest to the time when it again began to move. At the stops where the larger traffic entered or left the car the time per passenger to board or alight was much less, usually in the vicinity of one and one-half seconds, and this despite the fact that little use was made of the forward door in leaving the car. The observations were purposely made during the mid-afternoon period before the evening rush hours. The route traversed by the car is of the cross-town type and does not pass through the business center of Boston, although it lies almost entirely within a district occupied by residences, small mercantile establishments, concert halls and schools. A heavy local traffic is handled between the several transfer points named in the tabulation. The figures give a good idea of the working of the low-step center-entrance feature of the car, as the passengers voluntarily used this almost to the exclusion of the forward door. Had the latter been used, it is probable that the duration of passenger stops would have been still further reduced at points where several persons entered or left the car at the same time. Prompt handling of the pneumatically operated doors of the central compartment was a factor in the reduction of stops to the limits in the table.



Improved Articulated Car—Bottom View of Central Section Frame



Improved Articulated Car—Top View of Central Section Frame

Electrical Night of the New York Railroad Club

The Proceedings Were Devoted Exclusively to Problems of Electrification—At This Meeting Frank J. Sprague Outlined a Proposed Plan for a Technical Commission to Aid the Steam Railroads in Choosing a Proper System of Electrification and in Financing Electrification Projects

The New York Railroad Club held its annual "electrical night" on Friday, March 20, at the club headquarters in New York. No set papers were delivered, but upon invitation of the club a number of prominent operating and consulting engineers delivered brief talks on the present status of railroad electrification. President Chamberlin acted as chairman of the meeting.

MR. M'CLELLAN'S REMARKS

The first speaker was William McClellan, consulting engineer, New York. He discussed the progress that had been made in electrification. Not a dollar had been spent, he said, for absolutely new projects during the year 1912, but the Denver & Rio Grande and the Chicago, Milwaukee & St. Paul electrifications, comprising 203 miles and 440 miles of track respectively, would soon be under way. Both of these electrifications were on mountain divisions and would be supplied with energy from hydroelectric plants. Hitherto every electrification had been made on account of some special condition which favored electric operation, and none had yet been made purely for economy on a line with ordinary operating conditions. No official of a steam railroad could contemplate spending large sums of money for electrification under the present conditions concerning the regulation of corporations, the prices of material and the uncertainty of labor. There was nothing experimental about the engineering side of electrification, but the disturbance of income account caused steam railroad men to hesitate unless the conditions were plainly in favor of electrical operation. However, important progress had been made in gaining much experience which would be available to those who were going to electrify in the future.

MR. KATTÉ'S REMARKS

E. B. Katté, chief engineer electric traction New York Central & Hudson River Railroad, reported that during the past year his company had extended its multiple-unit operation to the present terminal on the Hudson division at Croton. It had made a route extension of about 10 miles which comprised some 40 miles of third-rail on the main line and some 10 to 15 miles of yard track. The new substation, No. 6, erected at Ossining contained three 1000-kw rotary converters and a storage battery with an hourly capacity of 2200 amp. The company had also completed nine circuit-breaker houses with automatic remote-control circuit-breakers feeding current direct to the third-rail. The transmission line, with two 11,000-volt circuits, had been erected between the last substation at Irvington and the new one at Ossining. This transmission work included 600-volt d.c. feeders and 2200-volt a.c. signal circuits.

The new extension had been inaugurated during the end of February, 1913, for suburban service. The Hudson division was now operating fifty-six trains a day, equivalent to 7000 multiple-unit car miles, and the Harlem division was operating seventy-two trains a day, equivalent to 7800 multiple-unit car miles. The average number of trains which operated in and out of the Grand Central Terminal was 525 a day. A new record for reliability had been made as compared with preceding years; namely, the electric locomotives had operated 4709 miles and the multiple-unit cars 10,798 miles for each minute of detention due to electrical causes. Likewise, the multiple-unit cars had operated 12,374 miles per minute detention due to mechanical causes. The average miles per minute detention on the whole electrical division due to all electrical and mechanical delays, including line, etc., was 4861 miles in 1912, 1200 miles in 1911 and 1785 in 1910. The table on the opposite page, which classifies all detention troubles and mileages for every month of 1912, shows that the company operated 1,351,577 locomotive miles and 4,297,633 multiple unit miles.

The electric locomotives and multiple-unit cars had now been in operation for more than six years. During 1912 the maintenance and renewal cost of the locomotives, including shop expenses, painting, etc., was 3.34 cents per mile, compared with 3.2 cents in 1910 and 3.08 cents in 1911, making the general average, say, 3.33 cents. Similarly the maintenance and renewal cost of the multiple-unit cars was 1.8 cents per car mile in 1912, 2.1 cents in 1911 and 1.9 cents in 1910, but Mr. Katté estimated that the average cost would run about 2 cents per car mile.

During the present year the electric locomotive service was to be extended through to Harmon, a distance of 34 miles from New York. The interchange terminal for steam locomotives was nearing completion, and additional and more powerful electric locomotives had been ordered for the increased service. The extended electric locomotive service would be inaugurated in June or July of the present year.

MR. SPRAGUE'S REMARKS

Frank J. Sprague, New York, was the next speaker. He called attention to the fact that the present year was very close to the twenty-fifth anniversary of electric railway operation, for it was on Feb. 3, 1889, that the Richmond Union Passenger Railway was opened to the public. Mr. Sprague then briefly described the many features of his original Richmond equipment which had found a permanent place in the art and told of his early advocacy of direct-current operation at 1200 volts and higher.

Referring to the old controversies about the merits of single-phase alternating current and direct current, Mr. Sprague said that too much had been expected of the former and too little attention had been paid to the possibilities of the latter in making use of higher line and motor voltages. The development of electric traction had now reached the point where one could specify the normal maxima in operating potentials on the working conductor at which there would be established a balance of advantages and disadvantages for any system. These potentials were about 6000 volts for polyphase operation, 11,000 to 15,000 volts for single-phase, 1200 to 1500 volts for direct-current with protected third-rail and from 2500 volts to 3000 volts with direct-current trolley. There were inherent differences in the weights and costs of single-phase and direct-current motor equipments, when built and operated under like conditions of reliability, which were irremedial and which would be found in a large measure to offset whatever advantages might be achieved in efficiency of the secondary transmission. In view of the coming necessary interconnection of power supplies in which railroad use would be but one of many, an arbitrary cycle adoption for trunk-line operation was of questionable advisability. Finally, he said, it was only after the inevitable development of each of the systems to its natural limit that any ultimate determination could be made regarding their relative values.

While the art had practically arrived in sight of the limiting potentials and fields of each system, there was still no general agreement as to fundamentals, and professional and manufacturing rivalries the world over were unduly manifest. No railway official, however broad his experience, no manufacturing company, whatever its resources, no electrical engineer, however experienced, could alone settle

New York Central & Hudson River Railroad, Electrical Department—Train-Minute Detention Due to Electrical Operation; for the Year 1912

Month	Train-Minute Detention																								Mileage			Average Miles per Minute Detention			
	Electric Power Troubles							Electric Locomotives							Multiple-Unit Cars										Loco.'s	M. U. Cars		Loco.'s	M. U. Cars		
	Power Stations	Substations	10,000-Volt Trans. Line	6,000-Volt Trans. Line	Third-Rail	2,200-Volt Signal Line	Total	Fuses	Contactors	Reversers	Misc. Elec.	Brakes	Misc. Mech.	Total	Fuses	Contactors	Relays	Control Jumpers	Misc. Elec.	Brakes	Hot Boxes	Misc. Mech.	Total	Total for All Causes*	Total	Electric Zone	Total	Total	Elec. Delays	Mech. Delays	Total for All Causes†
January	..	4	..	..	..	63	67	1	31	14	..	4	12	62	7	..	13	..	39	18	9	..	86	215	113,972	366,652	422,347	1,838	6,214	15,642	2,494
February	..	..	9	..	..	...	9	..	11	..	11	8	..	30	6	3	4	..	..	8	..	22	43	82	103,171	338,787	390,375	3,439	26,060	13,012	6,019
March	..	..	..	..	7	2	9	3	2	..	..	14.5	..	19.5	2	..	11	..	15	13	29	7	77	105.5	108,952	363,883	419,413	5,587	12,996	8,559	5,008
April	..	..	..	..	..	25.5	25.5	..	..	..	..	..	61	61	3.5	7	5	..	19	8	3	5	50.5	137	115,177	356,758	409,472	1,888	10,341	25,592	3,829
May	..	..	11	..	18	...	29	6	..	..	17	..	..	23	..	..	..	..	..	6	..	..	6	58	114,203	376,134	432,102	4,965	.....	72,017	9,419
June	..	..	..	..	..	3	3	2	..	9	6	9	5	31	..	13	10	9	7	31	4	..	74	108	112,167	359,737	417,458	3,618	9,224	11,927	4,904
July	..	..	..	..	..	7	7	..	11	2.5	3	4	..	20.5	.	..	7.5	20	30	11	19	57	144.5	172	113,149	359,351	421,166	5,519	6,250	4,841	3,106
August	..	..	..	..	17	6	23	..	2.5	..	..	..	..	2.5	3	..	3	..	14	15	.	9	44	69.5	115,548	341,124	400,127	46,219	17,056	16,672	7,420
September	..	..	..	..	..	...	...	13	..	..	3.5	..	..	16.5	..	..	..	..	8	..	15	..	23	39.5	115,157	338,900	397,520	6,979	42,362	26,501	12,979
October	..	..	..	..	..	5	5	5	..	2	..	3	..	10	3	..	..	..	37	..	15	..	55	70	116,575	369,877	426,600	11,657	9,247	28,440	7,759
November	..	..	..	..	..	4	4	..	..	..	..	..	..	..	..	..	..	10	6	5	14	..	35	39	110,790	355,394	409,795	.....	22,212	21,568	13,348
December	..	..	5	..	..	28	33	..	..	..	..	6	5	11	11	..	20	41	11	79	..	..	162	206	112,716	371,036	428,112	10,247	4,470	5,419	2,625
Total	..	4	25	..	42	143.5	214.5	30	57.5	27.5	40.5	48.5	83	287	35.5	23	73.5	80	186	194	108	100	800	1,301.5	1,351,577	4,279,633	4,974,487	4,709	10,798	12,374	4,861

*Does not include delays to New Haven trains. †Based on total mileage of locomotives and M. U. cars. "M. U. cars" signifies trailer and motor cars.

this question. The problem comprised too great an assemblage of advantages and disadvantages when viewed at different angles for any single mind. Even if such a one was entirely correct in final analysis and prophecy, his dicta could not carry the necessary measure of authority for general acceptance.

Mr. Sprague said he had always been a firm believer in meeting a condition of stagnation by some commensurate risk and then securing standardization by effective co-operation. Risks in an unknown field, with problematical results, were naturally taken by the enthusiast whose prophetic vision ignored ordinary financial restrictions in the hope of laying a foundation of development which in the end promised commensurate reward, but once the way had been blazed in a new field of endeavor then the attrition of mind against mind in co-operative effort was needed to formulate the grounds for the most stable and satisfactory advance.

It was with this idea in mind that some two years ago he had addressed himself to the problem of trying to find some means of breaking through the wall of inertia interposed between accomplished facts and the possibilities of main-line electrification. He had sought to find some way of meeting existing conditions, financial and otherwise, in the trunk-line situation, and while demonstrating the financial advantages of electrical operation, to suggest some plan to relieve the railways in a large measure of the financial burden of electrical equipment. It seemed also that the time had come when steps could be taken to remove the unnecessary asperities and soften the differences which had characterized the advocacy of different systems and to determine in some authoritative way the lines along which the future development should or should not take place. If engineers and manufacturers were sincere in their belief as to the economical advantages of electrical operation in the place of steam, something surely could be done to manifest that belief in a substantial financial way, either singly or in co-operation, and the best interests of the art would be subserved if the great manufacturing companies could come to a common basis of understanding and unitedly bend their energies toward common lines of development. It seemed, furthermore, that in connection with the future and inevitable concentration of small power stations into great ones and their interconnection of supply of electrical energy for a thousand and one purposes there was an opportunity for development of a financial organization outside of the manufacturing and railway companies which could play an important part in railway electrification.

He had discussed various phases of the question with many manufacturing officials and a number of consulting engineers. At first it was thought that the American Railway Association, or possibly the American Institute of Electrical Engineers, through suitable committees could be instrumental in arriving at the necessary conclusions, but such committees would necessarily be composed of men absorbed in their individual affairs, and their conclusions could not well indicate more than a general review of what had been accomplished; nor could any uncompensated group of men of the necessary ability and experience afford to give the time for radical studies or assume the great responsibility of decisions of far-reaching importance. If, therefore, this general problem could be referred to representative engineers who would occupy a confidential relation to the manufacturers, their engineers and to the railway companies, and who would be made the repositories of the technical advances and facts peculiar to the individual companies, as well as the construction and operating facts of the railway installations already made, effective conclusions could be hoped for.

If the latter procedure was assumed, the practical question was, Could there in any manner be organized a group of consulting engineers of sufficient judgment and experience, technical training, independence of judgment and knowledge of railway and electrical conditions—men big enough to subordinate their preconceived opinion in the face of facts—to whom such momentous questions could be submitted for at least advisory conclusions? Instead of attempting to arrive at conclusions with regard to the possibilities and economies of electrification from theoretical discussions or application of known facts to assumed conditions, they should apply their studies to some concrete case or cases which would embrace in extent and variety all the principal problems of trunk-line electrification.

Most of the electrification projects in connection with trunk lines which had been carried out in this country had been dictated by local terminal necessities which could not be met by steam operation, but for the more extensive projects other reasons must prevail. Even with a settlement of system and demonstrated ultimate economy of operation and increase of capacity denied to steam operation, the financial problem facing the railroad men was still a most serious one. Assuming, therefore, some general agreement as to standard, electrification would be materially advanced if the burden of reliable power supply at a reasonable rate and with ample reserve and the possible provision of rolling stock on a basis of usage could be undertaken through the agency of outside capital, leaving the railroads only the minor burden of supplying fixtures along the right-of-way and co-operating with the power companies in the erection of general power supply lines upon their own property.

In conclusion, Mr. Sprague said that he felt justified in stating that the principal manufacturing companies were now favorably inclined to the creation of a technical commission to be composed of disinterested engineers of wide and varied experience who should make a thorough study of the various systems of electrification as applied to such situation or situations as might be taken up; that they were prepared to bear a part, or, if necessary, to meet the entire expense of such a commission; that they were in favor of some scheme of financial development which should relieve the railroads of part of the burden of raising capital, and finally that they awaited only the necessary co-operation of railroad officials to make effective this joint effort to avoid the heavy costs of mistakes due to individual judgment on the threshold of a great electrical development in transportation.

PROFESSOR MURALT'S REMARKS

C. L. Muralt, professor of electrical engineering University of Michigan, pointed out that greater tractive power was the reason for adopting electric locomotives on lines where terminal and tunnel conditions were not controlling factors. An electric locomotive was best either where greater acceleration or heavier loads were under consideration. He had looked into several Western cases and had found that it was cheaper to electrify than to add tracks. He greatly approved Mr. Sprague's idea of a technical commission.

MR. MAILLOUX'S REMARKS

C. O. Mailloux, consulting engineer, New York, heartily indorsed the idea of a technical commission. He was pleased to see that the economics of electrification were receiving so much attention. The problem of securing the extra capital required to make electrification was the meat and core of the situation. His studies had shown that electrification was advisable on not more than 10 per cent of the lines in the United States. He did not mean to say, however, that this condition would always be so and he hoped that it would not always be so. He wanted to see a technical commission such as Mr. Sprague suggested and mentioned the excellent work which such a commission had done in Germany in carrying out the famous Zossen high-speed electric railway tests.

MR. HEDLEY'S REMARKS

Frank Hedley, vice-president Interborough Rapid Transit Company, believed that there was a larger percentage of steam railroads ripe for electrification than that given by Mr. Mailloux. In many cases it would not be a question of smoke elimination, tunnels or the like, but of capacity.

SUMMARY

Mr. McClellan summed up the discussion of the evening. He said that it seemed to be the way of the world to develop old methods to their maximum efficiency before taking up the new. For instance, the builders of the reciprocating engine had developed it to the highest point before acknowledging the superiority of the steam turbine, and it was possible that this operation would be paralleled by the history of the gas engine and steam turbine.

ACCIDENT PREVENTION CAMPAIGN OF WABASH VALLEY LINES

The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has entered actively on its accident prevention campaign under the direction of R. R. Ritchie, superintendent of safety of the company. The company is now running two series of newspaper talks, one series in the daily papers and one in the weekly papers, with change of copy daily in the daily papers and change of copy weekly in the weekly papers. The talks appear in more than thirty newspapers, which cover a population of about 200,000 people.

On the evening of Wednesday, Feb. 26, 1913, the company extended a general invitation to the public to attend a "safety first" rally at the Victoria Theater, Lafayette, Ind., given under the auspices of the Fort Wayne & Northern Indiana Traction Company, the Terre Haute, Indianapolis & Eastern Traction Company, the Monon Railroad, the Big Four Railroad and the Wabash Railroad. This meeting was addressed by George Bradshaw, general safety agent of the New York Central & Hudson River Railroad. Mr. Bradshaw illustrated his remarks with colored stereopticon views. More than 1200 people attended this rally. The Fort Wayne & Northern Indiana Traction Company sent an employees' special car for its men and their families, picking up all employees between Logansport and Lafayette, a distance of 40 miles. In pursuance of its regular policy the company held a morning meeting on the same day at which the employees were addressed by Richard Burke, chairman of the safety and efficiency committee of the Monon Railroad. This meeting was held at the company's carhouse in Fort Wayne at 7 a. m. Two talks from the series which is appearing weekly are appended:

"For a safe and sane everyday.

"The serious injury or death of a human being in a railway accident calls forth the keenest sympathy of the public and all connected with this company. A careful study of the past records has shown us that practically all accidents are avoidable if everyone thinks before he acts and thinks of safety first. Co-operation will do this where everything in the past has failed in part at least. All you have to do to join this safety movement is to

"Think,

"Never take any chance,

"Get the safety habit,

"Set the safety example—daily."

"If your child is cautioned and taught the safety habit, if you do not take chances where your life is at stake, and if you always will set the safety example for the younger folks, then, and only then, can you expect that you and your family will enjoy a long life, full of happiness and prosperity.

"Accidents happen when you least expect them. You rush to catch the train, and catch it on the fly; you fall and break your arm or leg. A man who did this not long ago fell and his arm was cut off.

"Please remember that 'haste isn't worth life or limb.'

"'Better be late than never.'"

NEW SUBURBAN LINE FOR PHILADELPHIA

The Philadelphia & West Chester Traction Company has just completed an extension of the Philadelphia and Garrettford lines to the borough of Media. This will be opened for passenger service in April, 1913. The road is built exclusively on private right-of-way from the Sixty-ninth Street terminal of the Market Street subway and elevated line, Philadelphia, through the townships of Upper Darby, Springfield and Nether Providence, thence over State Street to Orange Street in the borough of Media, thus opening up a most beautiful section of Delaware County. All the county seats of Philadelphia, Delaware, Chester, Montgomery and Lancaster Counties can now be reached through the electric railway systems terminating at Sixty-ninth Street.

The roadbed is built in accordance with steam railroad standards, being rock-ballasted throughout and equipped with 80-lb. steel rails. The bridges are of steel and the culverts and undergrade crossings of reinforced concrete. The steel spans across Crum Creek are 85 ft. long and 7 ft. 9½ in. in depth. The maximum grade has been limited to 3 per cent, although this necessitated heavy cuts and fills. The maximum curvature on the line is 5 deg. The permanence of construction is shown by the accompanying illustration of one of the five way stations which have been built along the route.

Philadelphia Suburban Line—Typical Way Station

The distance from the Sixty-ninth Street terminal, Philadelphia, to Media is 8.59 miles, and the running time will be twenty-five minutes. Trains will be run at half-hourly intervals, leaving the terminal points in Philadelphia and in the borough of Media at half-hourly intervals.

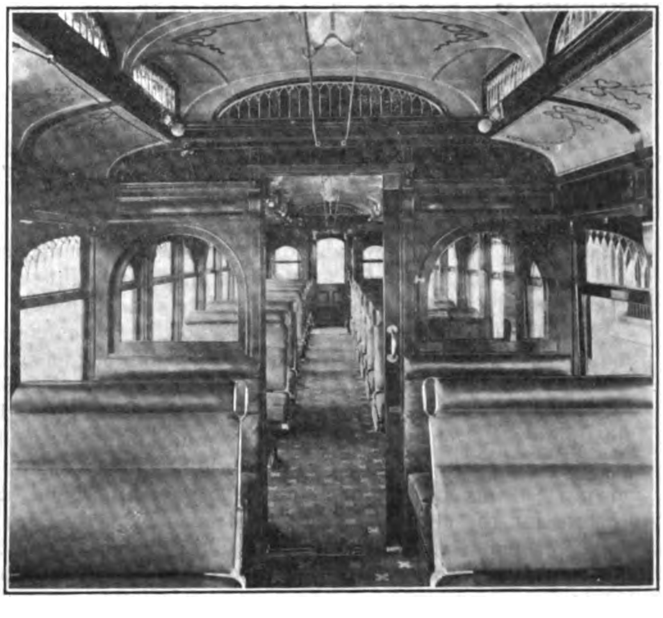
The fare from the Sixty-ninth Street terminal to Media will be 10 cents, the route being divided into two 5-cent fare zones. This, plus the 5-cent fare on the Market Street subway and elevated line, will give a ride from Media to any part of central Philadelphia, touching the main steam railroad terminals and steamship terminals, ferries and department stores, for 15 cents, with free transfers at several points in Philadelphia.

The saving in time and money effected by the new line is a very material item. The fare on the steam railroad from the Broad Street station to Media is 35 cents; the round-trip fare is 56 cents. The running time of local steam trains from the Broad Street station to Media is from thirty-nine to forty-seven minutes. On the electric railway route the fare one way from the Broad Street station will be 15 cents and the round trip will be 30 cents. The running time will be forty-one minutes.

An additional turbo-generator set of 1000-kw capacity has been installed at the Llanerch power station of the Philadelphia & Garrettsford Street Railway Company, and a new substation has been built at Drexel Hill, equipped with two 500-kw General Electric rotary converters. The line is equipped throughout with signals. Telephone jack-boxes have been installed at intervals of 1000 ft., making it possible to telephone directly from any point on the line to the dispatcher.

Philadelphia Suburban Line—Girder Bridge Over Crum Creek

New cars will be provided for the line, the first consignment of them having already been received. These are 51 ft. 3 in. in over-all length and 8 ft. 8½ in. in width. Cross seats upholstered in leather are used, the seating capacity being fifty-six. The cars are built with steel underframes and contain smoking compartments. Each car is equipped with four GE-205 motors of 115 hp and is capable of maintaining a speed of 40 m.p.h. Westinghouse electro-pneumatic brakes are used throughout. The total cost of each of these cars is reported to be about $12,000.



Philadelphia Suburban Line—Interior of Standard Car

ANNUAL BANQUET OF THE NEW ENGLAND STREET RAILWAY CLUB

Six hundred members and guests of the New England Street Railway Club gathered at the Hotel Somerset, Boston, Mass., on the evening of March 27 to attend the thirteenth annual meeting and banquet of the organization. As on previous anniversaries of the club, the dominant note of the occasion was one of relaxation and good fellowship, and neither the unpropitious weather without nor the cares of the electric traction industry could dim the enthusiasm of the assembly. The club has grown since its formation in 1901 to a present membership of 748, of which sixty-six were added during the past year, and is believed to be the largest organization of its kind in the country outside the American Association itself.

ELECTION OF OFFICERS

The annual meeting, held in the parlors of the hotel in the afternoon, resulted in the election of the following officers for the ensuing year: President, Elton S. Wilde, New Bedford, Mass.; vice-presidents, Maine, Harry B. Ivers, Portland; New Hampshire, J. Brodie Smith, Manchester; Vermont, F. C. Wilkinson, St. Albans; Massachusetts, W. W. Sargent, Fitchburg; Rhode Island, D. F. Sherman, Providence; Connecticut, W. S. Murray, New Haven; secretary, H. A. Faulkner, Boston, Mass.; treasurer, E. P. Shaw, Jr., South Framingham, Mass.; finance committee, Messrs. Elton S. Wilde, C. E. Learned and R. E. Hamilton, Boston; executive committee, Thomas Lees, Lowell, Mass.; Franklin Woodman, Haverhill, Mass.; A. E. Paddock, Providence, R. I.; C. S. Hawley, Boston; Carl P. Dennett, Boston; E. J. Dickson, Springfield, Mass., and George C. Ewing, Boston.

FEATURES OF THE BANQUET

At the close of an informal reception those in attendance filed into the main ballroom of the hotel, where the demand for banquet seats necessitated "double-decking" the establishment by the use of the visitors' gallery for belated applicants for tickets. During the evening a varied musical program, including the popular airs of the day and operatic selections, was rendered effectively by an orchestra of about fifteen pieces, many of the members joining vigorously in the choruses. A novel feature of the entertainment was the installation of a tiny theater at one end of the dining hall, which was used for a striking vaudeville entertainment at the close of the after-dinner addresses. The menu, in the form of a "Trolley Trip Through the Land of Gastronomy," made a distinct hit, and carried the hungry street railway man "across gorgeous tablelands, past sparkling springs and through picturesque paths bordered by the culinary concoctions of the Somerset chefs." The menu abounded with clever cartoons and hits aimed at prominent members and included a "railway map" of the dinner in which the main courses were set forth as stations on a trunk line with the entrées and side dishes on appropriate branch lines.

President Thomas Lees extended a cordial welcome to the members and guests at the close of the dinner and paid a tribute to former Secretary Lane and Secretary Faulkner, and then introduced President-elect Elton S. Wilde amid tumultuous cheering. President Wilde in a few well-chosen words thanked the club for the honor of his election and pledged his best efforts to the organization and its interests for the coming year. A telegram was then read from President George H. Harries of the American Electric Railway Association, regretting his inability to be present on account of illness.

ADDRESS BY LIEUTENANT-GOVERNOR WALSH

Lieutenant-Governor David I. Walsh of Massachusetts was then called upon and extended the hearty greetings of the commonwealth, emphasizing the importance of transportation in the State's welfare. He paid a high tribute to the Fitchburg & Leominster Street Railway Company as a home-ruled and home-owned organization which for over a quarter-century has both paid dividends and satisfied the public, contending that the record of this road shows that ample capital can be had for such a local development within the borders of the State itself. He believed that public service corporations are in partnership with the government. Indirectly the government invites the public to invest its funds in these corporations and it is the public's interest to see that the capital invested receives a fair return.

Good service and satisfactory returns should go together. The protection of the public and the investor are two sides of the same shield. The time has come when this partnership between the government and the public should be recognized. The transportation problem is second only in importance to the problems of government themselves. This partnership means open-mindedness, and it means that the public has a right to see the books, not to injure the company or its securities, but to assure itself that a proper service is being conducted without large dividends being the sole aim of the public utility. The principal trouble is that the public has seen so much in the past of overcapitalization that it is distrustful to-day. The opening of the books will dispel many of these present evils and misunderstandings. Weaknesses and limitations of government are human, but we need to talk more and more about the blessings and the good things of government and less and less of its evils. We should be proud of our banking laws and many other benefits of government. Street railway men should take a part in leading a campaign of confidence. The government is going to protect honest invested capital and is not going to destroy it, whatever political party may be in control. Agitation is not so much against business as a desire of the people to call attention to the fact that the government must be concerned in the people's interests and along humanitarian lines. "Think of the commonwealth as the mother government, as the college man thinks of his alma mater," said the Lieutenant-Governor, "a mother government most concerned about those millions of her children who have to travel the rougher and harder paths of life."

The old-age pension agitation and the child labor laws are examples of this, and the speaker contended that all can meet upon this common ground. He closed with an appeal for a broad, disinterested outlook which will redound to the glory and happiness of the commonwealth and leave it better and safer than it was before.

ADDRESS BY HON. LEVI GREENWOOD

The next speaker was Hon. Levi Greenwood, president of the Massachusetts State Senate. He praised highly the pioneers in electric transportation. Improved methods of transportation were second only to the printing press as a promoter of civilization. He appreciated the difficulty that the electric railways have to-day in maintaining dividends on a 5-cent fare in view of higher costs of material and labor. It seemed to him that the extension of electric railways into interurban and other heavy traction fields made it unnecessary for the State of Massachusetts to continue the present arbitrary distinctions between electric railways and steam railroads. The people of Massachusetts did not believe in cut-throat competition, but simply wanted good service under regulated monopolies. As an example of an enlightened development, he favored the proposed extension of electric railway facilities in western Massachusetts by the New York, New Haven & Hartford Railroad. In conclusion, he expressed the hope that the pending bill favoring electric railway development in the western half of Massachusetts would be passed.

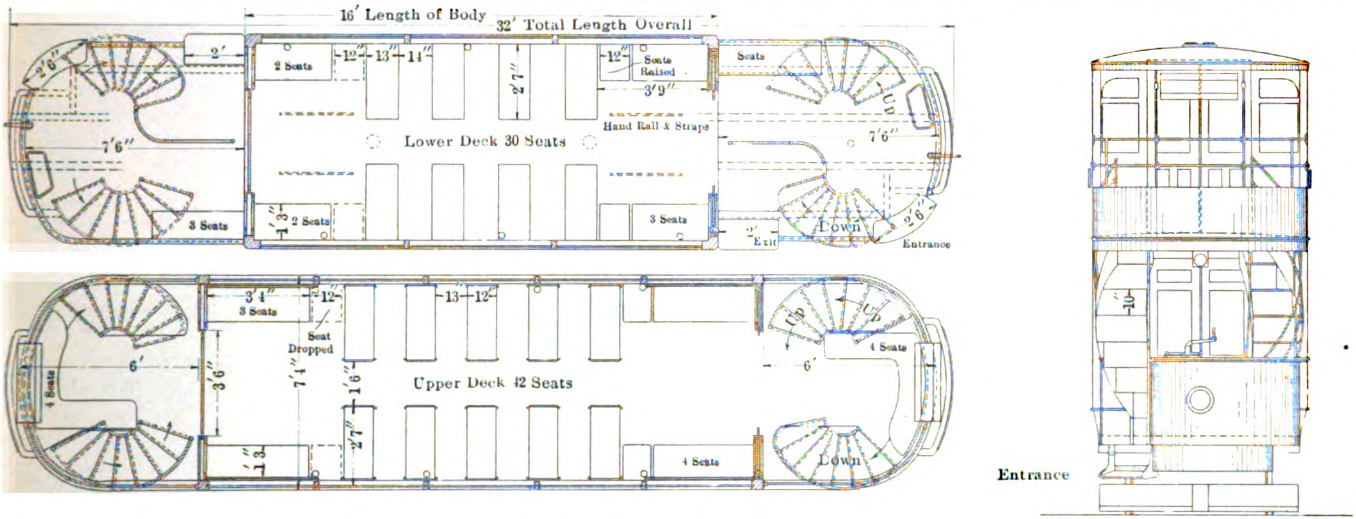
ENTERTAINMENT

The evening was pleasantly concluded by an elaborate vaudeville entertainment which ended at 11:30 p. m. to permit the delegates to get home before the wee sma' hours of the dawn.

New Cars for Liverpool

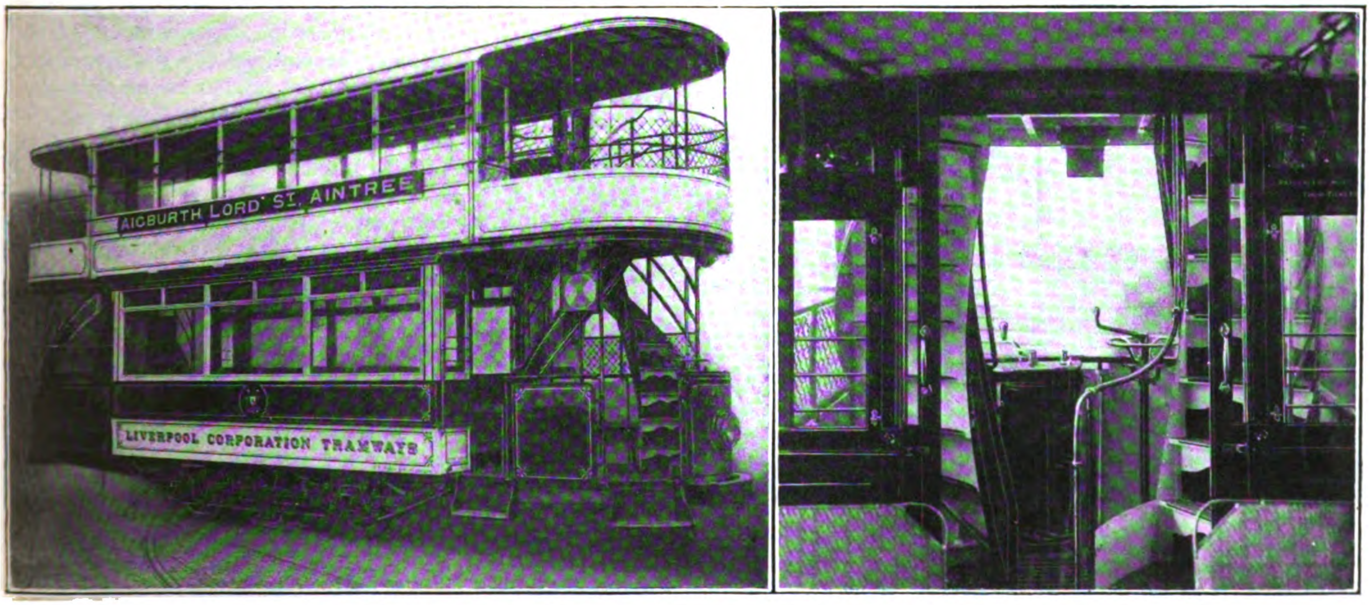
Description of Double-Deck, Drop-Platform and Center-Entrance Cars with Separate Stairways for Entrance and Exit

The Liverpool Corporation Tramways have recently completed the equipment of two double-deck cars, one of which is of single-truck, drop-platform type and the other of double-truck center-entrance design. A novel feature common to both designs is that all passages and stairways are divided for separate use as exits or entrances, although there is no immediate intention of using the prepayment system. Like other English cities, Liverpool has a zone system of fare collection, the rates being 1d., 2d. and 4d. The average ride for 1d. is 3 miles. The new cars were built by the United Electric Car Company, Preston, England, in accordance with the plans of C. W. Mallins, general manager of the tramways. A preliminary description was published in the ELECTRIC RAILWAY JOURNAL for July 6, 1912. The following particulars describe the cars as actually constructed.


16′ Length of Body
32′ Total Length Overall
2′
2′6″
7′6″
2 Seats
12″
13″
14″
2′7″
12″
Seats Raised
3′9″
Seats
Up
Hand Rail & Straps
Lower Deck 30 Seats
7′6″
3 Seats
1′3″
2 Seats
3 Seats
2′
Exit
Down
2′6″
Entrance
3′4″
3 Seats
12″
13
12
Seat Dropped
4 Seats
6′
3′6″
7′4″
1′6″
Upper Deck 42 Seats
2′7″
1′3″
Up
Up
4 Seats
6′
4 Seats
Down
10″
Entrance

Electric Ry. Journal

Liverpool Cars—Plans and End Elevation of the Lower and Upper Deck of Liverpool Double-Deck Car with Entrance and Exit Stairways

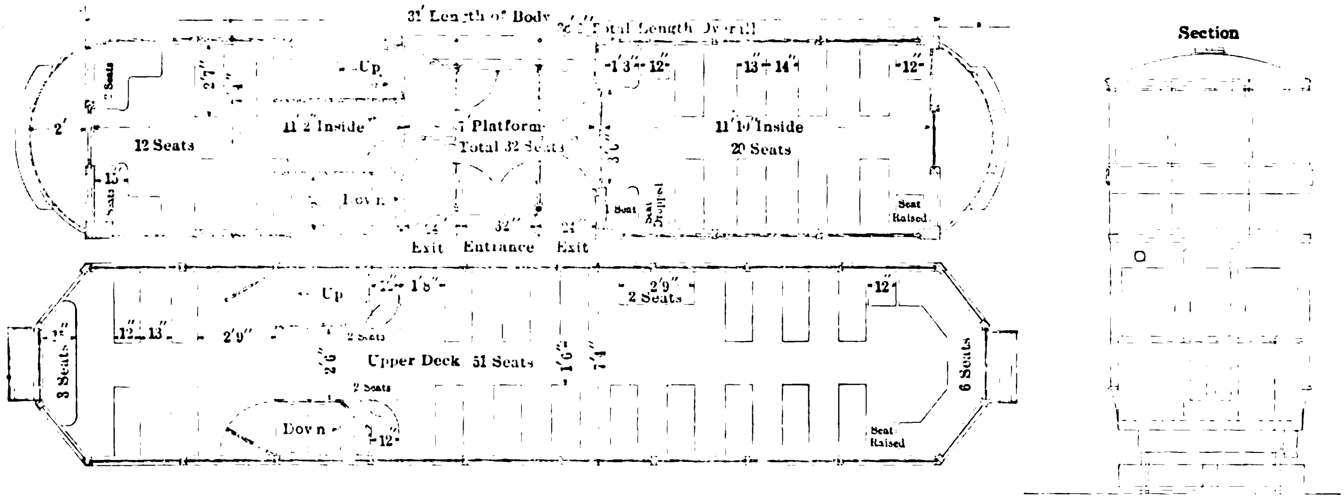

AIGBURTH LORD ST. AINTREE
LIVERPOOL CORPORATION TRAMWAYS

Liverpool Cars—Exterior and Interior Views of Double-Deck, Drop-Platform Car, Showing the Separate Entrance and Exit Stairways

SINGLE-TRUCK DROP-PLATFORM CAR

The most interesting feature of the single-truck drop-platform car is the use of a double staircase on each platform in order to provide separate exits and entrances to the upper deck. The passengers to and from the lower deck are also kept in separate channels by the usual forms of platform dividing rails. The distance from the top of the rails to the platform step is $15\frac{1}{2}$ in. and from the step to the platform $13\frac{1}{2}$ in. The entrance step is 2 ft. 6 in. wide and the exit step is 2 ft. wide, so that both are considerably wider than similar openings on many American prepayment cars. The platform railing, which extends as far as the pair of sliding doors in the bulkheads, gives separate 21-in. passages for incoming and outgoing passengers. It will be seen that ample space has been provided for free movement despite the presence of two stairways, and this was made possible by the use of platforms 7 ft. 6 in. long. On both decks the width of the aisle between cross seats is 1 ft. 6 in. and the clear width of the cross seat is 2 ft. 7 in. Clearances of 13 in. and 14 in. are provided alternately between the transverse seats on the lower deck and of 13 in. on the upper deck. The stairways previously noted are of liberal dimensions, the usual width of the step being 20 in. and the height of the risers 10 in.

Although the covered sections of both decks are of different lengths, the seating arrangement is practically the same, consisting of longitudinal seats at the corners and transverse seats in the rest of the car. One-seat extensions of the corner seats may be raised out of the way or lowered for use in accordance with the direction of running. Hand rails and straps are installed in the aisles between the longitudinal corner seats. The platforms on both decks are also provided with permanent benches, the lower platforms seating three and the upper platforms four passengers each. The lower deck seats thirty passengers and the upper deck forty-two passengers, a total of seventy-two. All seats are of rattan.



Liverpool Cars—Plans and End Elevation of the Lower and Upper Deck of the Center-Entrance Car

The principal dimensions of this car are as follows: total length over all, 32 ft.; length of lower body, 16 ft.; width over all, 7 ft. 4 in.; height from rail to trolley base, 16 ft. 8 in. This car, as well as the center-entrance type, is mounted on Brill trucks of latest design, equipped with 33½-in.-diameter steel-tired wheels and 4¾-in.-diameter axles. The power equipment of each car consists of two 40-hp Dick-Kerr motors.

PIER HEAD. WALTON. DALE STREET.
LIVERPOOL
CORPORATION TRAMWAYS

Liverpool Cars—Double-Deck, Center-Entrance Car with Open Platform

An interesting operating feature of the drop-platform car is a disk indicator which, as shown, is attached to the stanchion alongside one of the stairways. This indicator is operated electrically from the controller or by bell pushers on the platform. In its alternative position it displays the notice "Wait until car stops." The car was photographed before it was actually ready for service, and therefore it does not display the customary entrance and exit designations nor the Mallins plow-guard with which it was finally equipped.

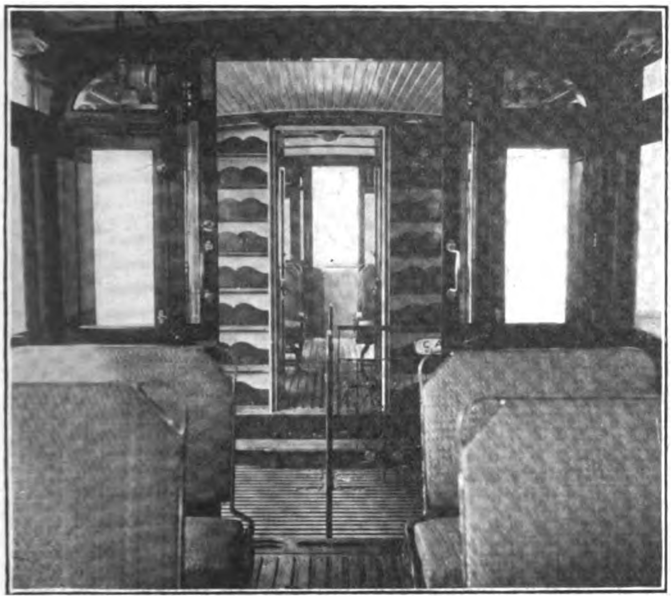
DOUBLE-DECK CENTER-ENTRANCE CAR

The Liverpool center-entrance car, unlike most of those recently built in the United States, has no special floor construction for the purpose of securing either an unusually low step or a stepless entrance from the street. However, the ascent from the ground to the car floor has been made a moderate one by the adoption throughout of a height of 11 in. for the distance from the ground to the outside step, from the outside step to the platform and from the platform to the car floor proper. The central opening is built as a platform 7 ft. wide, open at the sides and bounded at the ends by the doors of the two passenger compartments. This platform is divided by railings into an entrance aisle which is approximately 32 in. wide and is flanked by exit aisles approximately 24 in. wide. A pair of double sliding doors covers the 42-in. opening to the larger compartment on the lower deck, while a pair of swinging doors is used to cover the corresponding 32-in. opening to the smaller compartment. The cross-seat aisle in both compartments is 18 in. wide, the presence of the stairway accounting for the narrower doorway of the smaller compartment.

It is significant that an English street railway which has had so much experience with double-deck cars should have found it desirable to provide separate exit and entrance stairways for its center-entrance car. The stairways as installed are straight. They run parallel from the platform and open into the upper deck through vestibules. They are 24 in. wide, have 10-in. risers and 8-in. treads. The far-side stairs are for entrance, the near-side stairs for exit. The inside faces of the stairs are beveled in order to secure maximum width. The seating plans show that the lower deck has twenty seats in the larger compartment and twelve seats in the smaller, while the upper deck has a capacity of fifty-one seats, giving this car a total capacity of eighty-three seats, part transverse and part longitudinal. The seats and aisle dimensions are practically the same as in the drop-platform double-deck car. Although the motorman's compartment at each end is not of folding type, it is remarkably small, its inside clearance being only 2 ft.

The principal dimensions of this car are: length over all, 36 ft. 6 in.; length of body, 31 ft.; width over all, 7 ft. 4 in., and height from top of rails to trolley base, 16 ft. 8 in. On comparing these dimensions and the seating capacity with the drop-platform car of the same width and height, it will be found that the seating capacity of the center-entrance car is 2.7 passengers per foot of length and that of the drop-platform car only 2.2 passengers per foot of length.

The railings on the central platform are reversed when the direction of run is changed. The off side of the platform is protected by means of balanced horizontal bars which run in guides and which are arranged to slide upward when not in use. The main doors leading from the center platform are spring-controlled so that when the doors are operated half-way the spring completes the rest of the travel, holding them either wide open or shut tight as the case may be. A flap gate or barrier with the inscription "Wait until the car stops" is mounted on the vertical hand rail. This barrier is so connected that it is mechanically impossible for the car to start until the gates are closed, but it opens automatically when the car comes to a standstill.

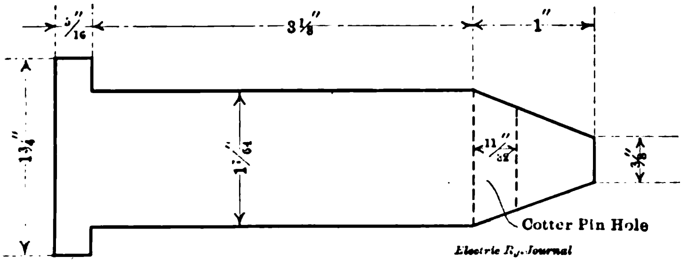


Liverpool Car—Interior View of Double-Deck, Center-Entrance Car

Acknowledgments are due to the *Tramway and Railway World* for the photographs from which the halftones in this article were made.

A SIMPLE IMPROVEMENT IN BRAKE RIGGING PINS

The tapering of the ends of brake rigging pins has been found by the Syracuse, Lake Shore & Northern Railway and allied lines to result in a considerable saving of time in assembling. The holes in both jaws and brake beams are lined with hardened Shelby tube steel bushings and make a close fit on the pins. Without the taper it requires some time and effort to get the holes lined up sufficiently to insert the pins. With the tapered end, as shown in the accompanying cut, the pin acts as a drift in lining up the bushings.



Tapered Pin for Brake Rigging Used on Syracuse Lines

FORTHCOMING ORGANIZATION OF THE PACIFIC COAST ASSOCIATION

For some time past there has been on foot a movement among the Pacific Coast electric railways to form a local association. This has now culminated in a plan for an organization meeting which is to be held in San Francisco on Dec. 31. In general, the companies interested in this movement are members of the American Electric Railway Association. It is not widely known that the membership of the national association on the Pacific Coast is equal to that of New England. In both cases the membership is about thirty-five companies, whose mileages, earnings, and consequently whose dues, are approximately the same.

In order to aid the proposed association in working along harmonious lines with the American Electric Railway Association, its projectors have invited to the San Francisco meeting representatives of the national body who have had experience in organization. This is splendid evidence of the get-together spirit which now prevails among the electric railways of the country, and it shows further a cordial appreciation of the work of the American Electric Railway Association, a body which now represents 80 to 90 per cent of the earning capacity of the electric railway business. The fact that such enthusiasm should be shown by the companies on the distant Pacific Coast is certainly inspiring. The American Electric Railway Association committee on electric railways which will address the organization meeting is composed of President George H. Harries, Third Vice-president Charles L. Henry and Secretary H. C. Donecker. These gentlemen left for the Pacific Coast on the afternoon of March 25 via the New York Central & Santa Fé Railways. They are due to arrive at San Francisco on Saturday evening, March 29.

ELECTROLYTIC ACTION ON REINFORCED CONCRETE

A portion of the instructive exhibit of the National Bureau of Standards at the Cement Show held recently in Chicago was devoted to a display of the effect of electrolytic action on reinforced concrete as determined by experiments made under government supervision at Washington. In most cases of reinforced-concrete construction local currents are set up due to moisture and impurities in the iron that cause the formation of iron oxide, and this reaction is greatly increased by the presence of stray currents. The iron oxide occupies a much larger volume than the iron from which it is formed, and when the pressure thus created exceeds the bond strength of the concrete cracking follows and more surface is exposed to disintegration.

The possible extent of the reaction was determined by an experiment in which a steel rod 1 in. in diameter, used as a core, was placed concentrically within a hollow steel cylinder, 1.5 in. in internal diameter, the space between being filled with cement which was allowed to set. The whole was then immersed in water and the iron core made the anode terminal of an electric circuit. The maximum pressure caused by the oxidation of the iron core and tending to break the cement was found to be 4700 lb. per square inch, the pressure being measured by the expansion of the outer cylinder.

In cases where salt is used, as is often done in cold weather to prevent freezing, the reaction is much hastened, as the salt solution forms a more active electrolyte than moisture alone.

One experiment was performed in which a test column of concrete was used, 1 ft. long and 6 in. in diameter, reinforced by an iron core. The mixture of the concrete was of the following proportions: Cement, 1; sand and gravel, 2.5; stone, 4, and salt, 3 per cent, measured by weight of cement. The column was then immersed in water and 50 volts applied across it, with the iron core as the anode. The specimen cracked longitudinally in three hours.

COMMITTEES OF C. E. R. A. AND C. E. T. A.

The folder of the Central Electric Railway Association and the Central Electric Traffic Association has just been issued by Secretary Neereamer. This contains, among other items of interest, the names of the members of the various committees for the year 1913. The following list of committees and the names of the members of the two associations which comprise them are taken from this publication and represent the make-up of the working organization in accordance with the latest appointments.

COMMITTEES OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

STANDING AUDITING COMMITTEE

Walter Shroyer (chairman), Union Traction Company of Indiana.

L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company.

E. L. Kasemeier, Ohio Electric Railway.

ANNUAL TRANSPORTATION

H. A. Nicholl (chairman), Union Traction Company of Indiana.

S. W. Greenland, Fort Wayne & Northern Indiana Traction Company.

J. O. Wilson, Cleveland, Southwestern & Columbus Railway.

C. P. Wilson, Interstate Public Service Company.

C. O. Sullivan, Western Ohio Railroad.

CONSTITUTION AND BY-LAWS

F. D. Carpenter (chairman), Western Ohio Railroad.

C. N. Wilcoxon, Chicago, Lake Shore & South Bend Railway.

C. L. Henry, Indianapolis & Cincinnati Traction Company.

C. A. Floyd, Grand Rapids, Holland & Chicago Railway.

G. O. Nagle, Wheeling Traction Company.

CLAIMS COMMITTEE

William Tichenor (chairman), Terre Haute, Indianapolis & Eastern Traction Company.

J. H. Shaw, Cleveland, Painesville & Eastern Railroad.

F. E. Rankin, Detroit, Monroe & Toledo Short Line Railway.

H. Rimelspach, Lake Shore Electric Railway.

C. P. Wilson, Louisville & Northern Railway & Lighting Company.

S. W. Reynolds, Danville, Urbana & Champaign Railway.

E. E. Slick, Union Traction Company of Indiana.

FINANCE COMMITTEE

F. D. Carpenter (chairman), Western Ohio Railroad.

W. H. Forse, Union Traction Company of Indiana.

B. J. Jones, Ohio Electric Railway.

H. E. Vordermark, Fort Wayne & Northern Indiana Traction Company.

C. N. Hawley, Northwestern Ohio Railway & Power Company.

F. J. Green, Springfield, Troy & Piqua Railway.

HOTEL AND ARRANGEMENT COMMITTEE

L. J. Drake, Jr. (chairman), Galena Signal Oil Company.

S. D. Hutchins, Westinghouse Traction Brake Company.

W. H. Bloss, Ohio Brass Company.

L. G. Parker, Cleveland Frog & Crossing Company.

T. A. Henkle, Electric Service Supplies Company.

M. B. Lambert, Westinghouse Electric & Manufacturing Company.

H. C. Marsh, General Electric Company.

INSURANCE COMMITTEE

F. W. Coen (chairman), Lake Shore Electric Railway.

F. A. Healy, Ohio Electric Railway.

W. H. Forse, Union Traction Company of Indiana.

LIGHTNING ARRESTER COMMITTEE

Edward Heydon (chairman), Terre Haute, Indianapolis & Eastern Traction Company.

F. T. Bundy, Ohio Electric Railway.

Fred Heckler, Lake Shore Electric Railway.

F. J. Stevens, Fort Wayne & Northern Indiana Traction Company.

Charles Sigler, Winona Interurban Railway.

E. J. Burdick, Detroit, Monroe & Toledo Short Line Railway.

Jerry Cronin, Western Ohio Railroad.

COMMITTEE ON COMPENSATION FOR HANDLING UNITED STATES MAIL

E. B. Peck (chairman), Terre Haute, Indianapolis & Eastern Traction Company.

R. A. Crume, Dayton & Troy Electric Railway.

W. A. Carson, Evansville Railways Company.

PUBLICITY COMMITTEE

Frederic Nicholas (chairman), ELECTRIC RAILWAY JOURNAL.

H. J. Kenfield, *Electric Traction.*

E. H. Farr, A. H. Pugh Printing Company.

STANDARDIZATION COMMITTEE

R. N. Hemming (chairman), Union Traction Company of Indiana.

H. H. Buckman, Louisville & Northern Railway & Lighting Company.

F. J. Foote, Ohio Electric Railway.

L. M. Clark, Terre Haute, Indianapolis & Eastern Traction Company.

Charles Sigler, Winona Interurban Railway.

F. J. Stevens, Fort Wayne & Northern Indiana Traction Company.

J. R. Fairchild, Western Ohio Railroad.

A. P. Lewis, Cleveland, Southwestern & Columbus Railway.

A. F. Rolston, Columbus, Delaware & Marion Railway.

SUBJECT COMMITTEE

W. S. Whitney (chairman), Ohio Electric Railway.

E. B. Peck, Terre Haute, Indianapolis & Eastern Traction Company.

J. Jordan, Cleveland, Painesville & Eastern Railroad.

C. D. Emmons, Chicago, South Bend & Northern Indiana Railway.

G. W. Parker, Detroit, Monroe & Toledo Short Line Railway.

F. D. Carpenter, Western Ohio Railroad.

Will H. Bloss, Ohio Brass Company.

SUPPLY MEN'S COMMITTEE

S. D. Hutchins (chairman), Westinghouse Traction Brake Company.

John F. Ohmer, Ohmer Fare Register Company.

W. H. Bloss, Ohio Brass Company.

L. J. Drake, Jr., Galena Signal Oil Company.

L. G. Parker, Cleveland Frog & Crossing Company.

W. D. Hamer, Electric Service Supplies Company.

M. B. Lambert, Westinghouse Electric & Manufacturing Company.

H. C. Marsh, General Electric Company.

J. H. Drew, Indianapolis Brass Company.

TRANSPORTATION COMMITTEE

G. K. Jeffries (chairman), Terre Haute, Indianapolis & Eastern Traction Company.

H. C. Warren, Toledo & Indiana Railroad.

E. Smith, Toledo, Fostoria & Findlay Railway.

Frank Smith, Interstate Public Service Company.

J. F. Keys, Detroit, Monroe & Toledo Short Line Railway.

E. F. Schneider, Cleveland, Southwestern & Columbus Railway.

B. J. Jones, Ohio Electric Railway.

C. F. Franklin, Winona Interurban Railway.

H. C. Mason, Benton Harbor-St. Joe Railway & Light Company.

VIGILANCE AND MEMBERSHIP COMMITTEE

C. D. Emmons (chairman), Chicago, South Bend & Northern Indiana Railway.

A. C. Miller, Gary & Interurban Railroad.

F. J. Green, Springfield, Troy & Piqua Railway.

R. A. Crume, Dayton & Troy Electric Railway.

T. F. Grover, Terre Haute, Indianapolis & Eastern Traction Company.

J. N. Tabb, Parkersburg, Marietta & Interurban Railway.

C. J. A. Paul, Mahoning & Shenango Railway & Light Company.

Will H. Bloss, Ohio Brass Company.

E. M. Haas, ELECTRIC RAILWAY JOURNAL.

WOOD PRESERVATION COMMITTEE

F. P. Smith (chairman), Interstate Public Service Company.

Gaylord Thompson, Ohio Electric Railway.

T. B. McMath, Indianapolis Traction & Terminal Company.

L. A. Mitchell, Union Traction Company of Indiana.

RULES GOVERNING THE INTERCHANGE OF EQUIPMENT

H. A. Nicholl (chairman), Union Traction Company of Indiana.

C. D. Emmons, Chicago, South Bend & Northern Indiana Railway.

A. Benham, Ohio Electric Railway.

E. F. Schneider, Cleveland, Southwestern & Columbus Railway.

COMMITTEE ON JOINT WEIGHT AND INSPECTION BUREAU

J. H. Crall (chairman), Terre Haute, Indianapolis & Eastern Traction Company.

R. A. Crume, Dayton & Troy Electric Railway.

W. S. Whitney, Ohio Electric Railway.

JOINT FOLDER COMMITTEE

E. B. Peck (chairman), Terre Haute, Indianapolis & Eastern Traction Company.

E. F. Schneider, Cleveland, Southwestern & Columbus Railway.

C. E. Palmer, Fort Wayne & Northern Indiana Traction Company.

COMMITTEES OF THE CENTRAL ELECTRIC TRAFFIC ASSOCIATION

STANDING AUDITING

Walter Shroyer (chairman), Union Traction Company of Indiana.

L. T. Hixson, Terre Haute, Indanapolis & Eastern Traction Company.

E. L. Kasemeier, Ohio Electric Railway.

BOOSTER COMMITTEE

F. D. Norviel (chairman), Union Traction Company of Indiana.

C. O. Sullivan, Western Ohio Railroad.

J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company.

O. H. Murlin, Dayton & Troy Electric Railway.

J. H. Pounds, Benton Harbor-St. Joe Railway & Light Company.

CONSTITUTION AND BY-LAWS

C. J. Laney (chairman), Cleveland, Southwestern & Columbus Railway.

I. E. Guthrie, Interstate Public Service Company.

E. Hamprecht, Toledo, Bowling Green & Southern Traction Company.

B. E. Parker, Public Utilities Company.

W. O. Woodard, Chicago, Lake Shore & South Bend Railway.

INTERCHANGEABLE MILEAGE TICKET

F. D. Norviel (chairman), Union Traction Company of Indiana.

W. S. Whitney, Ohio Electric Railway.

O. H. Murlin, Dayton & Troy Electric Railway.

INTERLINE BAGGAGE

O. H. Murlin (chairman), Dayton & Troy Electric Railway.

C. O. Sullivan, Western Ohio Railroad.

J. A. Greenland, Fort Wayne & Northern Indiana Traction Company.

JOINT PASSENGER TARIFFS

W. S. Whitney (chairman), Ohio Electric Railway.

F. D. Norviel, Union Traction Company of Indiana.

C. J. Laney, Cleveland, Southwestern & Columbus Railway.

JOINT FREIGHT TARIFFS

J. H. Pounds (chairman), Benton Harbor-St. Joe Railway & Light Company.

C. O. Warfel, Indianapolis & Cincinnati Traction Company.

C. B. Kleinhans, Toledo & Indiana Railroad.

W. D. Stansifer, Winona Interurban Railway.

F. C. Mayer, Grand Rapids, Holland & Chicago Railway.

OFFICIAL INTERURBAN MAP

G. M. Patterson (chairman), Toledo & Chicago Interurban Railway.

J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company.

O. H. Murlin, Dayton & Troy Electric Railway.

W. S. Whitney, Ohio Electric Railway.

C. C. Trees, Indiana Railways & Light Company.

OFFICIAL INTERURBAN GUIDE

C. O. Sullivan (chairman), Western Ohio Railroad.

J. M. Brick, Springfield, Troy & Piqua Railway.

F. D. Norviel, Union Traction Company of Indiana.

J. F. Starkey, Lake Shore Electric Railway.

J. A. Greenland, Fort Wayne & Northern Indiana Traction Company.

JOINT EXCEPTION SHEET

C. O. Sullivan (chairman), Western Ohio Railroad.

J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company.

C. O. Warfel, Indianapolis & Cincinnati Traction Company.

G. M. Patterson, Toledo & Chicago Interurban Railway.

J. H. Pounds, Benton Harbor-St. Joe Railway & Light Company.

W. S. Whitney, Ohio Electric Railway.

F. D. Norviel, Union Traction Company of Indiana.

RULES GOVERNING SETTLEMENT OF FREIGHT CLAIMS

F. D. Norviel (chairman), Union Traction Company of Indiana.

F. I. Hardy, Chicago, South Bend & Northern Indiana Railway.

J. S. Clark, Marion, Bluffton & Eastern Traction Company.

C. B. Kleinhans, Toledo & Indiana Railroad.

C. O. Sullivan, Western Ohio Railroad.

JOINT WEIGHT AND INSPECTION BUREAU

J. H. Crall (chairman), Terre Haute, Indianapolis & Eastern Traction Company.

F. D. Norviel, Union Traction Company of Indiana.

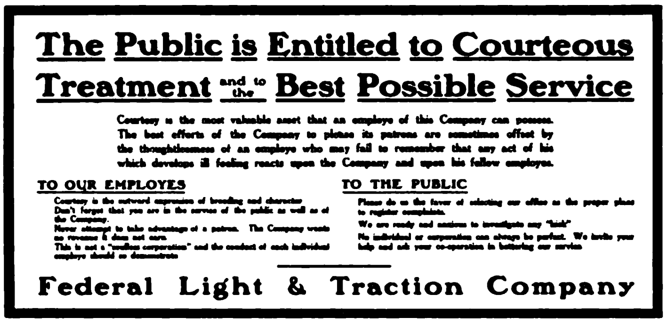
W. S. Whitney, Ohio Electric Railway.

F. I. Hardy, Chicago, South Bend & Northern Indiana Railway.

O. H. Murlin, Dayton & Troy Electric Railway.

A COURTESY CARD FOR STREET CARS

The accompanying illustration, reproduced from a placard of the Federal Light & Traction Company, New York, N. Y., indicates one of the means adopted by that company in the interest of closer co-operation with the public and employees. One of these cards will be placed in a frame at one end of each of the electric railway cars operated by the subsidiary companies of the Federal Light & Traction Company. Another card will be placed over the cashier's window at the home office, one in the show window of the office and several elsewhere in the office. The cards will also be placed in the club rooms or places where the employees congregate. Electrotypes have been made of the cards and these have been sent to the various newspapers in the cities in which the Federal Light & Traction Company operates the utilities. While the reading matter is the same on all of the cards, the company has used the names of the local companies in each city in which it operates. This makes the card a local issue.



The Public is Entitled to Courteous Treatment and to the Best Possible Service

Courtesy is the most valuable asset that an employe of this Company can possess. The best efforts of the Company to please its patrons are sometimes offset by the thoughtlessness of an employe who may fail to remember that any act of his which develops ill feeling reacts upon the Company and upon his fellow employes.

TO OUR EMPLOYES

Courtesy is the outward expression of breeding and character.
Don't forget that you are in the service of the public as well as of the Company.
Never attempt to take advantage of a patron. The Company wants no revenue it does not earn.
This is not a "soulless corporation" and the conduct of each individual employe should so demonstrate.

TO THE PUBLIC

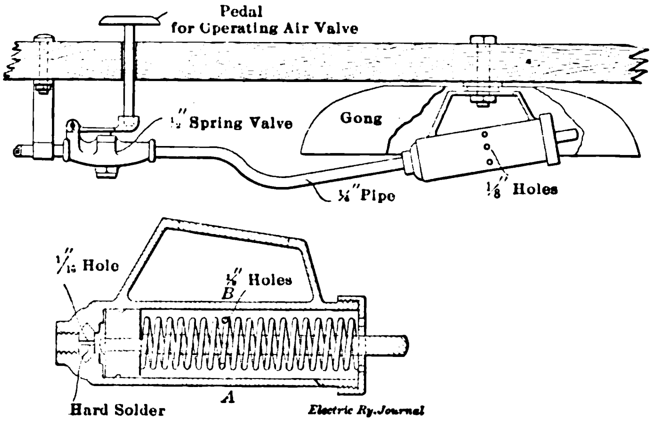
Please do us the favor of selecting our office as the proper place to register complaints.
We are ready and anxious to investigate any "kick"
No individual or corporation can always be perfect. We invite your help and ask your co-operation in bettering our service.

Federal Light & Traction Company

Courtesy Card of the Federal Light & Traction Company

A SIMPLIFIED PNEUMATIC GONG RINGER

The Kansas City Railway & Light Company is operating thirty city cars which are equipped with a new form of pneumatic operating gong. The device, which is the invention of C. C. Crewson, Kansas City, is shown in the accompanying illustration. The gong is operated by air which passes through the small port, 1/16 in. in diameter, in the hard-solder disk as shown in the line cut. The air pressure forces the piston forward until the piston head passes six ⅛-in. holes bored in the walls of the cylinder. These allow the air pressure to be instantly reduced to such an extent that the compressed spring forces the piston back about 1¼ in. At this point the piston is again picked up by the air pressure and again forced past the ⅛-in. holes, the process continuing at the rate of 800 strokes per minute as long as air pressure is supplied at the small hole in the hard-solder disk. A single tap of the gong may be produced by pressing the pedal down and immediately releasing it, but if the pedal is held down steadily a continuous ring is produced.



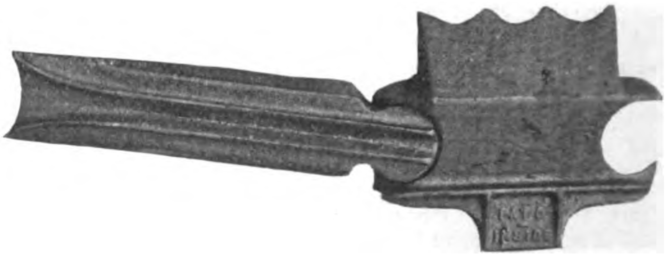
Pneumatic Gong Ringer for Kansas City Cars

The extreme simplicity of the device is its most important feature. With the exception of the small cylinder casting the entire device can be made up in any repair shop. Its low cost and freedom from repairs offer a material argument for its use in order to eliminate the customary awkward practice of having motormen stamp upon foot gongs. It has been suggested that the device can be placed on the rear of the car and operated by the motorman at the opposite end in order to give an alarm to approaching cars or automobiles when the car is about to make a turn or come to a sudden stop. The same arrangement can be used to signal to passengers who have alighted and are passing around the rear end of the car when another car is approaching in the opposite direction.

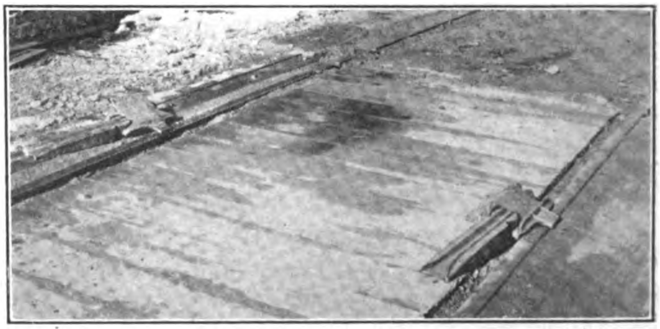
The small size of the port admitting air into the cylinder positively limits the amount of air used by the device, this restricted opening being an essential feature of the arrangement as it permits the charge of air in the cylinder to be released promptly from the large exhaust port before pressure can be built up by the incoming air. The disk in which the inlet port is placed is made of hard solder for the purpose of preventing moisture which collects at the port from freezing in cold weather. This is stated by the designer to be a new feature which has proved most successful in practice.

A SIMPLE CAR REPLACER

After two years' service on the New York Railways and several other roads had demonstrated its value, the car replacer shown in the accompanying halftones has been placed on the market by the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y. This replacer is of the simplest possible construction, consisting merely of two strong, deeply ribbed castings. The part which is fitted to the rail is formed with a three-quarters circle at each end in order to receive the other part, which can be swiveled through any portion of an arc of 45 deg. In operation the swiveling pieces of both the inside and outside replacers are first adjusted to the position of the truck wheels, and then the wheels are guided up the converging runway in each swivel piece to the rail casting. The latter is formed with an incline and outer lip, thereby permitting the wheel to slide down to the adjacent rail without difficulty.



Car Replacer for Inside Rail



Car Replacer Outfit Installed

News of Electric Railways

Tornado and Flood Damage

The tornado of March 23, which vented its worst fury on Omaha and vicinity, was followed on March 24 and 25 by what are considered the worst floods in the history of the Midde West. The reports which have been so far received indicate that the property loss will be very great. The railroads and the electric railways were hard hit. On March 25 Indianapolis was practically cut off from the rest of the world and all steam railroad and electric railway transportation into the city was reported to be suspended. The Wabash River overflowed, and it was stated that the tracks of the Fort Wayne & Northern Indiana Traction Company were inundated at many places. The Miami River rose ten inches in one hour.

A large part of the city of Dayton is under water and on March 26 the nearest that the railroads could get to the stricken city was Xenia, which is 40 miles distant. The worst flooded district in and near Dayton includes all of North and West Dayton, all of the downtown section, the south side as far as Oakwood, through which the Oakwood Street Railway operated, and all of the residence suburb of Glendale.

The tracks of the Ohio Electric Railway near Middletown, Ohio, were reported to be washed out and electric railway service in all parts of Indiana was uncertain. In Marion no attempt was made on March 25 to operate the electric railway there. Fort Wayne, at the junction of the St. Mary, St. Joseph and Maumee Rivers, was flooded on March 25. The electric light plant was submerged and the city was without light during the night. On the day mentioned the rivers just referred to reached stages higher than at any other time in twenty years.

Scores of relief trains dispatched from Chicago on March 25 reported that they could get no further than Lafayette or Logansport, Ind. Trains were detoured and those that were able to get through on March 25 were from four to ten hours late. A report from Akron, Ohio, on March 25 said that railroad and electric railway traffic there was paralyzed.

On March 26 western New York was reported to be in the grip of the flood. On that date street railway traffic in South Buffalo had to be suspended.

It is said that bridges of the Western Ohio Railroad, Ohio Electric Railway, Toledo, Bowling Green & Southern Traction Company and other roads in the western part of Ohio have been carried away. The power house of the Toledo, Bowling Green & Southern Traction Company at Findlay had to be shut down on March 24 and the town was left without railroad service and light. On the same day operations on the Western Ohio Railway's lines at Lima were completely suspended. From Delphos it was reported that no cars were in operation on the Ohio Electric Railway.

Only four of the interurban lines which enter Toledo were in operation on March 25. An overflowing river at Fremont prevented the Lake Shore Electric Railway from operating further than that point from the Toledo end of the line. A washout on the Ohio Electric Railway at Waterville was reported and no cars came into Toledo on Tuesday. The Toledo, Port Clinton & Lake Side Railway was partially in operation but washouts at one point prevented through cars. The Maumee Valley Railway & Light Company's line, the Toledo & Western Railroad, the Toledo & Indiana Railroad and the Detroit, Monroe & Toledo Short Line were not disturbed seriously.

The property of the Ohio Electric Railway at Columbus is probably seriously damaged, as the western part of the city is covered with water to a depth of several feet. The Columbus-Springfield branch enters from this side of the city. The Columbus-Newark-Zanesville division leaves the city on the east side.

No information had been obtained up to Tuesday in regard to the Columbus, Delaware & Marion Railway. Neither was any information obtainable relative to the Scioto Valley Traction Company, the lines of which traverse one division of the valley of the Scioto River. Only part of the system of the Cleveland, Southwestern & Columbus Railway was in operation Wednesday. About 6 ft. of water stood in the power station at Elyria. From Seville west operations had been suspended. A bridge near Galion was washed out.

The Cleveland, Youngstown & Eastern Railway was reported on Wednesday as operating between Cleveland and Chardon on one branch and Cleveland and a point beyond Chagrin Falls on the other. Middlefield could not be reached. The Lake Shore Electric Railway suffered from washouts. For a time operations were pretty well suspended, but on Wednesday cars were running between Cleveland and Lorain, Cleveland and Sandusky, Sandusky and Norwalk, and Toledo and Fremont. The power plants had not been badly affected at that time by water.

The tracks of the Cleveland, Painesville & Eastern Railroad near Ashtabula were weakened by washing on Tuesday, but a fair schedule was again established Wednesday. The power plant at Willoughby had to suspend for a short time as a result of the high water.

Cars on the Northern Ohio Traction & Light Company's line were in operation between Cleveland and Bedford Wednesday, but none of them could reach Akron. A report from Akron is to the effect that much of the track within the city has been torn up by the flood and that traffic between Akron and Ravenna and Akron and Cuyahoga Falls had been suspended. The Mansfield Railway, Light & Power Company was forced to suspend operations Tuesday, as the power plant was partially submerged.

Only about one-third of the track of the Columbus Railway & Light Company was in operation on Monday and Tuesday. It could not be learned whether or not the power plants of this company have been damaged. The Collinwood line of the Cleveland Railway was forced to suspend and was not operated on Monday or Tuesday.

Reports from Omaha, Neb., where there was great loss of life as a result of the tornado of March 23, show that, although the street railway service was discontinued when the wind and the torrential rain struck the city, cars were in operation on the following day. At the moment when the wind first hit the city some cars were directly in the path of the storm. In one case the conductor warned the passengers to leave the car. Nineteen lives are reported lost in the wreck of another car. The difficulties of the company were increased by the fact that the street lamps went out with the coming of the storm.

While the property loss in Omaha is estimated at $5,000,000 by the city assessor and some part of this represents damage to the plants of public utilities, the Omaha & Council Bluffs Street Railway had cars running on all but two lines on March 25 and the Omaha Electric Light & Power Company had its service resumed in some districts. The Nebraska Traction Company, running between Papillion and Omaha, suffered severe loss to its lines, but resumed operation as soon as connection was obtained with the Omaha Electric Light & Power Company's circuits.

The Commercial Club of Omaha announced on March 25 that the path of the tornado was through the residential district only and affected no business institution. Large contributions for relief purposes were made by representative companies. These included $5,000 each from the Omaha & Council Bluffs Street Railway, the Chicago & Northwestern Railway, the Union Pacific Railroad, the Chicago, Burlington & Quincy Railroad and the local gas company.

Electric railway service between Goshen and Elkhart had to be abandoned following the windstorm of March 21, but was resumed on March 22. Workmen are clearing the debris of the wrecked Dunlap carhouse and substation. C. D. Emmons, general manager of the Chicago, South Bend & Northern Indiana Railway, estimates the company's loss at from $25,000 to $30,000. Many of the city cars blown out of the carhouse were reduced to kindling wood.

A relief train stocked with provisions, blankets, cots, tents and water left New York early on March 27 for Dayton, Ohio, to aid the victims of the flood. This train was formed and provisioned under the direction of L. E. Olwell, an officer of the National Cash Register Company, who was assisted by many other Daytonians now in New

York, among them Henry Gebhart, general manager of the Oakwood Street Railway, and Harrie P. Clegg, president of the Dayton & Troy Electric Railway.

Serious flood conditions were reported on March 27 along the Mohawk and upper Hudson Rivers. High water at Spier Falls put the plant of the Adirondack Electric Power Company out of commission at 9 a. m., on March 27. This plant furnishes power for light and traction purposes to the cities of Albany, Troy, Cohoes, Rensselaer and Watervliet, in all of which the United Traction Company operated. With 5 ft. of water reported in the emergency steam plant of the United Traction Company at Mechanicsville, Saratoga County, no power was available there.

Proposed Transportation Lines Discussed with Reference to Philadelphia

Frank R. Ford, of Ford, Bacon & Davis, New York, N. Y., consulting engineers to A. M. Taylor, transit commissioner of the city of Philadelphia, contributed to the Philadelphia *Public Ledger* of March 25, 1913, an article, "Transit in Connection with Growth of Cities." Mr. Ford presented tables showing the population of the New York, Chicago, Philadelphia and Boston metropolitan areas embraced within a circle of 16 miles radius, according to the census of 1910. He said that New York was growing much more rapidly than any of the other cities and showed the growth of the four cities during the decade to 1910. In the cases of New York and Philadelphia the increase of population in each decade has been cumulative, while for Chicago and Boston the increases per decade have decreased. Consequently the growth of both New York and Philadelphia should be larger in the future than that of the other two cities. An estimate of the population of Philadelphia within the metropolitan area of the 16-mile circle covering a period of fifty years shows that in 1960 this area will have a population of 3,926,000. An estimate was also presented for a similar period covering the population within the present Philadelphia city limits. Mr. Ford concluded his article in part as follows:

"The bulk of the city's population lives within the 2-mile, 3-mile and 4-mile zones, which is the territory served by the present surface railway system. The important part that rapid transit will play in the development of Philadelphia's population growth is in the 4-mile, 5-mile and 6-mile zones. These contain 48,139 acres of land area, and if the present density within the 3-mile zone of 44 per acre can be there developed these three zones would accommodate 2,118,000 persons, or an increase over their present population of 1,529,000. Philadelphia is pre-eminent as the 'City of Homes,' having the least number of persons per dwelling, approximately one-fifth the average in New York. If Philadelphia is to maintain its pre-eminent advantage of having a dwelling for each family, it is necessary to develop the outlying areas, which can be done only by additional high-speed lines.

"It has been determined that on the proposed North Broad Street subway approximately 410,000 people would save time in their journey to and from the business district over a trip on the present surface lines; on the South Broad Street subway, 235,000 people; on the Frankford line, 300,000 people, and on the Darby line, 60,000 people. The present subway-elevated line in West Philadelphia saves time over surface lines for approximately 165,000 people, making a grand total, if these three proposed lines are built, of 1,170,000 persons benefited by this enlarged rapid transit system out of a total population within the corporate city limits estimated for 1912 of 1,623,000, or 72 per cent. A large part of the remaining 28 per cent of population is within the central part of the city and is served more expeditiously by surface lines to the business district. These people, of course, would be benefited in traveling to the outlying districts by the proposed rapid transit system. Compared with Philadelphia, twice as many rapid transit passengers are carried in Boston, over five times as many in Chicago and Brooklyn and twenty times as many in New York.

"Since June 1 of last year the technical force of the transit commissioner's office has been making studies of the most efficient location of additional rapid transit lines. A number of routes are under consideration, of which the most important are as follows:

"1. Subway under North Broad Street from City Hall to Olney Avenue, a distance of about 6 miles.

"2. Subway under South Broad Street from City Hall to League Island, a distance of about 4 miles.

"3. Elevated line from Front and Arch Streets over Front, Kensington and Frankford Avenues to Frankford, a distance of about 7½ miles from City Hall.

"4. Elevated line from Thirty-second and Market Streets on Thirty-second Street and private right-of-way parallel to the railroad right-of-way to Gray's Ferry Avenue, thence to Woodland Avenue near Forty-ninth Street, thence on Woodland Avenue and Main Street to the center of Darby, a distance of about 7 miles from City Hall.

"5. Delivery loop subway under Arch, Eighth and Walnut Streets, the fourth side being the Broad Street subway.

"Careful estimates are being made of the cost of construction and equipment of these lines. Based on the traffic survey which was made by this organization in October and November last, an accurate knowledge of the amount and direction of traffic to and from each part of the city has been determined, and from this information estimates are being prepared of the traffic and gross earnings to be expected from each of these proposed lines. The proportion that these gross earnings will draw from the present surface lines and that from the additional facilities are also being developed. Additional estimates of operating expenses and fixed charges and the net return on cost of construction and equipment are being prepared. It is expected that by June 1, or within twelve months from the beginning of this inquiry, definite results will be obtained."

Rapid Transit Progress in New York

On the day following the signing of the dual rapid transit operating contracts the Public Service Commission of the First District of New York approved the mortgages filed by the Interborough Rapid Transit Company and the New York Municipal Railway Corporation and authorized each company to issue bonds needed for the carrying out of the new agreements. The mortgage of the Interborough Rapid Transit Company to the Guaranty Trust Company of New York is for $300,000,000, and the bonds authorized by the commission total $160,957,000. The mortgage of the New York Municipal Railway Corporation to the Central Trust Company is for $100,000,000, and the bonds authorized total $40,000,000. Neither company may issue further bonds without the consent of the commission.

Commissioner Milo R. Maltbie, who has been opposed to the new contracts, cast the only vote against the approval of the mortgages and bonds. Both bond issues are to run for fifty years, the issue of the Interborough Rapid Transit Company from Jan. 1, 1913, and that of the New York Municipal Railway Corporation from July 1, 1912. Each will bear 5 per cent interest. The Interborough company's bonds must be sold for not less than 93½ and the New York Municipal Railway Corporation's bonds for not less than 97 per cent of their par value. The Interborough company's bonds are to be redeemable before maturity at 110 and the New York Municipal Railway Corporation's bonds at 107½, with accrued interest.

The new rapid transit system provided by these contracts will be about three times the capacity of the existing lines. It will have more than 600 miles of single track and will cost for construction and equipment about $325,000,000. The cost of construction will be borne jointly by the city of New York and the companies, and all the new roads, other than the extensions of privately owned elevated lines, will be owned by the city, but each company will get a lease of the roads allotted to it for forty-nine years. After the payment of operating expenses and other charges, the companies must share profits equally with the city. For the construction of city-owned lines the city will contribute about $163,000,000, the Interborough Rapid Transit Company $58,000,000 and the Brooklyn company $14,000,000. Each company must bear the entire cost of equipment, as well as the cost of construction of the privately owned elevated railroads. Of the city's contribution, contracts have already been awarded for about $75,000,000, so that there is yet to be let on the city-owned lines work to cost about $160,000,000. All construction contracts are to be awarded by the Public Service Commission, which is now increasing its engineering force for the purpose of properly handling the new work. The engineering department of the commission now numbers about 750 employees, and it is expected that 200 or 250 more will be necessary to recruit it to the required strength. Five thousand men are now at work on the contracts already awarded, and it is expected that this number will be doubled within a year or two. The new system is to be completed and ready for operation by Jan. 1, 1917, but the contracts provide for the operation of parts of the system as they are completed. This means that the Steinway tunnel, leading from Manhattan to Queens, the Centre Street loop in Manhattan, connecting the East River bridges, and the Fourth Avenue subway in Brooklyn will be placed in operation before the rest of the system is completed.

Chairman Edward E. McCall and Secretary Travis H. Whitney, of the commission, have executed the construction contracts for Sections Nos. 2 and 3 of the Woodside, Astoria and Corona elevated railroad in Queens. These sections comprise the main parts of the two projected rapid transit lines from the Queensboro Bridge to Astoria and Corona. When completed these lines will be operated jointly by the Interborough Rapid Transit Company and the New York Municipal Railway Corporation (Brooklyn Rapid Transit). The total contract price for the two sections is $2,924,341. Cooper & Evans have the contract for Section No. 2, the Astoria line, and the E. E. Smith Contracting Company for Section No. 3, the Corona line. The contractors will begin work within sixty days and have eighteen months thereafter in which to complete it.

The Future of the Willamette Valley

The new bridge of the Portland, Eugene & Eastern Railway at Salem, Ore., that links the east and the west side of the Willamette Valley, was dedicated on March 15, 1913. The construction of the bridge was started on May 5, 1912, and completed during February, the first train being sent over the bridge on Feb. 28, 1913. On March 10 regular service was inaugurated over the bridge. It is estimated that the work in connection with the bridge amounted to an approximate total cost of $300.000.

At the ceremonies on the afternoon of the day on which the bridge was dedicated Robert E. Strahorn, president of the Portland, Eugene & Eastern Railroad, asserted that the last of the new steam lines has been seen in Oregon and predicted that the time will come when there will be only one steam line north and south through the Willamette Valley. All other roads will be electrified.

At a banquet on the evening of March 15 Mr. Strahorn said in part:

"I regard the completion of the Salem, Falls City & Western Railway as vastly more beneficial to you and the Willamette Valley generally than the building of a new line from Salem to Portland. Of course I must modestly suggest that this presumes my being allowed to put on the finishing touches by electrification. I venture the assertion that no similar area west of the Mississippi is better served by railroads than this will be when this programme is complete. We may well pause to consider that in most regions to-day railroads are not seeking so much to extend their lines as they are to develop the territory they now occupy. This is because after all it takes large traffic to pay dividends. Without adequate tonnage the most gigantic transportation company heads straight to bankruptcy. It behooves us to pull together in consistent and persistent endeavor to develop this territory to its greatest possible production, encourage by every means the establishment of home industry and promote with most cordial co-operation the intelligent interchange of business and the enlightening and care-lifting habit of intercourse and travel."

Proposed Extensions in Utah

All of the electric railways in Salt Lake City are making or planning extensions. The Utah Light & Railway Company will build a 10-mile extension this spring north to Bountiful and a 5-mile extension on the Holliday line to the mouth of the Cottonwood Canyon and is drawing up specifications for twenty-four new cars. The type to be purchased has not yet been definitely settled, but will be determined during the next few weeks.

The company is also increasing the peak-load capacity of its hydroelectric stations by the construction of equalizing reservoirs. The water used at its hydraulic plants is employed farther down the stream by the farmers for irrigation purposes. For this reason it is impracticable to impound water for peak-load hours in the usual way because such a plan would interfere with the continuity of flow below the station, but by the installation of reservoirs at both the intake and tailrace this difficulty is avoided, and this is the plan which the company is following at its Ogden and Cottonwood Canyon plants. By this means it will increase its peak-load power capacity about 50 per cent.

The new equipment purchased for the Ogden Canyon station includes two 3750-hp Morgan-Smith wheels each directly connected to a 2500-kva Westinghouse generator; a bank of three 875-kva Westinghouse transformers stepping up to 45,000 volts, switchboard appliances, etc. At the Ogden Canyon station the company is installing a new 1000-kva Morgan-Smith wheel and four Westinghouse generators, with corresponding equipment. At the same time it is increasing the capacity of its West Temple substation by the addition of a 1500-kw motor-generator and will build a new substation with a 500-kw motor-generator at Bountiful. The company is also installing underground feeders on 2 or 3 miles of route in Salt Lake and substituting steel span poles for the present wooden center-bracket poles on these routes.

The Salt Lake & Ogden Railway, popularly known as the Bamberger route, is double-tracking a considerable portion of its line to Ogden. By July 1 this work will be completed as far as Kaysville.

An important electric railway, projected to connect Salt Lake City with Payson, Provo and other cities to the south, is that of the Salt Lake & Utah Railway. This company will occupy an interurban terminal at Salt Lake City in connection with the Salt Lake & Ogden Railway and will build some 65 miles of track through a rich agricultural district with the different towns some 6 miles apart. The population to be served, exclusive of the terminal city, is about 50,000. Large irrigation work is under way near the southern end of the system and, when completed, will draw many new settlers. The right-of-way has been secured and rails and ties for about 30 miles of track are on the ground. The company has not done much grading yet, as it is waiting for the spring. A bridge is being erected across the Provo River. It is expected that 45 miles of track will be in operation by the late summer. No contracts for rolling stock or equipment have yet been let. The company will purchase power from the Utah Power & Light Company.

The officers of the company are: W. C. Orem, Boston, president; James G. Berryhill, Des Moines, and H. C. Joy, Boston, vice-presidents; F. M. Orem, Salt Lake City, secretary and treasurer. The directors are J. E. Cosgriff, L. H. Curtis, James G. Berryhill, Jr., Joseph S. Keeler and J. S. Macbeth. The electrical engineer is Leonard Wilson and the constructing engineer is S. S. Arendt.

The company has an authorized capital stock of $2,000,000 and authority to issue bonds at the rate of $40,000 a mile, but as yet has made no public issue of its securities. At present the work is being directed by the president of the company, W. C. Orem, Newhouse Building, Salt Lake City.

The Ogden Rapid Transit Company is planning some important extensions this year under the direction of P. D. Kline, who has been elected superintendent in place of the late J. W. Bailey. Mr. Kline was formerly connected with H. A. Strauss & Company, constructing engineers of Chicago, and had charge of the electrical equipment of the Salt Lake & Ogden Railway.

The two most important projects of the Ogden Rapid Transit Company are a 6¾-mile extension to the Ogden Valley and a connection between its line and the Logan Rapid Transit System, which it also owns. This extension will involve the construction of some 50 miles of track. The company will also build about 3 miles of track in Ogden and expects early in the spring to purchase ten new cars. It is also preparing plans for a new carhouse and repair shop.

Rehabilitation Work of Allen & Peck, Inc., at Newport News Praised

In commenting editorially on the report of President C. Loomis Allen to the stockholders of the Newport News & Old Point Railway & Electric Company the Newport News *Times-Herald* said recently:

"Mr. Allen and his associates who acquired these properties a short while back found them in a condition of collapse and the power plant had to be rebuilt from the bottom. It was no small undertaking to tear away a lot of old machinery and replace it with new machinery of a different pattern, and yet keep the wheels turning day and night. This power plant supplies power not only for the electric cars and for many private machine shops, but lights for the streets, business houses and dwellings for the lower peninsula. But the change from old to new was done scientifically and as expeditiously as possible and the interruptions were so few in number as compared with previous conditions that it is small wonder that the people were patient and of a liberal spirit. This work was done under the immediate inspection and supervision of General Manager J. N. Shannahan and it is a monument to his skill and zeal.

"But that is not all that can be said of Allen & Peck, Inc., and their associates. They are men of character, as well as men of ability. They are men of their word, who have a keen sense of obligation, and they have fairly kept faith with this community. They have endeavored to give adequate service and to live up to all the responsibilities of their franchise, while at the same time doing their duty by the stockholders; for it must be considered always that the stockholders, as well as the general public, have their rights. By pursuing this course, Allen & Peck, Inc., have won the confidence and the good will of the people of the lower peninsula, and that spirit of co-operation referred to by President Allen is abiding. There is a new spirit in Newport News, and its birth was coincident with the coming of Allen & Peck, Inc. The confidence and optimism manifested by them proved a benevolent contagion and it is still spreading."

Cincinnati Negotiations

Following a conference on March 20, 1913, between the city officials of Cincinnati, Ohio, and Walter Draper and Attorney Lawrence Maxwell, representing the Cincinnati Traction Company, Mayor Hunt announced that the city could not accept the proposal for a settlement of the street railway situation made by the company. In its latest proposal the Cincinnati Traction Company specified that the betterments to the Cincinnati Street Railway, since the latter has been under its control, should be capitalized at $7,216,283. The city officials considered this amount excessive, although the proposal contained a condition that the accounts should be verified. The city proposed that the improvements should be capitalized at $6,500,000. An arbitration proposal as to the expenditures made for betterments had been made by the city.

The city and company are practically agreed as to the rates of fare, although there is a difference as to the periods for readjustment. The company insists that the first readjustment shall take place five years from the date of settlement, while the city contends that the fare should be readjusted in 1916. The interurban cars are to be charged 25 cents per car mile for operating over city tracks. On the Cincinnati Street Railway the fare is to be 5 cents with transfers good on the Mill Creek Valley and the Rapid Transit lines, while six tickets are to be sold for 25 cents, good only on the Cincinnati Street Railway system and carrying the privilege of transfers only on that system. On the Mill Creek Valley lines the fare within the city limits is to be 5 cents, with transfers to the Cincinnati Street Railway and Rapid Transit systems. The fare is to be the same on the Rapid Transit line, with transfers to the other two lines within the city limits.

The city objects to the clause in the company's proposal which specifies that before the city shall have a right to demand a readjustment of fares and extensions the earnings must be sufficient to pay 6 per cent on the capital stock of the Cincinnati Street Railway. The Cincinnati Street Railway has outstanding $18,738,950 of stock, the present market value of which is about $23,000,000. A fare of 4 cents during the rush hours with straight 5 cents at all other times of the day and universal transfers is under consideration as a substitute for the rates already practically agreed upon.

Review of Traction Developments in Troy.—The Troy *Record* recently contained a very interesting non-illustrated review of the progress in street railway development in Troy, N. Y., and vicinity. The lines in that city are now controlled by the United Traction Company, Albany.

Catalogs and Bulletins Wanted.—The European Bureau of American Manufactures, Berlin, W 9, Germany, has invited manufacturers to forward promptly their catalogs with best export discounts for the following articles: bird's-eye wood (maple) for street car ceilings, bent boards of five layers, tulip-shaped reflectors for electric lamps and railroad and surface car supplies in general.

Protests Against Railway Location in Cleveland.—Residents on the streets to be used by the proposed crosstown line on the East Side in Cleveland are protesting against the location of the road in front of their properties. At a meeting with the street railway committee of the City Council on March 18 Attorney M. P. Mooney for the protesting property owners intimated that an injunction suit might be filed.

More Storage Battery Cars in New York.—The Belt Line Railway Corporation, formerly the Central Park, North & East River Railroad, which was recently acquired by the Third Avenue Railway, New York, N. Y., has submitted to the Public Service Commission its plans for substituting storage battery cars for the horse cars now operated on its lines on the west and east sides of the city south of Fifty-ninth Street. The commission has set April 28 for a public hearing on the plan.

Franchise Adjustment in Tiffin.—The Tiffin, Fostoria & Eastern Railway, Tiffin, Ohio, has obtained a twenty-five-year franchise for the operation of the Tiffin city lines. The company has been operating in the city at a loss for several years. On complaint of residents there the Public Service Commission recently ordered the company to make improvements. The company replied that rather than spend more money on a losing venture it would take up the tracks. The Tiffin Commercial Club, Central Labor Council and other organizations interceded in behalf of the company and formulated a franchise that is acceptable to the company. This franchise has been passed by the City Council.

Automatic Stopping Devices.—Since the announcement by the New York, New Haven & Hartford Railroad of its intention to try out two of the many automatic stopping devices submitted in the competition for the $10,000 prize offered by President C. S. Mellen, there have been many inquiries for the names of the inventors of the two devices that will receive a trial. The two devices selected by the company for its experiment are being handled by the Union Switch & Signal Company, Swissvale, Pa., and the International Signal Company, New York. The railroad company has announced that it is not intended to convey the impression that either one of them will be the final choice of the company, as it may be found advisable to test a number of other devices that may seem to contain sufficient merit to warrant the experiment. The contest is open until July 1.

Normal Service in Binghamton.—The service of the Binghamton (N. Y.) Railway is now practically normal, and so far as the company is concerned the strike is a thing of the past. G. Tracy Rogers, president of the company, in a statement which he issued several days ago said in part: "As a result of the call issued for the employees on strike to return to work if they desired their old positions nineteen of the former employees responded and will be assigned to regular runs. We now have forty-five regular crews to operate the cars over the various lines of the system. Out of twenty-five students who applied for work this morning we accepted twenty men. We are well pleased with the situation and are receiving many compliments in regard to the courtesy of the men now manning the cars. We are going to put on extra cars during rush hours."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

DELAWARE

The House has passed the bill providing for a public utility commission. The measure empowers the Governor to appoint three commissioners at a salary of $3,000 a year each, one from each county. It abolishes the present Wilmington Public Utilities Commission. The Senate has killed the bill providing for "Jim Crow" cars.

ILLINOIS

Senator Denvir has introduced Senate Bill No. 257, limiting the hours of employment of street railway employees to ten hours, which must be in twelve consecutive hours.

INDIANA

Governor Ralston of Indiana has vetoed the Harlan "blue sky" bill. As the Legislature of Indiana has adjourned it will be at least two years before a "blue sky" bill is enacted. The Governor has announced, however, that a commission of three will be appointed to survey the security situation and report a bill for passage in 1915.

MAINE

The Legislature of Maine has passed the bill to create a public service commission. The measure is fashioned after the Wisconsin law. The commission is to consist of three members to be appointed by the Governor and his Council.

MASSACHUSETTS

The bill providing for the creation of a public transportation commission in place of the present board of Railroad Commissioners has been unanimously reported in the Massachusetts Legislature. The bill as finally drafted provides that the chairman shall receive a salary of $6,000 and that the other members of the board shall be paid at the rate of $5,000 each per annum. The proposed act gives the newly created commission mandatory powers over railroad and street railway rates, and it is an outcome of a long-continued discussion of the methods of regulating transportation companies within the State. Governor Foss continues to urge the desirability of a single public utilities board for the commonwealth, having jurisdiction over all public service companies, but there is little disposition in the Legislature to interfere with the present Gas and Electric Light Commission's functions.

Interest has centered during the past fortnight upon hearings by the committee on street railways on the bill requiring that a day's work for conductors and motormen shall not exceed nine hours of service performed within eleven consecutive hours. Representatives of all the principal electric railway systems of the State have testified before the commission in opposition to the bill.

MICHIGAN

Senator James E. MacGregor has prepared a public utilities bill for introduction in the Legislature. The measure is in line with the recommendations made by Governor Ferris in his inaugural address. It provides for transferring the duties of the State Railroad Commission to a public service commission and the employment of expert help sufficient to operate the department properly.

Attorney-General Fellowes has rendered an opinion to the effect that all amendments to city charters voted upon at the spring election on April 7, under the new home rule bill, will be illegal, since the Legislature is without power to give this law immediate effect. According to Mr. Fellowes, the law cannot go into effect until eighty days after the close of the present session. It was proposed by the Detroit city officials to proceed at the election on April 7 with the vote on the proposed municipal ownership amendments.

MISSOURI

A constitutional amendment authorizing St. Louis to become indebted to the extent of $30,000,000 to construct a municipal subway has passed the Legislature. If ratified at the fall election of 1914, the city could issue bonds. Under the proposed amendment Kansas City also is authorized to vote subway bonds. The Senate has passed the Rodgers bill, which provides that all railroads and electric railways which operate in Missouri must incorporate under the laws of that State.

NEW YORK

The Goldberg bill creating a state board of securities to supervise all companies and associations organized for profit, other than banks, which is patterned largely after the Kansas "blue sky law," passed the State Assembly on March 25. All the Stilwell stock exchange reform bills need to become laws now is the signature of Governor Sulzer. The Senate passed the measures on March 25. The Assembly passed them several days ago. They prohibit the publication of fictitious transactions in securities and false representations concerning securities. Assemblyman Small has introduced a bill to compel street surface, elevated and subway railways to pay the State 10 per cent of the money received for advertising in cars or stations. The bill would create another new office, known as inspector of advertising, salaried at $2,500 a year and traveling expenses. Mr. Small has also put in another bill to compel street railways to sprinkle with sand or oil between their tracks and 3 ft. each side four times a day from May 15 to Sept. 15.

OHIO

Representatives of the public service corporations called upon Governor Cox on March 30 to protest against the enactment of what is known as the administration public utilities bill in its present form. The bill has been amended to place with municipalities that have adopted the home rule form of government absolute control over public service companies, with the exception of the accounting system. About all the work left to the Public Service Commission to perform is the supervision of interurban railways. Instead of the uniform regulation of the past two years being continued there will be local regulation under about 600 commissions, representing as many cities and villages. The Governor refused to consider the suggestion to incorporate in the bill a provision that municipally owned plants shall not furnish service below cost.

J. C. Martin, president of the Ohio Electric Light Association, charged the Governor with failure to carry out the promises made in his inaugural address. He declared that the bill legislates out of office the present commission and repeals a good law. When Governor Cox took office it was thought that he would recommend the strengthening of the public service laws and select three experts to act as commissioners, with experts at the head of the various departments of the commission.

On March 19 the Bigelow bill providing for the repeal of the law requiring consents of owners of abutting property along a proposed line of electric railway was defeated in the House, but it has been reconsidered and reinstated on the calendar. Mr. Bigelow has promised to amend the measure so as to provide that property owners may bring suit for damages if they feel that their property has depreciated in value on account of the construction of a railway. Another proposed amendment would re-establish the necessity of securing consents for lines outside of municipalities and another would require consents inside if the tracks are not laid in the middle of the streets.

A. B. DuPont, Cleveland, is opposed to the Bigelow bill to revoke all franchises which were drawn for more than twenty-five years.

PENNSYLVANIA

The most interesting feature of the legislative sessions recently was the descent upon Capitol Hill of more than 1500 residents of Philadelphia, in the interest of the three Philadelphia bills reported favorably to the Senate on March 26. These measures are designed to improve the transit facilities in that city and to raise additional revenue for municipal purposes. One bill creates a department of city transit, and another empowers the city to purchase, lease or construct lines for a period not exceeding fifty years, subject to prescribed rates of fares, rentals and sinking fund. Among those who appeared before the committee on municipal affairs in behalf of the bills were Mayor Blankenburg, A. B. Johnson, president of the Baldwin Locomotive Works; George McCurdy, president of Common Council, and Secretary Lennon of the South Philadelphia Business Men's Association.

Before returning home the delegation called upon Governor Tener, who made a brief speech of welcome and declared himself in favor of early improvement of the port of Philadelphia, which, he stated, would benefit the State at large.

The House has passed the bill limiting the employment of watchmen at railroad crossings to eight hours per day, under penalty of a fine of from $50 to $100 for each violation. The same body also passed the workingmen's compensation and employers' liability bill by a vote of 159 to 28. Both of these measures now go to the Senate. An effort to have the bill making it a misdemeanor to have wooden passenger cars between steel cars placed upon the calendar notwithstanding a negative recommendation from committee was defeated by 102 to 54 in the House.

At a meeting of the joint committee on taxation on March 25 attorneys representing various railroad interests presented objections against the McClintock bill providing for the taxation of railroad property for county, township and borough purposes. They argued that it would be exceedingly difficult equitably to assess railroad property and urged that such taxation be withheld until the present work of compiling figures on the valuation of all railroad property in the country is completed at Washington.

RHODE ISLAND

A hearing upon the act providing a charter for the Boston & Providence Interurban Electric Railway was held on March 25 by the House committee on corporations of the Rhode Island Legislature. Stephen O. Edwards, Providence, of the law firm of Edwards & Angell, appeared on behalf of the railroad. He outlined the entire proposition and explained the reasons for its organization. He promised that if the company received permission to build it would construct a line over which electric trains would be run at a speed which would equal that of the fast express trains on the New Haven system. The attorneys declared that on the Boston end the freight and express terminal would be at Forest Hills. On the Providence end the terminal would be at tidewater near Field's Point. Chairman Langworthy continued the hearing until April 2.

An act providing for a board of arbitration and conciliation to handle labor difficulties has been introduced in the Legislature by Representative Jacob A. Eaton and is now pending before the committee on labor legislation of the House. The act provides for a board of three members, one of whom shall be an employer of labor, another an employee, and a third a member of the Rhode Island bar, all to be appointed by the Governor.

WASHINGTON

The House has killed the so-called "5-cent-fare bill" (H. B. 581), which removed the legal limit of car fares within the limits of a city and left the fixing of rates in the hands of the Public Service Commission.

WISCONSIN

The Assembly has killed the bill requiring street railways to maintain offices and keep their accounts and repair shops in the State. The bill requiring street and interurban railways to carry road material has been passed. The committee on transportation of the Assembly held hearings recently on the Jennings bill to prevent the overcrowding of street cars and permitting only ten persons to stand when all seats are occupied, and on the Gannon bill to compel street railways to pave between the tracks and 1 ft. on each side. The committee has taken no action on the bills. The committee on corporations of the Senate held hearings recently on the Linley bills to confer on municipalities the power to own and operate street railway systems.

Because it would have the effect of restricting the power of the Railroad Commission, the Schnitzler bill to prohibit interurban and electric lines from raising rates specified in their franchises was killed in the Assembly. The bill was on the calendar for indefinite postponement, but the author presented an amendment providing that such corporations could not surrender their franchises for indeterminate ones without the consent of the councils or other bodies granting them. Opponents of the measure said the bill would tie the hands of the Railroad Commission and tend to keep capital out of the State. No other matters of importance to electric railways have come before the Wisconsin Legislature lately.

Financial and Corporate

Stock and Money Markets

March 26, 1913.

Prices on the New York Stock Exchange made another advance to-day. The total number of shares sold was 446,551, notwithstanding the news from Ohio and Indiana indicating great property losses to the railroads and manufacturing interests. The bond transactions totaled $1,575,000, par value. Stock advances ranged from a fraction to several points. Rates in the money market to-day were: Call, 3 @ 4½ per cent, with the last loan at 4 per cent; sixty days, 5¼ @ 5½ per cent; ninety days and four, five and six months, 5 @ 5¼ per cent.

The market in Philadelphia to-day was broad and quite active. The demand for bonds was good.

The Chicago market to-day was narrow and the volume of transactions very small. The bond market was extremely dull.

In Boston to-day there was very little trading in the railroad issues. The demand for bonds was fair.

In Baltimore the trading in stocks was narrow and the volume of transactions small. The demand for bonds continued good, the bond transactions totaling more than $70,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Mar. 19	Mar. 23.
American Brake Shoe & Foundry (common)	90¼	90½
American Brake Shoe & Foundry (preferred)	131	130½
American Cities Company (common)	44	43
American Cities Company (preferred)	a76¾	71½
American Light & Traction Company (common)	350	345
American Light & Traction Company (preferred)	106	105
American Railways Company	..	39
Aurora, Elgin & Chicago Railroad (common)	44	43½
Aurora, Elgin & Chicago Railroad (preferred)	87	87½
Boston Elevated Railway	107	105½
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	a66	a66
Boston & Worcester Electric Companies (common)	7½	7¼
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	87	88⅛
Capital Traction Company, Washington	120	120
Chicago City Railways	150	150
Chicago Elevated Railways (common)	*25	26
Chicago Elevated Railways (preferred)	*88	88
Chicago Railways, ptcptg., ctf. 1	90	88
Chicago Railways, ptcptg., ctf. 2	22¼	21¼
Chicago Railways, ptcptg., ctf. 3	6⅞	6
Chicago Railways, ptcptg., ctf. 4	3½	*3½
Cincinnati Street Railway	112	*112
Cleveland, Southwestern & Columbus Ry. (common)	*5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred)	*30	*30
Cleveland Railway	103½	103½
Columbus Railway & Light Company	18	*18
Columbus Railway (common)	a69½	*69½
Columbus Railway (preferred)	82½	*82½
Denver & Northwestern Railway	*108	*108
Detroit United Railway	a80	74¼
General Electric Company	136	137½
Georgia Railway & Electric Company (common)	121	118
Georgia Railway & Electric Company (preferred)	a83¾	84
Interborough Metropolitan Company (common)	17¼	16⅞
Interborough Metropolitan Company (preferred)	58	58
International Traction Company (common)	*35	*35
International Traction Company (preferred)	*95	*95
Kansas City Railway & Light Company (common)	15	15
Kansas City Railway & Light Company (preferred)	30	*30
Lake Shore Electric Railway (common)	*6½	*6½
Lake Shore Electric Railway (1st preferred)	*91	*91
Lake Shore Electric Railway (2d preferred)	*25½	*25½
Manhattan Railway	127¾	127
Massachusetts Electric Companies (common)	16½	16½
Massachusetts Electric Companies (preferred)	74½	74
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*25¾	*25¾
North American Company	77	75
Northern Ohio Light & Traction Company (common)	72½	70½
Northern Ohio Light & Traction Company (preferred)	a105	*105
Philadelphia Company, Pittsburgh (common)	45	44½
Philadelphia Company, Pittsburgh (preferred)	40	40
Philadelphia Rapid Transit Company	25⅛	24½
Portland Railway, Light & Power Company	*67	*67
Public Service Corporation	115	115
Third Avenue Railway, New York	34	36¾
Toledo Railways & Light Company	2⅝	2⅝
Twin City Rapid Transit Co., Minneapolis (common)	103	103½
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	34	*34
United Rys. & Electric Company (Baltimore)	23	23⅛
United Rys. Inv. Company (common)	25	27½
United Rys. Inv. Company (preferred)	47	50½
Virginia Railway & Power Company (common)	51¾	51¾
Virginia Railway & Power Company (preferred)	89	89
Washington Ry. & Electric Company (common)	87½	94
Washington Ry. & Electric Company (preferred)	88¼	89
West End Street Railway, Boston (common)	76½	76
West End Street Railway, Boston (preferred)	a95	a95
Westinghouse Elec. & Mfg. Company	62	63½
Westinghouse Elec. & Mfg. Company (1st preferred)	117	116

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*Last sale. a Asked.

ANNUAL REPORT

Public Service Corporation of New Jersey

Earnings and expenses of the Public Service Corporation of New Jersey, Public Service Gas Company, Public Service Railway Company, Public Service Electric Company and subsidiary companies for the year ended Dec. 31, 1912, were as follows:

Gross earnings of leased and controlled companies..........		$32,654,469
Operating expenses and taxes..................	$17,779,433	
Amortizaiton charges	722,078	
		18,501,511
		$14,152,958
Public Service Corporation of New Jersey income from securities pledged and from miscellaneous sources		1,939,338
		$16,092,296
Bond interest and rentals of leased and controlled companies		11,289,076
		$4,803,220
Fixed charges of Public Service Corporation of New Jersey..		2,749,996
Net surplus		$2,053,224

Thomas N. McCarter, president, says in part:

"Out of these earnings dividends at the rate of 6 per cent per annum, aggregating $1,500,000, were paid during the year upon the capital stock of the corporation, which amounts to $25,000,000 at par.

"The corporation financed itself and its subsidiary companies for the year for the most part from the remaining proceeds of the sale of $13,860,000, face value, of its general mortgage bonds, which, as stated in the annual report for 1911, were sold to J. P. Morgan & Company and Drexel & Company during that year. These remaining proceeds were used to meet the construction and extension requirements of the three operating companies for the year, and, in addition thereto, the Public Service Railway issued $500,000 at par of equipment trust, series C, certificates, dated Aug. 31, 1912, the proceeds of which were used to pay, in part, for 100 new cars. To meet the further construction obligations of its subsidiary corporations, the corporation borrowed during the latter part of the year $600,000 on its note, secured by its general mortgage bonds as collateral.

"During the year the Public Service Railway leased the Riverside Traction Company for a period of 999 years from April 1, 1912. The lines of the Riverside Traction Company connect with those of the Public Service Railway at Riverton and run thence to the heart of Trenton, having a total trackage of about 33 miles. The Public Service Corporation of New Jersey also acquired during the year the capital stock of the Trenton Terminal Railroad (which last named company is the lessee of the Elizabeth & Trenton Railroad). These properties will embrace an additional trackage, when contemplated construction is completed, of more than 41 miles. By the acquisition of these properties and the completion of their construction the corporation fills in the gap in its railway system in the center of the State. When the remaining construction is finished, which we anticipate should not be later than May 1, 1913, the Public Service Railway will have a completed through line across the State from the Hudson River waterfront to the Delaware River waterfront at Camden. The old properties thus acquired are being thoroughly reconstructed and rehabilitated and the new construction is of the fine, modern interurban type, admitting of high speed. I regard these new properties as most valuable assets for the future. With them the Public Service Railway will parallel the Pennsylvania Railroad all the way from New York to Philadelphia. In addition thereto, and closely connected with this project, it is proposed to build a cut-off from this new line at a point near Port Reading Junction to Sewaren, a distance of 1.6 miles, where the cut-off will connect with our existing line into Perth Amboy. The result of this will be to provide the Amboys with high-speed facilities into Elizabeth and Newark, as well as to New York. It is the intention of the management not to extend further the activities of the company beyond the State line.

"The properties owned by the corporation have been maintained throughout the year at a high standard of efficiency, and, in addition thereto, the sum of $722,077 has been charged to amortization.

"The most important of the improvements completed during the year is the new Summit railway terminal and office building in Jersey City, built to be used in cooperation with the Summit Avenue station of the Hudson & Manhattan Railroad and the Pennsylvania Railroad.

"The large new carhouse, known as 'Big Tree,' in the town of Nutley, in the Essex division, was completed during the year and put into operation on Sept. 22. This carhouse affords capacity for 120 cars and provides in connection therewith a repair shop, office building and recreation room for employees. A new carhouse, to be built of brick and concrete, is in process of construction at West New York. A very substantial building for office purposes, designed as the Hudson division headquarters for the mechanical departments of the electric and railway companies, is in course of construction at Palisade Avenue and the elevated structure in Jersey City.

"The company has increased its number of prepayment cars so that there are now a total of 1113 cars of this variety on the system. During the year two-car trains to the number of forty-one trains were put in operation on various lines in the Hudson and Essex divisions and have been very successful.

"More than 51 miles of track was reconstructed during the year and, including the new properties above referred to, approximately 17½ miles of new track was laid. The total mileage of the railway when the new construction under way is completed will be approximately 850 miles.

"A very large and valuable piece of real estate has been secured during the year, fronting on the Passaic River in the meadow section of Newark, as the site for a new power station, which the rapidly growing business of the electric company in this locality clearly presages as a necessity in the early future.

"The corporation's subsidiary operating companies obtained an approximate gross increase from operating during the year of $2,200,000, or 7.31 per cent over 1911. The percentage of increase of the railway was 4.35 per cent. This is below normal and is due to two reasons—the severe climatic conditions which prevailed during the early winter months of 1912 and the direct loss suffered by the opening of the Summit station of the Hudson & Manhattan Railroad in Jersey City and the joint operation of the high-speed line to Newark by the Hudson & Manhattan Railroad and the Pennsylvania Railroad. The opening of the Summit station has very largely changed conditions in Jersey City. The vast majority of people living in the Hill section of Jersey City no longer take either the ferry or the tube to Exchange Place, but go right through in the tube trains to or from Summit Avenue, thus eliminating the ride on the street railway. The lines affected by the operation of these new facilities show an actual loss of business of approximately $225,000. Except for this the increases of the railway would have been very satisfactory, notwithstanding the severe winter.

"The taxes paid during the year amounted to $1,873,018, an increase over 1911 of $213,276. In addition to this, the corporation, as usual, contributed large sums to municipalities in the form of new improvements, street paving and street-paving assessments.

"The fire insurance carried as of Dec. 31, 1912, amounted to $26,860,669. This is an increase over the corresponding date of the previous year of $2,530,853. The total premiums for 1912 amounted to $118,534, which is an average of 44 cents per hundred and a decrease in the premiums paid, as compared with 1911, of $887.25. This it appears the company carried during 1912 a large amount of additional insurance over 1911 at a substantially less premium.

"The welfare plan of the corporation, which was put into effect Jan. 1, 1911, has been carried on and extended during the year of 1912. The following is the cost of the work: Insurance, $19,009; sick benefits, $24,119; pensions, $11,169; expenses, $6,819; total, $61,116.22. This is an increase of $12,327 over 1911, the reason for which, however, is that the cost of administration was not charged to this account in the former year but is included in the figures this year. The pension roll was increased from twenty-two at the beginning of the year to forty-one at the close of the year. Sick benefits were paid on 1124 cases, at an average of $21.45 per case.

"July 4, 1912, completed the first full year of the operation of the workmen's compensation act. The cost of accidents to employees occurring during this period, when the weekly payments are completed, will amount to $63,530. There were 2357 injuries to employees reported during the year, as against 1356 during the previous year, this largely increased number, however, being due to the care with which minor injuries are now looked after.

"During the latter part of the year the board of directors decided, as of Jan. 1, 1913, to put all female employees upon a minimum wage basis of $9 per week. The company regards this as an important step in its welfare work. While the increase involved in many cases was more than the positions merited, the company feels that it is doing that which is eminently fitting in vouchsafing to all its female employees a decent living wage.

"Another full year of operation has been passed under the supervision of the Public Utility Commission. Our subsidiary companies are constantly before the commission in a multitude of matters of greater or less importance. Our relations with the commission have been, and continue to be, of an entirely cordial character.

"While the company decided to obey the order and recommendations of the Public Utility Commission in regard to the reduction in the price of gas from $1 per 1000 cu. ft. to 90 cents per 1000 cu. ft., it did not waive its right to contest the legality thereof. The decision upon which the order is based is most drastic and, in the judgment of our lawyers, is illegal, being founded upon a principle which will not stand the scrutiny of the courts. To determine the correctness of this decision, with the knowledge and approval of the commission, we have sued out a writ of certiorari in the Supreme Court of New Jersey. The main point involved in the controversy will be the decision of the question as to the value of the company's franchises for rate-making purposes. The commission repudiated this value altogether. The Supreme Court of the United States, as we view the decision, has decided directly to the contrary in a precisely similar case."

A comparison of the railway traffic statistics for 1911 and 1912 follows:

	1911	1912
Revenue passengers	277,730.238	292.707,377
Transfers and passes	84,820,157	90,007,641
Total passengers	362,550,395	382,715,018
Percentage of passengers using transfers	21.4	21.2
Average fare per passenger, cents	3.82	3.82
Car mileage	44.561,141	47,355,292
Car hours	5,159,073	5.465,926
Passengers per day	993,289	1,045.669
Passenger receipts per car mile, cents	31.07	30.87
Passenger receipts per car hour	$2.68	$2.67

The statement of mileage of the Public Service Railway follows:

	Miles
First main track	516.591
Second main track and turnouts	275.489
Connections, crossovers, wyes and loops	12.850
Carhouse and yard tracks	38.845
Total	843.775

Total number of passenger cars available for operation: Closed, 1667; open, 503.

Number of new passenger cars since 1903: Closed, 878; open, 130.

	Miles
Track reconstructed with new rail during 1912	25.923
Track reconstructed with same rail during 1912	25.296
Extensions built during 1912	17.420

A comparative statement of gross earnings of the railway division of the Public Service Corporation for 1912 and 1911 follows:

	1912	1911
Bergen division	$967,606	$926,484
Central division	1,461,337	1,328,294
Essex division	5,437,024	5,153,906
Hudson division	4,628,284	4,606,249
Passaic division	1,311,553	1,241,628
Southern division	1,456,622	1,193,527
	$15,262,426	$14,450,088
Gross earnings of leased and controlled companies	$32,654,469	$30,125,508
Public Service miscellaneous income	1,939,338	1,890,512
Grand total	$34.593,808	$32,016,020

Belt Line Railway Corporation, New York, N. Y.—The Public Service Commission for the First District has authorized the Belt Line Railway Corporation to issue $431,300 in capital stock and $1,750,000 in first mortgage 5 per cent bonds, dated Jan. 1, 1913, payable on Jan. 1, 1943, and redeemable as an entirety at 105 per cent. By another order the commission authorized the Third Avenue Railway to purchase the stock and bonds issued by the Belt Line Corporation upon the condition that the Third Avenue Railway guarantee the principal and interest of the bonds. The Belt Line Railway Corporation owns the property of the Central Park, North & East River Railroad Company, consisting of the Fifty-ninth Street crosstown railroad and the east and west belt lines. The property was sold for $1,673,000 at foreclosure in November, 1912, to Edward Cornell, who turned it over to the Belt Line Railway Corporation.

Columbus, Marion & Bucyrus Railway, Marion, Ohio.—Master Commissioner William P. Maloney has changed the date of the sale of the property of the Columbus, Marion & Bucyrus Railway from April 12, 1913, to May 10, 1913, at the request of the Troy Trust Company, which is said to be preparing to bid in the property for the bondholders.

Durham (N. C.) Traction Company.—The Durham Light & Traction Company has been incorporated in Delaware in the interest of H. L. Doherty & Company, New York, N. Y., to take over the property of the Durham Traction Company. The capital stock of the Durham Light & Traction Company is $1,000,000.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Public Service Commission of the Second District of New York has authorized the Elmira Water, Light & Railroad Company to sell $339,000 of its first consolidated mortgage 5 per cent fifty-year gold bonds to refund a like amount of bonds of the Elmira Water Works Company.

Kansas City & Bonner Springs Street Railway, Bonner Springs, Kan.—J. D. Waters, cashier of the Farmers' State Bank, Bonner Springs, Kan., and his associates have taken over the interests of John W. McDaniel, which include the Kansas City & Bonner Springs Street Railway. All of the right-of-way has now been obtained for the Kansas City & Bonner Springs Street Railway and the line will be completed between Kansas City and Bonner Springs this year. The company is operating 5 miles of line between Bonner Springs and Lake Forest. New officers and directors have been elected for the Kansas City & Bonner Springs Street Railway, but the new owners are not prepared at present to announce their plans in detail. It is understood that the Kansas City & Bonner Springs Street Railway will be succeeded by the Kansas City, Kaw Valley & Western Railway, a new company.

Lake View Traction Company, Memphis, Tenn.—The bondholders of the Lake View Traction Company are reported to have arranged to sell the property of the company, exclusive of the building owned in Memphis and the carhouse, to the Memphis Street Railway for $160,000. Payment is to be made, according to report, in twenty-year bonds of the Memphis Street Railway, to bear 2 per cent interest for two years, 3 per cent interest for the next three years, 4 per cent interest for the next eight years and 5 per cent interest for the last seven years. The bondholders of the Lake View Traction Company took over the property of the company at foreclosure sale last fall.

Lehigh Valley Transit Company, Allentown, Pa.—At a meeting of the directors of the Lehigh Valley Transit Company on March 20, 1913, the various electric light and power companies controlled by the company were merged into a new company to be known as the Lehigh Valley Light & Power Company with a capital of $1,000,000. The constituent companies merged are the Allentown Electric Light & Power Company, the Halcyon Electric Light & Power Company, of South Bethlehem, and the Whitehall, Emaus, Slatington, Hanover, South Allentown, Salisbury, Fountain Hill, Northampton Heights and Sancon companies. The companies were consolidated to facilitate operation.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Harris, Forbes & Company, New York, N. Y.; N. W. Harris, Inc., Boston, Mass.; the Harris Trust & Savings Bank, Chicago, Ill., and others are offering for subscription at 96½ and interest a block of $877,000 of the new general and refunding mortgage 5 per cent gold bonds of The Milwaukee Electric Railway & Light Company dated 1911. The same interests placed the original $3,621,000 of these bonds. There are now outstanding $4,498,000 of the bonds and $13,228,000 of the authorized issue are reserved to retire underlying bonds.

Nashville Railway & Light Company, Nashville, Tenn.—A meeting of the stockholders of the Nashville Railway & Light Company has been called for May 8, 1913, to vote to purchase the property and rights of the Gallatin Pike Railway.

Ocean Shore Railroad, San Francisco, Cal.—The Ocean Shore Railroad reports gross receipts for the calendar year 1912 as $272,162, as compared with $219,022 for 1911; total expenditures for 1912, $253,380, as compared with $265,719 in 1911, and surplus for 1912, $18,782, as compared with a deficit of $46697 for 1911.

Southern Traction Company, Dallas, Tex.—For the express purpose of providing for bond issues to aggregate $10,500,000, the Southern Traction Company has filed in the County Clerk's office at Dallas two releases from the St. Louis Union Trust Company, one on a first mortgage for $7,500,000 and one on a second mortgage for $500,000. Each release states that the bonds have been returned canceled to the St. Louis Union Trust Company and that the deeds of trust are to be replaced, one with a first mortgage for $10,000,000 and the other with a second mortgage for $500,000.

Toledo & Chicago Interurban Railway, Kendallville, Ind.—The property of the Toledo & Chicago Interurban Railway is to be sold at receiver's sale at Fort Wayne, Ind., on April 14, 1913. The upset price has been fixed at $550,000. The property will be sold free and clear of the existing $1,250,000 bond issue, but the purchaser will be required to assume all taxes, receivers' obligations and claims for terminals in Fort Wayne.

Tri-City Railway, Davenport, Ia.—The Tri-City Railway has filed with the County Recorder a certificate of an increase in its capital from $3,500,000 to $5,000,000.

Walla Walla (Wash.) Valley Railway.—The Walla Walla Valley Railway, the entire capital stock of which is owned by the Pacific Power & Light Company, has made a first and refunding mortgage to the United States Mortgage & Trust Company, New York, N. Y., as trustee to secure an issue of $10,000,000 of 5 per cent gold bonds due July 1, 1930. It is understood that these bonds will be acquired by the Pacific Power & Light Company and be pledged by it to secure its own first and refunding mortgage 5 per cent bonds. The Walla Walla Valley Railway operates at present 27 miles of standard gage railway.

Dividends Declared

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1¾ per cent, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 2 per cent, common.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Columbus, Ohio, quarterly, 1½ per cent, preferred.

Frankford & Southwalk Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Germantown Passenger Railway, Philadelphia, Pa., quarterly, $1.31¼.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Metropolitan West Side Elevated Railway, Chicago, Ill., quarterly, 1¼ per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, common.

Porto Rico Railways, Ponce, P. R., quarterly, 1¾ per cent, preferred; quarterly, 1 per cent, common.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

South Side Elevated Railway, Chicago, Ill., quarterly, 1½ per cent.

Union Railway, Gas & Electric Company, Rockford, Ill., quarterly, 1½ per cent, preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

Western Ohio Railway, Lima, Ohio, quarterly, 1½ per cent, second preferred; quarterly, 1¾ per cent, first preferred.

Winnipeg (Man.) Electric Railway Company, quarterly, 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m., Feb., '13	$367,117	......	......	......	......
1 " " '12	350,001	......	......	......	......
8 " " '13	3,429,025	......	......	......	......
8 " " '12	3,260,844	......	......	......	......

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

1m., Feb., '13	$123,383	$82,599	$40,784	$32,454	$8,330
1 " " '12	120,641	80,525	40,116	31,970	8,146
8 " " '13	1,314,447	768,312	546,235	256,985	289,250
8 " " '12	1,229,302	717,902	511,400	253,096	258,304

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., Jan., '13	$28,095	$16,681	$11,414	$10,471	$943
1 " " '12	23,901	16,958	6,943	10,016	3,073

DETROIT (MICH.) UNITED RAILWAY

1m., Jan., '13	$1,005,346	$677,776	$327,570	$178,501	$149,069
1 " " '12	840,221	545,825	294,396	181,603	112,793

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

1m., Jan., '13	$164,634	$91,444	$73,190	......	......
1 " " '12	146,737	78,547	68,190	......	......
12 " " '13	1,709,154	1,001,259	707,895	......	......
12 " " '12	1,476,996	875,071	601,924	......	......

JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.

1m., Feb., '13	$40,667	*$25,848	$14,818	$12,541	$2,276
1 " " '12	36,356	*23,237	13,119	12,899.	220
12 " " '13	544,091	*322,035	222,056	152,013	70,042
12 " " '12	475,907	*279,701	196,205	153,479	42,725

LAKE SHORE ELECTRIC RAILWAY SYSTEM, CLEVELAND, OHIO

1m., Jan., '13	$100,373	$64,977	$35,396	$34,938	$458
1 " " '12	87,153	55,457	31,696	34,591	2,895

LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

1m., Feb., '13	$114,165	$58,313	$55,853	$44,835	$11,018
1 " " '12	98,671	51,486	47,185	39,268	7,917
12 " " '13	1,580,349	670,253	910,095	516,483	393,612
12 " " '12	1,383,371	611,171	772,201	465,416	306,785

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Jan., '13	$237,465	$142,250	$95,215	$44,671	$50,544
1 " " '12	209,389	122,536	86,853	43,825	43,028

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m., Dec., '12	$279,047	$164,783	$114,264	$42,835	$71,429
1 " " '11	247,386	144,491	102,895	44,319	56,576
12 " " '12	2,663,762	1,606,622	1,057,140	528,395	528,745
12 " " '11	2,401,995	1,451,010	950,985	529,290	421,695

SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS, OAKLAND, CAL.

1m., Jan., '13	$371,731	$233,928	$137,803	$99,647	$38,156
7 " " '13	2,728,393	1,651,504	1,076,888	707,765	369,122

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.

1m., Jan. '13	$107,323	*$58,822	$48,501	$20,182	$28,319
1 " " '12	102,541	*55,980	46,561	19,626	25,925
12 " " '13	1,184,622	*671,866	512,756	236,616	276,140
12 " " '12	1,110,838	*686,082	424,756	231,940	192,816

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*Includes taxes.

Traffic and Transportation

Owl Service Unprofitable in Birmingham

The City Commissioners of Birmingham, Ala., have consented to the discontinuance of the owl service by the Birmingham Railway, Light & Power Company. According to the agreement, the service was to be abandoned after a trial of thirty days if not self-sustaining. The commission received data from the company indicating that every night 193 persons were handled on the average. On the five lines the company handled an average of thirty-eight persons, while four and three-quarters passengers were handled per car. The officials of the company informed the commission that if 15 cents per passenger had been charged the revenue thus derived would have been insufficient to pay the cost. George H. Harris, superintendent of transportation, gave it as his opinion that if the service was continued there would be little if any increase. On the first night the service went into effect the revenue was about $7, while on the last night it was under that figure. The officials of the company pointed out to the commission that a six months' trial of the owl car service in Memphis had proved a failure, while in New Orleans the franchise called for that service, and although 10 cents was charged the company lost money steadily and is yet losing.

Fort Street Case, Detroit

Corporation Counsel Lawson of Detroit, Mich., has stated that the first step taken in the Fort Street litigation with the Detroit United Railway will be the filing of a motion to dismiss the stay of execution granted in the ouster case by the United States Supreme Court. Attorneys will argue that this matter does not properly come within federal court jurisdiction and should be left with the city through its control of the streets. It is thought that the motion will be argued within ninety days.

Mayor Marx is in favor of continuing the operation of the auto bus lines placed in service to the city recently, but Alderman Keating holds that it is useless to tie up money in the vehicles when there is doubt about the right of the city to use funds in this way. He fears that the company will sue for an injunction if the operation of the bus lines is continued. Alderman Vernor favors waiting until the charter amendments are passed and then constructing competing street railway lines.

Through Freight Between Clinton and Muscatine.—Through daily freight service between Clinton, Ia., and Muscatine, Ia., has been inaugurated by the Davenport & Muscatine Railway and the Illinois & Iowa Railway.

Increase in Wages on Ohio Electric Railway.—An increase of from 1 cent to 2 cents an hour in the wages of motormen and conductors has been granted by the Ohio Electric Railway to the men on its interurban lines and on the city lines in Lima, Zanesville, Hamilton and other points in the State.

Through Cars Between Frankford and Morrisville.—The Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa., and the Holmesburg, Tacony & Frankford Passenger Railway have entered into an operating arrangement by which the cars of both companies will run through from Frankford to Morrisville. This does away with at least two changes which through passengers have heretofore been compelled to make between these points.

Address by Mr. Shane on Accident Prevention.—An interesting meeting in connection with the accident prevention campaign of the Louisville & Northern Railway & Lighting Company, New Albany, Ind., will be held at the Carnegie Library in that city on March 31, when all of the road men of the company will be addressed by Alexander Shane, of the safety bureau of the Middle West Utilities Company, Chicago, which owns the Louisville & Northern Railway & Lighting Company.

Increase in Milk Rates.—The shippers of milk from Louisville to Lagrange, Ky., have been placed upon a parity as regards rates with the shippers of milk along the lines of the Louisville & Interurban Railway between Louisville, Ky., and Shelbyville. The company recently authorized an increase in rates on milk brought to Louisville from 3 cents to 5 cents upon each can carried more than 19 miles, or 10 cents for 5-gal. cans, 12 cents for 8-gal. cans and 15 cents for 10-gal. cans.

New Transfer Suggestion in Baltimore.—The United Railways & Electric Company, Baltimore, Md., has submitted to the Public Service Commission of Maryland a proposition that it be authorized to issue "walking transfers" between the lines serving southwest and northwest Baltimore as a means of solving the problem of getting quick transportation between the two sections and meeting the demand for such service by the people of the respective sections. This plan would necessitate the passengers walking two or three blocks, but it would save them a long ride downtown in order to make the transfer.

Skip-Stop Idea in Los Angeles.—The Board of Public Utilities of Los Angeles, Cal., has approved the list of proposed car stops on the Hollywood line on Sunset and Hollywood Boulevards of the Pacific Electric Railway and has authorized the company to place signs at the designated points to indicate "outbound" stops, "inbound" stops and "both direction" stops. Under the new stop plan it is estimated that the running time between the business center of Los Angeles and the Hollywood business center will be reduced from forty-five to thirty minutes. The proposed list of stops eliminates about 35 per cent of the present stops along the entire line.

Report on Conditions in Worcester.—Inspector George T. Delaney of the city law department of Worcester, Mass., recently investigated the property and service of the Worcester Consolidated Street Railway and submitted his findings in a written report to City Solicitor Ernest H. Vaughan, who in turn submitted the report to the Railroad Commission. In summarizing his conclusions Mr. Delaney said: "It is conclusive that the Consolidated Street Railway, with the exception of building a double-track line between Chandler and Pleasant Streets on Park Avenue, of work on the Burncoat Street line and of the extension of Providence Street, has not increased its trackage and has not kept pace with the growth of the city."

Increase in Wages by the Fort Wayne & Northern Indiana Traction Company.—On March 16, 1913, announcement was made by the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., of a change in wage scale for all city and interurban trainmen in the employ of the company. The new scale, which is to be effective from April 1, is as follows: Interurban—first six months, 20 cents, second six months, 21 cents; second year, 22 cents; third year, 23 cents; fourth year, 24 cents; fifth year, 25 cents; sixth year, 26 cents; seventh year, 27 cents; eighth year and thereafter, 28 cents. Fort Wayne city lines—first six months, 19 cents; second six months, 20 cents; second year, 21 cents; third year, 22 cents; fourth year, 23 cents; fifth year and thereafter, 24 cents. The rates for city trainmen at Peru, Wabash, Logansport and Lafayette are 1 cent less than the Fort Wayne city rates.

Traffic Diversion in Boston Back Bay.—Plans for the diversion of traffic from Boylston Street, Boston, between Exeter and Arlington Streets, during the construction of the Copley Square-Public Garden section of the Boylston Street subway were filed by the Boston Transit Commission with Commissioner of Public Works L. K. Rourke on March 22. The arrangements are the most extensive thus far authorized for the Boston Elevated Railway in the work of subway construction and provide for the temporary use of Exeter Street and Huntington and St. James Avenues. The subway is being built by the open-cut method and up to the present time traffic has been diverted from the Boylston Street trunk line mainly at night. The provision of a paralled route for one of the most crowded avenues of travel in Boston is made possible in large measure by the recent reconstruction of the principal streets involved. Work on the subway is progressing steadily.

Order of the Ohio Commission to the Dayton & Troy Electric Railway.—The Public Service Commission of Ohio has ordered the Dayton & Troy Electric Railway, Dayton, Ohio, to operate trail cars in connection with its car scheduled to arrive in Dayton at 5.50 a. m. and its regular car which leaves Dayton at 5.30 p. m., to keep its ticket offices and waiting rooms open continuously from at least five minutes before the first car is scheduled to leave in the morning until 8.30 in the evening, to provide proper shelters at five of its stops and stations which are specified, and to provide adequate means for passengers to signal approaching cars at signal stations at night. These conditions are to be complied with on or before May 1, 1913. In addition, the commission has ordered the company on or before Dec. 1, 1913, to provide not less than 400 kw of additional power capacity, or on or before May 1, 1913, to arrange for the purchase and delivery by Dec. 1, 1913, of additional energy.

Improvements in Service at Boston.—The Boston (Mass.) Elevated Railway has made public a letter from M. C. Brush, second vice-president of the company, to Gen. W. A. Bancroft, president, in regard to recent improvements in the service. Mr. Brush states that beginning with Jan. 20 a three and four-minute service was instituted on the Forest Hills elevated extension in the morning and evening rush hours, compared with a previous four and five-minute service. On Feb. 24 the company began running six-car trains on some of its elevated service during the morning rush hours where formerly less than six-car trains had been operated, and it is anticipated that more six-car trains will be run in the near future. On March 3 the company began to run seven-car trains during the afternoon rush hours, never having run more than six-car trains before. The surface car service is being analyzed and the rush-hour facilities have been increased at many points on the system. Some delays have occurred in the Back Bay on account of the construction of the Boylston Street subway, but these are being minimized so far as possible by the company.

The Question of Signals on Elevated Lines in New York.—At the inquest before the coroner into the death of a policeman who was killed in a collision on Jan. 25 on the Third Avenue elevated line of the Interborough Rapid Transit Company, New York, N. Y., Theodore P. Shonts, president of the company, testified in part as follows in regard to the consideration which had been given to the subject of installing a more complete system of signals on the elevated lines of the company: "The matter of signals for the elevated railroads was brought up in 1911, when the Public Service Commission ordered us to show cause why we should not have more and longer trains and another signal system on the line. Our policy has been safety first. The Third Avenue elevated is the most congested in the city. We operate trains on a forty-two-second headway. This is the first case of a passenger being killed in a collision. There have been passengers killed in derailment. If we established the system of signals used in the subway we could only run at a headway of one minute and thirty seconds, and that would cut the capacity of the line in half. We thought it to the best advantage of the public to run at a shorter headway."

Result of Inquiry in Connecticut Accident.—C. C. Elwell, chief engineer of the Public Utilities Commission of Connecticut, has concluded in part as follows his report to the commission in regard to the accident at Cheshire on Feb. 28, 1913, on the line of the Connecticut Company in which two persons were killed: "This accident was due entirely to the carelessness of the motorman who was running car No. 130, which was well equipped with all appliances in good working order for stopping it. No recommendations made by the commission or rules adopted by the company will overcome human frailty and positively prevent motormen from passing danger signals, but if the construction of electric railway cars can be so improved as to lessen the casualties caused by accidents of this character, the matter should receive serious consideration. I would, therefore, suggest that all electric railways operating cars within the State of Connecticut seriously consider the practicability of having all cars equipped with buffers of a uniform standard height, and some improved system of 'anti-climbing' device, to make the telescoping of passenger cars less likely in case of collision, and submit to the commission the result of their consideration and investigation." The commission has called attention to the suggestions made by Engineer Elwell and suggested that the company submit to it before April 15, 1913, the result of its consideration and investigation of such proposed equipment and the practicability of adopting it.

Personal Mention

Mr. Alexander Shaw has been appointed chief claim agent and assistant secretary-treasurer of the Montreal (Que.) Tramways. Mr. Shaw was formerly connected with the staff of the Windsor Hotel at Montreal.

Mr. Van Dusen Rickert, assistant manager of the Eastern Pennsylvania Railways, Pottsville, Pa., has been elected assistant secretary and assistant treasurer of the company and secretary and treasurer of all underlying companies.

Mr. C. E. Calder, assistant secretary and assistant treasurer, auditor and purchasing agent of the Eastern Pennsylvania Railways, Pottsville, Pa., has resigned to accept the secretaryship and assistant treasurership of the Texas Power & Light Company, Dallas, Tex. He is also comptroller of all underlying companies.

Mr. Allen Purvis, manager of the interurban lines of the British Columbia Electric Railway, Ltd., Vancouver, B. C., and Mr. W. H. Elson, division superintendent of that company, have returned to Vancouver after a trip of inspection of electric railway properties in which they visited Indianapolis, Chicago, Toronto, San Francisco and Seatle.

Mr. George B. Erdeman, chief clerk in the accounting department of the Eastern Pennsylvania Railways, Pottsville, Pa., has been appointed auditor of the company, vice Mr. C. E. Calder, resigned. Mr. Erdeman entered the employ of the Eastern Pennsylvania Railways as a bookkeeper in 1906, serving in that capacity for four years, when he was promoted to chief clerk.

Mr. E. W. Cabaniss has been appointed secretary of the Macon Railway & Light Company, Macon, Ga. For the last five years Mr. Cabaniss has been connected with the Central Georgia Power Company and for the last two years has been assistant secretary of that company. The Macon Railway & Light Company and the Central Georgia Power Company are under the same management and are controlled by the same interests.

Mr. Samuel B. Thompson has resigned as mechanical superintendent of the British Columbia Electric Railway, Ltd., Vancouver, B. C., and has become associated with Mr. James A. Roosevelt, formerly of the Third Avenue Railway, New York, N. Y., under the firm name of Roosevelt & Thompson, to investigate and report on electric railway and light properties. Mr. Thompson was formerly with the Consolidated Railway, Baltimore, Md., Sanderson & Porter, New York, N. Y., and was also consulting engineer in connection with various Pacific Coast properties.

Mr. William S. Kuhn has been elected president of the First-Second National Bank, Pittsburgh, Pa., which is a consolidation of the First and Second national banks of Pittsburgh, and will personally devote his time and attention to directing the affairs of that institution. Mr. Kuhn is vice-president of the investment banking firm of J. S. & W. S. Kuhn, Inc., Pittsburgh, has been president of the West Penn Traction & Lighting System from its inception and is an officer of the American Water Works & Guarantee Company and all of its subsidiaries. He is also connected as an officer or director with the Colonial Trust Company, the Commonwealth Trust Company, the Commercial National Bank, the Pittsburgh Bank for Savings, Pittsburgh, and the First National Bank, McKeesport.

Mr. James Dewar Fraser, who, as noted in the ELECTRIC RAILWAY JOURNAL of March 8, 1913, was recently elected a director of the Ottawa (Ont.) Electric Railway to succeed Mr. G. A. Cox, resigned, is a son of the late Andrew Fraser, of Martintown, Glengarry. He spent his youth in Glengarry and entered the employ of W. McClymont & Company, Ottawa, lumber dealers, in 1871 as accountant and telegraph operator. He remained with this company till 1882. He was then appointed secretary-treasurer of the Ottawa City Passenger Railway and continued in this position until 1891, when the company was merged with the Ottawa Electric Street Railway as the Ottawa Electric Railway. He has been secretary-treasurer of the last named company ever since. He is also a director and secretary-treasurer of the Ottawa Car Company, Ltd.; vice-president and secretary-treasurer of the Wallace Realty Company, Ltd., and a member of the executive committee of the Canadian Street Railway Association.

Mr. V. L. Edmunds has been appointed superintendent of transportation of the Binghamton (N. Y.) Railway in charge of operation. Mr. Edmunds was born in Petersburg, Va., on Aug. 23, 1880. After leaving school he entered railroad work as a fireman with the Norfolk & Western Railroad. He next became connected with the Atlantic Coast Line and was promoted to be engineer, in which capacity he served for six years. He then entered the service of the Missouri Pacific Railway as an engineer in through freight service. He resigned from the Missouri-Pacific to become connected with the Railway Audit & Inspection Company as railway efficiency man and served for that company on a number of railroads in connection with the development of their transportation departments. He became connected with the Binghamton Railway early in the present year as assistant to the president, and on March 16 his title was changed to superintendent of transportation in charge of operation.

Mr. George B. McGinty, assistant secretary of the Interstate Commerce Commission, has been appointed secretary of the commission to succeed Mr. John H. Marble, who as previously announced in the ELECTRIC RAILWAY JOURNAL has been appointed a member of the Interstate Commerce Commission. Mr. McGinty was born on Sept. 8, 1878, in Monroe County, Ga. He was graduated from the high school at Forsythe, Ga. Subsequently he pursued an A. B. course at Emory College, Oxford, Ga. He then took up the study of law, but left that profession to enter railroad work. He served the Atlantic Coast Line, the Georgia Railroad, the Southern Railway and the West Point Road. He entered the service of the bureau of animal industry of the United States Department of Agriculture in 1906; in November, 1908, became connected with the division of statistics and accounts of the Interstate Commerce Commission and later served as confidential clerk to Commissioner Clements. When Mr. Marble was appointed secretary of the Interstate Commerce Commission on Feb. 10, 1912, Mr. McGinty was appointed assistant secretary.

Mr. Edwin F. Wendt, who was elected president of the American Railway Engineering Association on March 20, was born at New Brighton, Pa., and was educated in the public schools of that city, after which he entered Geneva College, Beaver Falls, Pa., taking the classical course and graduating with honors in 1888. In September, 1888, he entered the service of the Pittsburgh & Lake Erie Railroad and has been continuously with the road ever since. Starting as axeman, he became successively in the next few years chain man, rod man and transit man. Since Oct. 1, 1898, he has been assistant engineer in charge of maintenance of way and construction and contract work, reporting to the chief engineer. Mr. Wendt was elected a member of the Engineers' Society of Western Pennsylvania in 1890 and a member of the American Society of Civil Engineers in 1903. He is a charter member of the American Railway Engineering Association, was chairman of the committee on records and accounts in 1903, 1904 and 1905, has been a member of the committee on signals and interlocking since 1906, was a member of the board of direction during 1908, 1909 and 1910, and has been chairman of the committee on publications during the past year. He was elected second vice-president of the association in 1911 and first vice-president in 1912.

Mr. L. C. Bradley, Galveston, has been appointed assistant district manager of the Stone & Webster properties in Texas, with headquarters in Dallas. The properties over which Mr. Bradley will now have control comprise the street railways and other public service corporations in Galveston, Dallas, Fort Worth, Beaumont, Port Arthur, Houston, El Paso and several interurban railways. In his new office Mr. Bradley will be the executive head in Texas for all Stone & Webster properties and will relieve Mr. M. M. Phinney, district manager and president of the properties, of a very large part of his duties. Mr. Phinney will hereafter spend most of his time in Boston. Mr. Bradley was formerly vice-president of the Houston Electric Company and the Galveston-Houston Electric Railway and manager of the Galveston Electric Company and resided in Galveston about two and a half years. He served previously in the following capacities: general superintendent of the Puget Sound Electric Railway, Seattle, Wash.; general manager of the Key West Mining & Railway Company, Salt Lake City, Utah; general superintendent of the Tennessee Northern Railway, Knoxville, Tenn.; general manager of the Scioto Valley Traction Company, Columbus, Ohio, and general manager of the J. G. White railway, lighting and gas properties at Pottsville, Pa. Announcement of Mr. Bradley's successors with the Galveston, Houston and interurban properties has not yet been made. Mr. Bradley has been a leader in civic affairs in Galveston and was a director in several social and civic organizations in that city.

E. S. Wilde

Mr. Elton S. Wilde, the newly elected president of the New England Street Railway Club, is one of the best known of the younger electric railway managers in New England. He is a native of Fairhaven, Mass., and, after being educated in the public and preparatory schools of Fairhaven and New Bedford, entered the employ of the law firm of Crapo, Clifford & Prescott in the latter city. At the suggestion of Mr. H. H. Crapo, the present president of the Union Street Railway, New Bedford, Mr. Wilde entered the street railway field, serving in various capacities in the mechanical and electrical departments and steadily advancing through the assistant treasurership and operating department to the post of vice-president and superintendent which he now holds in the Union Street Railway. He is a director and vice-president of the New Bedford & Onset Street Railway and has served as commander of Sutton Commandery, No. 16, Knights Templars. Mr. Wilde is a director of the Board of Trade and president of the Dartmouth Club of New Bedford, besides being a member of the Engineers' Club of Boston.

Mr. Arthur L. Linn, Jr., has resigned as assistant secretary and assistant general auditor of the Syracuse (N. Y.) Rapid Transit Railway, Utica & Mohawk Valley Railway and the Oneida Railway and as secretary and general auditor of the Ontario Light & Traction Company, Canandaigua, N. Y., to become associated with Mr. Harrison Williams, New York, N. Y., in the purchasing, financing and operation of public utility properties. The Williams syndicate controls a number of electric railways in Eastern Ohio and Western Pennsylvania through the Republic Railway & Light Company and others in Washington, Arizona, Colorado and other Western states through the Federal Light & Traction Company. It has also been prominent in electric lighting and power enterprises through the organization of the American Gas & Electric Company and in the control of the Cleveland Electric Illuminating Company and other properties. Mr. Linn has been connected with electric railways for many years. He started as assistant bookkeeper with the Cleveland (Ohio) Electric Railway, in which capacity he served for several years and was then appointed assistant auditor. He subsequently became assistant treasurer, auditor and assistant secretary of the Utica & Mohawk Valley Railway and subsidiary lines at Utica, N. Y. He resigned his connection with that company in 1905 to become general manager of the Fairmont & Clarksburg Traction Company, Fairmont, W. Va. The following year, however, he returned to New York as general auditor of the electric railway and power companies controlled by the New York Central & Hudson River Railroad in New York State. He was also secretary and assistant treasurer of a number of subsidiary companies and was general auditor of the Mohawk Valley Company, which was organized to hold temporary control of certain properties. In 1909 Mr. Linn was made general auditor and assistant secretary of the New York State Railways. Mr. Linn was also assistant auditor and auditor of the subsidiary lines of the New York Central & Hudson River Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Elbow River Suburban Railway, Calgary, Alta.**—Application for a charter has been made in Alberta by this company to build an electric line from Calgary along the Elbow River to Canyon Creek.

***East Side Electric Railway, Centralia, Ill.**—Incorporated in Illinois to build an electric railway from Centralia to Irvington. Headquarters, Centralia. Capital stock, $25,000. Incorporators and first board of directors: C. F. Lender, H. C. Higgins, G. L. Pittenger, S. A. Frazier, W. M. Grisson, W. F. Bundy and Robert Rohl.

***Richmond, Portland & Fort Wayne Railroad, Portland, Ind.**—Application for a charter has been made by this company to build an interurban railway to connect Fort Wayne, Decatur, Monroe, Berne, Ceylon, Geneva, Bryant, Portland, Ridgeville, Winchester, Lynn, Fountain City and Richmond. Capital stock, $100,000. Directors: Grant S. Staub, William T. Harbinson, Charles F. Harbinson, Richard J. McCarty and C. H. Frank.

***Durham Light & Traction Company, Durham, N. C.**—Incorporated in Delaware in the interest of H. L. Doherty & Company, New York, N. Y., to take over the property of the Durham Traction Company. Capital stock, $1,000,000. Resident incorporator, James M. Satterfield, Dover.

***Warrenton & Norlina Railway, Warrenton, N. C.**—Chartered in North Carolina to build a 5-mile railway between Warrenton and Norlina. Headquarters, Warrenton. Capital stock, $50,000. Incorporators, J. P. Scoggin, W. H. Burroughs and W. E. Twitty, Warrenton; A. C. House, Weldon; J. K. Plummer, Jr., Raleigh, and J. E. Bowers, Scotland Neck, N. C.

***Cleveland (Ohio) Interurban Railway.**—Incorporated in Ohio to build an electric railway on Shaker Heights, a suburb of Cleveland. Capital stock, $5,000. Incorporators: W. D. Turner, L. M. Henders, B. E. Robertson and others.

***Birmingham-Tuscaloosa Railroad & Utilities Corporation, Birmingham, Ala.**—Chartered in Virginia, with headquarters at Norfolk, as an extension of the Tidewater Power Company's line from Birmingham to Tuscaloosa. Capital stock, $5,000,000. Officers: F. E. Calkins, New York, N. Y., president; R. Mitchell Brown, Norfolk, vice-president, and Henry Cross, Philadelphia, Pa., secretary and treasurer.

FRANCHISES

Birmingham, Ala.—I. C. Beatty, general manager of the Birmingham Realty Company, has asked the Council for a franchise to build an electric line in Norwood along the new boulevard.

Burnaby, B. C.—The British Columbia Electric Railway, Vancouver, has asked the Council for a franchise for a mile along North Road and 2 miles along Barnet Road.

Burlingame, Cal.—The Easton Railroad, Burlingame, has asked the City Trustees for a franchise for an extension to the Burlingame station by way of Burlingame Terrace and Burlingame Avenue in Burlingame. The plans outlined by the company call for a line in San Mateo and Burlingame and part of Hillsboro, including El Cerrito Park, San Mateo Park and the Easton Additions. Ansel M. Easton, Burlingame, is interested. [E. R. J., March 22, '13.]

Los Angeles, Cal.—The Los Angeles Railway has asked the Council for a franchise for an extension of its West Tenth Street line from Hoover Street to the west city limits of Los Angeles.

Sacramento, Cal.—The Pacific Gas & Electric Company has asked the Council for a franchise on Third Street between I Street and M Street in Sacramento. The company has entered into an agreement with the Oakland, Antioch & Eastern Railway to allow that railway to operate over the Pacific Gas & Electric Company's lines between I Street and M Street.

Macon, Ga.—The Macon Railway & Light Company has asked the Council for a franchise to double-track Monroe Street between Washington Avenue and Forsyth Street in Macon.

Hillsboro, Ill.—The Springfield & Central Illinois Traction Company has received a franchise from the Montgomery County Board of Supervisors in Montgomery County.

Bonner Springs, Kan.—J. D. Waters, president of the Kansas City, Kaw Valley & Western Railway, has asked the Wyandotte County Commissioners for a franchise to use the county roads and bridges between Kansas City, Kan., and Bonner Springs. It is intended ultimately to extend the line to Topeka. A branch line 1½ miles long will extend to the Lake of the Forest near Bonner. The main line will extend from Bonner direct to Edwardsville, a distance of 14 miles. It is understood that this company will succeed the Kansas City & Bonner Springs Street Railway. [E. R. J., Feb. 8, '13.]

Paducah, Ky.—The Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, has purchased a franchise from the Council to enter Graves County with its lines. The divisions of this railway to be constructed first will be from Paducah to Fancy Farm and Murray, via Mayfield. Work will be begun in the spring.

***Slidell, La.**—The City Council will be asked to grant a franchise to build a gasoline railway through Slidell. This is part of a plan to build a line from Artesia to Oaklawn via Slidell and Liberty. It is said that New Orleans and Chicago capitalists are interested in this proposition.

***Iron River, Mich.**—F. D. Sullivan, John Holland, G. W. Robertson and A. D. Johnson have received franchises from the Councils in Iron River, Stambaugh and Ashland. This is part of a plan to build a 12-mile electric railway to extend from the Palatka district on the south to the locations lying to the north of Iron River. Power will be furnished by the hydraulic electric plant at Iron Mountain.

Yorkville, N. Y.—The Public Service Commission, Second District, has authorized the New York State Railways to construct an extension consisting of a second track on Whitesboro Street in Yorkville beginning at the westerly line of the city of Utica and extending westerly for about 1476 ft., and to assign the franchise for such construction to the Utica, Clinton & Binghamton Railroad upon condition that it be included in the lease by that company to the Utica Belt Line Street Railroad.

Greensboro, N. C.—The Southern Power Company will ask the County Commissioners for a franchise to build an electric railway from Greensboro to High Point.

High Point, N. C.—The North Carolina Public Service Company, Salisbury, has asked the Council for a franchise to extend its line eastward out of High Point.

Cleveland, Ohio.—The Cleveland Railway has received a franchise from the Council to extend its Union Avenue line from its present terminal to a point near East 116th Street in Cleveland. The company has asked the Council for a franchise to double-track several of its lines in Cleveland.

Tiffin, Ohio.—The Tiffin, Fostoria & Eastern Electric Railway has received a twenty-five-year franchise from the Council to take the place of the present franchise in Tiffin, which has five more years to run.

Hamilton, Ont.—The Hamilton Street Railway has received a franchise from the Council for extensions in the northeastern and southeastern sections of Hamilton.

Toronto, Ont.—The Board of Control has decided in favor of the city taking over the franchise of the Humber Valley Electric Railway. A by-law will be submitted to the people asking authority to spend the necessary money to build this railway.

Portland, Ore.—The Portland Railway, Light & Power Company recently filed its acceptance of the franchise granted by the Council which calls for the immediate construction of 18 miles of track.

El Paso, Tex.—The El Paso Electric Railway will ask the Council for two franchises in El Paso. One is for the extension of the Mesa line from Arizona Street to Kansas

Street. The other line will leave the Mexico line at Tenth Street and will extend to Seventh Street to connect with the Second Ward line.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company has placed in operation its new line from Brighton to Woodward, 2 miles. The line will eventually be extended to Dolomite.

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by this company to build a line into the Fernwood district to connect with the city lines at Quadra Street in Victoria. A. T. Goward, local manager.

Los Angeles-Pacific Railway, Los Angeles, Cal.—A survey has been completed by this company for an extension of the Franklin Avenue line through Beachwood Park, Hollywood, to connect with the present Brush Canyon line by loop.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company plans for the formal opening on April 5 of its line from Bay Point through the Contra Costa hills to Oakland.

Mexico & San Diego Railway, San Diego, Cal.—This company will operate two Edison storage battery cars between South San Diego and Imperial Beach, beginning about April 1. This line will be 2 miles in length. E. S. Babcock, president. [E. R. J., March 15, '13.]

Peninsula Railway, San José, Cal.—Plans are being considered by this company for an extension into the foothills in the southeastern section of the Santa Clara Valley.

Stockton (Cal.) Electric Railway.—Work on the Ophir Street line of this company will be begun next month.

Jacksonville (Fla.) Traction Company.—Six extensions are now being planned by this company for its lines in Jacksonville. One will be the extension of the Hogan Street line to connect with the Pearl Street line, and another will be a line to Murray Hill.

Centralia & Central City Traction Company, Centralia, Ill.—This company will build from Junction City to Sandobal, a distance of 4.5 miles, during the year.

Springfield & Jackson Electric Railway, Springfield, Ill.—A 30-mile line between Berlin, Springfield and Jacksonville will be built by this company during the year.

Evansville & Southern Indiana Traction Company, Evansville, Ind.—Grading will be begun April 15 by this company on its line between Chrisney and Lynnville.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has submitted to the Board of Works its outline of work to be done on its property for the coming year. The work includes the rebuilding, extending and double-tracking of its lines in Indianapolis.

Des Moines (Ia.) City Railway.—One of the improvements planned by this company for the summer will be the construction of the proposed line through the territory lying between University Avenue and Ingersoll Avenue in Des Moines.

Union Electric Company, Dubuque, Ia.—This company plans to build about a mile of new track in Dubuque during the year.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—A 40-mile line between Laporte City, Ind., and Urbana, Ill., will be built by this company during 1913.

Louisville (Ky.) Railway.—This company views favorably the proposition to construct a ½-mile extension to its Brook Street line from the present terminal at Oak Street south to Hill Street, where a connection with the Second Street line may be made. The work will cost $15,000. No definite steps have been taken toward the improvement, as a franchise for its execution is yet to be purchased.

Joplin & Pittsburg Railway, Pittsburg, Kan.—Preparations have been begun by this company for laying ties and rails for the extension of its line from Fourth Street and Joplin Street to the Union Station grounds in Joplin.

Manhattan City & Interurban Railway, Manhattan City, Kan.—A 13½-mile line between Eureka, Ogden and Fort Riley will be built by the company during 1913.

Bangor Railway & Electric Company, Bangor, Maine.—This company announces that it has decided to build the 2-mile extension of its Hampden line to the city limits. The company will ask the Hampden Council for a franchise.

Winnipeg (Man.) Electric Railway.—Under the street railway by-law, the city may require this company to construct certain lines each year and the following list gives the requisition for 1913: Arlington Street, from Milburn to Mountain; Mountain Avenue, from McGregor to Arlington; Talbot Avenue, from Strathcona to Roland; Portage Avenue, from Hargrave to Maryland; Pembina Street, from Subway to Kylmore Avenue; Sargent Avenue, from Arlington to Erin, and Notre Dame Avenue, from the end of the present track to Keewatin Street. The lines are in operation on Portage Avenue to Pembina Street, but as these are to be paved with asphalt the tracks will have to be relaid.

Towson & Cockeysville Electric Railway, Towson, Md.—Work has been begun by this company on the extension from the present terminus at Chesapeake and Bosley Avenues, Towson, to Washington Avenue and Chesapeake Avenue.

Bristol & Norfolk Street Railway, Boston, Mass.—Surveys have been made by this company for a line from Holbrook Square along Union Street to the station in Holbrook. It is said that the company is to run storage battery cars and has applied for the right to run over the New York, New Haven & Hartford Railroad tracks.

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—Surveys have been completed and construction will soon be begun by this company on its extension to Townsend. It is expected that the company will soon build a line from Fitchburg to Nashua, N. H., a distance of 19 miles.

New Hampshire Electric Railways, Haverhill, Mass.—This company is asked to consider plans to build a line between Rochester and Farmington.

Worcester (Mass.) Consolidated Street Railway.—About 2 miles of new track will be built in Worcester by this company during 1913.

Linden, Mich.—Plans are being considered to build an electric line between Linden and Holly. The proposition is that if the township of Linden will do the grading, build culverts and prepare the right-of-way, the Independent Power Company will build the line and furnish the power. This line will be extended to Owosso, Pontiac and Flint. O. H. Lau, Detroit, is interested. [E. R. J., Oct. 5, '12.]

***Redwood Falls, Minn.**—Engineers are making surveys to build an electric line between Redwood Falls and the Twin Cities.

Jackson Light & Traction Company, Jackson, Miss.—This company plans to build about 1 mile of track during 1913.

Meridian Light & Railway Company, Meridian, Miss.—This company plans to build possibly 2 or 3 miles of track during the year.

***Fredericton (N. B.) Street Railway.**—This company plans to build a 5-mile electric railway to connect Fredericton, St. Mary's, Gibson and Marysville.

Moncton Tramways, Electric & Gas Company, Ltd., Moncton, N. B.—During the year this company plans to build 3 miles of new track to include 2 miles of interurban track to North Sunny Brae.

Public Service Railway, Newark, N. J.—Plans are being made by this company to extend its Hawthorne Avenue line through Fourth Avenue between Broad Street and Belleville Avenue in Newark.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—This company will soon begin the work of laying new tracks on Center Street and on North Broad Street in Trenton.

United Traction Company, Albany, N. Y.—Plans are being made by this company for an extension of its Arbor Hill line to Watervliet Avenue, via North Lake Avenue and Third Street in Albany.

New York & Stamford Railway, Port Chester, N. Y.—

Plans are being considered by this company for a line direct from White Plains to Port Chester, through Westchester Avenue, White Plains.

Piqua & Bradford Traction Company, Covington, Ohio.—This company plans to build a line between Covington and Bradford. At Covington the line will connect with the Dayton, Covington & Piqua Traction Company, West Milton, Ohio. Hugh C. Marlin is interested. [E. R. J., March 22, '13.]

Ottawa (Ont.) Electric Railway.—The double-tracking of 1½ miles on Creighton Street, from St. Patrick to Sussex Street, with 75-lb rails is being contemplated by this company.

Ottawa & Morrisburg Electric Railway, Ottawa, Ont.—Plans are being considered by this company to make Brockville its terminal.

Toronto & Suburban Railway, Toronto Junction, Ont.—This company expects to begin work on May 1 on a line on Annette Street and Pacific Avenue in Toronto.

Portland, Eugene & Eastern Railway, Portland, Ore.—This company will begin the work of electrifying the old line of the Southern Pacific Railway on the west side of the Willamette River immediately. Paul Lebenbaum will have charge of the work.

Portland Railway, Light & Power Company, Portland, Ore.—This company has planned an extensive programme of betterments and extensions for the present year. In all, the improvements will require an expenditure of $4,000,000, of which $2,500,000 will be used for railroad construction, new buildings, equipment, repairs and other betterments in the city and suburban railway lines.

Corry & Columbus Street Railway, Corry, Pa.—During 1913 this company will build possibly 15 miles of track.

Centre & Clearfield Street Railway, Philipsburg, Pa.—This company plans to build 7 miles of new track during 1913.

East End Passenger Railway, Williamsport, Pa.—This company, which is owned by the Lycoming Improvement Company, has asked for charters to operate in half a dozen nearby townships and boroughs.

Hull (Que.) Electric Company.—This company will build about 1½ miles of track in Hull during 1913.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—During 1913 this company will build 0.6 mile of city track and 4½ miles of interurban track.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company plans to build 12 miles of interurban track during the year.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has practically completed ballasting an extension which it is constructing for several miles on the Kingston pike in Knoxville. The company has practically completed the construction of an extension along the Sevierville pike.

Murfreesboro (Tenn.) Electric Railway.—Plans are being made by this company for an extension from Nashville to Woodbury, via Murfreesboro. Work will be begun in the early spring. The company will soon ask the County Court for a franchise.

Jefferson County Traction Company, Beaumont, Tex.—This company has completed arrangements with the Port Arthur Traction Company for entering Port Arthur over the latter's track. [E. R. J., Jan. 4, '13.]

El Paso (Tex.) Electric Railway.—This company plans to build about 11 miles of new track to include a 9-mile line from El Paso to Ysleta during the year.

Port Arthur (Tex.) Traction Company.—During the year this company plans to build 3 miles of new track.

Utah Light & Railway Company, Salt Lake City, Utah.—This company plans to build about 10 miles of new track during 1913. Work has been begun by this company on its Capitol Hill branch in Salt Lake City.

Chehalis & Cowlitz Railroad, Chehalis, Wash.—Plans are being made by this company to electrify its line into eastern Lewis County. The contract for the poles has been let to the Brown-Robinson Logging Company.

Charleston (W. Va.) Interurban Railroad.—It is possible that during 1913 this company will begin construction on a 27-mile line to Montgomery.

***Laramie, Wyo.**—Plans are being considered to build an electric railway in Laramie. The Laramie Electric Company (C. E. Van Diest, Laramie, manager) is interested.

SHOPS AND BUILDINGS

Shore Line Electric Railway, Saybrook, Conn.—The general offices and headquarters of this company are to be located in the Thames Loan & Trust Company's Building on Shetucket Street, Norwich.

St. Petersburg & Gulf Railway, St. Petersburg, Fla.—Plans are being made by this company to build a new carhouse and repair shop in conjunction with its new power plant in St. Petersburg.

Illinois Traction System, Peoria, Ill.—Plans are being considered by this company to build a new passenger depot in Springfield.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—The four-story office building of this company in Wheaton was destroyed by fire on March 24. The loss is estimated to be about $40,000.

Bay State Street Railway, Boston, Mass.—Preparations are being made by this company to build a new carhouse on Middlesex Street in Lowell.

Springfield (Mass.) Street Railway.—As soon as a location is decided upon this company will build a new depot in Springfield in the Highland section.

Mesaba Electric Railway, Duluth, Minn.—This company has opened its new passenger station on Wyoming Avenue in Virginia.

International Traction Company, Buffalo, N. Y.—Plans are being made by this company to begin work soon on its new depot at the local terminal of the Buffalo and Lockport line in Lockport. The structure will be two stories high and of brick construction. It is proposed to have train sheds into which the cars will run.

Portland Railway, Light & Power Company, Portland, Ore.—This company has been asked to build a new terminal station in Portland from which all lines shall radiate.

Salt Lake & Utah Railway, Salt Lake City, Utah.—Plans are being considered by this company to build a passenger station in Salt Lake City. F. M. Orem, Salt Lake City, secretary and treasurer.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company will build three two-story steel frame and reinforced concrete transformer stations, two in Hastings and one near Sapperton. Approximately $450,000 will be expended.

St. Petersburg & Gulf Railway, St. Petersburg, Fla.—This company has awarded contracts for the equipment of its new brick power plant in St. Petersburg. The structure will be 80 ft. x 100 ft. The chimney will be 165 ft. high. Two units of 1000 kw and three boilers with an aggregate of 1500 hp will be installed. The generators will be connected to cross-compound engines which will be run condensing. A rotary converter has been ordered from the Westinghouse Electric Manufacturing Company. The boilers will be supplied by the Erie Iron Works. The generators have been ordered from the General Electric Company. All other accessories have been ordered from one or another of these companies.

Kentucky Utilities Company, Lexington, Ky.—This company is installing new equipment at its plant in Somerset.

West Penn Traction & Water Power Company, Pittsbugh, Pa.—This company has ordered from the Westinghouse Electric & Manufacturing Company two 19,000-kva Westinghouse-Parsons turbo-alternators for its power house.

Ogden (Utah) Rapid Transit Company.—This company is installing new machinery at its power plants in Ogden Canyon and Big Cottonwood Canyon.

Manufactures and Supplies

ROLLING STOCK

Oregon Electric Railway, Portland, Ore., will soon receive forty-two new cars from the St. Louis Car Company.

San Antonio (Tex.) Traction Company has ordered from the American Car Company ten cars mounted on Brill 27-G trucks.

Springfield (Mass.) Street Railway has ordered six 30-ft. 3½-in closed-car bodies from the Wason Manufacturing Company.

Connecticut Company, New Haven, Conn., has ordered five eight-wheel dump-car bodies from the Wason Manufacturing Company.

Hudson Valley Railway, Glens Falls, N. Y., has ordered three 38-ft. 1½-in. closed-car bodies from the Wason Manufacturing Company.

General Electric Company, Schenectady, N. Y., has ordered six locomotive cabs with twelve trucks from the Wason Manufacturing Company.

Harrisburg (Pa.) Railways has authorized the purchase of seven pay-as-you-enter cars for the Steelton line. The cars replaced will be used on the city lines.

Pascagoula Street Railway & Power Company, Pascagoula, Miss., has ordered from the American Car Company four 18-ft. closed cars mounted on Brill 21-E trucks.

Utah Light & Railway Company, Salt Lake City, Utah, will order twenty-four cars this spring. The company has not settled upon the details of these cars, but is considering various types.

Belt Line Railway Corporation, New York, N. Y., has submitted to the Public Service Commission its plans for substituting storage battery cars for the horse cars now operated on its lines.

Hummelstown & Campbellstown Street Railway, Hershey, Pa., has ordered from The J. G. Brill Company one 30-ft. 8-in. semi-convertible pay-within car body mounted on Brill 27-MCB-1 trucks.

Columbia (S. C.) Railway, Gas & Electric Company has built in its own shop two pay-as-you-enter cars and a concrete mixer. They are equipped with Westinghouse motors. It is stated that the company will build more cars in its shops.

Shore Line Electric Railway, Saybrook Junction, Conn., noted in the ELECTRIC RAILWAY JOURNAL of March 1, 1913, as being in the market for six cars, has placed an order with the Wason Manufacturing Company for eight 30-ft. 8-in. semi-convertible plain-arch car bodies mounted on Brill 27-MCB trucks, to be delivered July 1, 1913.

Houston (Tex.) Electric Company, reported in the ELECTRIC RAILWAY JOURNAL of Feb. 15, 1913, as having ordered ten double-truck closed cars from the St. Louis Car Company, has included the following details in the specifications for this equipment:

Seating capacity	40	Curtain material	Pantasote
Length of body	26 ft. 6 in.	Destination signs	Hunter
Length over buffers	39 ft. 0 in.	Gongs	Wall
Width over sheathing	8 ft. 7 in.	Hand brakes	Peacock
Height, rail to siils	32⅞ in.	Headlights	C-H
Sill to trolley base	8 ft. 6⅞ in.	Sash fixtures	Edwards
Body	composite	Seats	H. & W.
Interior trim	mahogany	Seating material	wood slats
Roofing	¼-in. Agasote	Step treads	Mason
Roof	arch	Trolley catchers	Keystone
Underframe	steel	Ventilators	Stone & Webster vacuum
Bumpers	6-in. channel		
Curtain fixtures	Nat.L.W.Co.	Wheelguards	H-B

TRADE NOTES

Edward J. Hunt, Newark, N. J., manufacturer of Hunt transformer oil, dryer and purifier, has moved his office from the Prudential Building to the Ordway Building, Newark.

Howard & Curtiss, San Francisco, Cal., Pacific Coast representatives of the Federal Storage Battery Car Company and agents for Edison storage batteries, have moved their offices from the Metropolis Bank Building, 55 New Montgomery Street, San Francisco, Cal.

Jeffrey Manufacturing Company, Columbus, Ohio, announces that J. W. White, the engineering salesman until recently stationed at its Athens (Ohio) office, has been transferred to Duluth, Minn., with headquarters at 1905 East Superior Street. Mr. White will have charge of the sales of the company in the eastern part of Minnesota, northern Wisconsin and the northern part of Michigan.

Dearborn Chemical Company, Chicago, Ill., announces that Paul T. Payne, who has been associated with the company for many years and who has for the past ten years been engaged in various capacities in the sales department of the company, has been appointed district sales manager with headquarters in the Hume Mansur Building, Indianapolis, Ind. Mr. Payne will direct the sales of several of the company's branches in that territory.

Duff Manufacturing Company, Pittsburgh, Pa., manufacturer of Barrett lifting jacks, etc., has moved into its new plant and general office building located on Preble Avenue, N. S., Pittsburgh. Its old works on Marion Avenue, Pittsburgh, have been dismantled. The new building comprises approximately 68,000 sq. ft. of area. The company plans to erect a plant in the Chicago district and expects to have this factory in operation by next fall, the question of location being under final consideration at this time. A Canadian factory will also be equipped during the coming summer to be in operation by this fall. The Canadian factory will be located at Windsor or Hamilton, Ont.

Allis-Chalmers Company, Milwaukee, Wis., through its reorganization committee, has given notice that the properties of the company having been purchased on behalf of the committee and the sale having been confirmed by the courts, the Allis-Chalmers Manufacturing Company, to which reference appeared in these columns last week, will take over the properties and begin operation at an early date. Notice has also been given by the committee to holders of certificates of deposit for the preferred and common stock that it has called for the payment of the balance due on the assessments levied under the reorganization plan. On the preferred stock $4 a share is payable on or before April 24 and the same amount is payable on or before May 15. Two payments, each of $2 per share, are payable on each of these dates on the common stock.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has appointed Charles Robbins, who since 1909 has been manager of the industrial and power department of the company, as assistant sales manager with headquarters at East Pittsburgh. Mr. Robbins became associated with the Westinghouse Electric & Manufacturing Company in 1899 and was for a number of years located in New York. Previous to his connection with the Westinghouse Company he was associated with the Cutter Company of Philadelphia. He is a member of the National Electric Light Association and the American Institute of Electrical Engineers. J. M. Curtin, who heretofore has been assistant manager of the industrial and power department at Pittsburgh, has been appointed manager of this department to succeed Mr. Robbins. Mr. Curtin is a graduate of Penn State College and has been identified with the company ever since his graduation.

ADVERTISING LITERATURE

Joseph Dixon Crucible Company, Jersey City, N. J., has published *Graphite* for March, 1913, which contains, among other interesting reading matter, an article calling attention to the power plant of the Terre Haute, Indianapolis & Eastern Traction Company, in which the steel work is protected with a shop and field coat of Dixon's silica-graphite paint.

California Corrugated Culvert Company, West Berkeley, Cal., has printed an elaborate pamphlet illustrated in colors showing the manifold applications of its American ingot iron corrugated culverts. This material is especially suited for culverts because it is strong, light and resistant to corrosion. These qualities are clearly brought out in the chapter on tests of irons. An important part of this publication is the table on distributed load test of corrugated pipe as made by Professor A. N. Talbot, in charge of the materials testing laboratory, University of Illinois.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, APRIL 5, 1913 No. 14

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.

Chicago Office.............................1570 Old Colony Building
Philadelphia Office.......................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

A CURIOUS LEGISLATIVE PROPOSAL

A bill that is entitled to high rank among the curiosities, not to say the monstrosities, of legislation has been introduced in the New Jersey Legislature with the purpose of preventing railways from determining the exactness with which engineers observe track signals. The surprise test has long been an object of execration among careless railway employees. This fortunately small class of railway men have now induced a member of the New Jersey Legislature to introduce a bill providing that when tests are to be made in the operation of trains the railroad shall give previous notice in writing to the engineers! Only the type of legislator and labor man whose bias produces blindness to all considerations but one could fail to see the absurdity of a "surprise test" of which due notice was given in advance. Unfortunately legislation of the type here referred to is not always killed by its obviously preposterous character. Almost as bad as the New Jersey bill is the full-crew measure just signed by Governor Sulzer of New York in the face of the conclusive showing by the railways that the law will cost the carriers $2,000,000 a year and accomplish no good whatever, the Public Service Commission having ample authority to order additions to train crews wherever it is shown that such augmentation is necessary. It is reported that Governor Sulzer, to secure the votes of the railway men, promised in advance of his election to sign a full-crew bill. If true, it makes this specimen of union-labeled legislation particularly vicious.

THE ARTICULATED CAR

The articulated car, some experimental results from which were published in our last issue, seems to have many points of usefulness. In order to secure economical operation a large car capacity, the largest which can be conveniently handled by the usual crew, is highly desirable, yet there has proved to be a serious practical limit in increasing the car capacity owing to several important causes. First of these is the difficulty in working extra long and large cars around the curves which are found in most street railways. Second, there is the inaccessibility of the ordinary large car on the usual high trucks. Getting on or off becomes an operation troublesome to the passengers and productive of many delays. The articulated car seems to meet this situation very effectively when properly designed for low-entrance operation. The carrying capacity is large and is secured without loss in accessibility. It secures most of the practical advantages of a two-car train or a single car with a capacious trailer without the risks and inconveniences that attend these in ordinary city practice. The maximum length which can be given to an articulated car obviously depends on traffic conditions, but it will be readily demonstrated by experience, and unquestionably the carrying facility of the system, even if not worked to its extreme capacity by reason of short curves or other difficulties, appears to be exceptionally great. Whether the end doors are of real advantage in cars of this type may be considered somewhat dubious. They afford a small additional chance of egress at some risk in giving the conductor too many entrances to watch, and these, too, of differing kinds. We believe that this is a question depending largely upon the kind of traffic. If a car does a large amount of short-haul business, good exit facilities are much more important than if most of the passengers travel long distances. For the latter service the logical development would seem to be a car with closed ends permitting the maximum carrying capacity and entrance wholly via a low-entrance middle section. As an effort along these lines the articulated car is a very promising one and deserves to be thoroughly worked out in all its details. It is satisfactory to learn that the Boston system is planning to put a number of these cars in service.

UNIQUE FARE CONCESSION

The proposed plan by which the New York Railways Company and the city of New York, as owner of the municipal ferry to Staten Island, will unite to make a through 5-cent fare possible between Staten Island and uptown in Manhattan may give rise to some misunderstanding outside of New York. The details have not yet been settled, but the railway company and the ferry authorities have announced that such an arrangement will be made and that the ferry will receive 2 cents and the railway company will receive 3 cents instead of each receiving 5 cents as at present. The primary reason for the plan, so far as the city is concerned, is that, under the present subway scheme for the development of the city, Staten Island, which is a part of New York City, will receive no benefit, and as the city is subsidizing means of transportation to the north and east, the claims of its citizens to the south, it was thought, should also have some recognition. The New York Railways is not directly concerned, of course, with this phase of the question, except as it forms part of the broad general proposition of rapid transit development in the entire city, and the company obviously could not make any reduction in its standard 5-cent fare for any considerable portion of its traffic. It so happens, however, that a great majority of those who would use this joint route are commuters whose offices are within a radius of a mile from the ferry, and it is believed that the length of the average railway ride which will be taken by passengers at this reduced fare will be considerably less than a mile. In fact, most of them now walk to their places of business. Viewed correctly and with a full understanding of the local conditions, it is one of the few places where a departure from the standard nickel fare might be possible, because the rate for most of this particular traffic would be more than 3 cents a mile. But the plan should not be considered as a precedent for a reduction elsewhere any more than the 2½-cent fare now charged for a ride over the Brooklyn Bridge is an argument for extending the same service over all of Brooklyn or all of Manhattan.

THE FLOODS OF LAST WEEK.

The floods which occurred last week all through the Central States, particularly in Indiana and Ohio, and even in a number of the Middle Atlantic States, are now fortunately subsiding. It is impossible yet to determine the actual loss of life and property, but while the earlier reports of both seem to have been exaggerated, it is probable that the disaster was the worst which has occurred from natural causes in the history of this country. While a great many of the details in connection with the flood are familiar to our readers through the accounts which have appeared in the daily papers, it has been thought that it would be of special interest to publish this week such information as was available in regard to the electric railway properties in the affected districts. It was not practicable to secure this information from every city in the flooded district or to record every instance of heroism or of the foresight and effort which were put forth to keep cars running as far as possible and to minimize the loss of life and to electric railway property. Nevertheless, the history of the flood, if it could be written in detail, would supply many such instances. The properties most affected in the Central States are but just emerging from the disaster which has overtaken them and the territories which they serve, but the work of rehabilitation has already been begun and will be continued and completed, we are confident, with the same courage and energy which marked the original construction and promotion of these lines.

The broad question of the best means to adopt so as to avoid a similar disaster in the future is still to be considered. It will undoubtedly be solved by the engineering profession. A note of warning is sounded in this week's issue of the *Engineering Record*, however, in regard to quick judgment upon this matter. The *Record* says: "Reservoirs, levees, by-passes—all have been carefully studied, but whether one or another or a combination is desirable for a particular watershed and stream is not a subject for snap judgment. The factors involved are too many and too variable to generalize. While, therefore, engineers can concur in the general proposition that measures to stop, or to minimize, the floods are advisable, commitment to any particular means without careful investigation would indeed be imprudent." It is impossible to conceive that the general question of protection against floods of this kind is beyond human ability, even with an exceptional rainfall of 6 in. or more during five days, such as occurred in Indianapolis and other places in the flooded district. The lesson has been a very costly one, and the solution of the problem should at once be attempted.

THE ARRIVAL OF THE BUS-VERSUS-TRAM CONTROVERSY

In the past few years occasional comment has been made in these columns upon the so-called "bus-versus-tram controversy" which has been raging in Europe without the least sign of weakening as it gains in age. In fact, the seriousness with which the more enthusiastic adherents of the automobile bus regard its ability to replace the trolley car for congested city traffic has been exemplified by actual expressions of doubt as to the wisdom of the recent extensions to the street railway system of Paris in preference to the use of the cheaper but less efficient self-propelled vehicle. Apparently this controversy has at last been projected into the United States, for strong opposition by a number of railway officials developed at a public hearing on Wednesday against some proposed legislation designed presumably to permit bus competition with the existing street railway lines of New York City.

That the impending competition would really follow the passage of the necessary enabling legislation seems quite likely, in view of the public announcement of the backers of the proposed bus line. Yet the financial success of such a project is extremely problematical. The limited use of the automobile bus in this country does not provide an opportunity for exact cost comparisons with the trolley car, but from such figures as are available, it appears inconceivable that a bus line can fairly compete with the electric railway in city service.

It is of course quite possible that under special privileges the bus will thrive. Such a condition exists in London where an area roughly 3 miles in diameter, on account of its narrow, crooked streets, is served only by buses. As this is the business district of the city with an all-day, short-haul traffic, it is rightly called the "bus paradise," and with such a profitable district as a basis, it is easy to see how Londoners can fall into the error of assuming that their trolley cars, whose traffic is strictly limited to the less profitable service and which are handicapped by a high capital charge, could not compete with the buses.

For a fair comparison competition must be upon a reasonably even basis. The costly pavements which make the operation of the bus a commercial possibility enable it to escape the heavy interest charge which the electric railway pays for its tracks, and as the bus is notoriously hard upon paving, any community which does not impose a tax sufficient to cover the item is simply transferring its money from one pocket to another if it seeks to receive cheap or frequent bus service at the expense of its streets. In England an attempt to equalize this is made by the imposition of a road tax of 3 cents per gallon on gasoline, amounting to about 0.4 cent per bus mile. Yet evidence has been adduced to show that this is insufficient.

In New York City the surface lines are handicapped by the heavy fixed charges involved by the underground trolley system originally imposed by the city, and the bus is favored by very generally smooth pavements. If the bus can be made to compete for city traffic in this country, New York is manifestly the place for it, and if it can be proved to be better for the public and more profitable to its owners than the electric car any legislation which arbitrarily prevents its use is the height of absurdity. This does not mean the advocacy of unrestricted competition. Nothing could be less desirable. Unless the bus can be clearly shown to be capable of supplying something which the electric railway cannot, its entrance into the field could only produce financial loss and, in the end, lessened facilities for the public. Still, New York is so fortunate as to have a Public Service Commission which has already established precedents against the inception of such chaotic conditions, and it is certain that the bus will have to demonstrate a *raison d'être* before its use is extended very far.

SIXTY-CYCLE CONVERTERS IN CLEVELAND

The arrangements for power supply of the Cleveland Railway Company described elsewhere in this issue are typical of the present apparent tendency toward the use of purchased power. The railway company has arranged for the use of sixty-cycle current purchased from the local lighting company and, as a means to that end, has installed, in its various substations throughout the city, specially designed sixty-cycle rotary converters having capacities of 1500 kw. As mentioned before in these columns, the use of large sixty-cycle converters became practicable only with the development of the commutating pole because this has largely eliminated the influence of fluctuations in the d.c. load and the consequent difficulties in commutation.

At Cleveland the effect of steady-running steam turbines which supply the power is believed to have a considerable influence on the successful operation of the new rotaries through their ability to produce electric current at constant frequency, thus relieving the designers of any necessity for protection against disturbances on the a.c. side of the converters. Undoubtedly the success of the new design is also due in part to the high speed employed and to the great mass of the armature. The mechanical effect of the momentum thus set up enables the converter to pull through momentary overloads without hunting.

As the designers have kept a reasonable proportion of the mass of the machine in the moving parts, the heat losses are thereby minimized. The magnetic circuit also tends to respond very rapidly to the demand for reversing flux. While the machines have been in service but a few months, experience with them during that time has amply demonstrated that flashing over can be practically eliminated in high-frequency rotaries and that sixty-cycle machines of large size may be installed without any fear that the difficulties of design have not been overcome.

CHICAGO WAGE ARBITRATION

The arbitration to settle the question of the wages of the street railway employees in Chicago was concluded last Saturday, and under the new schedule the majority of the men will receive an increase of 2 cents an hour. The decision of the majority of the board does not exactly suit either side, but both have agreed to accept it. It is unfortunate that a unanimous decision was not reached by the arbitrators, but this is hardly to be expected in any board composed of one representative from each side to the dispute under consideration and one neutral arbitrator. The representatives chosen on behalf of the opposing sides must be arbitrators in name only. Practically they are the counsel for their respective sides and are expected to urge the claims of the side they are representing during the hearing and to secure for it as much as they can. Hence, when a decision is reached by the neutral arbitrator, or he decides upon a compromise which is accepted by one of the partisan arbitrators, the other is almost bound to dissent and submit a minority report. Otherwise he will seem to those whose interests he is representing not to have been sufficiently active and aggressive in their defence.

As we have said before, if an arbitration board is to be made up with one-third of the members to represent one side, one-third the other side and one-third to be neutral, we believe that it would be much better to have the board composed of six members rather than three. With six members there would be two to represent each interest, and one would be able to give moral support to the other in the acceptance of compromises or of conclusions which have been found during the hearing to be fair but might be considered disadvantageous to some of those concerned in the dispute.

In this connection it is interesting to note that the Railway Business Association is advocating the passage of an amendment to the Erdman arbitration act at the present extra session of Congress. One of the reasons urged in favor of this action is that the present law provides for but three arbitrators, two of whom are partisans. It is believed that an increase in the number of neutral arbitrators would bring more minds to bear upon the questions arising and would tend to promote equity in the decisions. The Railway Business Association also urges a longer period for the investigation, which is now limited to thirty days, that the act should be made more generally applicable to railway employees and that the qualifications for arbitrators should be enlarged so as to make a larger number of individuals eligible.

The opinion expressed by the majority of the Chicago board upon the cost of living is a clear discussion of the situation, which is really very simple but is often misunderstood. The claim of the trainmen was that their pay under the old schedule was not adequate to cover the actual cost of living as it prevails under the present-day conditions in Chicago, and detailed statistics were presented to justify this claim. The opinion of the board is that the question under consideration by it was not what constituted a "living" wage for the Chicago trainmen but what was a "fair" wage for them. It was impracticable, the board said, for it to decide what was a living wage, because no two authorities would agree upon this point. An income that would be sufficient for one family would be inadequate for another of equal size. Again, according to the board, if the actual cost of living was the only standard for wages, then all wage earners would receive the same amount, and the wages which would be paid to trainmen, with the skill and responsibility which go with their positions, would be the same as those received by lower priced labor, of which there is, of course, a great deal in Chicago, even on the railway systems.

We agree with this view. A great deal is being said today about the desirability of establishing a "minimum" wage for the very lowest paid of industrial employees, like shop girls. Economists differ as to the practical effect upon the workers at large of an attempt to establish and enforce a minimum wage of this kind. But whether such a plan would be desirable or not, it hardly concerns the skilled industries, like railway operation, where the criterion of the adequacy of the wages paid is the wages which will secure and retain in the industry employees having the skill necessary to perform the work required, and by wages in this connection we mean also the conditions surrounding the work and the permanency of the employment. For these reasons the percentage of men who leave the service of an electric railway company during the year is a better standard by which to judge whether the wages are adequate than theoretical discussions whether any given sum constitutes a living wage or is adequate for a certain specified standard of living.

EQUIPMENT TROUBLES WITH LONG TRAINS

Reference was made in these columns in the issue of Dec. 28, 1912, to the trouble experienced in burning shoe fuses on the end cars of long trains due to the shunting effect of the bus line in parallel with the third rail. There are other equipment troubles that can be directly attributed to the length of the train or troubles that are very much increased from this cause. A familiar example is the application of brakes on the head cars of long trains before the other cars are affected. This has been overcome by the development of the electro-pneumatic system, which permits the brakes throughout the train to be set before the slack has a chance to run ahead.

Another source of trouble on electrically operated trains has been the drop in potential in the control train line. As this line is one of low voltage, a poor contact in the receptacles or between the jumpers and receptacles causes a considerable drop in voltage, and this in turn causes sluggish operation of the control switches. The uneven acceleration of the different cars in the train which results from this action is not only a source of discomfort to passengers but leads to excessive drawbar strains as well, and manufacturers are now providing jumpers and receptacles with spring contacts and spring points.

The inability of motormen to reset the line switches from the cab after these have been blown on overload has been another source of trouble. All reset coils for the line switches on different cars are generally connected in parallel, and when the reset wire is energized the current passes through all coils whether the line switches are blown or not. With long trains the current taken by these coils sometimes reduces the available voltage to such an extent that the current which passes through the coil on the blown line switch is insufficient to reset it. With heavy traffic the additional load thrown on other motor cars by the blowing of a line switch has caused others to blow and stall the train. It is then necessary to reset each line switch by hand before the train can proceed. To overcome this on one system, the connections have been changed so that current will pass only through the reset coil of the line switch which is open. This change, together with the adjustment of line switches on inspection so that they can be reset with about three-quarters of the normal voltage, has eliminated the trouble almost entirely.

MEMBERSHIP IN TERRITORIAL ASSOCIATIONS

In the ELECTRIC RAILWAY JOURNAL for March 1 the attention of non-member companies throughout the country was directed to the advantages and low costs of membership in the American Electric Railway Association. It is equally pertinent to point out that this participation in the affairs of the national body of electric railway interests should be supplemented by membership in state or other territorial associations. It is erroneous to assume that membership in one kind of association makes it unnecessary to belong to the other kind, for each society has a field of its own. The great technical and economical questions of the industry, including those which affect interstate commerce, are best handled by a nation-wide organization, whereas a state or sectional organization is the proper medium for the interchange of information on local problems. The constant growth in the number and scope of state utility commissions, however, is a later and most logical reason for the united action of the railways which come under their control. The very law of self-preservation should impel the electric railways of each state to fix upon common policies if they desire to enjoy the respect of the men whom the state has appointed with powers to make or break them.

The recent hearings on block signal installations held before the Indiana Railroad Commission showed clearly the necessity for the united action of the railways concerned, and this united action was fostered by the fact that the railway managements had already become well acquainted with one another through the Central Electric Railway Association. Again, the average public service commissioner does not come into office as a railroad expert, and his just understanding of conditions will be greatly retarded to the injury of the railways if he or his delegates are not brought into touch with the railway representatives as a whole. Without doubt the electric railways which are under the jurisdiction of the New York Public Service Commission, Second District, have saved a great deal of money and gained much good will by the fact that members or representatives of the commission have been frequent attendants at the quarterly meetings of the association. At these meetings they can expound their views on the subjects under discussion and also enjoy the opportunity of seeing from the very nature of the proceedings how earnestly the railways are trying to increase their usefulness to the public.

If an association can accomplish such results when it represents only part of the railway interests of its state, it is obvious that its field of usefulness will be far greater if it can appear as the spokesman of all or practically all the electric railways within its territory.

PLANING MILL EXHAUSTER SYSTEMS

A fact which does not seem to be generally realized in planning a shop is that the wood mill should be located as near as possible to the shop power house. The reason for this is that the shavings exhaust system which is almost invariably installed in the planing mill to care for the sawdust and other refuse made by the woodworking machines becomes the most uneconomical method of transporting this refuse when the distances are excessive. The power required to handle shavings for a distance of 400 ft. or 500 ft. is all out of proportion to the value of the service rendered. In fact, a planing mill should not be installed more than 150 ft. away from the point at which the refuse is to be destroyed.

It is, of course, possible, as is done in some cases, to discharge the shavings into a special burner located 50 ft. or more from the wood mill and thus destroy them without transporting them to the boiler house. On the other hand, this procedure involves expense for attendance and the shavings have a certain heat value which, especially in winter time, is worthy of consideration from the standpoint of economy.

The reason for the inability of a shavings exhaust system to handle material for long distances is that the velocity of the air in the shaving ducts must be maintained at a high figure. Otherwise the shavings will be dropped out of the moving current of air and deposited in the bottom of the duct, thus choking it up. A velocity of 3000 ft. per minute is about the lowest which can be successfully used, and at times of heavy load this, of course, has to be increased. The result of the high velocity is that the skin friction of the duct becomes such an important item that when great lengths of duct are used the pressure required to force the air through it is relatively enormous.

This is one of the prime causes why so many exhaust systems fail to operate satisfactorily after installation. A common method of designing such plants is to put in a single fan which is only capable of exerting a total pressure equivalent to about 10 in. of water. On the suction side of the fan about 6 in. or 7 in. of this pressure is necessary to draw shavings into the ducts of the machines and into the floor sweeps of the floor of the mill. The remainder, or say a 3-in. water column, is available for transporting the shavings between the fan and the shop boilers where they are generally burned. If the distance is excessive the proportion of the total pressure difference which is used upon the discharge side of the fan will subtract so much from the pressure available for suction on the suction side that the system will hardly operate at all.

The difficulty is sometimes overcome by using two fans and two separators, the second fan and separator being installed on the roof of the building containing the shop boilers; but such an arrangement involves an expenditure of power so great that it is a grave question whether the saving in labor added to the fuel value of the shavings warrants this step.

INTERURBAN ROADS IN THE NEW INDIANA LAW

The effect of the new public utility commission law of Indiana is to class interurban lines as "public utilities" and to subject them to a degree of state regulation from which the steam railroads are relieved. The railroad law is continued in force so far as the steam railroads are concerned; the interurban lines, on the other hand, are no longer to be under the mild form of regulation which it prescribes, but are to be under the control, as to service, rates, securities and valuation, of the thorough-going law which becomes effective May 1. The discrimination in the policy of the State as between electric interurban roads and steam roads is exercised in spite of the argument of the representatives of the interurban lines that the two classes of properties are competitors and that the electrically operated properties should not be placed at a disadvantage as compared with the steam properties. The plea of the interurban roads was disregarded, however, so that the conditions under which the properties must be operated are those of the new law, an abstract of which was published in our issue of March 15.

The statement that the interurban lines are competitors of the steam roads is, of course, a fact. It is not all of the truth pertaining to the competitive relations of the properties, however. The interurban lines have taken business from the older properties, but they have also developed business which the steam roads were not equipped to handle and did not cater to successfully. If the interurban lines have not built up more business from undeveloped sources of traffic than they have taken from the steam roads, if they have not provided service, convenience, facilities and comfort that the older properties have not provided, they have not filled their proper place. These conditions, however, have been worked out by interurban lines in localities where there is direct competition with the steam roads, where rates are nearly equal or are a little lower on the electric property, but where the electric line has more trains per day, better terminal facilities and prompter delivery of packages. While the Indiana electric lines were freed from any regulation which seriously hampered their development by these methods, the steam lines were just as free to meet and overcome the competition if they could do so.

The fact that the conditions as to state regulation are to be changed raises the question of how the State, to be equally fair to each interest so far as the law permits, will adjudicate the questions which will arise. Certainly it cannot afford to use powers conferred by a strong law to the detriment of the interurban properties and to use the powers of the old law so that a preferential advantage to the competitors of these properties will result. The duty of the new commission will be to follow the course laid down in the letter of the law, but to do all that it can to protect the various classes of property interests with justice to each. The serious problems that are laid before the commission by the potential complication in the language of the statute should be handled in that spirit of wise regulation which seeks to conserve and upbuild utilities as well as to protect the public interest.

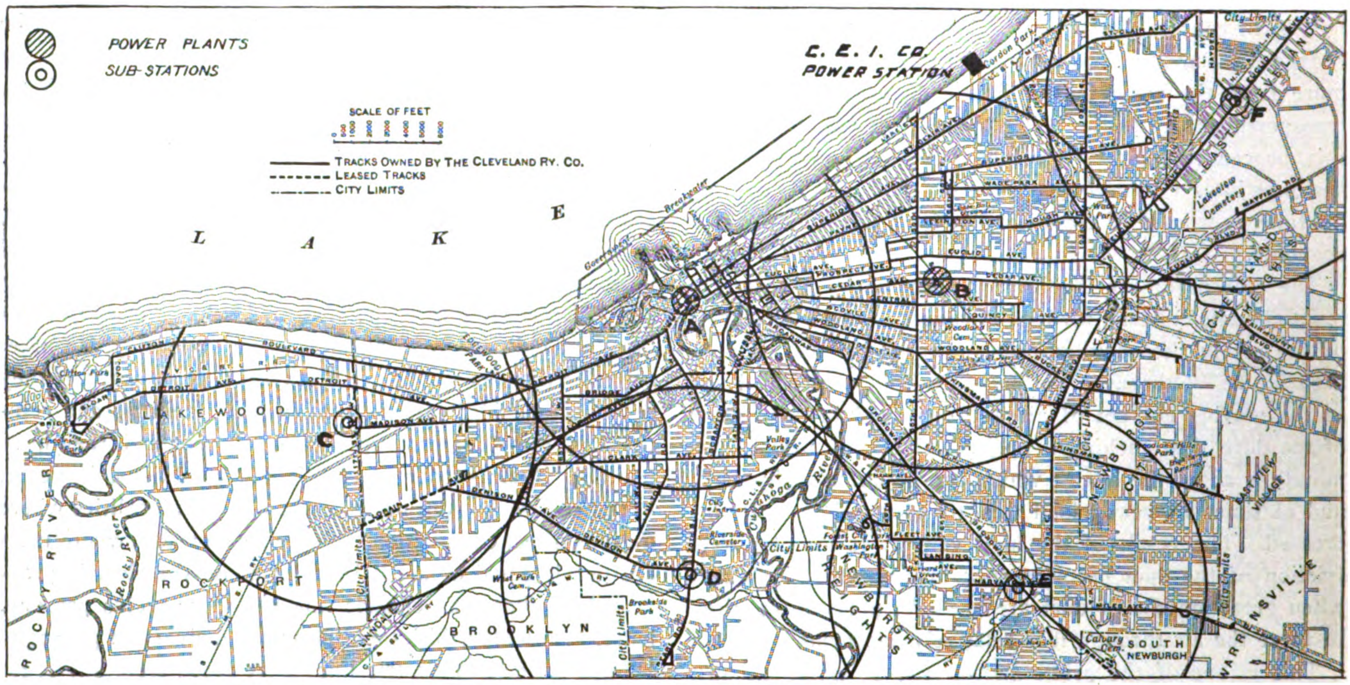
Electric Power in Cleveland

The Cleveland Railway Company Has Abandoned a Large Part of Its Power-Generating Equipment and Is Purchasing from the Local Lighting Company 60-Cycle Current Which Is Converted to Direct Current in a System of Modern Substations with Storage Batteries—An Account of the Installation Is Given Together with a Description of the 60-Cycle, 1500-Kw Rotary Converters

For the past few months the Cleveland Railway Company has been drawing power in increasing quantity from the stations of the Cleveland Electric Illuminating Company under the contract described in the issue of the Electric Railway Journal for April 20, 1912, page 664. The contract went into effect Nov. 15, 1912, but at that date the railway company had but one substation in operation. The date at which the minimum-power clause of the contract becomes operative was, therefore, advanced to May 15, 1913.

POWER HOUSE AND SUBSTATION DISTRIBUTION

The plan of power house and substation location for the electric railway is shown in the accompanying chart. The zones are 4 miles in diameter and each one is normally supplied from a single station. The points marked "A" and "B" are respectively the Viaduct and the Cedar Avenue d.c. steam power stations, which are located in the downtown district. The former station was originally operated by the Cleveland City Railway Company and the latter by the Cleveland Electric Railway Company. The four substations shown are, from west to east, Contant Avenue, West Twenty-fifth Street, Harvard Avenue and Windermere. Of these the fourth was put into operation on Nov. 15, 1912, and the third two months later. The others will be completed in a few weeks. These substations are all equipped with 60-cycle rotary converters and draw 11,000-volt, three-phase power, principally from the recently constructed Seventieth Street power station of the Cleveland Electric Illuminating Company.



Cleveland Power—Distributing Areas Around Power Plants and Substations

PRESENT AND FORMER STEAM PLANTS

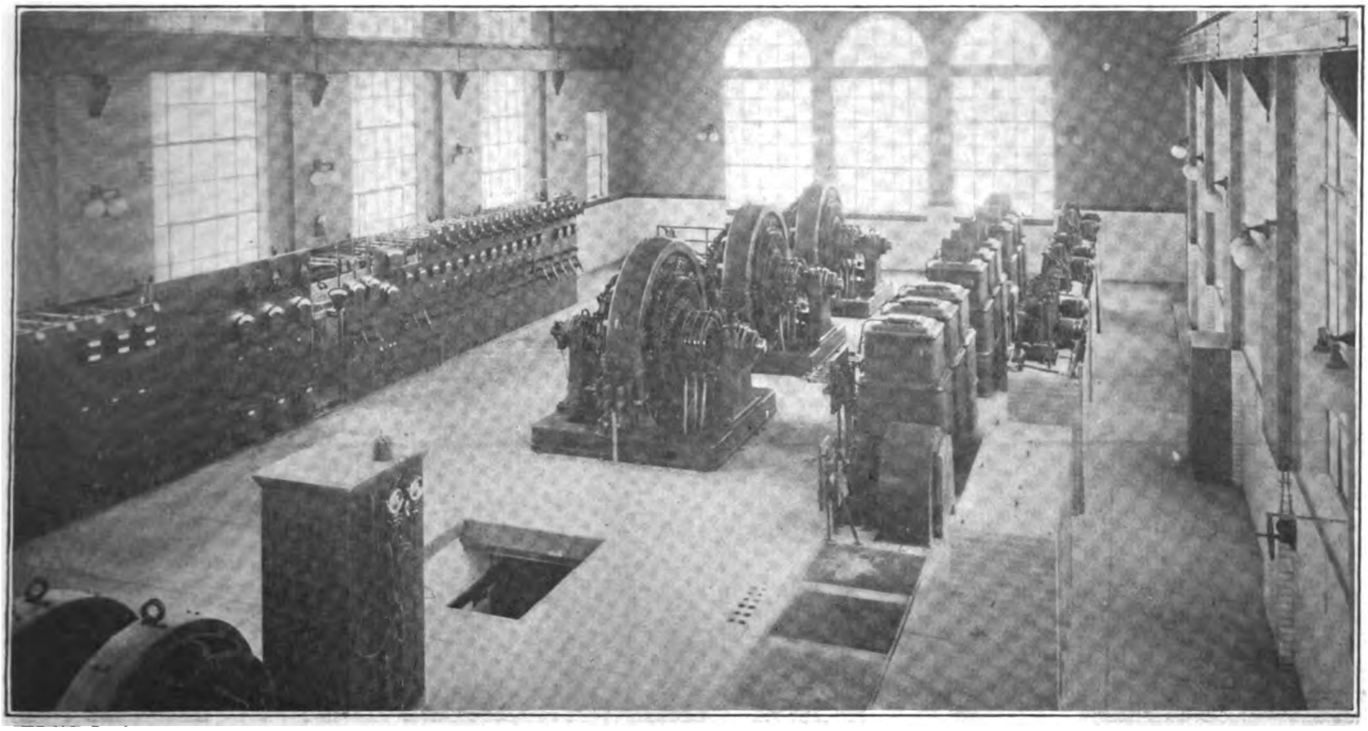
Before the completion of the Windermere substation all power generated for railway purposes in Cleveland was in d.c. form. This was produced in four power plants inherited from the companies which united to form the Cleveland Railway Company. The oldest was the Canal Road station, built twenty-six years ago and containing ten 62-kw and two 125-kw bipolar generators belted to Ball engines. This was shut down last November. The Division Street plant, which will be abandoned in a few weeks, is equipped with one Wetherill and two Allis-Chalmers Corliss condensing engines having a total capacity of 3900 hp. The engines are supplied with steam by a battery of four Heine and four O'Brien water-tube boilers, all equipped with Roney stokers. Both the Viaduct and the Cedar Avenue plants consist of two parts, one obsolete, the other fairly modern. Both of the modern parts will be continued in service.

The newer engines in the Viaduct station have a combined capacity of 9600 hp and are of the horizontal cross-compound, Corliss condensing type, three Allis-Chalmers and one Cooper. All are direct-connected to General Electric and Westinghouse d.c. generators. There are ten Stirling boilers equipped with chain-grate stokers and these have a combined capacity of 5792 boiler-hp. The modern part of the Cedar Avenue plant contains two horizontal and two vertical cross-compound Corliss engines with a total capacity of 12,000 hp. They are supplied with steam by ten B. & W. boilers and eighteen Stirling boilers. The engines are direct-connected to General Electric d.c. generators. All of the plants contain the auxiliaries usual in the best type of stations built about ten years ago.

BATTERY HOUSES AND BATTERIES

In connection with the original d.c. plants five storage battery stations were employed. At Cedar Avenue there was a 2400-amp battery containing 288 cells of the G-65 type made by the Electric Storage Battery Company. This will now be removed and the plates incorporated with those of other batteries. The Harvard Avenue and Windermere substations were formerly battery stations only. The former contained a 2300-amp, 219-cell G-59 battery and the latter a 1600-amp, 264-cell G-41 battery. At the Harvard station the battery will remain as before except that cells from the Cedar Avenue battery will be added to raise the voltage to 600. At Windermere an entirely new battery has been installed and is operating in parallel with the rotary substation. The new battery has 290 cells of R-25 plates with a capacity of 1440 amp-hr.

The Detroit Avenue battery is located about a mile east of the Contant Avenue substation. It originally contained a 1600-amp battery of 252 cells. This number will be increased to 290 by the addition of cells from Cedar Avenue as at the Harvard substation. This battery will be operated from the Contant Avenue substation where the booster, switchboard, etc., will be located. It will be connected with the station by two 1,000,000-circ. mil. cables. A pilot cell in the substation, located in an isolated basement room, will be connected in series with those in the battery house. This is for hydrometer measurements, which are to be made every hour. By this simple expedient skilled attendance in the battery house is rendered unnecessary. The West Forty-fifth Street battery is located somewhat more than a mile southwest of the Viaduct power house. It contains 262 cells of R-25 plates with 1440 amp-hr. capacity. It will be removed to the West Twenty-fifth Street substation in the near future and twenty-eight cells from Cedar Avenue will be added.


Cleveland Power—Interior View of Windermere Substation Showing Switchboard and Converters

All of the batteries are furnished with booster sets consisting of 600-volt motors and generators capable of boosting the voltage at least 50 volts, and with sufficient capacity to carry any current which the batteries may give out. All boosters, instruments and control equipment will be in the substations, suitable battery switchboard panels having been provided.

SUBSTATION EQUIPMENT

The new substations will contain the following equipments:

Substation	Number of Rotaries Present	Number of Rotaries Ultimate	Size of Rotaries, kw	Total Ultimate Capacity, kw	Remarks
Windermere	4	5	1500	7500	Fourth rotary now being installed
Harvard Avenue...	3	5	1500	7500	
Contant Avenue....	2	4	1500	6000	Under construction
West 25th Street..	2	4	1000	4000	Under construction

At the West Twenty-fifth station the demand is for smaller machines which are adjusted carefully to the load curves. Smaller units work in here to better advantage. They are the new type, exactly similar to the larger units at the other stations.

THE WINDERMERE SUBSTATION

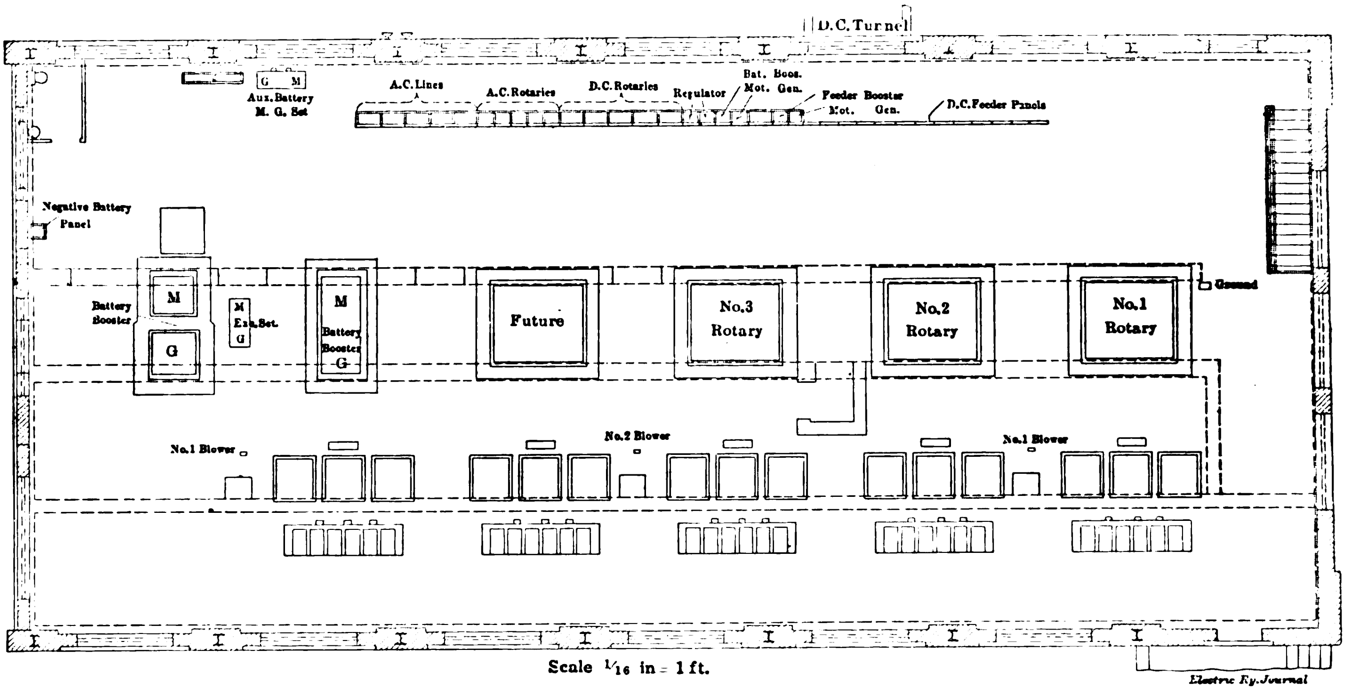
The Windermere substation is typical of all the others. General views of its interior as well as the details of the layout are shown in the accompanying illustrations. The building, like those housing the other substations, was designed in the power department of the company, after an exhaustive study of the best practice throughout the country. In addition to the electrical equipment described below it contains an electrically operated crane and an air compressor for use in cleaning machinery and other auxiliaries. This, while not absolutely necessary, conduces to convenience and cleanliness. The general layout shown on page 620 will serve as a basis for the following explanation, and this when examined in connection with the interior photographs gives an accurate idea of the arrangement of the equipment.

At the top of the plan are shown at the left the auxiliary battery and lighting panels and in the center the main switchboard. Details of these are given in other figures. Rotaries No. 1, No. 2 and No. 3 are now in operation and No. 4 is being installed in the space marked "future." On the site of future rotary No. 5 is now located a 250-kw series feeder booster, with a range from 0 volt to 250 volts. This is driven by a 600-volt d.c. motor.

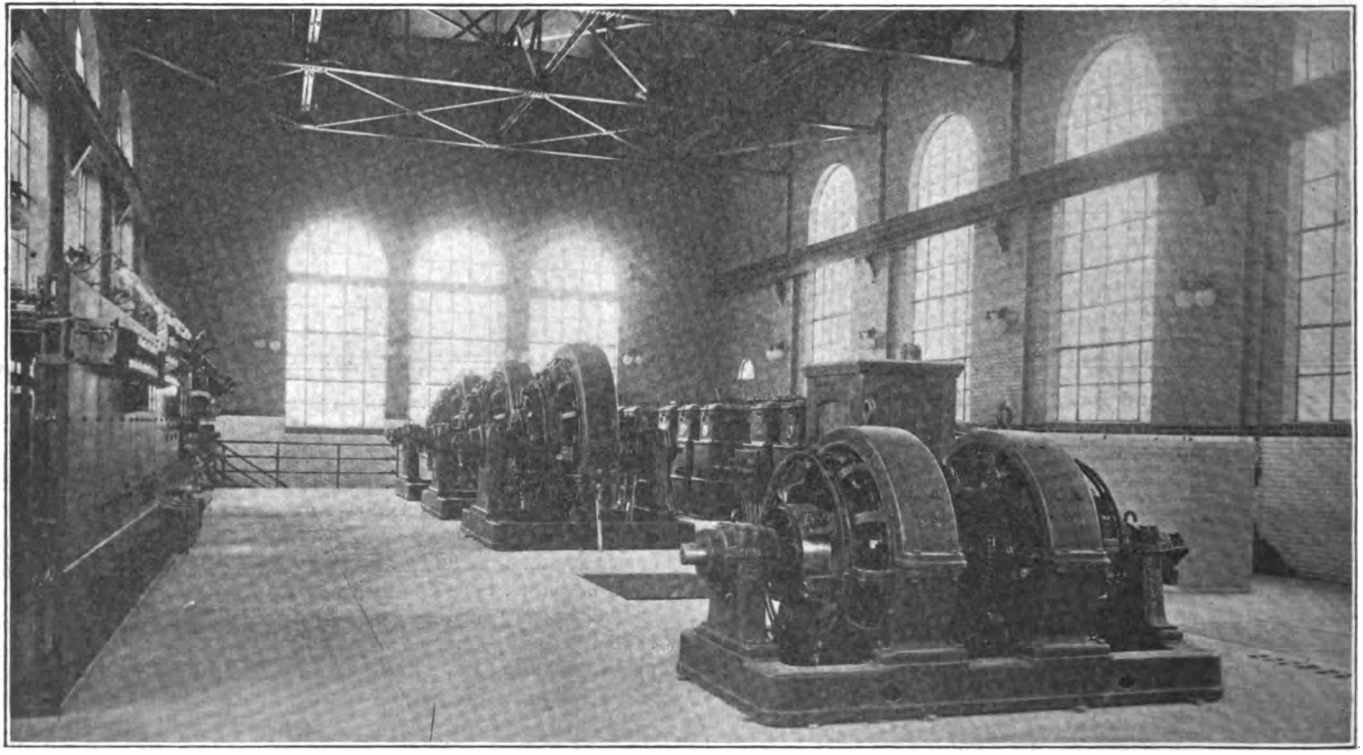
The battery booster, shown at the left, is of 112-kw capacity and produces about 175 volts. It is driven by a 170-hp, 600-volt motor at a speed of 520 r.p.m. Between the two boosters is the exciter set for the battery booster. The field of this is controlled by a carbon-pile battery regulator, the armature terminals of the exciter being connected directly to the booster generator field terminals. The connections are shown in the accompanying wiring diagram. To the right of the auxiliary battery and lighting panels is a 50-kw motor-generator battery-charging set.

TRANSFORMERS

The banks of 550-kva delta-connected, air-blast transformers are shown on the layout below the rotaries. These have 6 per cent reactance and an additional 2 per cent is provided by the natural reactance of the leads. Taps are brought out for a.c. starting, giving one-third, two-thirds and full voltage on the low-tension side. The starting panel is shown above the center transformer of each bank. The fans are placed to the left of the first and third banks and provision for a third is made to the left of the fifth bank. Near each blower is a control panel through which current can be supplied from the 1-3-5 taps of either of two rotaries, the armatures of which are diametrically connected. The fans have 20,000 cu. ft. per minute capacity at ¾-oz. pressure and are driven by 15-hp squirrel-cage three-phase motors.


D.C. Tunnel
G M
Aux. Battery M. G. Set
A.C. Lines
A.C. Rotaries
D.C. Rotaries
Regulator
Bat. Boos. Mot. Gen.
Feeder Booster Mot. Gen.
D.C. Feeder Panels
Negative Battery Panel
Battery Booster
M
G
M Ex. Set. G
M
Battery Booster
G
Future
No. 3 Rotary
No. 2 Rotary
No. 1 Rotary
Ground
No. 1 Blower
No. 2 Blower
No. 1 Blower
Scale 1/16 in = 1 ft.
Electric Ry. Journal

Cleveland Power—Plan of Windermere Substation



Cleveland Power—Interior View of Windermere Substation Showing Battery Booster Set

HIGH-TENSION SWITCHING APPARATUS

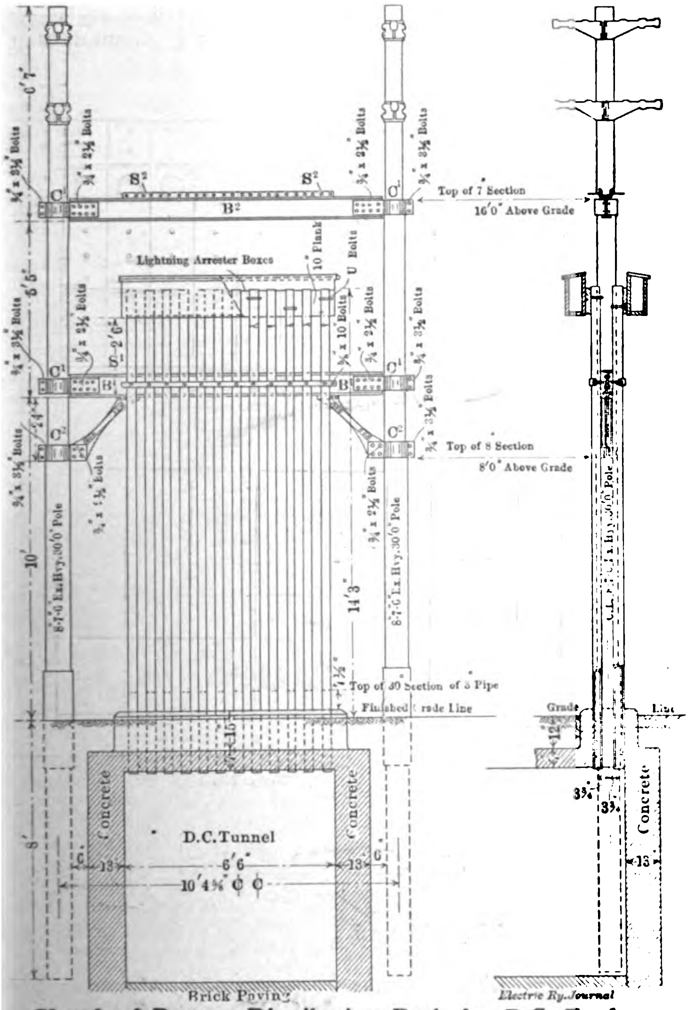
The high-tension switches are in fireproof compartments on the main floor behind the transformers and the bus chambers are directly below them in the basement. The switches are of the GE, F-13 type and are designed for 300 amp and 15,000 volts. The bus chamber is about 9 ft. wide and 9 ft. high with one side devoted to the busbars and the other to incoming lines. On the ceiling are wattmeter and relay current transformers.

The bus compartments are placed one above the other on the floor and arranged for sectionalizing the buses. This is important because at present all substations are operated with open lines, the rotary and line buses being sectionalized to prevent the destructive effects of short-circuits. The vertical partitions are of brick and the horizontal ones of reinforced concrete set into recesses in the walls.

The buses are of flat copper 2 in. x ¼ in. in section. They are supported on pin porcelain insulators. All apparatus in the chambers is mounted upon angle irons set in the brick partition walls. The instrument wiring in the bus chambers is concealed in iron conduits molded in the concrete slabs.

MAIN SWITCHBOARD

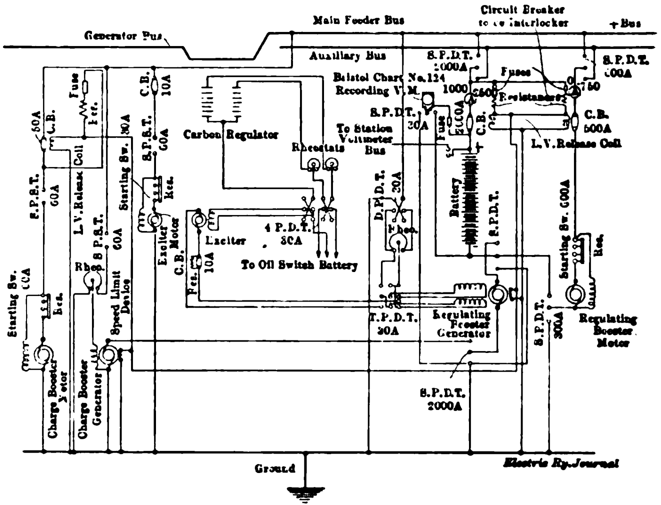
The main switchboard is shown in elevation in one of the illustrations and diagrammatically in plan on the general layout. As indicated in these, beginning at the left, there are two future and three present a.c. line panels, two future and three present a.c. rotary panels, two future and three present d.c. rotary panels, two battery regulator and two booster panels, one total d.c. load panel, two feeder booster panels and fifteen outgoing d.c. feeder panels. At the top of each a.c. line panel a voltmeter and an ammeter are located. Below these are a polyphase indicating wattmeter, a power-factor indicator and watt-hour meters on two phases. Lowest of all are the controls for the line switches.


S²
S²
B²
C¹
C¹
B¹
B¹
C²
C²
Top of 7 Section
16'0" Above Grade
Lightning Arrester Boxes
Top of 8 Section
8'0" Above Grade
Top of 40 Section of 3 Pipe
Finished Grade Line
Grade
D.C.Tunnel
Concrete
Concrete
Concrete
6'6"
10'4¼" ℄ ℄
13"
13"
8'
10'
14'3"
8-7-0 Ex.Hvy.30'0" Pole
8-7-0 Ex.Hvy.30'0" Pole
Brick Paving
Electric Ry.Journal

Cleveland Power—Distributing Rack for D.C. Feeders

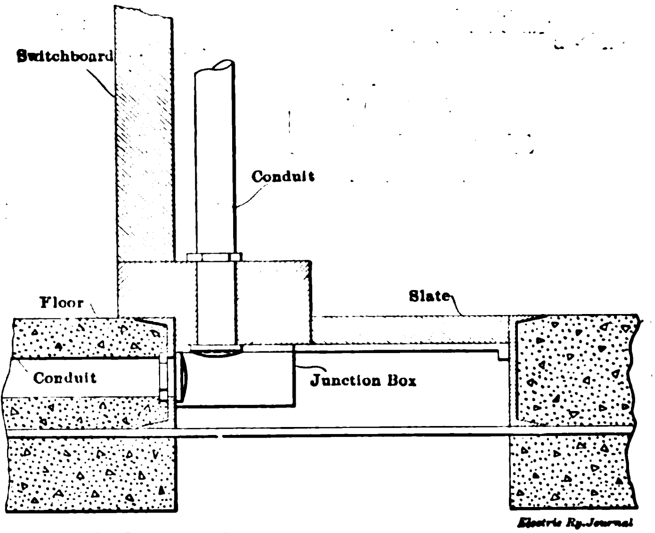
On the a.c. rotary panels are ammeters and wattless power indicators. The latter show the amount of wattless power necessary to keep the power factor of the outgoing current at unity. A circuit-breaker, an ammeter, a pair of lever switches connected in parallel and a d.c. watt-hour meter are mounted on each d.c. rotary panel. The regulator panels contain a carbon-pile regulator, a rheostat and various control switches. The left-hand battery booster panel is for the motor and contains a circuit-breaker mechanically and electrically interlocked with that on the generator panel. Below this are an ammeter, a four-point motor-starting switch and a double-throw switch for connecting the motor either to the main power bus or to an auxiliary bus.

The circuit-breaker, the ammeter, the positive line switch and a field rheostat are on the generator panel below. The totalizing panel contains a totalizing ammeter, *A*, and two differentially wound voltmeters, *DV*. In one of these one winding is between the main bus and ground, the other between the rotary positive potential bus, which can be connected to any rotary, and ground. When the two voltages are equal the instrument reads zero. If the rotary voltage is reversed, the voltmeter indicates this fact by a positive reading. The second differential voltmeter is a spare one, but one side of it is normally connected to the converter bus as a check, the reading showing the converter potential. The totalizing panel contains also two recording voltmeters, one for the station bus, the other for the battery voltage. At the bottom of the board are switches for lighting and crane circuits.


Generator Bus
Main Feeder Bus
Circuit Breaker to be Interlocker
+Bus
Auxiliary Bus
S.P.D.T. 2000A
S.P.D.T. 600A
Bristol Chart No. 124 Recording V.M.
1000
2500
750
Fuses
Resistance
S.P.D.T. 30A
To Station Voltmeter Bus
Fuse
C.B.
C.B. 600A
L.V. Release Coil
Fuse
Res.
C.B. 10A
50A C.B.
L.V. Release Coil
S.P.S.T. 60A
S.P.S.T. 60A
Starting Sw. 30A
Carbon Regulator
Rheostats
Exciter Motor
Res.
Exciter
4 P.D.T. 30A
To Oil Switch Battery
C.B. 10A
Res.
D.P.D.T. 30A
Rheo.
Battery
S.P.D.T.
Starting Sw. 600A
Res.
Starting Sw. 60A
Res.
Rheo.
S.P.S.T. 60A
Speed Limit Device
T.P.D.T. 30A
Regulating Booster Generator
S.P.D.T. 300A
Regulating Booster Motor
Charge Booster Motor
Charge Booster Generator
S.P.D.T. 2000A
Ground
Electric Ry.Journal

Cleveland Power—Battery Wiring Diagram

The feeder booster panels, for motor and generator, have at the top interlocked circuit-breakers with ammeters directly below. On the motor panel is a four-point starting switch and a single-pole double-throw switch for connecting the motor to either the main or the auxiliary bus. There is also a field-regulating rheostat. On the generator panel is a heavy double-throw switch and a single-throw switch below. These are similar to the switches on the adjacent feeder panel.


Switchboard
Conduit
Floor
Slate
Conduit
Junction Box
Electric Ry.Journal

Cleveland Power—Arrangement of Junction Boxes at Switchboard

The bottoms of the lower switches are cross-connected. The purpose of the switches is to permit the first feeder to be operated either with or without the booster and either on the main or the auxiliary bus. To operate with the booster switches *C* and *D* are closed and *B* is opened. To operate without the booster *A, C* and *D* are opened and *B* is closed up or down as desired. The switch *A*, can be closed up or down, raising the voltage from the main or from the auxiliary bus respectively. As explained above, the first feeder panel is interconnected with the booster panels and normally is used in conjunction with it. However, it is possible to raise the voltage on one or more other feeder panels in addition through the auxiliary bus.

The remaining feeder panels are provided simply with circuit-breakers, ammeters and double-throw switches. The busbars are designed for a capacity of 1000 amp per square inch and are built up of 5-in. by ¼-in. copper.

FEEDERS AND LIGHTNING PROTECTION

The feeders are all of 1,000,000-circ. mil cross-section. They are supported on the basement wall and are taken out of the station in a short tunnel, which terminates at the curb line. Iron pipes lined with fiber conduit lead vertically from the tunnel to the overhead distributing rack. On this boxes are mounted to house GE, MD type lightning arresters. The iron pipes furnish the necessary choking effect to divert lightning discharges through the arresters and thus render the use of choke coils unnecessary. In addition to the outdoor arresters static discharges are provided on the busbars and aluminum electrolytic arresters are connected across the converters. In case of storm the storage battery is also connected across the converters without resistance, insuring almost perfect protection. The ground connection is made to a 200-sq. ft. plate buried in permanently moist earth and bonded to the rails.

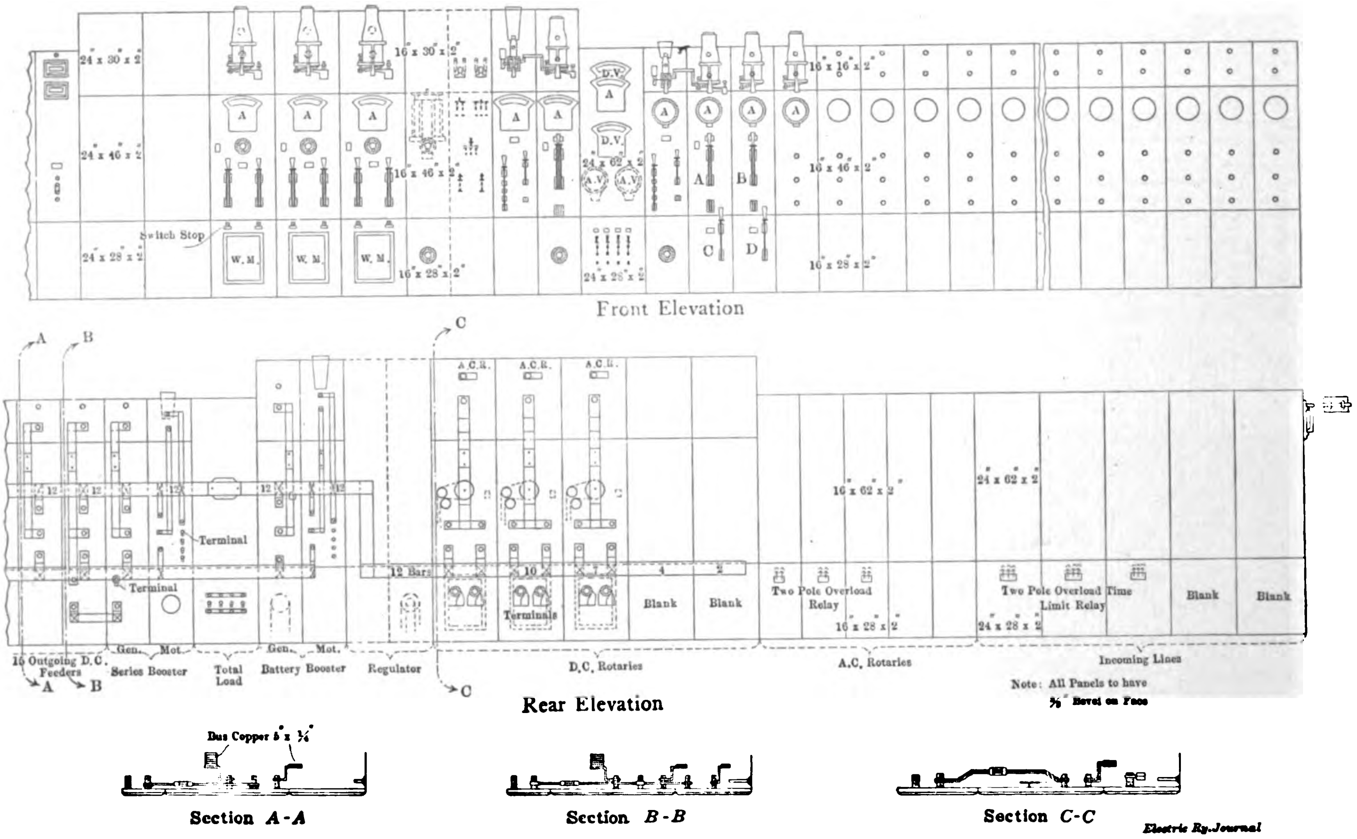
60-CYCLE ROTARY CONVERTERS

The rotary converters are of novel design constructed in accordance with specifications prepared by the power department of the railway company and submitted to several manufacturers. The contract for these as well as for the transformers and auxiliary apparatus was awarded to the Westinghouse Electric & Manufacturing Company.

Unusual precautions were taken to prevent flash-over by the use of liberal quantities of active iron and copper, as well as the use of a very heavy armature having great energy storage capacity and operating at the highest allowable rotative speed. The allowable speed was determined partly by the strength of the materials and partly by the necessity for having a fairly quiet machine, the substations being located in residential neighborhoods.

The speed of the armatures is 514 r.p.m. approximately and there are 14 poles. The diameter of the commutator is 40.25 in., appearing very small for the 6-ft. armature. No provisions are made against centrifugal forces other than careful design of the parts.

The armatures of the 1500-kw rotaries are 6 ft. in diameter and weigh 10 tons each. The current and flux densities are much below usual values and very conservative values of current density under the brushes were specified. The commutating poles have but one turn each placed near the armature to secure minimum magnetic leakage. The magnetic circuits of the commutating poles are designed for low saturation and therefore for maximum sensitiveness. No inductive shunts are used with the commutating-pole winding. The adjustment is secured by changing the reluctance of the magnetic circuit by means of sheet steel liners between the commutating-pole cover and the frame which permit the width of the air-gap to be changed. This adjustment is made once for all in the factory.



24" x 30" x 2"
24" x 46" x 2"
24" x 28" x 2"
Switch Stop
A
W. M.
16" x 30" x 2"
16" x 46" x 2"
16" x 28" x 2"
D.V.
A.V.
24" x 62" x 2"
24" x 28" x 2"
A
B
C
D
16" x 16" x 2"
16" x 46" x 2"
16" x 28" x 2"
Front Elevation
A
B
C
A.C.B.
12
Terminal
12 Bars
10
7
4
2
Terminals
Blank
16" x 62" x 2"
24" x 62" x 2"
Two Pole Overload Relay
16" x 28" x 2"
Two Pole Overload Time Limit Relay
24" x 28" x 2"
16 Outgoing D.C. Feeders
Gen.
Mot.
Series Booster
Total Load
Battery Booster
Regulator
D.C. Rotaries
A.C. Rotaries
Incoming Lines
Note: All Panels to have ⅝" Bevel on Face
Rear Elevation
Bus Copper 5" x ¼"
Section A-A
Section B-B
Section C-C
Electric Ry. Journal

Cleveland Power—Front and Rear Elevations of Switchboard

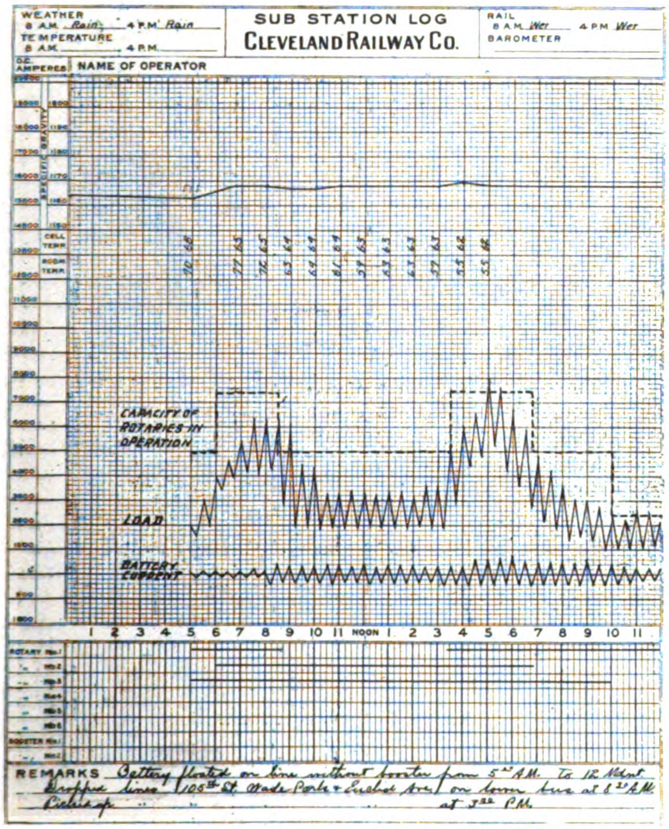
Squirrel-cage dampers for use in starting and for preventing hunting are mounted in the main pole pieces. They consist of ⅜-in. square bars of special composition. Copper was found to produce too low a resistance to give an effective starting torque so that a small proportion of tin was added and the resistance was thus greatly increased. As an excessive resistance increases the liability of hunting there is a practical limit to its value, and the final proportion of tin to copper which was selected was such as to give the bar one and a quarter times the resistance of pure copper. The bars are screwed to the short-circuiting strips with two screws on each end, thus insuring good contact.

The converters are giving perfect satisfaction and no flash-overs have been experienced. The flywheel action of the heavy armature prevents the effects which usually follow a d.c. disturbance and the commutating poles take care of fluctuations in the d.c. load. As the power comes from a station containing very large steam turbines, a.c. disturbances are practically absent; hence no provision is made to care for them. Equalizing rings are connected to alternate coils to insure uniform distribution of the armature current. The air inlet at both ends of the armature is closed to reduce noise, yet this does not produce any serious effect on temperature rise on account of the liberal cross-section of iron and copper employed.

STATION RECORDS

The station records are kept in the form of a graphical and numerical log as shown in the sample record sheet. On the back of the log sheets all watt-hour readings are recorded. Printometers are now being installed to supplement or replace the present practice of reading the recording meters at regular intervals, as all indicating meters are read every fifteen minutes.

The records from the various stations are forwarded daily to the office of the power department, where they are assembled and totalized. In order to insure efficient operation of the machines the substation operators trace on the graphical log a line showing the operating rotary capacity and thus have constantly before them the degree of loading of the operating machines.



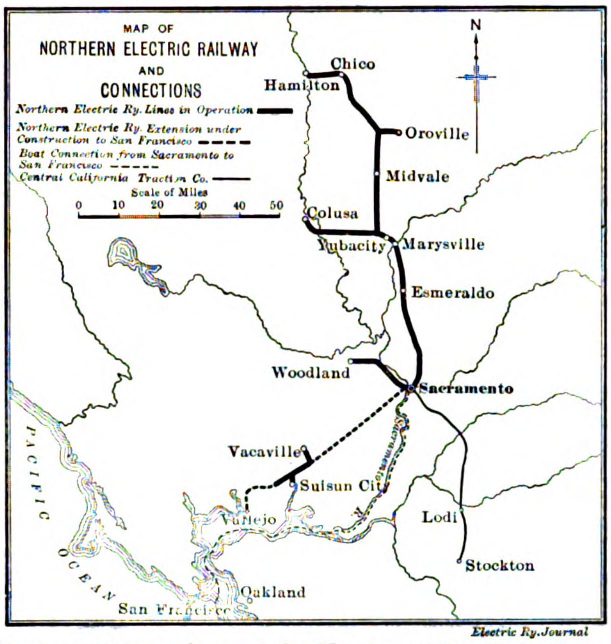
Cleveland Power—Graphical Log at Windermere Substation

VESTIBULED TRAINS ON SHARP CURVES.

With many interurban roads the through vestibule may be impracticable, owing to numerous short-radius curves. On the Cedar Rapids & Iowa City Railway, however, there are only two curves which are too sharp to permit the passage of a vestibuled train, one at Iowa City and another at Cedar Rapids. In consequence of these two curves a novel procedure has been adopted so that through vestibules can be used. When a train approaches either of the two limiting curves the motorman stops the train and the conductor closes the doors between cars and unhooks the diaphragm curtains. The train is then run around the curve, after which the vestibules are again coupled.

EXTENSIONS PROPOSED IN CENTRAL CALIFORNIA

All of the states on the Pacific Coast expect to profit greatly by the completion of the Panama Canal because of the opportunity thereby offered them of securing a desirable class of immigrants directly from Europe. Nowhere is this sentiment more pronounced than in central California; hence it is not surprising to find there great activity in electric railway promotion and construction. One of the most important enterprises under way in this district is the proposed extension of the Northern Electric Railway to San Francisco Bay, as shown in the accompanying map.



Projected Extensions of the Northern Electric Railway

A short time ago this company, whose third-rail system operates through one of the most fertile valleys of the State, that north of Sacramento, purchased the Vallejo & Northern Railway, near Suisun City, and now it purposes to use this line as part of its route to tidewater. Active construction work between Sacramento and Vallejo, a distance of approximately 58 miles, is under way. At Vallejo extensive harbor improvements to provide facilities of a terminal character are about completed, as is the cutting of 100,000 yd. of material to secure a harbor approach on private right-of-way and to minimize the grade conditions to a 1 per cent maximum. Vallejo, a city of about 12,000 population, is immediately adjacent to the government navy yard on Mare Island, being separated from it by a deep navigable channel about 450 yd. wide. Mare Island is one of the important government yards, being completely equipped for the building of modern battleships.

The boat trip from Vallejo to San Francisco now occupies about one and one-half hours. This can easily be reduced to one hour and fifteen minutes, allowing five minutes for transfer of passengers. The entire run from Sacramento to San Francisco can then be made in two hours and a half. The towns of Vallejo, Napa, Cordelia, Pierce, Fairfield, Suisun, Cement, Vacaville, Elmira, Dixon, Washington and Sacramento will be served by this road.

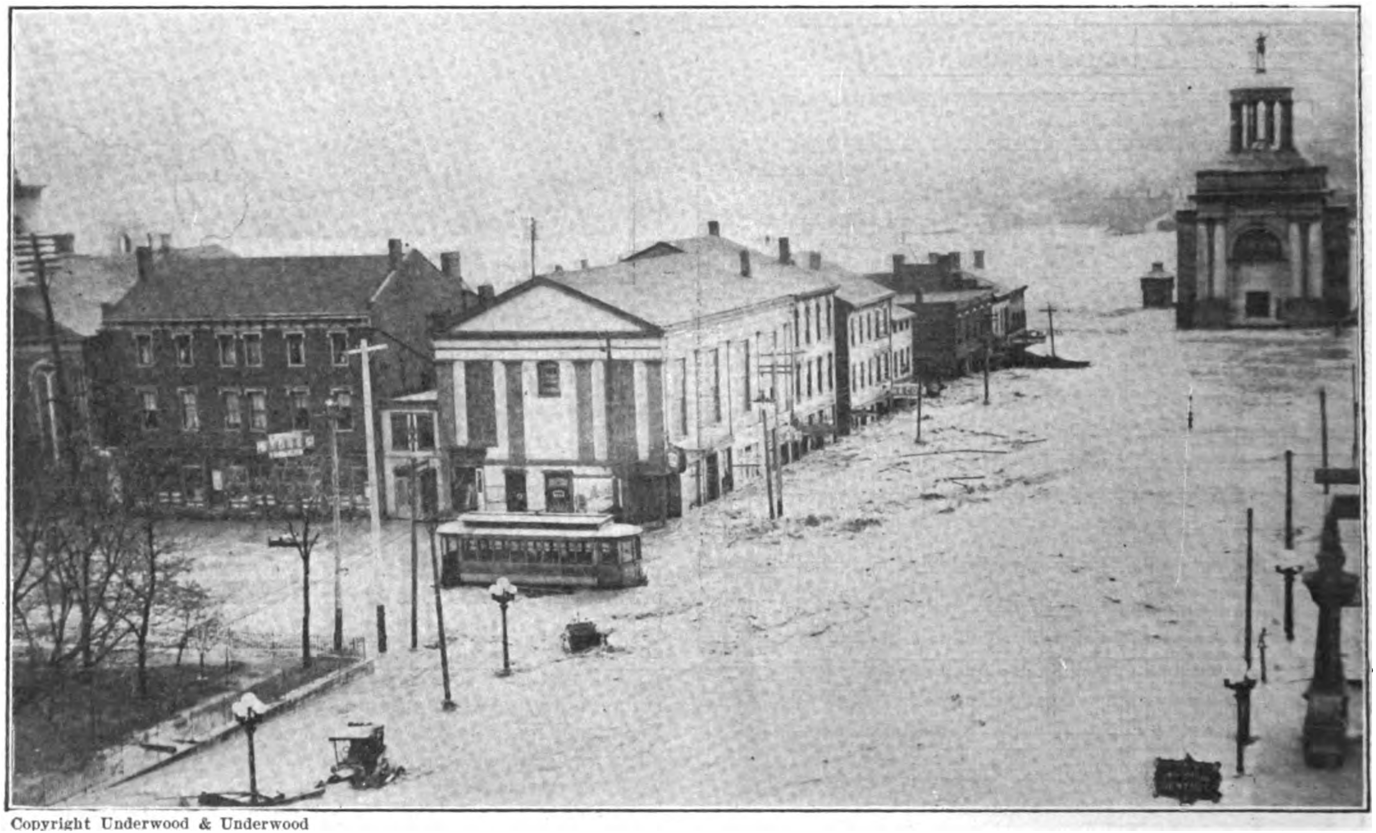
The construction and equipment of the Sacramento-Vallejo branch, according to the engineers, will be the very best. They will include heavy traffic rails, crushed-rock ballast, steel-ballasted deck trestles, wide fills, many openings, handsome terminal and station facilities, large high-speed cars for train service and heavy electric locomotives weighing from 80 tons to 100 tons for freight haulage. The passenger equipments are being designed for speeds up to 75 m.p.h. in trains of from five to ten cars. Block signals of the track-circuit type will be installed.

The Flood in the Middle West

The Disastrous Floods of Last Week Are Unquestionably the Worst Which Have Occurred in the History of the Middle West—An Account of Their Effect on Electric Railways in the States of Indiana, Ohio, Pennsylvania and New York Is Given

Following a week of unseasonably warm weather, extraordinarily heavy and long-continued rains occurred throughout the Middle West. These began on the night of March 23 and continued without interruption until March 27. At New Bremen, in western Ohio, the precipitation during this period was nearly 8½ in., and at Indianapolis during the same four days 6 in. of rain fell.

On Monday, March 24, all of the rivers of Ohio and Indiana were reported to be rising rapidly, and soon after flood conditions existed in Dayton and several other cities of Ohio. At Dayton, as reported in the daily newspapers, the entire city was suddenly submerged on March 25 owing to broken levees. The disaster has been laid to an alleged failure of the Loramie Reservoir, a large body of water north of the city, but as a matter of fact the long dike inclosing this is still intact with the exception of two insignificant washouts at points where the water was shallow.



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Flood Disaster—Scene on High Street, the Principal Thoroughfare in Hamilton, Ohio

THE FLOOD IN EASTERN OHIO

The sudden disaster at Dayton concentrated attention on that point early in the week of March 23, and for a time it was hardly realized that the rains which continued without interruption until March 27 had actually covered the entire State of Ohio.

On the Tri-State Railway & Electric Company, which operates along the valley of the Ohio River and in many places runs alongside of the very high and abrupt hills which border the river, the first trouble began on Monday, March 24. This was due to heavy slides caused by the rains, which buried the tracks in different places. The Ohio River Passenger Railroad was covered in several different places, aggregating probably a full mile of both tracks. The East Liverpool Traction & Light Company had five very heavy slides covering an aggregate of 3000 ft. The Steubenville & East Liverpool Railway & Light Company had about ten slides, covering an aggregate of over 10,000 ft. The Steubenville, Wellsburg & Weirton Railway on the Wellsburg branch was blocked by two small slides and one washout and on the Weirton branch had slides which extended for a mile and a half and loosened one bridge.

These railways went under water, beginning Tuesday, at thirteen separate places in a stretch of 40 miles, covering an aggregate of 5 miles of track ranging from 2 ft. to 12 ft. deep. Interurban service was abandoned on Tuesday. From Thursday, March 26, until Saturday, the 29th, the entire 60-mile stretch of railway was tied up. By herculean effort traffic was opened from Midland, Pa., to Wellsville, Ohio, a distance of 10 miles, early on Saturday morning. Continuing the work, which included the removal of scores of slips which buried both tracks, the line was opened to Steubenville, a distance of 30 miles. On Monday evening and later it was cleared eastward to Beaver, Pa., 26 more miles. It was a task fraught with considerable difficulty, and W. R. W. Griffin, general manager, assumed personal charge of the work. Besides the cost of rehabilitation, the company will lose the normal receipts for the period during which cars were not in operation.

The Youngstown & Ohio River Railroad Company reports that the damage sustained from floods will not exceed $1,500. The service was affected but slightly.

CONDITIONS IN NORTHERN OHIO

The Toledo, Bowling Green & Southern Traction Company reported from Findlay, Ohio, that it had suffered a loss of about $15,000 by reason of the flood. The power house had several feet of water in the basement, which shut down the electric light and railway service for two days. The company, however, managed to give service between Portage and Bowling Green, Ohio, by securing power from the Lake Erie, Bowling Green & Napoleon Railway.

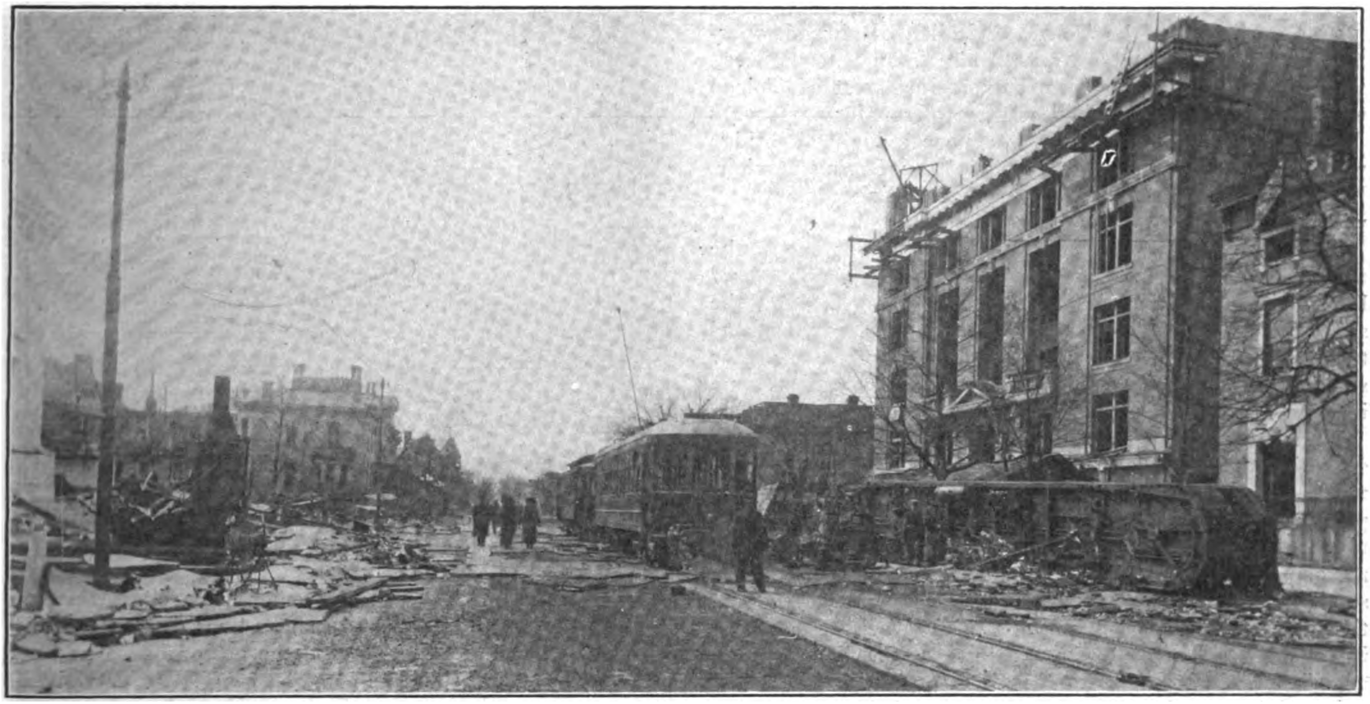
The Lake Shore Electric Railway reports some small washouts which were not serious. No bridges were lost. The great trouble was from a sleet storm which carried down many high-tension lines. The flood at Fremont was 16 ft. in depth in one of the streets over which the railroad operates. About 8 ft. of water came into the shops and a like amount in the boiler room. The water at one time stood 2 ft. 6 in. above the engine room floor in the power house, sufficient to water-soak all of the electrical machinery. Just what damage there may be to generators and transformers cannot be yet estimated, although the company hopes that it is not so great as to make unprofitable the work and expense of drying them out. The entire road is operating with about two-thirds service west of Norwalk and Sandusky to Toledo.

On the Lake Shore Electric limited trains were routed by way of Sandusky and the Detroit-Cleveland service was resumed on Monday. At that time the Fremont bridge was still giving trouble and the machinery of the power house at that point was soaked. It will be thoroughly dried out and perhaps baked before being put into operation. This, with small washouts and other minor damages, with loss in receipts of perhaps $10,000, constitutes the loss to the road. The Fremont-Lima line is said to be pretty badly damaged in places. No cars were being run over it early in the week. The Cleveland-Lima service of the Lake Shore Electric Railway was suspended when the water came up at Fremont and Lima.

The Cleveland, Painesville & Eastern was operating fairly well Monday. Water got into the power house at Painesville and put it out of commission. The line was operated with power from the Cleveland Electric Illuminating Company over part of the distance and the company's other equipment took care of the remainder.

The Northern Ohio Traction & Light Company states that when the deluge first struck Akron and vicinity it was believed that the damage would be extremely great. The basements of the power houses were filled with water for a short time, which interfered with the operation temporarily, and the tracks in the lowlands were covered with water, necessitating the transfer of passengers. In addition, a number of transmission line poles were wrecked and a small bridge near Akron was washed out. Although the flood was stated to be the worst ever heard of in this section of the country, the company's losses at this time are estimated not to exceed $10,000 on property and $15,000 on earnings.

On the Western Ohio Railroad the only serious damage resulting from the recent floods, it is stated, was the washing out of a 160-ft. two-span steel and concrete bridge at Lockington, Ohio. The repair of the rest of the damage, which consisted of a number of minor washouts, has been about completed at a cost not exceeding $1,000. No train service was operated on Tuesday, March 25, but on the 26th and 27th regular service was started from Beaver Dam, Lima, Wapakoneta and St. Mary's to Celina and from St. Mary's to Loramie. Regular service from Findlay on the north to Sidney on the south and Celina on the west and to Loramie was commenced March 28. There was no interruption to the power and lighting service.



Flood Disaster—Overturned Interurban Car Opposite New Y. M. C. A. Building in Dayton, Ohio

The Toledo Railways & Light Company suffered little property loss by reason of high water, although the high wind of March 23 blew down a number of poles and two steel smokestacks. There has been no interruption to the service furnished the public by the transportation, electric, heating and artificial gas departments. For three days, however, the main power house on Water Street was completely surrounded by water to a depth of some 3 ft., which rendered the operation of the plant very difficult. The result might have been serious had not the operating force bricked up windows and surrounded the machinery operated in the basement with brick walls to keep out the water. The condenser pumps and the other auxiliaries were pressed into service to remove the water which leaked into the basement.

It is expected that the operating expenses will be greatly increased on account of the flood, on account of the inability of the railroads entering from the coal fields to operate through service, thus causing a shortage of coal. However, the company has enough coal in Toledo to operate for a number of days.

At the Mansfield Railway, Light & Power Company power plant the high water got into the wheel pit and necessitated cutting four of the large belts at the power house. All light and railway service was suspended from 2:30 a. m. Tuesday, March 25, until 6 p. m. Friday, March 28, when the company was able to restore electric light service.

The interurban track between Mansfield and Shelby was damaged to the extent of about $1,000. Partial service on the railway was resumed at 9 a. m. on March 29.

The Pennsylvania & Ohio Railway Company and the Ashtabula Rapid Transit Company both report that they suffered no loss whatsoever. Schedules were not affected with the exception of the larger part of one day when the overflow of a small stream near the village of Jefferson prevented cars from reaching the southern terminal of the lines.

Service on the Detroit, Monroe & Toledo Short Line was not seriously interrupted. In order to insure safe operation, however, limited service to Detroit was discontinued for three days. A four-hour interruption in the local service occurred at Monroe, Mich., where the tracks were submerged, making it necessary to transfer passengers. The total loss to this company is considered to be only that coming from reduced traffic.

Flood damage to the Toledo & Indiana Railroad, operating between Toledo and Bryan, Ohio, 56 miles to the west, was slight. A 6-ft. concrete culvert just west of Toledo was washed out, making it necessary to transfer passengers for two days. This opening was near a highway bridge which withstood the flood and made transferring possible. It is estimated that the arch and back-filling replacement will cost $2,000.

The Toledo & Indiana Railroad Company was one of the three lucky lines running into Toledo. The damage was light, merely the washing out of some track along the side of a macadam highway where the transfer amounted to only 300 ft., and cars were running over the temporary structure in 18 hours. The flood involved practically no interruption to traffic.

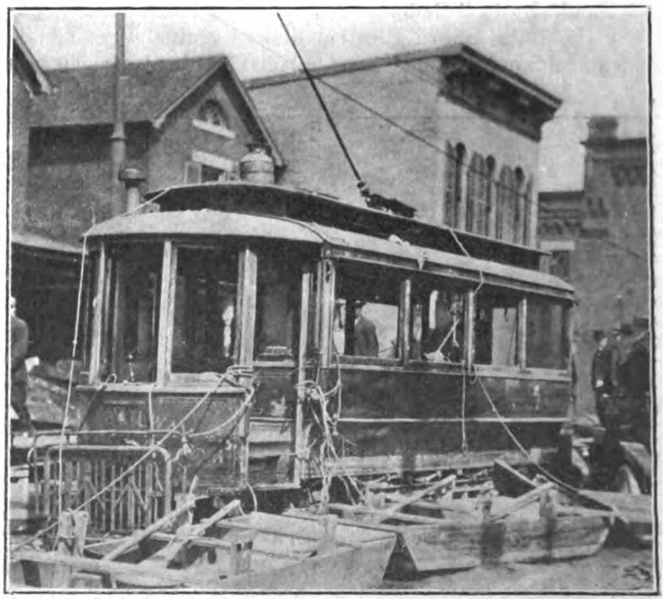
The Northwestern Ohio Railway & Power Company, operating a line between Toledo and Marblehead, Ohio, 53 miles, suffered flood damage only from the traffic standpoint, this being estimated at $2,000. For six days 1½ miles of track just east of Oak Harbor, Ohio, was submerged under 24 in. of water. Fortunately it was necessary to discontinue operation of this section at a time when there were a sufficient number of cars to give regular service on both sides of the break. No special difficulty was experienced in transferring passengers. On account of a 4-ft. settlement in the Cherry Street bridge over the Maumee River in East Toledo this company's cars could not enter the city. A new bridge under construction alongside, however, was made ready for traffic as quickly as possible, through service being resumed on March 30. The windstorm on March 21 blew down several poles, interrupting the transmission and trolley lines for three hours.

DAMAGE IN CENTRAL OHIO

Following the interruption to traffic during the previous week, local cars were put into operation on regular schedules over the entire system of the Cleveland, Southwestern & Columbus Railway Company on the morning of Sunday, March 30, and the limiteds began regular operation Tuesday morning. The power station at Elyria was not injured to any extent, although the water was within 4 in. of the engine room floor at one time. A bridge near Galion was washed out completely, but the use of a wagon bridge has been secured until repairs can be made. Abutments here and there were rendered unstable, but have been repaired. Between Ashland and Mansfield half a mile of track was almost completely washed out. This has also been replaced. On the western division heavy sleet storms last week resulted in breaking wires in a number of places.

The Columbus Railway & Light Company, whose whole system was almost entirely out of commission for several days last week, was able to offer an almost normal service Sunday morning, except on the West Side, where the tracks are in bad condition and in some places covered with debris. Service will be given to that section as soon as the tracks can be got into condition.

The Ohio Electric Railway Company has begun the construction of a temporary bridge across the Scioto River at Mound Street in order to provide for the admittance of cars to the city from the Columbus-Springfield division. These cars cannot come into the city from the west now. Regular service, including express service, is maintained between Columbus and Newark and cars are operated east of Newark to Black Hand, a distance of 12 miles. The company's engineers have found that the Y bridge at Zanesville is not badly damaged, and it is expected that its service will reach West Zanesville within a short time. With the help of two portable substations an attempt will be made to operate the local lines there, as well as furnish light. Flood damage to the company's lines east of Columbus was slight, but water entered the power house at Hebron, causing a shut down of one-half day. Several small washouts of track occurred between Newark and Zanesville, where the road parallels the Licking River, and blocked traffic for one week.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Flood Disaster—Home-Made Boats Moored to Abandoned Car in Dayton, Ohio

The Ohio Electric Railway is furnishing regular service between Springfield and Durbin. A section of track, 200 ft. long, has been completely washed out near Dayton, and until this is replaced service cannot be furnished that city. Cars are in operation between Springfield and Urbana. Service between Fort Wayne and Lima has been abandoned for some days owing to serious washouts near Monroeville, Ind.

The Scioto Valley Traction Company, operating 78 miles in two divisions out of Columbus, had regular service interrupted for twenty hours on account of the high water submerging two bridges just outside of Columbus. Through service has, however, been resumed to Lancaster and to a point within a half mile of Chillicothe, where the deck has been washed away from 800 ft. of trestle. Physical damage to this road is estimated at $5,000. Repairs to the Chillicothe bridge have been completed, and regular service will be resumed April 5.

The Columbus, Delaware & Marion Railway was so fortunate as to escape material damage to track and roadway, but all its rolling stock was seriously injured by flood water. Temporary service was resumed by borrowing a car from the Columbus Railway & Light Company. It is estimated that the physical damage will amount to $15,000, and in addition lost revenue will amount to $20,000.

The Dayton & Troy Electric Railway Company has suffered to some extent from washouts, which, however, were located at points which were difficult of access for repairs. Service was re-established between Dayton and Piqua on April 3 and at that time the damage to the property was estimated at $30,000. The city of Piqua sustained heavy damages and practically every house in town was found, after the flood subsided, to contain heavy mud averaging 5 in. in depth. All of the bridges across the Miami River were badly damaged.

CONDITIONS AT COLUMBUS

From Columbus, Ohio, it is reported that the high water on the Scioto River reached the unprecedented mark of 22.9 ft. on Tuesday noon. All except two of the bridges on the west side of the city over the Scioto and Olentangy Rivers were washed away. About one-fifth of the population living on the West Side was entirely cut off from communication until the morning of Friday, March 28, and the entire city was without street lighting after the night of March 24. Transportation was, however, resumed on Friday morning on a number of the railroads, and within a few days nearly normal train service prevailed on all roads.

The Columbus Railway & Light Company estimates its loss in damage to property at $200,000. This amount added to the loss in revenue from traffic will total in excess of $250,000. Seven cars were so badly damaged by the flood that they are considered a total loss. All but one of these were double-truck prepayment cars.

The West Broad Street carhouse is practically a total wreck. This building faced the direction of the flood. Consequently the doors were forced open and the force of the current and drift pushed all the cars through the rear of the building. An undermined brick house on an adjoining lot fell into one bay, completing the wreckage. One mile of double track in West Columbus, which was the district devastated by the flood waters, was washed out and was so badly twisted and broken that it cannot be used. Six feet of water entered the engine room of the Spring Street power house and put it entirely out of service for sixty hours. A 1500-kw Curtis turbine which was submerged up to the electrical end was the first unit back in service. Two small 500-kw turbines were later dried out and are now helping to carry the load. Fortunately two old reserve stations which were about to be dismantled were outside of the flooded area and enabled the company to give limited service during the flood period. Service was more or less demoralized, however, as about 250 of the platform and station men lived in the flooded district. None of these employees reports loss of life in his family, but many suffered loss of property.

The company has hired help to clean up the houses of its employees and has relieved the city of the necessity to furnish them with supplies. Regular schedules through the flooded district have been abandoned temporarily as the two bridges used to reach the business district have been destroyed. On April 2 108 cars out of the normal equipment of 125 were on regular schedule. The shortage of cars has temporarily cut down schedules on the West Side of the city, but as fast as the electrical equipment can be dried and the mud removed it is being added to the service. The method of drying out the large units at the Spring Street power station is interesting. This station contains several 1000-kw generators direct-connected to horizontal engines. The generators were housed in with wood and composition roofing and four hot-air gas heaters set at the corners of the housing. A large vent at the top and two 30-in. blowers provided circulation while the armature was revolved at a slow speed. Sufficient heat was supplied by the furnaces to keep the temperature in the housing at 220 deg., or just above the boiling point of water. The first unit required one week to be dried in this manner.

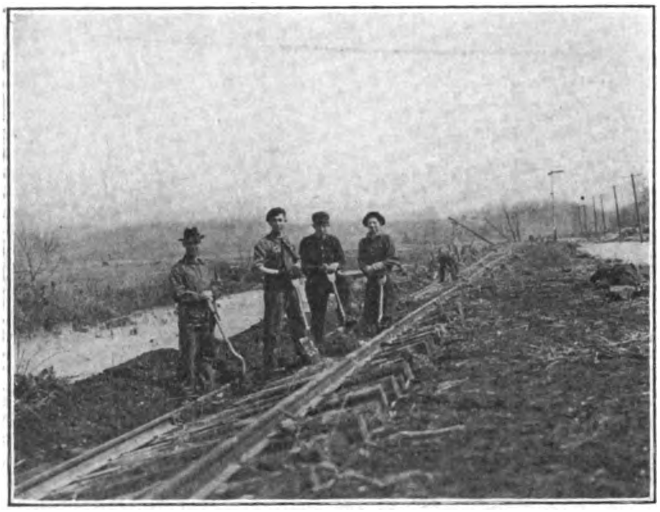
In the company's efforts to maintain service through the flood period a Curtis turbine was run when the step and guide bearings were submerged. This resulted in badly scored bearings making replacement of these parts necessary before the unit could be put back in service. All switchboards in the station were put out of service by the flood and a temporary one was rigged up to handle the load coming to the three turbines first put in service. This temporary switchboard was built of store-box lumber, crude but effective. High-water mark showed at 6 ft. on the switchboards, and this damaged practically all recording meters. The switchboard-regulating coils were taken to a vacuum drying plant and after the dried silt had been removed they were returned to service. When the water had receded to the engine-floor level a professional diver was called to open the pump valves in the basement. From 2 in. to 6 in. of mud was left on the engine-room floor and from 6 in. to 24 in. in the basement.

STAUGLER'S CAFE
KEEN KLEENER

Flood Disaster—Debris Covering the Street Railway Tracks in Dayton, Ohio

CONDITIONS AT LIMA, OHIO

Damage from floods in the immediate vicinity of Lima is slight, but both the Ohio Electric Railway, which makes this point headquarters for the northern district, and the Western Ohio Railway have had considerable property wrecked and inundated at various points some distance away. The latter company is probably the greatest loser, from both a traffic and a physical standpoint. At Lockington, Ohio, just north of Piqua a truss bridge over the Loramie River, consisting of two 90-ft. spans on concrete abutments and piers, is a total wreck. The middle pier underscoured, dropping both spans into the river. These blocked the channel and the undermining of both abutments followed. One fell into the river, and the other is so badly out of line it cannot be used. At another point the failure of a small reservoir washed gravel 6 ft. deep over the track for a distance of 500 ft. Near this point 300 ft. of track and the overhead lines were washed from the roadbed. This was the only break in the transmission and trolley lines on the system. Near Lima a 75-ft. through-truss span was damaged from underscoured abutments. Operation over this structure was discontinued until repairs could be made, but it is being used for transferring passengers. Two steel and concrete bridges on the Lima-Findlay line were slightly damaged owing to undermined abutments, but did not seriously interrupt traffic.



Flood Disaster—Scene on the Ohio Electric Railway Between Springfield and Dayton

It is believed that the destruction of the Lockington bridge will prevent the operation of through service between Dayton and Toledo for some time, but on all other lines regular service was resumed after an interruption of three days. A conservative estimate of the financial loss to this company, from both the physical and the traffic standpoint, is placed at $75,000 by F. D. Carpenter, vice-president and general manager.

The northern district of the Ohio Electric, comprising over 147 miles, experienced complete tie-up of all service for four days. In a few instances it was possible to make some short trips, but traffic was so demoralized that these were hardly worth while. On the Lima-Springfield division two small bridges were washed out near West Liberty and at three other points the track was submerged under from 4 ft. to 6 ft. of water, in sections from 200 ft. to 1½ miles in length. In each of these instances it was back-water, and after it had receded the damage amounted only to soft track. A small washout on this division near South Warsaw, 200 ft. in length and 6 ft. deep, forced the abandonment of through service until April 2.

On the Lima-Toledo division inundated track at Ottawa, where there was 3 ft. of water in the passenger station, and at Leipsic made it necessary to discontinue through service from March 25 to March 29. The Fort Wayne-Lima division was more seriously damaged. Approximately 6 miles of track between Monroeville, Ind., and Dixon, Ohio, was submerged four days. At Middlepoint, Ohio, and east of Delphos occurred the only washouts on this division. At both of these points 500 ft. of track was undermined 5 ft. deep. The substation near Middlepoint was the only one to be put out of service by the flood in this district. A few inches of water on the floor grounded the transformers, but the interruption was of short duration.

The most extensive damage to track in the northern district was found on the Lima-Defiance division. Twenty-five hundred feet of track was washed from the roadbed but fortunately away from the pole line, leaving it undisturbed. Through service on both the Springfield and the Defiance divisions was not resumed until April 5. A remarkable and fortunate circumstance in connection with the floods in this district was that at no time was service interrupted on account of overhead lines being down. In fact, the Ohio Electric offered the only means of telephone communication with the outside world for five days. Another interesting fact is that not a single car or motor was damaged. It is estimated that damage to physical property on this district will total not more than $10,000.

Flood Disaster—Result of the Flood at Enon on the Ohio Electric Railway

EXPERIENCES AT SPRINGFIELD, OHIO

The Springfield, Troy & Piqua Railway was so badly damaged by the recent floods that all service was abandoned from March 25 to April 3. Mr. F. J. Green, vice-president and general manager, estimates his loss in property damaged and traffic lost at $30,000. A large portion of this sum is chargeable to property. The track was washed out at six different points between Springfield and Troy, Ohio, and a 60-ft. timber bridge was totally destroyed. Near Troy the bridge over the Miami River was forced badly out of line by drift, and a pile bent washed out of a timber bridge in the same locality. This road did not fare so well as some others with its transmission and trolley lines. Twenty-seven poles went down and eighteen of these were carried away by the flood. A forty-eight-hour interruption at the Mailland generating station was caused by water entering the basement where the oil switches are situated. This power failure also affected the Springfield & Xenia Railway, to which it supplies energy. The discontinuance of service over the latter line, however, is the only loss it suffered.

Between Springfield and Dayton on the Ohio Electric line, a distance of 27 miles, the devastation wrought by the

Mad River was amazing to behold. Several miles of track were washed from the roadbed and covered with driftwood. In many instances the track was turned completely over or bent in indescribable shapes, just as though it had been ordinary telephone wire. There also were two breaks in the trolley and transmission lines on this line. In all, about 4 miles of track was washed off the roadbed, and a river channel occupied its place.

Fortunately the substations and the power station, which is situated at Medway, were built on high ground not touched by the flood waters. Owing to the destruction of the banks of the station feedwater channel, however, it was necessary to shut down this plant for four days, owing to lack of sufficient water. This interruption in power supply also made it necessary to discontinue service on the Springfield-Columbus line, which was not seriously damaged by high water. The failure of the Town Street bridge at the Columbus end of this line cut off entrance to the city. At the present time Dana Avenue, West Columbus, is the eastern terminal. Repair work is being rushed by large forces of laborers on all lines north of Dayton, and it is hoped that all regular schedules may be resumed by April 5. The total loss of revenue from traffic was estimated at $100,000.

The experience of the crew on the last car to attempt to enter Columbus may be of interest. When it reached Town Street the flood came down upon it unexpectedly. The crew, however, thinking the water would not rise very high, remained on the car. In a comparatively short time the water reached the car floor and, thinking that precautions for a few feet more rise would be best, one of the crew caught a pair of wooden steps floating near. These were placed on the backs of the seats. The rapid rise in the water soon reached this point of refuge making it necessary to wade through the water in the car to the vestibule where access to the car roof was to be had. After being marooned on the roof of their car for more than twelve hours a passing boat picked them up and took them to Mount Carmel Hospital, where they remained on the upper floors with others for four days.

The Springfield Railway Company lost but little from damage sustained by floods. Water entered the generating station causing a shut-down of twelve hours. It also reached one of the carhouses, but this was anticipated sufficiently in advance so that all cars were removed to high ground. Practically the total loss, estimated at $1,000, was confined to ties which were carried away by the high water.

CONDITIONS IN DAYTON, OHIO

Water from Mad Creek first passed over the levees from 4 ft. to 7 ft. deep at a sharp bend 2 miles above the water works early Tuesday and was augmented by the Miami Canal diversion at Findlay Street and two 300-ft. breaks below the canal river crossing, where two of five spans were carried out.

About 9 a. m. a break occurred near Main Street, converting the thoroughfare into a swift channel about 12 ft. deep. Thousands of yards of asphalt pavement were lifted from the street surface. Smaller houses were crushed or carried off their foundations. The Mad River overflow discharge followed the Big Four tracks and the canal through the factory section, reaching the second floors of buildings in many cases. The Second Street Cincinnati, Hamilton & Dayton Railroad freight station was wrecked.

At the water works the old boiler room floor was under 12 ft. of water and the new boilers were submerged 16 ft. The men escaped to the second story of the pumping station. The water subsided on Thursday and by Saturday afternoon fires were started. Seventy-five tons of coal were washed away, but the fuel was found on the streets and confiscated. The State militia impressed idlers into service. Springfield and the Pennsylvania Railroad sent men. Pumps were entirely submerged under 12 ft. of water over the ground floor. Three pumps delivering 35,000,000 gal. per day were started on Saturday afternoon with 40-lb. pressure, instead of 80 lb., in the mains.

Debris washed against the Sixth Street bridge made a dam which caused the water to flow east toward Main Street. A dump below the mouth of Mad Creek narrowed the channel and not only caused breaks in the levees but also caused the water to flow several feet deep over them.

Conditions at Dayton are in such a turmoil that it is impossible to estimate the loss of property and revenue to the electric railways. From the standpoint of property loss, the Ohio Electric Railway probably was the greatest sufferer. On its Dayton-Cincinnati division practically all important bridges are out and miles of track and overhead lines have been washed off the roadbed. An eight-span 1000-ft. through-girder bridge across the Miami River near Middletown is a total wreck. Two other bridges across the river, one a footbridge at Chautauqua and the other at Russ Bridge in the spur line to Germantown, Ohio, have been washed away. A county bridge over which the Cincinnati division operates at Hamilton also has been destroyed by the flood. It is estimated that 5 miles of track will have to be rebuilt and 15 miles of transmission and trolley line will have to be straightened up and wires strung. Although the bridges went out with the flood, the steel transmission line on the Dayton-Cincinnati division cut off the source of energy to the Dayton-Richmond and the Dayton-Union City lines. A few small track washouts on these latter lines have been repaired and regular schedules will be resumed as soon as energy can be obtained. A section of the Union City line between that point and Brookville is furnishing service with energy supplied by the Indiana Union Traction Company's Anderson station. It is hoped that the transmission lines will be rebuilt by April 5. Operation from Hamilton to Cincinnati was not seriously interrupted, as the power station at Lindenwald, just south of Hamilton, was not put out of service by the high water.

A portable substation at Miamisburg was completely submerged. There were also three cars at this point. The replacement of the bridges on the Dayton-Cincinnati division will delay through service between these points for some time. The Dayton Street Railway lines, which include the City Railway, Dayton Street Railway, Oakwood Street Railway and the People's Railway, were tied up by debris in the street as well as by lost bridges. The City Railway lost a number of cars which were caught in the flooded district, but the other companies were more fortunate. The shops and carhouses of the other companies were reached by the flood, but the water did not attain a height sufficient to damage equipment. The City Railway also had water in its power house and the work of drying out the generators is under way. Neither the Dayton & Troy Electric Railway nor the Dayton, Covington & Piqua Traction Company suffered serious damage from washouts, but regular schedules were interrupted. The former company cannot reach its Dayton terminus, owing to the condition that three houses are blocking the track in the Dayton streets. This company also had a few short stretches of track washed out, and through service has been interrupted at Troy by the underscoring of two abutments in an undercrossing with the Big Four Railroad. Both abutments were overturned, thus blocking the electric railway track. However, passengers are being transferred at this point. The most serious loss to the company will be that from revenue, as service was abandoned for three days on account of high water.

All generating stations in the Ohio flooded district are confronting fuel shortage because the steam roads on which they depend for coal are too busy repairing their lines to do more than run relief trains. In order to economize in this direction, motormen have been instructed to run their cars on the second controller points.

THE FLOOD IN INDIANA

Almost immediately after the tornado which struck the western part of Indiana, on March 23, Indianapolis became the center of a flood-bound district that covered almost the entire State. Steam railroad as well as interurban railway service was abandoned temporarily and conditions were stated to be worse than at any other time for twenty-five years.

The theories in regard to the cause of the flood appear to have settled pretty definitely on one or two matters. The heavy fall of rain started on March 23 and continued with unusual violence on the following day, reaching water-soaked ground that could not carry it away. It flooded the White River and tributaries so seriously that the result was a high stage that exceeded by 5 ft. or 6 ft. the previous high stage reached in 1904. The 1904 stage was unprecedented in the history of the city. In addition to the enormous volume of water thus indicated, the size of the channel of the White River had been narrowed when the West Washington Street bridge was constructed to replace the one carried away at that point in 1904. The task before the city is indicated by the statement of H. W. Klausmann, city engineer, that he favors the reconstruction of the river-bed and levees along the tributary Fall Creek on lines that will provide, if necessary, for wide enlargement of the channel and condemnation of private lands for that purpose. It is also reported that there has been encroachment by private land owners on the eastern bank of the river which has had the effect of narrowing the channel still further. A street, Perry Avenue, was opened along the west bank of the river about seven years ago, and the theory in Indianapolis is that this also contributed to the narrowing of the channel and thus to the flood.

INDIANAPOLIS TRACTION & TERMINAL COMPANY

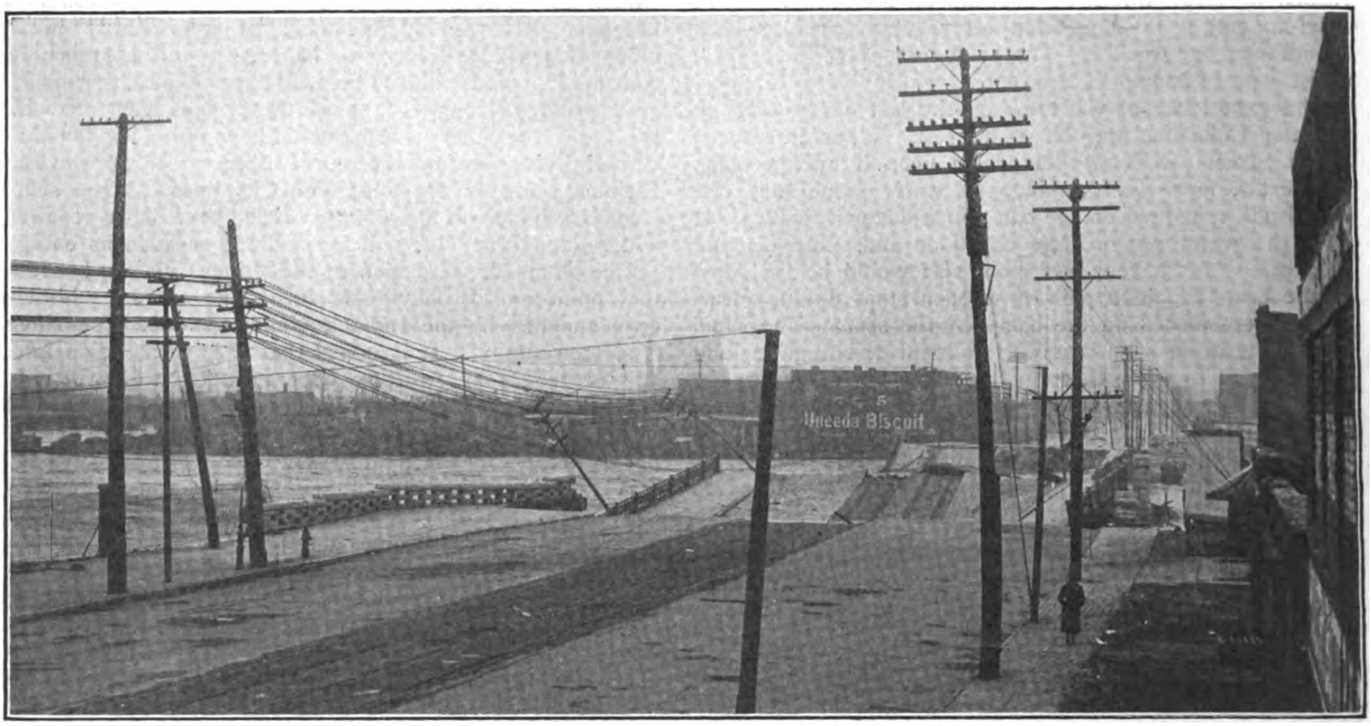
While the actual difficulty with service conditions in Indianapolis began about noon on Tuesday, March 25, the alarming condition of the water, levees and bridges in and near the city before that time had prepared the officials of the Indianapolis Traction & Terminal Company for probable greater trouble.

So far as efforts could be made in advance to minimize the effect of the flood of water that was feared, they were carried out, but the results were effective only in part so great was the rush of the released waters when they reached the power plant, shops, carhouses and certain sections of the city where the tracks were flooded.

The newest large improvement in Indianapolis made by one of the electric railway companies in that section of the State was the West and Tenth Street power house of the Terre Haute, Indianapolis & Eastern Traction Company. This is not the property of the local Indianapolis system but is used for the supply of power both to the interurban and to the city systems. In view of the floods to which Indianapolis has been subjected at times in the past, it was believed that every necessary precaution was observed in the selection of a site for the West Tenth Street power house which would assure its safety in time of danger of this character.

The break in the levee on the White River above the West Tenth Street power plant, however, released a large volume of water that caused temporary interruption but only slight damage to the transformers in the basement of this plant. The levee break released a volume of water that seemed, when viewed from this point, to increase the height of the flood 15 ft. to 20 ft. inside of thirty minutes. While, as stated, the water flooded the basement of the plant it did not reach the turbine room or affect in any way the stability of the fine structure itself. Signs of damage on the grounds immediately surrounding the West Tenth Street power plant, however, give some indication of the terrific force of the flood of waters. The embankment and track of the Belt Railroad were entirely washed away. This is the road on which the traction company depends for transportation for its supply of coal. In addition part of the spur track which the traction company uses to haul cars of coal by electric locomotive from the Belt Railroad track directly to the power house was partly washed out, although the damage apart from the track which was washed out was confined at that immediate point to the loss of the contents of a carload of coal which was overturned when the track embankment gave way. The electric locomotive was on a section of the track which remained solid. Before the cables leading from the plant across the White River went down in the flood they were cut.

Among the loss sustained by the company at this point was about 1000 tons of coal which was carried away by



Flood Disaster—Washington Street Bridge in Indianapolis After Its Collapse

the rush of the water and disappeared completely. There is still abundance of coal on hand, however, for this plant. The site on which the West Tenth Street power plant stands is one of the highest points in the vicinity and it now stands far above the fast-receding waters. Originally this ground was somewhat low, but in order to raise it above all the danger points known in the history of the city of Indianapolis it was filled in before the new plant was constructed.

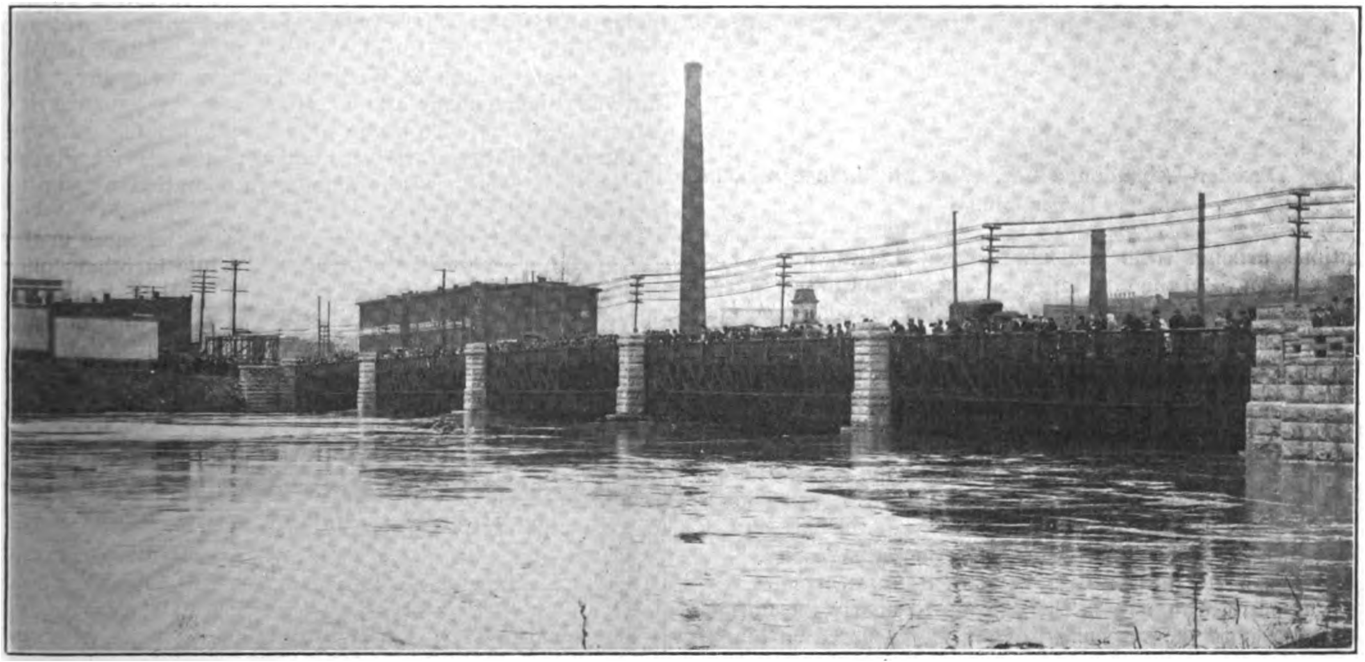
As soon as the water receded at the West Tenth Street power plant the work of restoration of the track of the Belt Railroad was begun and rapid progress is being made. This work is being done by the forces of the traction company working for the Belt Railroad Company.

POWER SUPPLY IN INDIANAPOLIS

Part of the West Washington Street power plant was acquired by the Indianapolis Traction & Terminal Company from the old Citizens' Street Railroad Company at the time of the consolidation, but additions have been made to the plant since that time. This plant is adjacent to the shops and carhouse on the same street and is in the part of the city which suffered most severely. In this plant the water reached a height of 17 in. in the engine room, flooding all the electrical equipment and thus necessitating almost a complete suspension of service on the city lines. The flood, of course, reached a much higher point in the adjoining shops and carhouse, where the water rose to about 7 ft. from the ground and flowed rapidly through the buildings, covering everything with a thick coating of mud and debris.

In anticipation of the flooded condition of this part of the property the officials early on the morning of March 25 removed as many of the cars as possible from the West Washington Street carhouse and stored them temporarily on streets in the higher section of the central business district of Indianapolis. As this section was entirely free of water the cars were therefore ready for service as soon as power was available. The men in the shops remained at work until the water reached the building, when they climbed out of the way and made their way across the roof to the storeroom building which is located directly south of the power plant. When the water subsided this building was used as headquarters by the militia that under orders of the Governor assumed control of affairs in the West Indianapolis district as quickly as possible after the height of the flood was reached. The building also served as the headquarters of the commissary department established by the Indianapolis Traction & Terminal Company for the accommodation of its employees. About thirty refugees camped in the building.

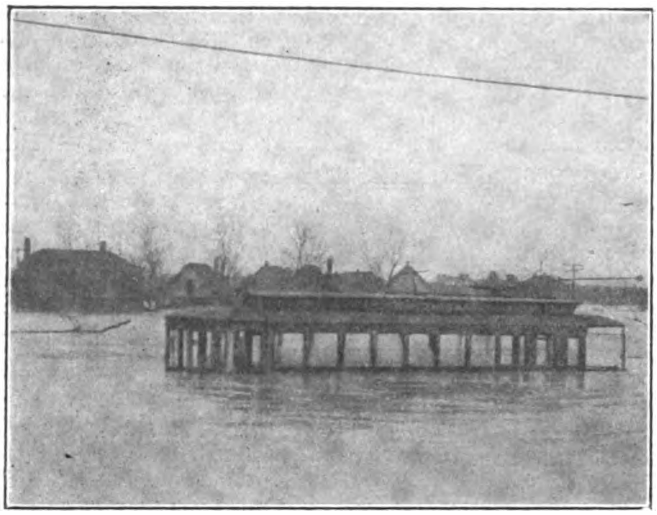
It was in the West Washington Street Power plant that the damage occurred which was the immediate cause of the interruption of the Indianapolis city service. All the efforts of the management consequently were directed toward the restoration of normal conditions in this plant. The equipment, of course, was so thoroughly wet through that nothing whatever could be done until the water receded, and then time and patience were the two factors that with constant hard work on the part of both the men and the executives of the company finally brought slow success first in one unit and then in another and another and so on until normal conditions were reached. As soon as the water began to recede the work of cleaning the apparatus and floors was started. The men worked without interruption for sleep or much rest until the worst part of the conditions began to show some sign of improvement and definite steps could be taken to dry out the apparatus. Although rubber boots were scarce in Indianapolis and finally became unobtainable at any price, the company was fortunate in securing part of a supply early and had 110 pairs of these useful articles of clothing to distribute among its men. The regular force at the power plant remained on duty for about forty hours and they were joined in this by officials of the company. As soon as the water had receded from the engine room the company began running the generators continuously on open circuit in order to dry out the armature and fields in the shortest possible time and tested out the machines two or three times a day to see how the work of drying out was progressing.



Flood Disaster—Washington Street Bridge in Indianapolis Before the Crest of the Flood Was Reached

President Robert I. Todd of the Terre Haute, Indianapolis & Eastern Traction Company concentrated his efforts mainly on the power situation and made his way between Indianapolis and the West Washington Street power plant by boat. He stayed at the West Washington Street plant from noon Tuesday, March 25, until the afternoon of the following day. Vice-president E. B. Peck remained all night at the headquarters in the Traction Terminal Building, where reports from the various parts of the system extending in different directions were received as far as the telegraph and telephone facilities permitted. Superintendent G. K. Jeffries and other officials of the operating departments were on duty continually to work and direct the work of relief as effectively as possible under the crippled conditions prevailing in the city at large.

These conditions were greatly complicated by the failure of other public utility service and by the natural confusion and alarm into which the whole city was thrown. While the electric railway service was affected in the manner described the entire city was struggling under other conditions arising from the unprecedented situation. The water service in the city failed on Tuesday morning, March 25, before the electric railway service was discontinued and for three days the city was without the usual water facilities. When the water service finally was resumed this was accomplished by means of a centrifugal pump owned by the Merchants' Heat & Light Company which was used to pump water into the city mains. This water, although not safe for drinking purposes, was a great aid in the restoration of normal conditions in the city. The electric lighting companies had comparatively little trouble, but the gas service was entirely suspended in certain sections of the city.



Flood Disaster—Abandoned Car, West Michigan Street, in Indianapolis

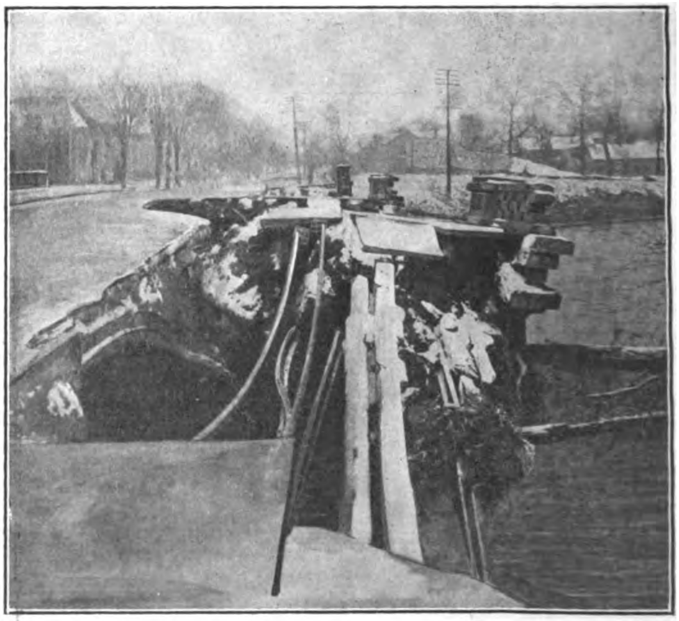
INTERRUPTION OF CAR SERVICE IN INDIANAPOLIS

The company operated the cars up to nearly the normal schedule until the suspension of service occurred on March 25. When the service was necessarily discontinued of course the cars remained standing in the streets in all parts of the city. The trainmen were instructed to remain with their cars and to keep up the heat in the stoves. The relief committee which was in charge of the work of lessening the distress arising from the flood requested the company to do this as far as possible, and in accordance with this plan the cars were used as places of refuge for those who needed them. A few of the cars, of course, were caught in sections of West Indianapolis or other parts of the city where the flood reached them so quickly that their movement to places of safety was impossible. Several old sand cars were caught in flood water and washed away. No damage of material amount was done to cars and where the motors were wet in some instances they dried out very quickly.

The trainmen and all employees in the other departments of the company with the exception of one group of linemen proved perfectly loyal to it in this time of trouble. No greater degree of loyalty could have been displayed by the employees as a whole than was evidenced through the entire period. In spite of discomfort and inconvenience the men worked willingly in water and cold to protect the property and improve conditions as rapidly as possible. Ten men employed as linemen thought that the time was an opportune one to demand an increase in wages and threatened to strike if they did not receive what they wanted. They were discharged immediately and no difficulty was found in securing other men to take their places. When the foreman in charge of the men refused to meet their demands they tried to take their tools away with them. Lieutenant Hill of the militia forced the men to give up their tools and leave the district as otherwise the work of relief would have been hampered seriously. In addition to supplying meals for the men engaged in the arduous forms of special service developing from the flood conditions the company has also had to supply for a week or more good drinking water for its employees. A number of wells and springs in the city have been used for this purpose, not only by the company, but by the inhabitants of Indianapolis generally. Warnings against the use of the usual supply of water for drinking or cooking purposes unless it was boiled were issued by the city health department and the water company.

The interruption of service to the company was complete for only a very short time, although, of course, conditions at the end of a week were still not normal. After the complete stoppage of service on March 25 the company was able to resume in an hour or two partial operation on the Irvington city line. The power for this purpose was received from the Philadelphia power plant of the Indianapolis, Terre Haute & Eastern Traction Company. On March 27 the company was able to start a two-hour service on some lines and also began to make a beginning on some of the other lines. Cars were added to the service gradually until on March 30 the number in operation was up to seventy.

During the height of the flood conditions business in the city in many instances was suspended while in others only part of the usual volume was continued. All the cars that were operated, of course, carried heavy loads, and automobiles and wagons of every type were used to transport the crowds. As the heat and other facilities in many office buildings were discontinued, little business was done that was not necessary. A number of the steam railroads were able to operate trains into the suburban districts and thus take care of part of the demand for transportation. They were able to do this because they could not operate through service. The condition in Indianapolis on March 31 was that about one-half of the number of cars operated on the regular schedule, not counting the tripper service, were in operation on the city lines.



Flood Disaster—Meridian Street Bridge in Indianapolis, with Street Railway Feeders Left Intact

CONDITIONS ON THE T. H., I. & E.

Some indication of the conditions under which the interurban lines of the Terre Haute, Indianapolis & Eastern Traction Company labored may be obtained from the following brief statement of the conditions on March 31 as stated in Indianapolis. It was believed then that the Northwestern line reaching to Lafayette would be able to operate to Indianapolis on that day. Operation between Crawfordsville and Lebanon was started on March 27. The line between Crawfordsville and Indianapolis continued operation without interruption between the former city and the outlying part of the capital city. The line between Indianapolis and Danville, Ind., was operated to the Indianapolis city limits on March 31. The line between Indianapolis and Terre Haute was operated on March 31. Conditions on the Martinsville line made it seem probable that service as far as Mooresville would be commenced by April 2 or 3 and to Martinsville by the latter part of the present week. The abutment of one bridge on this line was cracked on the corner. The abutment of another bridge went down and the bridge dropped, but the company thinks that this bridge can be put up. The eastern line of the company was in operation between Indianapolis and Knightstown on the western end and between Richmond and Centerville on the eastern end. The Richmond city line continued in operation without interruption. The Terre Haute city line discontinued operation for a part of one day. The line in Brazil continued in operation except for the same part of a day. The line extending to Clinton from Terre Haute was in operation almost as far as Clinton. The bridge at Clinton over the Wabash River did not go out, but the trestle will have to be filled in. The line between Terre Haute and Paris, Ill., was broken on account of the Wabash River flood. It was opened from Paris to the Wabash River valley, but could not get through the flood to Terre Haute. The line between Terre Haute and Sullivan was in operation.

The worst conditions which confronted the company were those that resulted from the flooding of the two power houses in Indianapolis and arose mainly from the interruption of service and the consequent inability to make normal gross earnings. No bridges on the interurban lines of the company were absolutely out, although, of course, some of the city bridges on which cars are operated at Indianapolis were carried away by the force of the water.

So far as conditions can be judged at this time, it is believed in Indianapolis that the loss to interurban lines will not be nearly so great as to the steam roads, either in damage to physical property or in loss of earnings while service was crippled. The full extent of the loss, however, cannot be determined for many weeks. It is reported in some instances that sections of track have completely disappeared.

FLOOD DAMAGE THROUGHOUT INDIANA

T. C. McReynolds, of the Kokomo, Marion & Western Traction Company, telephoned Governor Ralston of Indiana on March 26 asking for permission to take blankets belonging to the Kokomo members of the State militia to Peru, where many survivors of the flood were suffering from cold weather. The Governor promptly gave permission to do this.

The Indianapolis *News* of March 27 said that one of the heroes of the flood was Jack Abbott, local superintendent of the Fort Wayne & Northern Indiana Traction Company at Lafayette, Ind., who for the previous forty-eight hours had been standing on duty at the South Street power station endeavoring to keep the plant in operation. This was the only source of light and power in Lafayette and Mr. Abbott and his men endangered their lives to keep it in operation. They built dams and wells in order that operation might be continued.

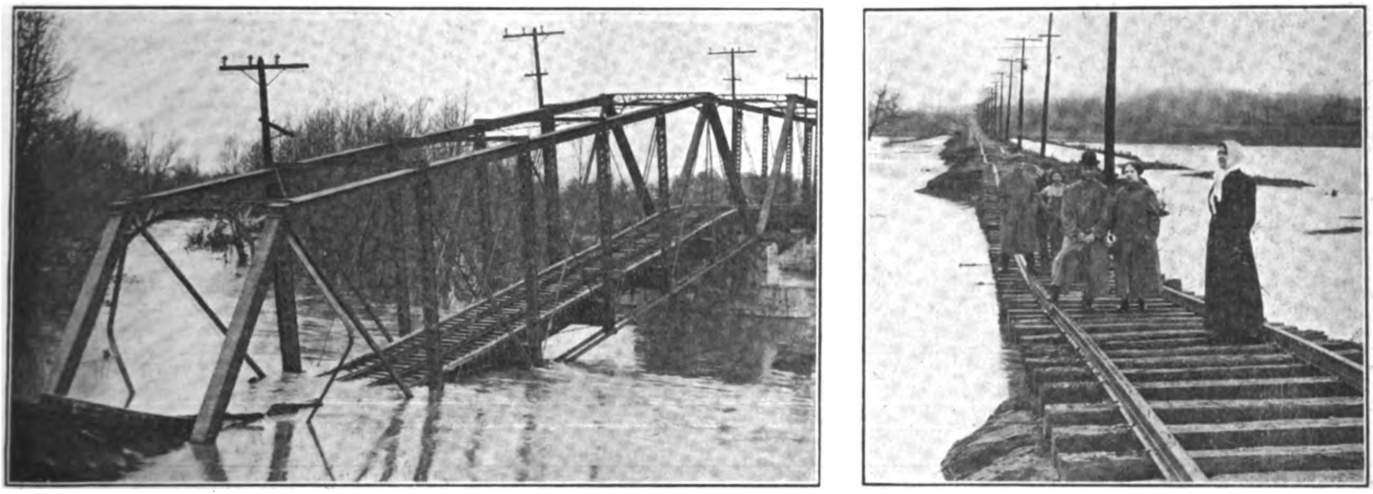
The Indiana Railway & Lighting Company of Kokomo, Ind., according to a dispatch published in the Indianapolis *News* on March 31, estimates its loss at about $100,000.

The Winona Interurban Railway Company reported from Warsaw, Ind., that its loss consisted of whatever damage was sustained by four motor cars which were caught by the flood in Peru and submerged for three or four days. There were also a few washouts which will require a small amount of track work. The damage was slight compared with that to the other two traction lines entering Peru.

The Toledo & Chicago Interurban Railway experienced but little difficulty except that for several days its cars were unable to reach the passenger terminal in Fort Wayne, owing to the flooded condition of that city at that time. Bridges over the Wabash River at Peru and Logansport, Ind., one used by the Union Traction Company of Indiana and the other owned by it, gave away before the flood, cutting off both these lines from their northern terminals. The financial loss in both of these instances will include not only the loss of the two structures but that from the cessation of traffic during the time required to replace the bridges.

Service on the Fort Wayne & Northern Indiana Traction Company's lines was seriously interrupted by flood conditions along the St. Mary's and Wabash Rivers. Local street railway service in Fort Wayne was abandoned March 25 on Nebraska and South Calhoun Streets, and interurban service to Logansport and Decatur, Ind., was abandoned owing to a number of washouts. The flood conditions prevailing in this district, however, did not affect interurban service between Fort Wayne and Bluffton.

Reports from Fort Wayne also advise that the traction



Flood Disaster—Views on Martinsville Division of Terre Haute, Indianapolis & Eastern Traction Company

company has rendered assistance to the flood sufferers by supplying the rescuers with boats obtained from a summer resort on one of its lines. There was no interference with the generating station, which not only carried its own load but, beginning March 25, supplied energy to the city's arc lamps, the municipal plant being out of service on account of the flood. The traction company also agreed to take over as many of the city's power customers as it could carry.

The Indiana Railways & Light Company reports that on the lines of the Kokomo, Marion & Western the power plant was forced out of commission at noon on March 24 and was not able to resume operation until Saturday afternoon, March 29. The damage was not great except that the machinery was wet and very muddy and required considerable cleaning. Only one bridge went out on the entire interurban line. The interurban cars suspended operation for about three days and the city lines but one day. The loss will not exceed $25,000 on the entire system.

Between Louisville and Indianapolis the Indianapolis, Columbus & Southern Traction Company, operating between Seymour and Indianapolis, suffered the most damage, its system being put entirely out of commission for several days. Operation between Indianapolis and Franklin was commenced on March 31. The Indianapolis & Louisville Traction Company was compelled to cease operation completely for forty-eight hours and subsequently maintained a regular schedule between Louisville and Seymour, although its service between Seymour and Columbus was badly interfered with because of the torn-up tracks.

The Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, connecting Louisville with New Albany and Jeffersonville, Ind., and thence connecting with Sellersburg and points farther north, suffered but little from storm violence and floods.

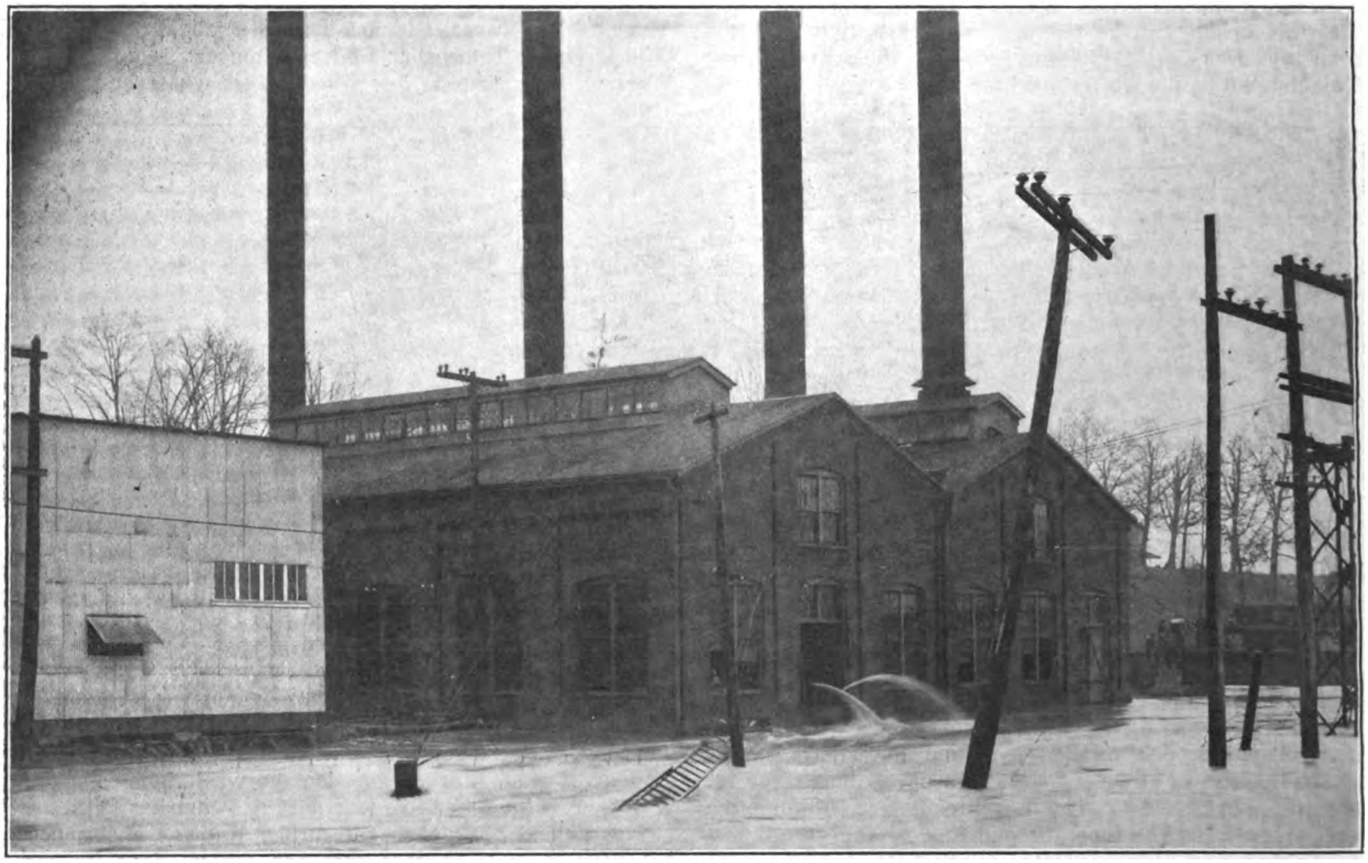
MAINTAINING POWER SUPPLY AT MARION, IND.

An interesting account of the flood is given in a letter to the American Gas & Electric Company from O. M. Dreschel, of the Marion Light & Heating Company, which furnishes power to the Marion, Bluffton & Eastern Traction Company. An abstract of the letter follows, the plant referred to being shown in one of the illustrations as it appeared after the flood had fallen 22 in.:

"Tuesday morning at 1:30 the water was 22 in. high over our turbine room floor. All of the boiler room was under water and it got up within 1 in. of the grates. We had to bank our fires and close down everything with the exception of the spare circuit, keeping on just enough power to give us lights so as to operate the pumps that were pumping the water out of the pit in the turbine basement.

"By operating three of the pumps in the basement we were able to hold our own for a time. We built cofferdams around the openings leading into the boiler room and also around the south and west doors of the plant, but finally, even with the three pumps, we began to lose ground. As a last means we broke an elbow on the No. 4 circulating pump suction and made a connection for a 4-in. pipe discharge at a hand-hole of the condenser and with this outfit in operation we were able to keep the water at a standstill.

"When the water was at its highest the south wall of the basement sprang a leak and water was pouring in at the rate of 500 or 600 gal. per minute. Two of the men with their arms succeeded in keeping this back until it might be plugged with rags and clay. About this time the firemen reported that the water was reaching their fires and that the drafts were entirely covered. We thought within the next fifteen minutes we should be entirely at the mercy of the water. We banked the fires and opened the fire doors, receiving what little draft was possible through them, and by operating only the spare circuit with what auxiliaries



Flood Disaster—Power Station of Marion Light & Heating Company After Water Had Receded Two Feet

we had in our plant we were able to run in this condition until about 2:30, when the water was at a standstill. At 3 o'clock the water had fallen about 1/8 in. and we knew if we could hold out a little longer the victory was ours. By 6 a. m. Wednesday we had about 2 in. of draft space under our boilers and were gaining ground. The river began to fall very rapidly and by Wednesday night only 6 in. of water covered the boiler room floors."

INDIANA UNION TRACTION COMPANY

The lines of the Union Traction Company of Indiana extend in various directions, crossing many rivers and streams that were flooded and therefore were affected in many points. The statement, made officially, however, at the headquarters of the company, Anderson, Ind., on the morning of April 2, showed that with the exception of the line extending between Anderson and Middletown interurban service had been resumed. Except for possibly the line between Anderson and North Anderson and two lines in Muncie, the city lines had continued in operation without difficulty.

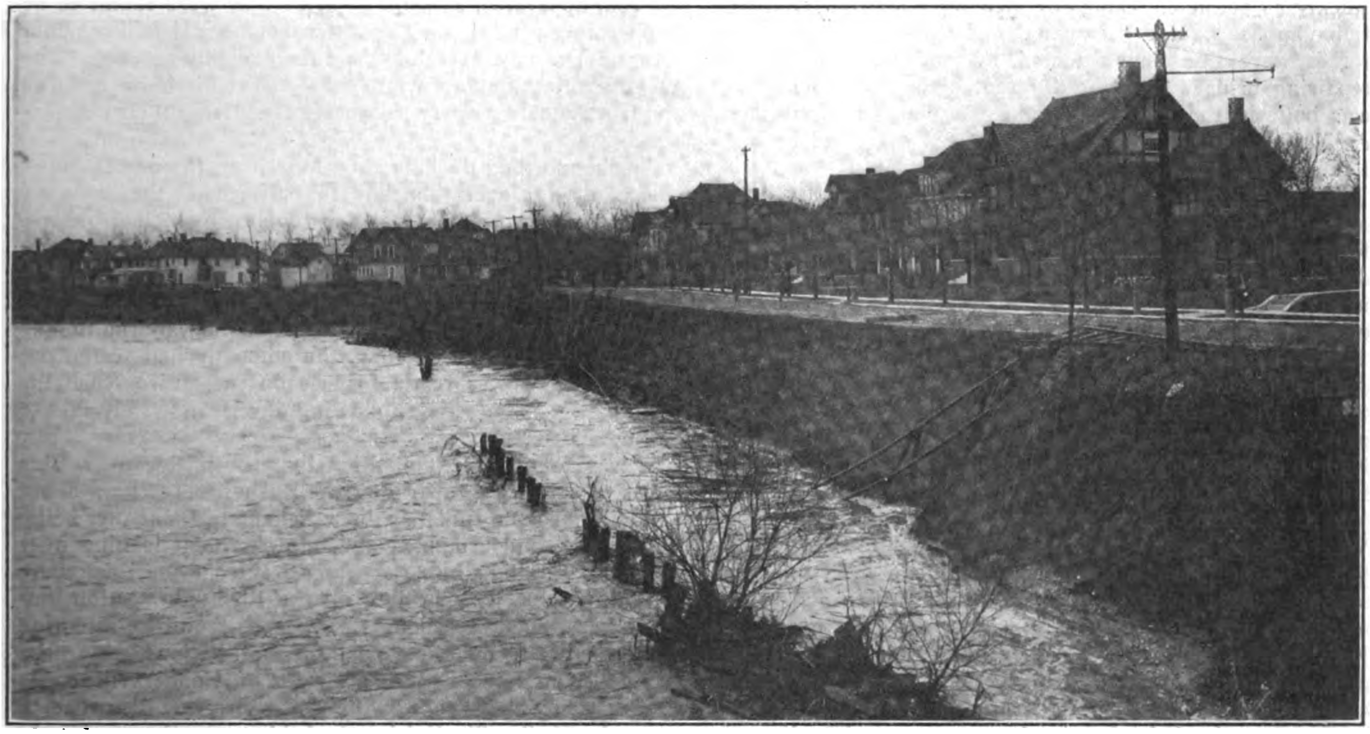
Interruption in train service was due entirely to washouts. Except for power plants at Eaton and Winchester, which were closed down on account of high water, no difficulty with power houses was experienced. In neither of these two plants did the water reach the engine room. It got into transformer rooms and up to the rheostats of generators, practically forcing suspension. Even if these plants had been in operation cars could not have been run on the lines which they serve on account of washouts. Condensing apparatus in the Newcastle plant was apparently disabled on account of difficulty with a motor-driven pump. The pump is now all right and the station was not shut down.

The washouts on lines were complicated by trouble with bridges. Three reinforced concrete bridges on the Newcastle line caused trouble as the water undermined the grade back of the abutments and under foundations of the piers. A bridge on the Muncie-Union City line was thrown out of alignment by the failure of the city bridge above it. This bridge was not knocked off the abutments and was put in service on the third day after the accident. On the Whiteley line a bridge was thrown out of alignment by the force with which logs and debris were propelled against it. This was straightened and proper foundations were built and the bridge placed in service again on March 27.

The Muncie-Union City line had numerous washouts, particularly at Union City, where Farmland and Selma Park, owned by the company at Muncie, were completely inundated and some of the buildings were badly damaged. The loop on which cars are turned at this point was entirely washed out. At Eaton there was an extensive washout and another bridge was disabled. At Hartford City one bent of the bridge was washed out. At Montpelier a latticed deck bridge with two spans of 60 ft. each was washed off the abutments and went into the river. It was expected that this bridge would be in place by April 5. At Pendleton, on the Muncie-Indianapolis line, the track just east of the abutment of the bridge was badly washed out. This has been repaired. One end of the bridge over the White River at Chesterfield dropped into the river. This bridge was repaired temporarily and raised so that operation could be resumed.

At Anderson the track on the North Side, extending around the freight house, and also the connecting lines between Muncie and Indianapolis and the Anderson-Marion lines were washed out. The track north of the White River bridge was badly washed out. There were also bad washouts at Alexandria, Summitville, Fairmount, Gas City and Marion. At the last point the company uses the county bridge, the center abutment of which was washed out, thus causing interruption of traffic between Anderson and Indianapolis. The track was also washed out for the entire section between Twenty-seventh and Thirtieth Streets, Indianapolis. In this case new temporary track was built in a night and day on adjoining streets, the track being laid directly on top of pavement.

At Broad Ripple there were two large washouts. One piece of bridge in the center of the river was undermined so that it leans quite badly and operations are suspended at that point. A temporary track about 1/2 mile long was built across the county bridge in three days. South of Noblesville 2500 ft. of grade 25 ft. high was washed out. North of Noblesville about 3000 ft. of grade of the same height was washed out and the track had to be moved back to



Flood Disaster—Washed-Out Tracks of the Union Traction Company of Indiana in the Outskirts of Indianapolis

the adjoining cornfield. About ¾ mile of track south of Peru was badly washed out and placed afloat. At Peru the company bridge paralleled the county bridge, and when the latter went out it carried the company bridge also. This was a through-plate girder bridge with five spans of 60 ft. each, all of which are at the bottom of the Wabash River. One cement pier was also lost. The company is now working on this bridge. At Lincoln the abutments of one span plate girder bridge were undermined and damaged so badly that the bridge cannot be used. The company is repairing it. About 250 ft. of 30-ft. grade at Logansport was washed away and one span of the steel bridge thrown into the river by the undermining of one pier. In addition to the more serious locations mentioned there were any number of small washouts. The station at Peru used jointly with the Chesapeake & Ohio Railway had 8 ft. of water. The water was also 8 ft. high in the interurban station at Logansport.

The overhead work did not suffer very badly except at Broad Ripple, Noblesville, Peru, Logansport and other points where the grade was lost. At these places poles were down and wires tangled. When trouble with bridges was seen to be serious the company laid plans for repair as quickly as possible. Gangs of men were secured from the Indianapolis Bridge Company and the company's own forces were thus supplemented. At one time men were repairing bridges at eight different places. A pile driver was built in the Traction Company's shops in four days. At Noblesville the bridge will be raised 4 ft. and at Peru 1 ft.. A new bridge will be built at Montpelier.

The first news of serious washouts began to reach the office of the company by telephone on March 24. This was followed during the night by frequent reports of difficulty due to subsequent culmination of flood conditions. As in the case of other companies, small streams that had been practically unheard of became raging torrents. The endeavors of the company were bent toward the protection of the bridges and the restoration of normal physical conditions. The officials of the company worked in whatever places their services were most needed. General Manager Nicholl remained in Anderson and was able to keep in close touch with different parts of the system, as the company's telephone lines remained generally in operation. Where these lines were down, communication was established by means of commercial telephone systems. The officials hunted up labor and worked with track and bridge men. An example of this is shown by the fact that G. W. Norveil, general passenger and freight agent, acted as foreman of a section gang. The trainmen and shop employees also worked on bridge and track gangs. The superintendents put in their time in the same way. The linemen gave splendid service, although their work was affected because of the damage done by heavy wind. Great credit was given by the general manager to all employees. An illustration of the work of the men is shown by the fact that the shopmen at Muncie went to Whitely Bridge to protect it from floating timber. One unfortunate man engaged in this work lost his balance, fell in the river and was drowned. Another man employed by a contractor on the Newcastle line lost his life in the same way.

CONDITIONS ON THE INDIANAPOLIS & CINCINNATI TRACTION COMPANY

BY CHARLES L. HENRY, PRESIDENT

The Indianapolis & Cincinnati Traction Company has two lines extending in a general direction east and southeast from Indianapolis. One extends through Rushville to Connersville, a distance of 58 miles almost directly east from Indianapolis, and the other extends in a southeasterly direction through Shelbyville to Greensburg, a distance of 49 miles. The power house is situated at Rushville, and the principal shops and carhouse are also located at that point.

At Rushville the Flat Rock stream overflowed, backing the water up into the town around the traction company's shops 2 ft. deep. The water was 42 in. deep in the power house basement, shutting down the plant and thoroughly soaking the motors of all of the cars in the yards. The turbines, engines, transformers, exciters, etc., were on the upper floor of the engine room and were not reached by the water, the only electrical operating machinery reached by the water being the motors driving the coal crusher and the coal elevator, so that no other damage was done in the power house except the shutting down of the plant.

The flood reached the property of the company at Rushville about midnight on the night of Monday, March 24, and the plant was then entirely shut down, leaving the cars scattered out at different points over both divisions. None of the cars outside was damaged in any way and, with the exception of seven cars in the yards at Rushville, the motors of which were wet, the rolling stock of the company is wholly uninjured.

Just as soon as the water abated and the dirt in the basement of the power house could be cleaned out, the power house was ready to start up, and even the motors operating the coal apparatus, as soon as dried out, were found to be in operating condition. The water commenced falling about noon on Tuesday, March 25, and then rapidly receded. The coal-operating motors were dried out with blow torches, and it was not necessary to remove them from their installation.

On the morning of Thursday, March 27, the power house was ready for operation, and that afternoon the company began to get work cars out for repairs on both divisions. As it was known that trolley and transmission poles were down at various washouts, the company was careful not to turn on power in any transformer section until the linemen were within reach of it. Following this plan, by the middle of the afternoon of that day, the company had tested out and had the power ready for use on the entire Rushville section. By noon of the following day it was ready on the Shelbyville section.

It was found on examination that the bridge over Blue River near Morristown on the Rushville section, about 20 miles out from Indianapolis, was damaged, one pier being undermined and crumbled and one abutment leaning over and almost falling into the water. Except for this, there was no trouble with bridges on the Rushville section, but there were several washouts of the track requiring attention before any cars could be moved, the most serious being near Rushville and about 5 miles west of Connersville. At neither place, however, was the grade seriously disturbed.

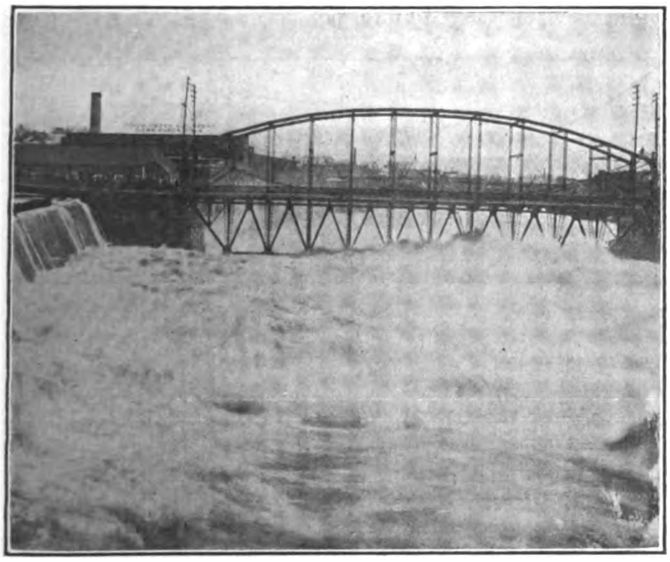
On the Shelbyville division the bridge over Swamp Creek, about 6 miles west of Shelbyville, had both abutments washed out, and the bridge over Brandywine, about a mile east of Shelbyville, had the west abutment undermined, but in neither case was the steel work down in the water, as it was left supported by the crippled masonry. The water washed around both abutments of the bridge over Blue River in the suburbs of Shelbyville, but did not injure the bridge.

About three-quarters of a mile west of Shelbyville the waters of Blue River washed through a 20-ft. embankment of the Cleveland, Cincinnati, Chicago & St. Louis Railway and across the traction company's lines, washing out about 200 ft. of the grade on both the stream and the traction line. In addition to this, several small culverts and bridges were washed out within the section between Fairland and Shelbyville, and the track in numerous places had the gravel washed off, and in some instances part of the grade. None of these, except the special cases above noted, however, was significant as of a serious character.

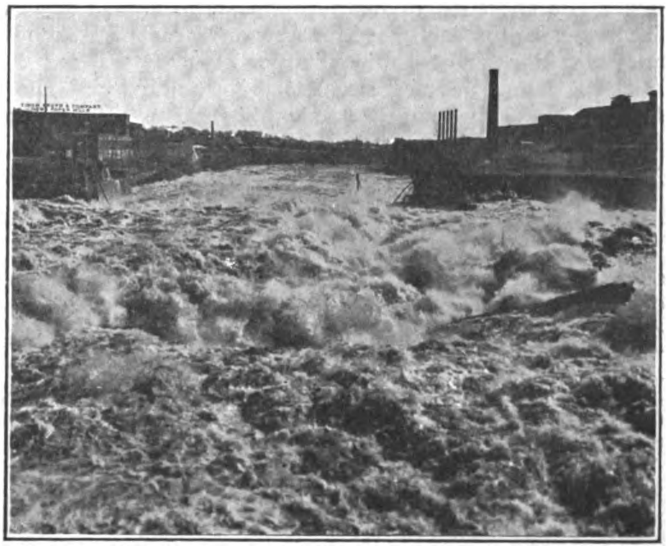
Nearly all of the damage on this division was occasioned by the very heavy flood on Blue River, which runs immediately through the suburbs of Shelbyville. It was this that caused the cutting out of the embankment of the Big Four road and the traction lines near there. About 7 miles above Shelbyville, at the little town of Freeport, a dike was cut which allowed the water from Blue River to flow down in an almost southerly direction into the two streams of Brandywine and Swamp Creek, carrying an immense flood of water down both of these streams, which caused the washouts of the two bridges above mentioned. About a mile above the traction company's line, just before this flood of water reached Swamp Creek, it had washed a channel like the bed of a regular stream of ten times the size of the ordinary creek into which it was flowing. No such amount of water was ever known in this territory, and it came sweeping down these small streams, cutting out the Big Four bridges and the traction company bridges wholly unexpectedly.

The cars that were left out at various points on the line on account of the storm were brought into the carhouse as soon as the small repairs on the tracks could be made to enable this to be done. On April 2 no cars went out of the carhouse except those that were on the Indianapolis end, cut off from the shops at Shelbyville and the shops at Rushville.

Work was commenced immediately to put the property in order. As soon as a pile driver could be secured, work was commenced on repairing the Blue River bridge near Morristown, and, with reasonable success, this will be completed in time for cars to pass over it on Saturday morning of this week (April 5), when service can be resumed over the entire Rushville-Connersville division.



Flood Disaster—Hudson River at Glens Falls, N. Y., Showing Bridge Before Its Collapse



Flood Disaster—Hudson River at Glens Falls, N. Y., After Collapse of Bridge

On the other division it will take perhaps ten days longer to repair the bridges between Fairland and Shelbyville, and until this is done not much can be done in the way of service on that division; but about the time the service is begun on the Rushville division, partial service will be commenced on the Shelbyville division between Indianapolis and Fairland on the one end, and between Shelbyville and Greensburg on the other. It was impossible to secure more than one pile driver. In fact, we were fortunate to get that one, as the railroad companies immediately picked up all that could be secured in any way.

All in all the damage to the property is much less than we supposed it was and very much less than a person could believe possible in looking over the territory and seeing the vast amount of water that came down the streams.

Looking over the field, the company is to be congratulated upon the fact that no one was injured, no cars were derailed, no injury resulted to the power house and machinery and but little to any of the car equipment. All of the serious damage is centered at the Blue River bridge on the Rushville division and the washouts between Fairland and Shelbyville, a distance of 6 miles. All other damage is of an inconsequential character.

IN NEW YORK AND PENNSYLVANIA

The Citizens' Traction Company, of Oil City, which comprises 35 miles of track, experienced several slides and washouts. During high water the general manager, W. W. Cole, had all dangerous points patrolled day and night. Service was temporarily interrupted at certain points, but passengers were transferred around these points. The power station was kept in service although the flood was at one time within 6 in. of the windows.

Norman McD. Crawford, president of the Mahoning & Shenango Railway & Light Company and other subsidiaries of the Republic Railway & Light Company, states that the direct damage to the property will be less than $6,000.

On the lines of the Elmira Water, Light & Railroad Company two small sections of track were submerged but there was no serious interruption to the service. The latter was also true on the Fonda, Johnstown & Gloversville Railroad.

The Western New York & Pennsylvania Traction Company reports that traffic was interrupted on the Bolivar, Local, Allegany-Salamanca and Bradford-Carrollton divisions for about twelve hours, but no interruption to the supply of power occurred. No serious delays occurred on the Beebe lines.

The Otsego & Herkimer Railroad Company reports a few minor washouts only, although the storm established a record for high water and caused extensive damage to highway bridges and roads throughout the district. The company's service was interrupted for one day only.

The Hudson Valley Railway, Glens Falls, N. Y., experienced some interruptions to its service from the flood. On the line between Stillwater and Schuylerville the water from the Hudson River covered the tracks beginning Tuesday afternoon, March 25, necessitating the withdrawal of service between these points. From Tuesday until Friday the water reached a depth of from 1 ft. to 5 ft. on the tracks. On Saturday it began to recede and on Monday the company was able to have the tracks repaired by the section men preparatory to resuming service on Tuesday, April 1.

On Thursday the highway bridge spanning the Hudson

River between the city of Glens Falls and the village of South Glens Falls was carried away, owing to the very high water conditions and the floating of thousands of logs which piled up against the substructure of the bridge. The carrying away of this bridge stopped all through traffic between Glens Falls, Saratoga and Albany and is the most serious of all the trouble which occurred on the line. Arrangements are now being made for the construction of a temporary footbridge, which will probably be completed in ten to fifteen days, after which the company will be able to transfer passengers over the Hudson River at the point in question until such time as a permanent structure is erected and the cars are able to cross.

On Thursday afternoon the company's Mechanicsville power house (steam plant), which is the main source of supply for all the company's lines, was compelled to shut down owing to water in the engine room. The load was kept on while the water was rising and the power was not shut off until a depth of about 3 ft. was reached. This failure of the power shut down all cars except two local cars operating between Glens Falls and Fort Edward. The supply of power for these was generated in the company's Middle Falls water power plant, which is over 20 miles from Glens Falls. The current was transmitted over the high-tension lines at 22,000 volts to the Glens Falls substation. The operation of this power plant furnished sufficient power for the lighting of the company's carhouses, shops and substations and for other lighting over the system.

As in Albany, the most serious loss to the Hudson Valley Railway Company from the flood will be the loss of revenue from the non-operation of cars, especially in this instance, the operation of through cars from Glens Falls to Albany via Saratoga. The actual property damage will not represent very much for the reason that the principal expense involved was the replacing of ballast, etc. Of the two accompanying engravings, one shows the river bridge at Glens Falls on the afternoon of Thursday before it was carried away. The other is from a photograph taken early Friday morning, the bridge having gone out at 10 p. m., Thursday.

The Mechanicsville power plant was able to take up the entire load at 9 o'clock Saturday morning, having been shut down from 4 o'clock Thursday afternoon. Subsequent to Saturday the company was able to operate cars on all of its lines except between Schuylerville and Stillwater, where the water was too high to permit operation with safety.

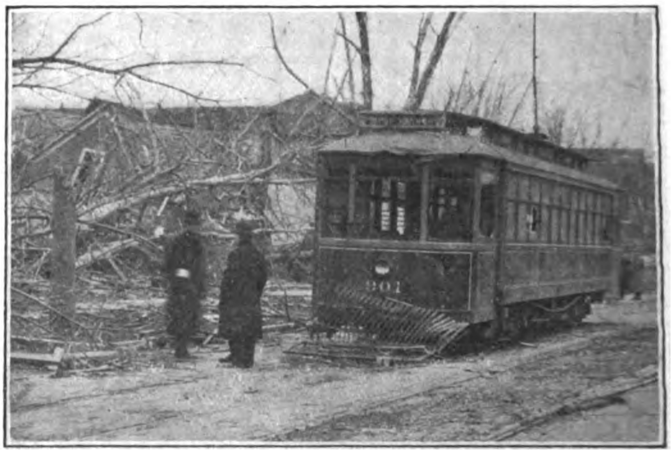
THE SITUATION IN ALBANY AND SCHENECTADY

There was no interference with the Schenectady Railway from the high water last week, but the properties of the United Traction Company at Albany and Troy suffered some inconvenience. On the evening of March 23 the rising water of the Hudson got into the Adirondack power plant and cut off the supply of power from all of that system except at Schenectady. The management had been watching developments and promptly put into service the steam plant of the Delaware & Hudson Company at Mechanicsville, which supplied power to the system until 11 a. m. Thursday. In the meantime the line department had strung 1000 ft. of feeder between the end of the Schenectady power supply and the Albany power supply, so that when the steam plant had to shut down Thursday morning from rising water it was possible to continue the operation of more than one-fourth of the Albany cars and all of the interurban cars between Albany and Schenectady, although the system in Cohoes and Troy was out of service. By March 25 at noon the Adirondack Power Company was able to connect up the Schaghticoke water power station with the Adirondack plant. It was then possible to put in service practically two-thirds of all the cars on the system. On Saturday the water went down sufficiently to permit the company to use its transformer stations. No water had entered the transformers, but the blowers, which were on a lower level, were flooded.

THE OMAHA AND TERRE HAUTE TORNADOES

The tornado which struck Omaha at 6 p. m. on Sunday, March 23, inflicted a loss of no small amount upon the Omaha & Council Bluffs Street Railway, but on the whole the company came out of the disaster in remarkably good shape. The storm wrought its havoc diagonally across the city, coming from the southwest. It cut a swath from three to six blocks wide, and the distance traversed over the city measures about 5 miles. Eight lines of street railway were in its direct path. Ten cars on these lines were caught and were more or less damaged. The accompanying photographs will give one a fair idea of the damage done to the rolling stock. The loss on this item is estimated to be about $5,000.

The greatest loss suffered by the company was in its overhead construction. Several miles of this was completely wrecked; wooden poles were broken and iron poles were bent to the ground. Trolley wire, feeders, telephone wires and light wires were all down in one mass. The company estimates the loss on this item at $15,000. Fortunately, the power station, substations and all four carhouses were outside of the tornado's path. The only building belonging to the company that suffered any damage was one of its shop buildings. This damage, however, was but slight and is estimated at $2,000.



Omaha Tornado—Corner of Thirty-third Street and Cumming Street

Before striking Omaha the tornado was seen to split, and a portion took an easterly course, crossing the Missouri River and striking Lake Manawa, a beautiful summer resort owned by this company, which is situated southeast of Council Bluffs and about 8 miles from Omaha. Considerable damage was done at the park. A dance pavilion recently erected at a cost of $17,000 was badly damaged, and a large restaurant building, together with several smaller buildings, was badly wrecked. All fences and many beautiful shade trees were destroyed. The park is leased to H. M. Barnet, formerly of St. Paul, Minn., and it is planned to have it in readiness again for the coming summer season. The damage at Lake Manawa is estimated at $10,000.

The matter of loss of and damage to its property was, however, of secondary consideration with the management of the company. Its first thought was the restoration of service on the many wrecked lines. Of course, when the tornado struck the city the entire system was paralyzed in an instant. Miles of track had to be cleared of huge piles of debris—wrecked buildings, trees, poles, etc.—and miles of overhead had to be rebuilt.

Every man in the employ of the company who was able to do so reported for duty immediately after the storm. R. A. Leussler, the assistant general manager, after making a hurried survey of the situation, issued orders to first open one line to each section of the city, and by Monday morning there were cars running to each section of the city. By Wednesday evening practically normal service had been restored on all lines.

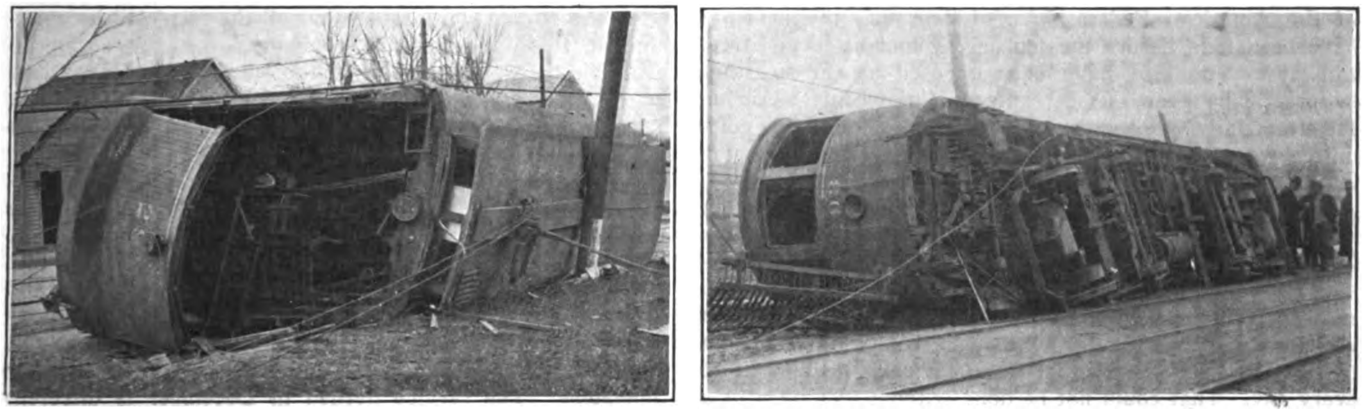
Owing to the fact that the city was in utter darkness, without telephone service and with but meager means of transportation, the company was greatly handicapped in its work. But with the loyal response and faithful work of its men wonderful progress was made the first night. A drop in temperature on Monday, followed by a driving snow on Tuesday, came as an afterclap, adding a further handicap to those engaged in the work of restoring the lines for service and increasing the suffering of the hundreds of victims of the storm.

The company, however, was extremely fortunate in having a liberal supply of poles and other line material on hand. This material had been purchased since the first of the year for replacements and new construction work scheduled for the current year. Additional material was also rushed to Omaha from other cities. Of course, a great deal of the work done is necessarily of a temporary character and will have to be done over again. It will probably be a month or longer before the permanent reconstruction work has been completed.

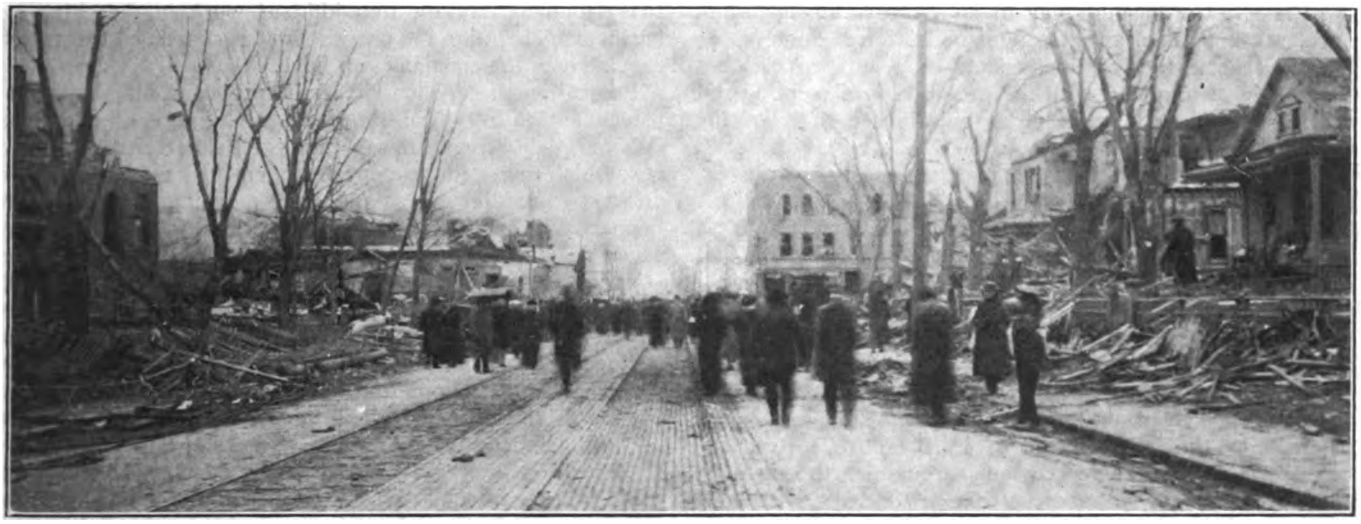
Among the employees of the company, one was killed in the tornado (his wife was also killed), five were injured and forty-four lost or sustained more or less damage to their homes. Many of the men who lost everything they possessed in the world nevertheless worked straight through, day and night.

Those of the employees who escaped injury to person or damage to property lost no time in coming to the help of the less fortunate ones. They have a relief subscription list well on its way for the purpose of helping to place on their feet again all those of their fellow-employees who were victims of the tornado, and it has been intimated that the officers and directors of the company intend to swell this relief fund materially. The company has already paid $5,000 into the general relief fund.

The dead in the city as a result of the tornado will number about 150, the injured about 500 and the homeless about 2000. The property loss in the city of Omaha is estimated to be about $5,000,000.



Omaha Tornado—Cars Overturned by the Wind



Omaha Tornado—View on Street Showing Complete Disappearance of Trolley Wire and Trolley Poles

THE STORM IN TERRE HAUTE

On Sunday night, March 23, a destructive tornado also passed through the west-central part of Indiana, striking the neighborhood of Terre Haute, Brazil and Greencastle. Its path was in a northeasterly direction. About twenty persons were killed at Terre Haute, and probably 200 injured, and nearly 300 houses were wholly or partly wrecked. The probable property loss in that neighborhood is nearly $1,000,000. Only three places in Indiana were struck by this tornado, which descended near Prairietown about 9 p. m., and then passed on to Terre Haute, taking a path through the open country to the northeast, and vanished about 10 o'clock.

A large amount of damage was done to the street railway system not only on account of broken cables and trolley wires, but also on account of the wrecking of a number of cars. Immediately after the windstorm rain commenced to fall and before the railway company could repair the damage from the cyclone several of its lines were under water and service on the system was partially suspended on account of the flood.

MR. SERGEANT ON PROPOSED NINE-HOURS-IN-ELEVEN BILLS.

Among the most important measures under consideration at the present session of the Massachusetts Legislature are the so-called "Nine-Hours-in-Eleven" bills (House 588 and House 1373), providing that the day's work of motormen and conductors shall not exceed nine hours' service performed in eleven consecutive hours. The supporters of these measures are identified with the Massachusetts Branch of the American Federation of Labor, and the hearings have been held before the legislative committee on street railways. The bills have been opposed at the hearings by practically every street railway in the State. Among the street railway executives who appeared before the committee was C. S. Sergeant, vice-president of the Boston Elevated Railway Company. An outline of his testimony is given below.

Mr. Sergeant reviewed the history of Massachusetts legislation bearing upon the hours of employment of motormen and conductors and stated that since entering the street railway field in 1888 he had always been informed that it was for the interest of the extra man to have his trips put together in such a way that he knew what he had to do every day. That could not be done without making a long day, and in the early times there is no question that some of the days were excessively long. In 1894, when the ten-hours-in-twelve law was passed, the operating officers were advised by counsel that the swing extra and regular extra cars must be eliminated and a circular announcement was issued to that effect. Scarcely anything ever stirred up the employees so much at Boston as the issuing of timetables without any swing extra or regular extra cars. Mr. Sergeant then submitted a chart illustrating the variable demands of the public at different hours for traffic accommodations. On the Boston system the company has 1310 surface cars in service between 7 and 8 a. m.; between 8 and 9 a. m., 966; between 10 and 11, 621. Somewhere in the valley of the curve lies a chance to make regular cars that will extend over enough hours, but it cannot be done on the peaks. The business day of an electric railway is not an eleven-hour day, and it cannot be made so.

Mr. Sergeant then outlined the difficulties of working out a schedule in harmony with the proposed law, pointing out that it would soon result in a typical case in operating many cars practically empty upon the street, giving an excessive service and creating needless noise and dust in the highways.

When the present nine-hours-in-twelve law went into effect on Jan. 1, 1913, the company faced the condition that its men were going to do one-tenth less work and the company realized, more forcibly than others perhaps, that what the men really wanted of the Legislature was the former day's pay for a shorter day. The company announced its intention to accord this and to allow overtime pay for any platform time over nine hours. The company established payment by the hour instead of by the day as formerly, because it was a general custom throughout the country. A study of the payroll showed that few extra men earned more than the guaranteed minimum pay of $12, and it appeared fair to put extra work on the straight rate per hour along with other work so long as the guarantee was left. Except in a few instances, the change to payment by the hour has not reduced wages, as the company increased the rate per hour to offset the decrease in the number of hours required for the maximum day's work, and it also agreed to pay overtime for anything exceeding nine hours, the present law recognizing the right to lay out days not exceeding nine and one-half hours. A very few cars, running under eight and three-quarter hours, have lost one-quarter hour's pay. The present law cut the outside time of regular extras to a maximum of sixteen hours. The average length before Jan. 1 was sixteen hours and twenty-nine minutes, and the average of regular extras by the present tables on the Boston system is fourteen hours and fifty-six minutes.

Mr. Sergeant said that among the objections to the present law voiced at the hearing is that the twelve-hour limit does no good, because the men have to be on hand. The company assumed that the Legislature recognized the fact that it could not get its morning and evening traffic peaks into a period of less than twelve hours. With 1310 cars leaving between 7 and 8 a. m. and 1423 between 5 and 6 p. m. the work is laid out so that all the men will be available at these times. The company's men were not all available before on account of the starting of regular cars in the morning. A change was made to get all the men available for both peaks, and that necessarily pushed the regular cars down a little later in the day.

The advocates of the bill testified that many men formerly working on regular cars have been obliged to take the extra cars as a result of the foregoing change. Mr. Sergeant said that the proportion is small and stated that in December, 1912, the company had 1046 regular cars and that it now has 998. Of the regular extras the company has 457, or 130 more than in December, and of trippers 361, or 230 less. The net result is 148 less runs on the winter timetables. The service needed in December is different from that required in January and February, and only forty-eight of the decreased trips came out of the regular cars. At present 63 per cent of the trips are run by regular cars at Boston, and they are run by 55 per cent of the crews; 27 per cent of the trips and 25 per cent of the crews are regular extras, and 10 per cent of the trips and 20 per cent of the crews are trippers. The inference is that the company has made up more of the tripper work into regular extra work, so that more men are getting paid for a full day than formerly, there being 230 fewer trippers and 130 more regular extras. Such practice tends to alleviate the evils of the extra list, which is the bane of everybody, and Mr. Sergeant said that the sooner the man is put on the regular extra list the better off he is, even if the day is stretched out to sixteen hours, which is an entirely humane day for that kind of work in that kind of business. The more the outside limit is shortened the fewer regular cars the company can have.

Presenting the application of the proposed nine-hours-in-eleven act to a typical timetable, Mr. Sergeant cited the Allston-Park Street subway line via Beaver Street, Route 905, which under the present arrangement has eight regular crews, two regular extras and seven morning and afternoon trippers. In applying nine hours in eleven to it the line has seven regular cars, all the regular extras are lost, and the trippers are increased from seven to fourteen. The net result is that four more sets of men are required, with less pay for each, on the average. At present on the Boston surface system 68.4 per cent of the full day's work comes within an outside limit of twelve hours, and 28.8 per cent outside of fourteen hours and under sixteen. The trippers are not included in these figures. The total number of platform men on the regular schedule has decreased from 5290 to 5227 since December. The proposed law would mean a large increase in a number of men working a few trips, and that would mean either that the men cannot make a reasonable earning or that the company cannot hold them because they cannot earn enough and has got to give a guaranty. The company cannot afford to give a guaranty of $12 a week to a man making only one trip a day. It is not in the public interest to hold a lot of men idle most of the time or to make the business of street railroading unduly expensive. At present, with all the large high-speed cars running on the Boston surface and elevated lines, the company is carrying only three more revenue passengers per half trip than it carried in the horse car days. It is probable that the number of crews would have to be increased 12½ per cent if the law were passed.

PACIFIC COAST ELECTRIC RAILWAY ASSOCIATION

(By Telegraph)

Pursuant to a call signed by F. W. Hild, general manager Portland (Ore.) Railway, Light & Power Company, following a conference of electric railway men held in December last, about forty representatives of the electric railways of the Pacific Coast States of California, Oregon and Washington met at San Francisco March 31 and April 1, 1913. The purpose of the meeting was to organize an electric railway association of these three States. A. W. Leonard, vice-president and general manager Puget Sound Traction & Light Company, Seattle, was made chairman, and Thomas Finigan, purchasing agent United Railroads of San Francisco, secretary of the meeting. Following a full discussion as to the reasons for the proposed association, the following resolution was unanimously adopted:

"Resolved, That all companies or corporations engaged in the electric railway business in the three Pacific Coast States of California, Oregon and Washington shall be eligible for full membership in the Pacific Coast Electric Railway Association, and in case the Pacific Coast Electric Railway Association becomes a section of the American Electric Railway Association that its members may also become member companies, if they are not so already, of the American Electric Railway Association."

A committee was appointed on constitution and by-laws and another committee on nominations of officers. At the session held April 1 the following officers were elected: President, F. W. Hild, Portland; first vice-president, T. T. C. Gregory, president Vallejo (Cal.) & Northern Railway; second vice-president, A. W. Leonard, vice-president and general manager Puget Sound Traction, Light & Power Company, Seattle; treasurer, Norman Logan, secretary and treasurer Northern Electric Company, San Francisco; temporary secretary, Thomas Finigan, San Francisco. Executive committee: president, vice-president, W. E. Dunne, vice-president Los Angeles Railway; Paul Shoup, president Pacific Electric Railway; Charles N. Black, vice-president and general manager United Railroads of San Francisco; D. L. Huntington, president Washington Water Power Company, Spokane; Guy W. Talbot, Pacific Power & Light Company, Astoria, and W. R. Alberger, United Properties Company, Oakland.

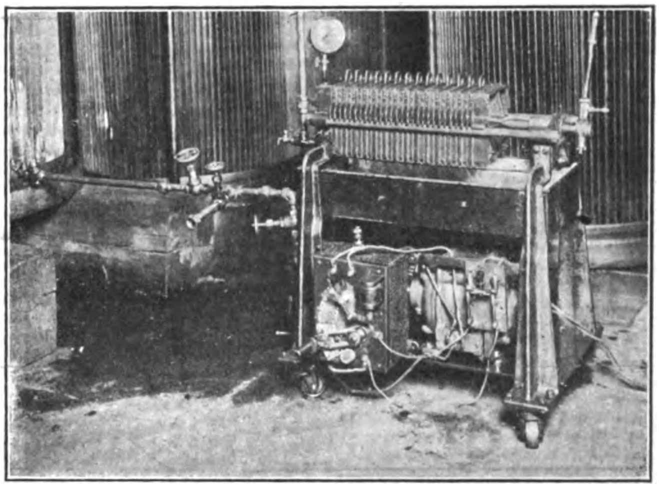
The constitution, as adopted, provides for two classes of membership according to the following plan: First, member companies, consisting of urban and interurban railway companies or steam railways having electrified sections, lessees or individual owners of such railways or railroads located in the Pacific Coast States of Washington, Oregon or California; in case this association becomes a section of the American Electric Railway Association, eligibility for membership shall be conditional upon the company members becoming also company members of the American Electric Railway Association; each company member shall be entitled to one vote, which shall be cast by a properly accredited delegate. Second, members, consisting of individuals, copartnerships and corporations that are actively identified with urban and interurban railway interests located in the Pacific Coast States, and any other persons similarly located who, in the opinion of the executive committee, have had experience of such a nature as to render desirable their connection with the association; the privileges of the members shall be similar to those of the company members except that they shall not be entitled to vote or hold office.

Application will be made to the American Electric Railway Association that its by-laws be so changed as to admit the Pacific Coast Electric Railway Association as a sectional branch, in which case a company to be eligible for membership in the Pacific Coast Electric Railway Association must be first a member of the American Electric Railway Association. Dues for full membership have been placed at $50 a year, and an initiation fee of $25 will be charged. The rest of the money required will be raised on a percentage basis of gross earnings.

Much credit for the organization is due to F. W. Hild, of Portland, who perhaps more than any other was the originator of the idea which has made the association an accomplished fact. A secretary, to devote all of his time to the association, will be employed, and special attention will be given to public relations. Besides the Pacific Coast representatives there were present Secretary H. C. Donecker of the American Electric Railway Association, E. H. Baker, James H. McGraw, Samuel M. Curwen and Secretary H. G. McConnaughy of the Manufacturers' Association; also Albion E. Lang, past-president American Electric Railway Association, and Safford K. Colby, vice-president Allen & Peck, Inc.

PURIFIER AND DRIER FOR TRANSFORMER OIL

An electrically operated press and filter for cleansing and restoring the dielectric strength of transformer oil is made by E. J. Hunt, Newark, N. J., who now has several of these machines in service. As shown in the accompanying illustration, the device embodies a series of filters through which the oil is forced at the rate of 6 gal. per minute (in the standard size). One passage of the reclaimed oil through these filters is sufficient to raise its dielectric strength from an initial value of 15,000 volts to 40,000 volts and even to 50,000 volts. In one instance, a very large public service company was about to use about 100 barrels of old transformer oil for road sprinkling when it was persuaded to try reclamation with one of these presses. Before filtration this oil showed a dielectric strength of only 11,200 volts on an oil gap of 0.2 in., which made it practically worthless for transformer purposes. After one passage through the filter press, the dielectric strength for the same gap was raised to 25,600 volts and after thirty minutes' continuous circulation without changing the filter papers the dielectric strength for the same gap was brought up to 55,700 volts. In about two weeks the hundred odd barrels of oil were reclaimed at a total saving more than double the cost of the press.



Transformer Oil Drier and Purifier

Another public service company reports that the oil so treated is not only cleansed thoroughly but is also freed from every particle of water. The fact that one of the transformers held some water in suspension revealed one very good feature of the press, namely, that when water is contained in the oil it will be stopped by the filter paper. This filter paper becomes thoroughly saturated and so will not pass any more oil, thus raising the pressure to such an extent that it becomes necessary to shut down the machine to substitute new paper.

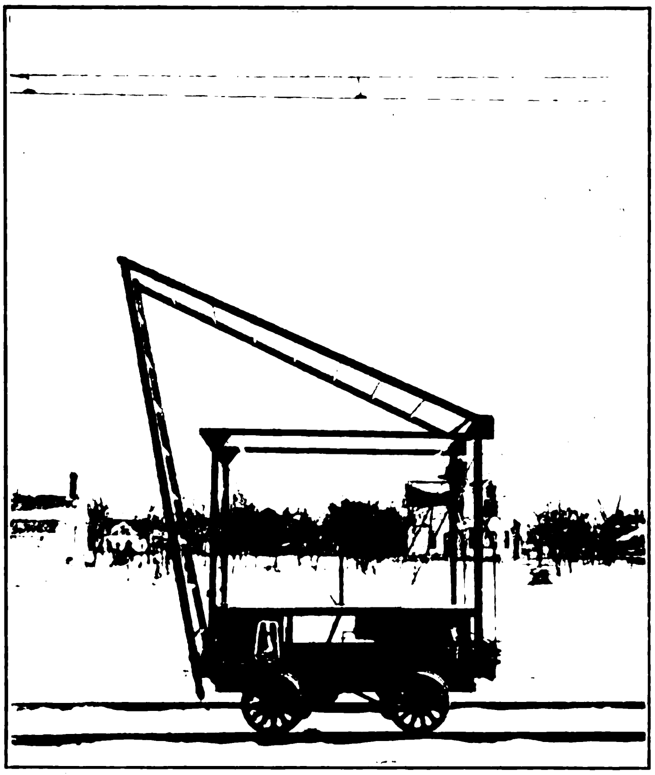
PENNSYLVANIA ELECTRIFICATION PLANS

Although no official information has been forthcoming regarding the details of the plans of the Pennsylvania Railroad Company to electrify its main line from Philadelphia to Paoli, this paper is unofficially informed that alternating current will be used and that the company will buy power locally, at least for the next few years. The announcement of March 15 regarding the Philadelphia-Paoli electrification stated that the improvement would involve the expenditure of $4,000,000 and would be completed in 1914. It was assumed that the company's plans included the erection of its own power house, but this is an ultimate rather than an immediate probability.

The next steps in Pennsylvania electrification cannot be stated with official exactness, but it may be said that logically electrification of the Baltimore terminal and tunnel would be the step to follow the completion of the Philadelphia work, and that with the electrification of the Washington (D. C.) terminal next in order, the linking up of Washington, Baltimore and Philadelphia by electrified lines will not be long delayed.

EMERGENCY LINE CARS FOR MILWAUKEE

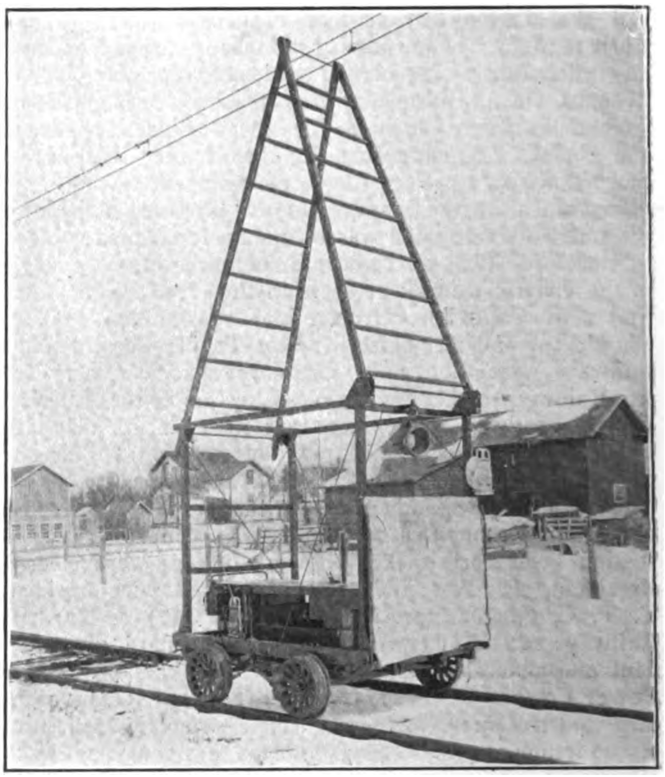
The Milwaukee Electric Railway & Light Company has recently placed in service six gasoline motor cars for making overhead repairs on its interurban lines. These cars are designed for emergency work only, repairs of a heavier nature, such as stringing in several spans of catenary construction, and the maintenance of the transmission line being handled by one of the heavy line tower cars specially equipped for such work. The cars were arranged by the company as shown in the accompanying illustrations, the superstructures being built upon the bodies of standard Fairbanks-Morse section motor cars.



Milwaukee Emergency Line Car—Frame Lowered for Running

Each car is equipped with an 8-hp air-cooled two-cylinder, two-cycle horizontal gasoline engine, the crank shaft of which forms the rear axle of the car. The body is arranged with a seat 6 ft. 6 in. long and 23 in. wide, which comfortably accommodates four men. The direct drive from engine to axle, thus eliminating gears, makes the operation very simple, speed regulation being effected through a spark control and the throttle. A battery ignition system is used.

Each car has been equipped with an A-frame ladder mounted on a rectangular tower, the corner posts of which are supported at the four corners of the car body. The ladders are arranged on the tower so that they may be dropped to meet average roadway clearance requirements. The base of one of the ladders is pivoted to the tower and the base of the other is provided with two strap-iron hooks which may be dropped over the tie rod at the top tower posts when in the working position or may be lowered to the tie rod between the side sills of the supporting tower when moving over the road.



Milwaukee Emergency Line Car—Frame in Working Position

Other facilities added to the emergency cars in order to make them serviceable for either day or night work include an automobile headlight mounted on the cross brace at the front end of the tower, arranged so that it can be turned in any direction for night inspection work. Lanterns are placed at the side and rear of the car for flagging or emergency use. Wind shields have recently been added to the front end of the car, but some difficulty has been experienced in operating against a head wind when the shield is in position.

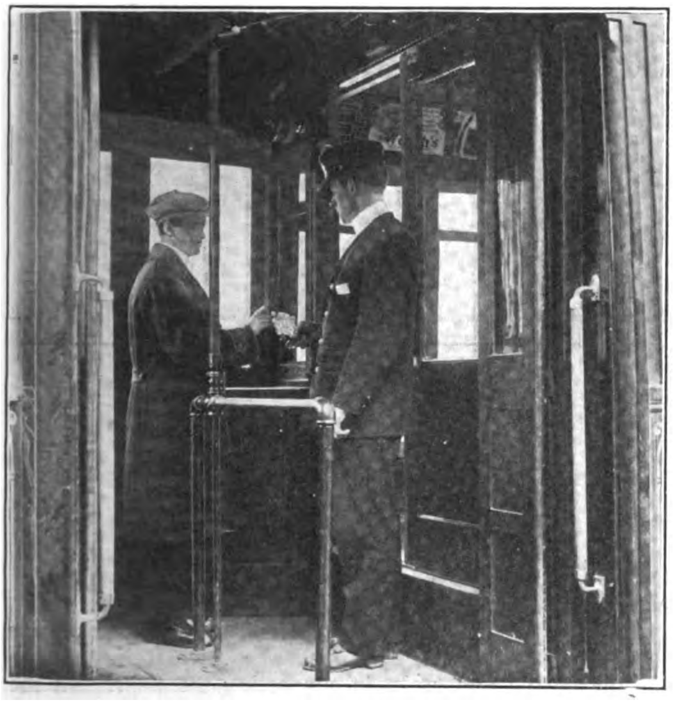
Equipped complete, a maximum speed of 30 m.p.h. has been obtained on level track and 23 m.p.h. on a 2 per cent grade. A test of the braking shows that even at the high speeds attained when going down grade the car is readily brought to a stop. This is accomplished by a hand lever which operates brakes on all four wheels at one time. The lever is located within convenient reach of the seat and applies the brakes if moved in either direction.

The overhead line department at Milwaukee considers these gasoline cars as equipped to be valuable assets for emergency use. They are especially applicable to interurban lines of considerable length, and it is expected that they will minimize interruptions of service and enable the company to win the approval of the public through its ability to cope with any situation which may arise.

FARE COLLECTION AT PROVIDENCE

The use of the Rooke system of automatic fare collection on the lines of the Rhode Island Company has increased from the initial trial installation of six years ago to the point where every car operated in the passenger service of the road is using this method of registration, and about 900 registers are in use.

The register is carried by the conductor, as it weighs but 21 oz. In brief, it is a small nickel-plated box having a coin slot on one side, through which the passenger inserts the nickel, the coin being drawn into the device by the mechanism of the register as soon as its edge touches certain levers within the slot, whereupon the fare is registered automatically. The coin passes entirely through the register immediately after it enters the receiving slot, ringing a bell in the register as it is recorded, and is delivered into an open receiving compartment at the bottom of the device, thus becoming available for making change. When the coin has once entered the slot it cannot be withdrawn but must pass through the register into the conductor's hand. The entrance to the coin passage is automatically closed by the passage of the coin, and no additional coin can be inserted until the re-setting of the opening by the conductor.



Providence Fare Collection—Receiving Fare in Portable Register

The Providence equipments carry two totalizing registration trains, one for nickels and one for dimes, and in the latest type of register made by the Rooke Automatic Register Company at its factory, in Providence, R. I., an additional counter is provided for metal tickets. It is not intended, however, that the public should pay fares in dimes, and while the dime registration feature is built to withstand the same hard service imposed upon the nickel-recording mechanism, the rules of the company require nickel payments alone. Signs carrying instructions for passengers as well as a request for them to have nickels ready for payments are posted in all of the Providence cars. It is, however, possible for the conductor to make change and to use both hands in so doing, since the register is provided with a ring through which the conductor passes his middle finger, and when both hands are required the register is allowed to turn upon the finger and drop after the manner of the ordinary transfer punch.

With this system the conductor has nothing to do with the registration and does not handle the money until after it is registered. While the passenger and the conductor appear to be alone in this exchange of money for service, the company is actually present interposing the register between them. The registration mechanism is sealed at the factory and traffic records are obtained by subtracting successive readings. On the lines of the Rhode Island Company and elsewhere experience with this system shows that at least 90 per cent of fares formerly lost to the company are collected by its use.

The register is in no sense a money container. It operates in full view of the conductor and the passenger, can be held in any position or at any angle best suited to the passenger's convenience or to the conditions prevailing in the car, and accommodates in its lower receptacle eight or ten fares, or at least as many as a conductor would ever accumulate with his outstretched hand before examining and pocketing them. The registration has a total capacity of 99,999 nickel readings. It is the usual practice with the Rooke system not to register transfers.

The accompanying photograph shows the application of the Rooke system to the platform collection type of car used in Providence. The conductor stands behind the railing in the vestibule, and the portable character and small size of the register are important points in the facility with which traffic can be handled. The space taken up is negligible, and in case the conductor is obliged to make change for one or more passengers in an entering line he can save time by presenting the register to others in the line without waiting for all to pass a predetermined point. Actual counts show that eighty passengers have been loaded and their fares all taken in two minutes on a single car making a stop in front of a large factory at closing time. In some cases individual registers handle as many as 3000 fares per day.

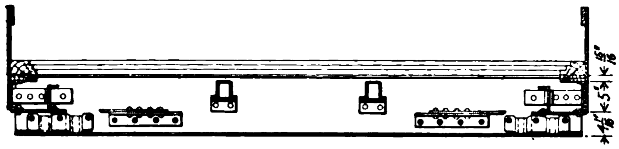
Apart from the accuracy of the system and its removal of temptation from the conductor, the makers emphasize the point that it saves the conductor time otherwise consumed in manipulating the register cord or bar, and also obviates the registration of false fares by passengers who mistake the register cord for the bell cord. On the older cars of the Rhode Island Company the conductor makes the usual personal collection from passengers on the inside, and the use of the portable register has been found a convenience to the public through its avoidance of jerky attempts to reach the ordinary register cord on the part of short conductors. The collection of fares by this method on crowded open cars during the open season has been very successful. No new printed reports of any kind were required in Providence on account of the adoption of this system. Conductors use the same trip sheets as before.

Registers are leased by the maker on terms which cover inspection and repairs. It has been found that in the extremely few cases where a register has been stolen the conductor has found the theft so great a burden that the registers have been anonymously returned. A brief account of the operating rules for the Rooke system was given in the Electric Railway Journal for Nov. 30, 1911, page 1321, together with an outline of the legal decisions upholding them.

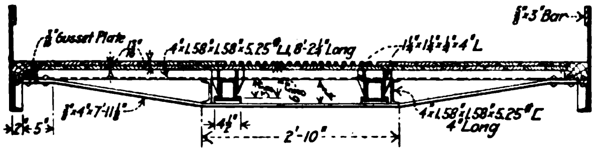
An American consul reports that several municipalities in a Latin-American country, with the approval of the national government, are offering very favorable terms and concessions to persons to build an electric railway to connect certain points. The line will be about 36 miles long, over a generally level and easily graded country, well watered and provided with ample water power for the plants. Contractors and companies interested in electric railway construction and materials can obtain further particulars by addressing No. 10494, Bureau of Foreign and Domestic Commerce, Washington, D. C.

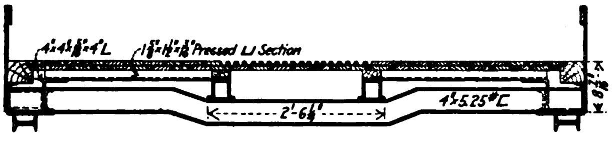
NEW CARS FOR ROCHESTER

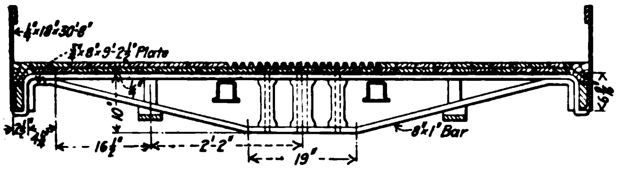
Twenty cars which were recently put into service on the Rochester lines of the New York State Railways show the effect of careful design with a controlling purpose of reducing weight without sacrificing necessary strength. The new car weighs 35,900 lb. and the seating capacity is forty-six, giving a unit weight of 780 lb. per seat. As shown in the accompanying cross-sections of the underframe, all of the weight is carried by the reinforced side sills. While the design is special the standard parts used by the manufacturers were employed as far as possible and in construction the original designs were slightly modified to facilitate manufacture. A folding door and step and an original sanding device due to G. M. Cameron, master mechanic, are among the interesting features.

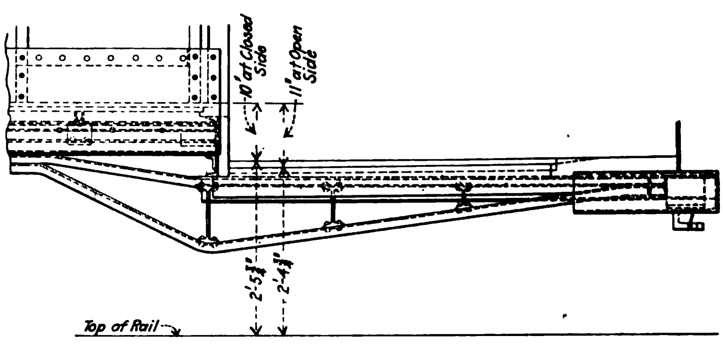


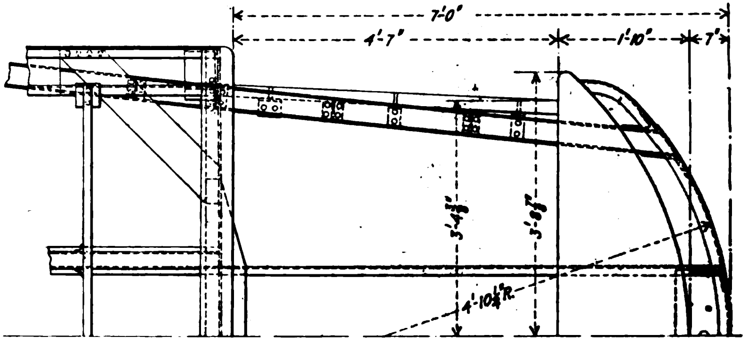
Section at Rear End Sill


3/8" Gusset Plate
4"x1.58"x1.58"x5.25# ⊔, 8'-2 1/4" Long
1 1/4"x1 1/4"x 1/4"x4" L
5/8"x3" Bar
5/8"x4"x7'-11 1/8"
2"
5"
4 1/2"
2'-10"
4"x1.58"x1.58"x5.25# C 4" Long
Section at "A" and "B"

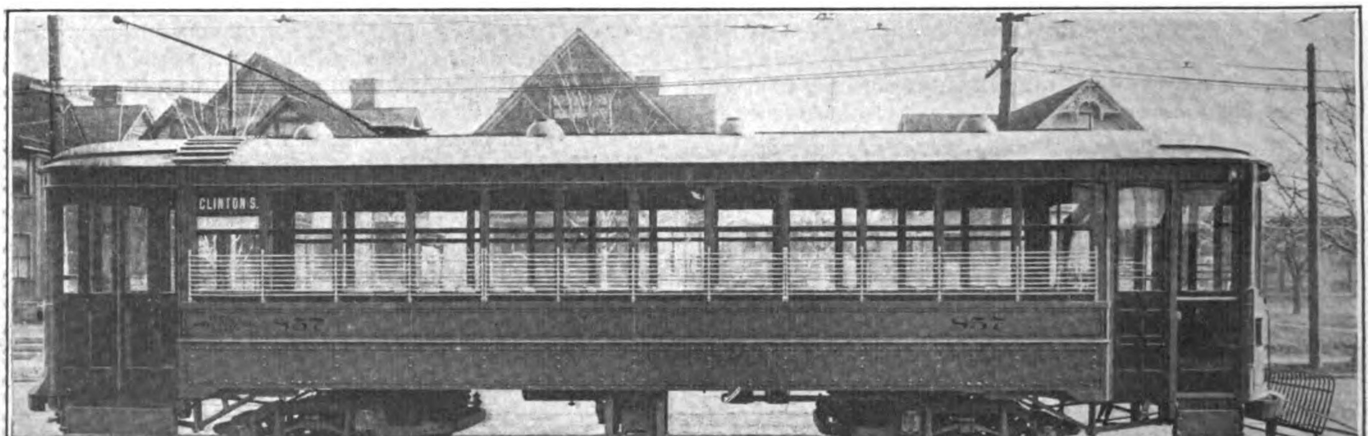

4"x4"x 3/8"x4" L
1 5/8"x1 1/2"x 1/8" Pressed ⊔ Section
2'-6 1/4"
4"x5.25# C
8 7/16"
Section at End of Platform
Knee Braces


1/4"x18"x30'-8"
3/8"x8"x9'-2 1/2" Plate
10"
2 1/2"
4 1/2"
16 1/2"
2'-2"
19"
8"x1" Bar
6 1/16"
Section at Bolster


10" at Closed Side
11" at Open Side
2'-5 1/4"
2'-4 1/4"
Top of Rail


7'-0"
4'-7"
1'-10"
7"
3'-4 5/8"
3'-8 7/8"
4'-10 1/4" R.
Rear Platform

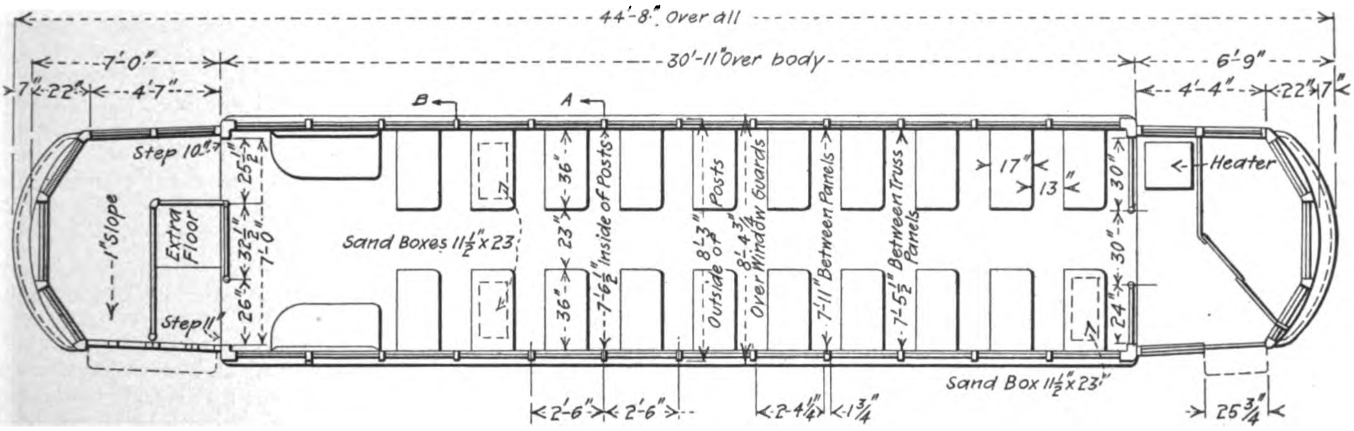
Rochester Cars—Details of Framing



Rochester Cars—General View Showing Folding Doors and Steps

The underframe is very light, but the liberal factor of safety of six was allowed in the essential parts. The side sill consists of a steel plate ¼ in. x 18 in. At the bottom on the inside is riveted a 5-in. steel channel weighing 6½ lb. per foot. This serves to stiffen the sill and also to support 4-in. channels, weighing 5¼ lb. per foot, which connect the side sills and in turn support the floor. At the top of the sill, on the inside, is riveted a steel stiffening bar, ⅝ in. x 3 in. The bolsters are built up of 1-in. x 8-in. steel with the ends bent so as to hook under the side sill. The under frame is braced in the center by diagonal straps ⅜ in. x 3 in. and at the corners by straps ¼ in. x 6 in. There is no center sill, but in place of this there are two pressed-steel box shapes which form conduits for the wiring and assist in supporting the floor. In the present cars these conduits do not project under the front platform, but in the next cars one will be continued to a point under the controller to give additional protection to the wiring.

The design of the body is not radically different from that of other recent prepayment cars with arch roof. There is no bulkhead separating the platform space from the main portion of the car. A light railing takes its place and the cross seats are placed close to the railing. The motorman's compartment is inclosed by a light partition which cuts off a part of the front platform. The hot-air heater is located outside of the compartment, but in later cars the location of the partition will be changed so as to include the heater in it. To facilitate the cleaning of the floor under the seats a type of seat was selected with no obstructions below. These seats are supported upon shelves on the window side and pedestals on the aisle side. When the cushions are lifted off for sweeping there is no obstruction to interfere with the motion of the broom.



Rochester Cars—Plan Showing Seating Arrangement

A new form of folding door and step is used. The door is folded away from the center by means of cranks and rods operated from an overhead shaft, the two sections of the door being hinged on vertical shafts. The rear-door shaft is connected with a crank and lever below the floor to raise and lower the step. The doors are guided by means of rollers mounted on bearings near the tops of the doors and working in a guide groove. The form of this groove was worked out experimentally to give a straight-line motion to the inner door edge and also to lock the door in the closed position. The position of the operating strap from the overhead shaft is such that the conductor is obliged to look toward the door in closing or opening it, so that he gets a good view of boarding or alighting passengers.

In the motor and control equipment the important fact to be noted is that field control is used in connection with a manual controller. The motors are Westinghouse No. 307-A-3 and are the first of this type to be made with split frames. They are mounted on maximum traction trucks. The controller is type K-51-A, which, through the use of field control, provides four running points.

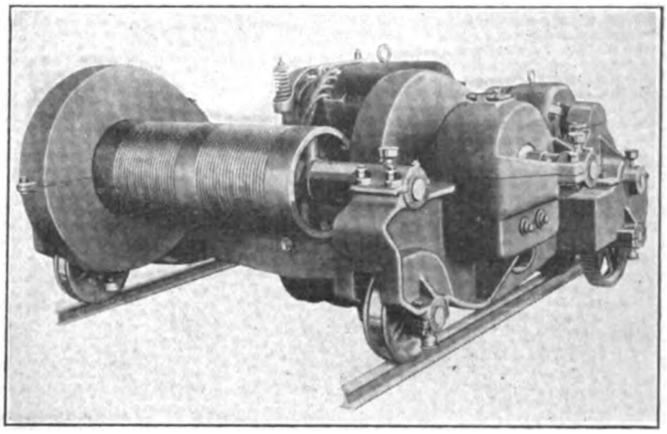
The bell cord is carried under the center of the arch roof in a small conduit and is thus out of the way of passengers' hats. It is used only in emergencies as the signaling to the motorman is done automatically by the opening and closing of the rear door. Signaling is accomplished by a contactor mounted at the rear end of the overhead shaft which operates the door, and signal lamps in the front of the motorman's compartment are illuminated when the door is closed. The contact cannot be made until the door is tightly closed because the shaft has to move through a considerable angle after closing the door in order to lock it. It is during this locking period that the signal lamps are lighted.

A series of tests has been conducted during the past three months to determine the operating efficiency of the new cars. A sample car was equipped with a Sangamo watt-hour meter and observations were made for many days. These comprised, for each trip, the time of beginning and ending the trip, the number of passengers carried, the number of stops made and the energy consumed. From this information the results were reduced to standard form. The tests were made on the Clinton Street line, which is about 4 miles long and extends in both directions from the business district. The gear ratio used was 16:82.

The tests show that, with approximately 100 passengers carried per hour, seven and one-half stops per mile were made with a schedule speed of 8.3 m.p.h. The energy consumption was 2.4 kw-hr. per car mile, or 119 watt-hr. per ton mile, the values for different days being quite uniform although there was a great variation in the results of individual runs.

A NEW CRANE TROLLEY WITH INCLOSED GEARING

A new design of trolley for electric traveling cranes has been brought out by the Whiting Foundry Equipment Company, Harvey, Ill. All gears are inside the main bearings and this absolutely prevents gears from working off their shafts and falling below. The trolley trucks are steel castings of I-beam section, and the bearing caps are held in place by bolts which extend through the flanges, making them very accessible. The mechanical brake of the hoisting mechanism is contained in a pocket in the truck. Necessary adjustments can be made without removing cover.

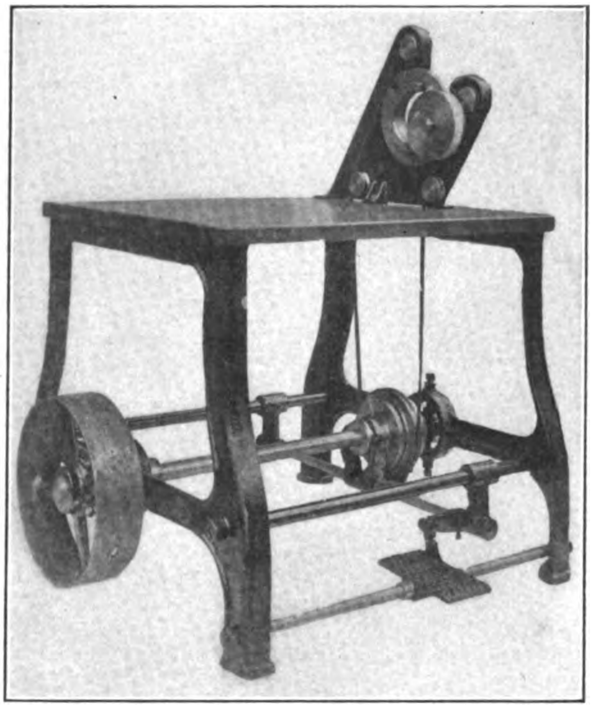


Electric Traveling Crane Trolley of the Completely Inclosed Type

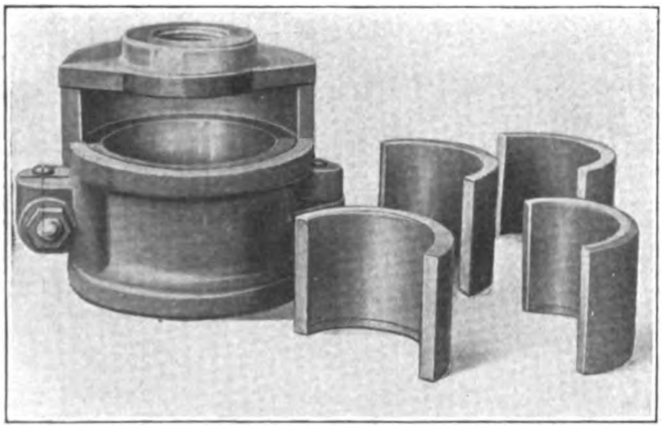
Both the hoist gearing and the trolley travel gearing have only two reductions from the motor. All gear cases are cast iron with horizontal machined joints, and liberal opening is provided in each case for inspection and lubrication of gearing. The shaft boxes are all integral with truck castings. All bearings are cast iron with babbitted shells except the axle bearings, which are bronze, and all bearings are machined to gages, turned on the outside and fitted into bored boxes. It is claimed by the manufacturers that this trolley, which is made in an unusually wide range of capacities, is the most accessible of the trolleys with gearing completely inclosed that are on the market. Modifications in construction are, however, made to meet special conditions of customers when necessary.

TWO NEW AIDS FOR THE ELECTRICAL SHOPS

The Columbia Machine Works & Malleable Iron Company, New York, has lately enlarged its line of electrical specialties by the addition of the armature-coil taping machine and lathe chuck for boring bearings shown in the accompanying illustrations. The new taper is an improved machine which has already shown its worth in the shops of the Interborough Rapid Transit Company, New York, and of other railways. This machine, of course, permits the coils to be taped much faster than could be done by hand, and it also permits better work because it pulls the tape tighter and more uniformly. The operating speed can be increased from 100 r.p.m. to 225 r.p.m. in accordance with the growing skill of the operator. The entire mechanism, including the drive, is carried on a metal framing, which has a hard-wood top 24 in. x 36 in., to give a handy work table. The driving pulley is located near the floor line in a position which makes it equally accessible for drive from above or below. A friction clutch and automatic brake serve to stop the machine instantly at any point of revolution when the operator removes his foot from the treadle.



Armature Coil-Taping Machine



Lathe Chuck for Armature and Axle Bearings

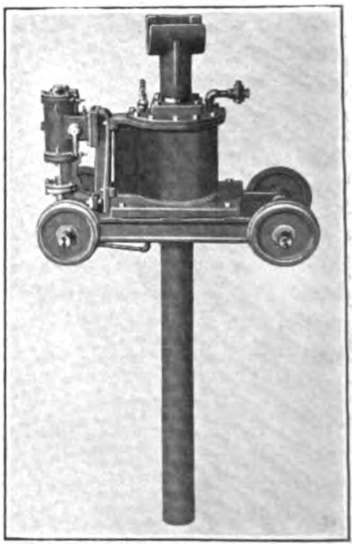
The lathe chuck for boring axle and armature bearings is threaded to fit any lathe spindle, and with it bushings are furnished to accommodate all sizes of bearings which the customer uses. An allowance of 1/32-in. to finish the bore is left by the manufacturer so that the chuck will be absolutely true on the user's lathe.

As an example of the high-grade miscellaneous work done by the Columbia company, mention may be made of the fact that it now has in hand 250 lighting generators of axle-driven type for steam railroad service.

AN IMPROVED PIT JACK

The Watson-Stillman Company, New York City, has recently made an important change in the construction of its hydraulic pit jacks by replacing the old fashioned hand-operated pumps by pumps which are driven by air engines. These are attachable to any style or size of jack manufactured by the company. The use of compressed air at about 90 lb. per sq. in. pressure has become so universal in repair shops that the air-driven engine adapts itself admirably to modern shop equipment, and to make the air connection for one of the new pumps it is merely necessary to run a rubber hose or other flexible tube from the nearest air main to the pump engine just as is done in the case of pneumatic riveters. The operating valves can be placed in any convenient position which will invariably permit the foreman or man in charge to operate the lift in addition to directing the work of his men. The use of this air engine therefore eliminates one man—the pump operator—from the crew.

By the use of air power the speed of operation is very greatly increased. When it is desired to raise the saddle up to the work air is admitted directly to the top of the reservoir, thus forcing the water into the cylinder and lifting the ram at almost any desired speed. As soon as the load becomes too great for this pressure the air is by-passed into the air engine, which in turn lifts the ram. In the jack shown in the accompanying illustration the ram is raised at the rate of 7½ in. per minute, whereas only 2 in. per minute is attainable with a hand power pump. The jack illustrated has a lifting capacity of 10 tons and a total raise of 103 in. The ram is telescopic in two lengths of 4-in. and 5-in. diameter respectively, and since it is equipped with an air power pump it embodies the latest feature in these tools.



Pit Jack with Air Pump

Five per cent of the gross receipts from the sale of tickets on New York's subway and elevated lines on Monday, March 31, was contributed toward the relief of the flood sufferers. Monday is normally the day of heaviest traffic. The total contribution amounted to $6,073. This indicates that about 125,000 more tickets were bought than during any previous twenty-four-hour period in the whole history of the company.

LONDON LETTER

(*From Our Regular Correspondent*)

The Tramways & Light Railways Association held its annual meeting in February followed by a successful dinner at the Trocadero Restaurant. The Hon. Arthur Stanley presided at the meeting. He referred to the principal feature of the year, the passing of the government's light railways act. The association did not get all it desired as it was still necessary for trackless trolley schemes to proceed by bill as before, instead of being promoted as light railways. Many matters connected with the national insurance act had received attention, and the association had also negotiated with the General Post Office in regard to guard wires, and a special committee was actively engaged in the preparation of a set of standard rules for motormen and conductors. Mr. Stanley also presided at the annual dinner. Mr. Stephen Sellon proposed the toast of "Our Guests" and referred to the excellent work which the association had been able to do in the modification of the light railways act. He also congratulated the Municipal Tramways Association upon the work it had accomplished and upon the way in which that association worked in conjunction with the Tramways & Light Railways Association. Lieut.-Colonel Sir Arthur Yorke, responding for the guests, stated that it was a pleasure for him as a Board of Trade official to do all that he could to assist tramway enterprise. A. R. Fearnley, president of the Municipal Tramways Association, proposed the toast "The Tramways and Light Railways Association." During the past year the two associations had the satisfaction of co-operating in a number of matters referred to. He trusted that the result of the visit of the deputation to the Postmaster-General on the matter of control of all telegraph and telephone wires would be to introduce restrictions on guard wires. He hoped that the deputation might help to secure the decision of the Postmaster-General, so that telegraph and telephone wires might be placed underground in city areas at least. He also suggested broadening the scope of the association so that it might look after the interests of trackless trolleys and motor buses, as the present year promised to be a busy one in Parliament in respect to applications for that class of work. The work of the traffic board and the committee inquiring into fatal accidents in streets due to power-propelled vehicles also deserved the attention of the association. Mr. Stanley replied to the toast.

General satisfaction is expressed at the decision of the London County Council not to proceed at present with the construction of tramways over St. Paul's Bridge. The great objection was that the scheme provided for a subway terminus under St. Paul's churchyard in the immediate vicinity of the cathedral. Much expert testimony was brought to bear upon the fact that the construction of such a subway created a real danger to the cathedral, the foundations of which at the present moment are evidently none too secure. Sir John Benn endeavored to get the Council's assent to the proposal to bring the tramways over the new bridge without construction of this terminus, but as the construction of the bridge is not likely to be begun for some time the Council can consult with the City Corporation regarding this later.

Stockport has completed a system of new trackless trams between Stockport and Offerton, a distance of 1¼ miles, and a quarter-hour service of cars will be maintained. Should the cars prove a success the Stockport Corporation will extend the system, probably in the direction of Marple. The overhead equipment of this system cost about £800 a mile and the cars about £700 each. The type of trackless system adopted is known as the Bremen system. In the system which has been described several times in these columns, namely, the R. E. T. system, in use in Leeds, Bradford, Dundee and Rotherham, the current is derived from and returned to the overhead wires by means of twin rigid trolley poles. In the Bremen system a flexible rope trolley is used, which is paid off from and rewound onto a spring drum as the car deviates from its path. The weight of the trolley is suspended from the upper (negative) wire. The Stockport installation is the first of its kind in England.

A new 5000-kw turbine for the Pinkston power station of the Glasgow Corporation Tramways has been formally taken over from the makers. About three years ago the corporation installed a turbine of 3000-kw capacity, and this, with the original reciprocating engines, carried the whole load. Now the entire electricity supply will be provided by the two turbines. The original engines will be reserved for emergency use. The new turbine and generator cost about £10,200, making in all £20,400 for both turbines, as compared with £102,000, the cost of the original plant.

The Glasgow tramways committee has decided to allow policemen in uniform and while on duty to travel free on the cars.

The Manchester tramways committee has decided to contribute £100,000 in relief of the rates, after allowing for depreciation and other incidentals. It is pointed out that improvements have been made during the year in the conditions of service for tramway workers, the penny stages lengthened and the age raised for the payment of half fare. The sum mentioned is the largest that has been contributed by any municipal undertaking for the same period. The service has been established ten years and the system has contributed altogether £700,000 toward the relief of the city rates.

A new type of petrol-electric motor omnibus is being tried on the Hastings roads with a view to its being approved for use on the Front line. The question of the best system of locomotion for the Front has been raised by the action of the Hastings Tramway in promoting a new bill in Parliament, and this has roused frontagers to opposition, unless some undertaking is forthcoming that shall not provide overhead wires. A conference is to take place between the company and the Corporation on the subject. The Board of Trade has intimated that it intends to condemn the stud system in six months' time, and this fact, together with the trial of the new bus, may have some effect in leading to an amicable solution of the traffic problem at Hastings.

The work of electrifying the East London Railway has been completed. The line is 5¾ miles long and the work has been undertaken by the engineering departments of the various railways interested in this line. It runs from Shoreditch to New Cross via Whitechapel and Wapping, and is leased to as many as six companies, the Brighton, Great Eastern, Southeastern, Chatham & Dover, Metropolitan and Metropolitan District Railways. The system is the same as on the Metropolitan and the Metropolitan District Railways, and current will be supplied from the Lots Road power house at Chelsea. The new passenger service will be provided by the Metropolitan Railway. A complete system of automatic signaling has been installed. The cost of conversion, estimated at about £90,000, is being borne by the Great Eastern Railway.

The London City Council, by means of reduced tramway fares, return tickets and other devices, appear now to be able to hold its own against the competition of the motor omnibuses. For the first time in nine months an increase in the traffic receipts is recorded. The Council has recently been experimenting with number plates on the cars to indicate the route, and it has been decided to adopt the scheme for all its lines. It has also decided to proceed to equip a number of trail cars for service in the Woolwich district. Old horse-car bodies will be employed for this purpose. They will be equipped with route indicators and wired for electric lighting, the bodies being mounted upon light strong underframes of standard rolled steel sections. In addition to the drawbar, the trailer is connected to the tractor by a bell cord, a jumper cable for the lighting circuit and a pair of telescopic gates protecting the gap between the two cars.

At a meeting of the Rotherham Council the chairman presented some figures as to the successful working of the R. E. T. trolley omnibuses, which have now been working for about six months. The period under review, however, was for four months, and the average receipts for these four months, at the worst part of the year, were 10.03d. per car mile, and the total expenses, including capital charges, slightly over 7d. The engineer and manager estimate that the average cost throughout the year will be lower than this figure, while the receipts ought to increase. Included in the cost of 7d. is a sum of ⅜d. per bus mile for road maintenance and 1⅜d. per unit for electrical energy.

A. C. S.

News of Electric Railways

The Kansas City Franchise Negotiations

Senator James A. Reed, who is acting as adviser to the city administration of Kansas City, Mo., in the negotiations which are being conducted between the city and the Metropolitan Street Railway for an extension of the franchise of the company, presented the proposal of the city to the company at a meeting of the representatives of the company and the city on March 19, 1913. The terms as outlined by Mr. Reed follow the conditions which Mayor Jost set forth in the tentative franchise offer of March 6, 1913, which was referred to at length in the ELECTRIC RAILWAY JOURNAL of March 22, 1913, page 555. The proposal of March 19, 1913, includes the following provisions: A capitalization equal to the company's $28,700,000 bonded debt, and a return of 6 per cent on that for thirty years; a sinking fund to be the property of the city and kept up by taking, first, 2 per cent from the gross earnings before paying interest on bonds, upkeep and other operating expenses and then the remainder to go to the sinking fund; 5-cent fare for three years, after which the city is to have the privilege of making the fare six tickets for a quarter, and if the city should exercise its right to purchase the property within ten years, it is to pay the cost of refinancing not to exceed $1,000,000.

Ford F. Harvey, one of the receivers of the company, conferred on March 20 with Mayor Jost in regard to the proposal. The other receiver, R. J. Dunham, was in Chicago and could not be present at the conference. Mr. Harvey and the Mayor are said to have discussed the franchise situation for more than two hours. At the conclusion of this conference Mr. Harvey is reported to have said:

"There should be some reward for merit and a penalty for demerit. I am not particularly concerned about the matter of valuation, as that ought to be worked out from the reports of the experts, even if it be necessary to call in a third party. The real principle involved is, it seems to me, and I say it impersonally and not in any way binding on Mr. Dunham or the owners of the property, that no matter what is the fixed return on the investment, the investor should have participation in the surplus, but to what extent I am not now ready to say. That ought to be worked out. The Mayor listened attentively to my views, and I believe I made some impression upon him."

The Mayor said that Mr. Harvey had stated correctly the purport of the conference between them. He added:

"I have great respect for and confidence in Mr. Harvey, and as I understand it he did not call upon me in the capacity of a receiver, but as a friend, that we might exchange our views in the pending matter. As is well understood, I have some fixed ideas on this matter of participation, but my mind is receptive to ideas by anyone who wants to talk about participation and can show me that my attitude should be changed. I was impressed with Mr. Harvey's line of reasoning."

Terms of Proposed Agreement Between Cincinnati Traction Company and the City

The terms of an agreement to be entered into between the city of Cincinnati and the Cincinnati Traction Company have been arranged by the officers of the company in conference with Mayor Hunt of the city, and the agreement, if approved by the Council, the Mayor and the stockholders of the companies which are involved, will be submitted to the voters at a special election and if approved by them will become effective on the first day of the succeeding month.

The articles of agreement include a provision for the surrender of the fifty-year franchise by the company for an indeterminate permit, which practically makes the city a copartner with the company. At the expiration of five years, and upon two years' previous notice, the city may exercise its option to purchase the property of the company upon the valuation submitted. If the city after taking over the property releases it or sells it to some other company within five years after its purchase an additional 15 per cent is to be included in the price which the city is to pay.

The city is to build the rapid transit railway, commonly known as the loop, while the company will furnish the rolling stock and operate it as soon as completed. Officials of the company at first insisted that 2 per cent of the company's capitalization invested in the loop should be allowed it for operating the same, but this was finally waived by the company, when the city agreed to allow it an extra 1 per cent, before the final division of the net profits, amounting to 55 per cent for the city and 45 to the company, shall be allowed. The company agrees to pay as rental 5 per cent of the cost of construction of the loop on not to exceed $7,000,000, less the amount to be expended by the company for rolling stock and station equipment, and to reimburse the city for interest and sinking fund not to exceed three years during construction. This rental is to care for interest and sinking fund, so as to retire the bonds at maturity.

The company is to be permitted to earn 6 per cent a year on the betterment valuation, which is fixed as follows: "This value shall not exceed the sum of $7,216,283 plus the outstanding bonds of the Ohio Traction Company, $2,500,000. The said value shall be determined by said board by allowing the moneys actually expended for and on said properties for betterments; betterments being defined as extensions, additions, replacements and renewals, as distinguished from repairs and maintenance, and adding thereto the reasonable and necessary cost of securing such moneys for the purpose for which they were used and at the time secured, and such sum or percentage as may be deemed by said board equitably to be allowable to the Cincinnati Traction Company and Ohio Traction Company for contractors' profits and other proper expenses; provided that if the said board shall find that the said companies have not expended on said properties for maintenance during their occupancy, in addition to said expenditures for betterments, a sum equal to 14 per cent of the aggregate gross earnings thereof, including the 6 per cent on gross earnings paid to the city of Cincinnati, then and in such case the net value shall be reduced by the difference between said 14 per cent as aforesaid and the sums actually thus spent for maintenance, including such 6 per cent paid to the city of Cincinnati, and if the said board shall find that the said companies have in addition to said expenditures for betterments expended in excess of such 14 per cent for maintenance, this said value shall be increased by such excess. All not to exceed $7,216,283."

The proposals pertaining to the reduction in fares follow: Six tickets for a quarter or 5-cent cash fare on Cincinnati Street Railway system, with universal transfers on that system, or 5-cent cash fare with transfers throughout the street railway system to and from rapid transit system and Millcreek Valley system; 5-cent fare on Millcreek Valley system within city limits, with transfers to and from the street railway system and rapid transit lines; 5-cent fare on rapid transit line with transfers to and from Cincinnati street and Millcreek Valley systems. Universal transfers from any point to destination, but no round trip; 25 cents per car mile to be charged for interurbans on city lines. Provision is made for a readjustment of fares every five years, while the city, through its supervisors, may require adequate service and proper maintenance, extensions and betterments.

To safeguard low fares and provide against any possible excuse at any time on the part of the company to permit inefficient service because of its inadequate earning power a reserve fund of $750,000 will be created immediately by the sale of securities, the proceeds of which are to be invested in city bonds. This reserve fund must first be exhausted to meet any deficiency in its earnings before any attempt is made to revise the fares upward. The gross receipts are to be applied as follows:

1. Operating expenses, including 6 per cent street maintenance fund to the city and taxes.

2. Rents to Cincinnati Street Railway, the city for rapid transit line and other rents, interest and sinking fund on $2,500,000 bonds of Ohio Traction Company.

3. Six per cent on betterment valuation.
4. Any deficit due the city.
5. Amount necessary to reimburse the assurance reserve fund.
6. Amount necessary for renewal and depreciation reserve fund.
7. One per cent on betterment valuation.
8. Ten per cent employees' pension fund and subject thereto 55 per cent to the city and 45 per cent to the company.

The board of supervisors which will manage the affairs of the company for the city will consist of three members, one to be appointed by the Mayor, one by the board of sinking fund trustees and one by the company. This commission will have absolute power to supervise operation, service, accounting, rates of fares, transfers, extensions, betterments, maintenance and rates charged interurbans. The decisions of this board, however, are subject to revision by the Public Service Commission or a court of competent jurisdiction. All books and records of the company are to be open for the preparation of cases for arbitration from the date of the approval of the agreement by the people until arbitration is closed and thereafter to the Public Service Commission.

W. Kesley Schoepf, president of the company, in a statement which he made after the tentative agreement had been reached, said in part: "While it was necessary for the company to make a great many concessions which will result in rigid economy and close attention to operation to enable us to live under the new conditions, I realize that the construction of the rapid transit line will mean so much to the city that its growth and prosperity in the future will operate to the company's advantage as well as to every other interest in the city. It remains for me to convince the Cincinnati Street Railway and the Ohio Traction Company stockholders that the settlement is one that they should ratify. If they inform themselves thoroughly of the exact situation I believe they will approve the action which has been taken."

Award of Arbitrators in Chicago Wage Controversy

The board of arbitration which for more than five months has been taking testimony and considering the demands of the employees of the railways in Chicago for an increase in wages has presented its findings. In general 2 cents an hour increase was awarded to the men. This applies to all men who have been with the companies eighteen months or more. The increase dates back to Aug. 1, 1912. The men asked an increase on the average of 5 cents an hour. The new scale compares as follows with the demands of the men, the present rate and that offered by the companies:

	Award	Offered	Asked	Present scale
First three months	$0.23	$0.23	$0.30	$0.23
Second three months	.25	.25	.30	.23
Second six months	.26	.26	.30	.25
Third six months	.27	.27	.30	.26
Fourth six months	.28	.28	.30	.26
Third year	.29	.29	.35	.27
Fourth year	.30	.30	.35	.28
Fifth year	.31	.31	.35	.29
Sixth year	.32	.31	.35	.30

The arbitrators were Justice Orrin N. Carter of the State Supreme Court, who was chairman of the board; Harvey B. Fleming, representing the companies, and Judge Kickham Scanlan, representing the men. The majority report was signed by Justice Carter and Mr. Fleming. Justice Scanlan dissented. He presented a minority report. Justice Carter said in part:

"No two authorities will agree on the question of a living wage or a fair wage. An income that one family could live on another family of equal size would find inadequate, while still a third could live on that income and save something. Writers on the subject usually place a fair living wage for an average family at from $800 to $1,000, though there are some who put the figure above or below these amounts. The statistics introduced in the record shows that the yearly income of the ordinary laboring man is less than $800 a year. As a matter of fact, every one knows that many families in this city are living on less than $800.

"The phase 'living wage' is often used by different people with a different meaning. Some use it as meaning the actual cost of living, others as having the same meaning as a 'fair wage.' If the actual cost of living were the only standard by which to fix wages, then all wage earners should receive the same income, for then it might well be argued that all families of the same size should live on the same income.

"With that definition responsibility, skill and experience would count for nothing in fixing the wage scale; then the janitors and car cleaners employed by these companies whose wages we have been here called upon to fix should receive pay equal to that of motormen and conductors. No one connected with this hearing expects or desires this.

"The men requested this board to allow $2.25 per day for the first year's work for car cleaners, janitors and terminal men. This, as I figure it, would give the men an income of less than $800 a year. The finding which Judge Scanlan and I signed as to the pay of car repairers, motor repairers, inspectors and dopers allows $2.20 per day for the first year's service. This was Judge Scanlan's proposition, which I accepted and voted for. This finding for these men will give them less than $800 a year income.

"Representatives of the men have argued that the increase of wages of the street car men in Chicago has not kept pace with the increased cost of living, while it has been contended by the representatives of the railway companies that the cost of living has increased less rapidly than the increase in wages. Here the evidence is not conclusive. The data as to the increase of wages and the cost of living are not such, in my judgment, as to justify any positive finding on this point. Every one recognizes that responsibility, skill and experience should count for something in fixing the rate of pay. For this reason I have felt that the discussion should not be as to a living wage, but as to a fair wage.

"The findings made by a majority of the board increase the pay of all trainmen on the South Side lines; for the majority of them the increase is 2 cents an hour. To the men on the 'swing runs' ten minutes' additional time is allowed for the second 'pull out,' for which they are paid. It was stated during the hearing that the North and West Side lines were to abide by the decision of this board as to the South Side lines. The pay of all motormen and conductors on the North and West Side lines will therefore be substantially increased—for the majority 2 cents an hour. The findings also increase the pay for some of the North and West Side trainmen five minutes for turning-in time each day.

"In addition to that, all of the men on the North and West Side lines will be allowed fall-back time for meals (not allowed them under the old contract) for which the company will pay. The working conditions on 'swing runs' and regular Sunday runs will be appreciably improved by the agreement of the parties and the findings of this board under the contract that will now go into force. These findings will cause the North and West Side lines to cease giving extra pay to the trainmen in the so-called night car service. This will affect less than 150 men (to be exact, the record shows 130) out of more than 10,000.

"No one will deny that all men should have some time for rest and recreation. The long working hours of the men on 'swing runs' are such that it would be out of the question for them to undergo the strain of such work day in and day out—Sundays included—during the entire year without lay-offs. Indeed, the trainmen on the so-called 'straight runs,' with the responsibilities that rest upon them, could not do their work without such lay-offs.

"Every one connected with the street railway business in large cities realizes this. Doubtless for this reason there has grown up in this city on the street railway systems a practice of having an extra list of experienced men who can be called into service to take the place of the regular men at any time desired, so that the latter may be allowed lay-offs. The employees favor this plan. I judge from this record that one-fourth or one-fifth of the trainmen employed on the South Side lines are extras, that is, that the average regular man, either because he finds it necessary for his health or because he wants the time for rest and recreation, lays off from one-fifth to one-fourth of the time—an extra man taking his place.

"If I could have seen any way to figure out a schedule of Sunday runs as requested by the men that would go into force at once, I should have been very glad to have voted for it; but on the record it did not seem to me possible for this board to figure out any practicable scheme that could go into force at once. I therefore agreed to the finding that the requests of the men as to the Sunday runs should be put in force as soon as practicable. The wages of the employees other than the trainmen, in my opinion, are fixed by these findings as high as any workmen employed in like lines of labor in this or other cities. The wages fixed for each class of employees were reached in each instance by a compromise.

"With the views that each arbitrator held on many of the points at issue, an agreement could be reached only by compromise. A disagreement might mean a strike. To avoid the danger of such a situation I accepted the responsibility of this work."

Decision in Des Moines Franchise Case

The Supreme Court of Iowa has reversed the decision of Judge J. H. Applegate of the District Court of Dallas County and holds that the Turner franchise of 1868 is not perpetual and that the franchise of the Des Moines City Railway has expired, or at least has been indeterminate since 1898. The Supreme Court concludes its decision in part as follows:

"Our final conclusion is that the franchise has expired, or at least has been indeterminate since the year 1898, but that it would be wrong and inequitable to grant an immediate ouster. We think the company should have a reasonable time to negotiate an extension or renewal of its franchise, or if this cannot be done that it have the same length of time to dispose of its property to some one who will consent to operate under such reasonable franchise as the voters of the city of Des Moines may see fit to grant or to dispose of its property to the city itself should it elect to purchase, or, failing all this, that it have the right to remove its plant, without let or hindrance, subject to any rights it may have against the city or any of the property owners growing out of its payments for a referendum vote and perhaps two submissions to the people at general or special election and much detail work. We are constrained to grant the company the full period of two years from and after the filing of this opinion with which to make compliance herewith.

"It follows that the trial court was in error in holding that the street railway franchise had not expired, and its judgment must be and it is reversed. It is our duty, as we view it, to enter such judgment as the trial court should have entered; and as each party moved for a directed verdict, we believe we have full power in the premises to direct what the final order should be. The case will therefore be reversed and remanded, and at plaintiff's option, a final judgment will be entered in this court.

"It seems, in view of the past history of this controversy, that it is time for some tolerance on both sides. A street railway is absolutely essential to the future growth and development of a city. On the other hand, a street railway has a social profit which cannot be entirely overlooked. Every increase in population, by reason of birth or removal to a city has added to the valuation of its property. Defendant's franchise, were it existent to-day and in perpetuity, would be worth large sums of money. Doubtless the original promoters conducted the business at a loss for a certain length of time and may never have profited a cent therefrom, and they and their successors are entitled to great consideration. Regard, too, must be had for the fact that with the growth of the city the company must necessarily be put to great expense in the way of making extensions and improvements in its plant and must often go into localities which are not now populated at all, or if at all, very meagerly, and by these extensions it builds up and adds value to the property of every citizen. In the final adjustment of matters, we have no doubt that all of these, as well as many other considerations, will be taken into account and we grant the time indicated in order that there may be a period for sober reflection and in the end sound judgment exercised."

Regulation and Not Administration Should Be Function of Commissions

In connection with the bill before the Legislature of Pennsylvania to create a public service commission Randall Morgan, first vice-president of the United Gas Improvement Company, Philadelphia, Pa., and a director and officer of other public utilities, has expressed himself in regard to the function of public service commissions as he views them. He says that the danger of all such legislation is the tendency to impose on the commissions the duty of administering the affairs of corporations. This duty he regards as the proper function of the board of directors elected by the stockholders. The line of demarcation between regulation and administration is often difficult to establish, but it should be clearly drawn. It would be physically impossible for a commission of seven men such as is proposed in Pennsylvania to administer and regulate all the public utilities of that State. The labors of the members of the commission should be confined to regulation necessary to insure good service at reasonable rates. Pennsylvania should profit by the mistakes of the early commissions in other states. The investor should be made to feel that he will be treated fairly by the Legislature and that the property in which he is interested will be permitted to earn sufficient money to provide a fair margin in excess of that which is necessary to meet the annual charges. The fewer mandatory provisions of a bill such as that before the Pennsylvania Legislature the better will the public be served.

Report and Recommendation on the Railroad Situation in New England

The directors of the Boston Chamber of Commerce have issued their report and recommendations upon the railroad situation in New England. The report is addressed to the members of the chamber and a meeting of the full chamber has been called to discuss and take action upon it. Among other things the directors recommend that the Chamber of Commerce take the position that at the present time there should be no legislation which would terminate the existing relations between the railroads. The directors also recommend that the railroads receive no power to acquire electric railways in Massachusetts. The recommendations of the directors in regard to the electric railways, the proposed tunnel at Boston and terminal electrification follow:

"The majority of your board of directors believes that it is unwise to permit our steam railroads to purchase electric railways in Massachusetts or acquire additional interest in other classes of property not necessary to the operation of railroads. In order to secure the improvements most needed in our railroad service we believe that the attention of the railroad management should be centred directly on the projects and problems we have reviewed, and that there should be no diversion of thought or capital to those which are not so immediately pressing. Moreover, railroad skill should be utilized in the improvement of railroad service and not in further experiment with other classes of transportation.

"The proposed tunnel under the streets of Boston would, if built, be constructed chiefly to furnish added passenger facilities, for freight can now be transferred between the yards on the north and south sides of the city by means of the Union Freight railway, and it would also be comparatively simple to transfer freight cars around the waterfront by means of car floats. The tunnel is not imperatively needed, and, in our opinion, it is better to postpone for the present its construction and to conserve the financial resources of the Boston & Maine Railroad for more urgent needs.

"What we have said in regard to the expediency of postponing the construction of a tunnel between the north and south sides of the city we think applies in general to the electrification of any substantial portion of the Boston & Maine system. We do not mean to intimate that the chamber does not believe in electrification to a reasonable extent and within a reasonable time. We believe, as your committee on transportation has already reported, that this matter should be left in the control of the Railroad Commission with power to indicate when and where a beginning should be made. Let us first secure freight cars, locomotives, improvements at the present badly congested junction points, and other facilities imperatively required."

Associated Manufacturers of Tramway and Railway Material

J. Sutherland Warner, of the Warner International & Overseas Engineering Company, Ltd., London, Eng., as chairman of the council of the Associated Manufacturers of Tramway & Railway Material, calls attention to the objects and influence of the association with regard to the tramways, railways and allied industries. He refers to the enormous annual purchases made by tramway and railway officials and the difficulties which are experienced in framing specifications and suitable standard clauses governing conditions of tender, acceptance and completoin of contracts and says that the association will work for the settlement of acceptable standard clauses and bases of intercourse between the different interests and will refer all differences to a representative council for decision so as to avoid lengthy and unprofitable disputes. The subject of exhibitions, their support and encouragement will receive consideration from time to time. All purchasers, he says, experience difficulty in securing and maintaining touch with manufacturers and their agents and he believes that the occasional attendance of buyers at well-organized exhibitions is essential. The council of the association has considered the question of national and international representation and has decided to admit foreign manufacturers to the association. Mr. Warner says that many influential manufacturers are already members of the association, the subscription of which is £2 2s. annually. Applications for membership should be sent to William Hopkins, secretary of the association of Manufacturers of Tramway and Railway Material, Westminster Palace Hotel, London, Eng.

Temporary Operation of Steinway Tunnel

Within a few months the Steinway tunnel, under the East River, and the Centre Street loop subway in Manhattan will be placed in temporary operation. The Public Service Commission for the First District has authorized the Interborough Rapid Transit Company to arrange to place the Steinway tunnel in operation at the earliest possible date and has directed the New York Municipal Railway Corporation (Brooklyn Rapid Transit Company) to connect its elevated railroad tracks crossing the Williamsburg Bridge with the Centre Street loop subway and to operate the same temporarily from the bridge down to the Chambers Street station underneath the new Municipal Building.

The operation of the Steinway tunnel will prove a great benefit to the people of Queens Borough. The tunnel, which runs under the East River from Forty-second Street, Manhattan, to Long Island City, has been completed for nearly five years, but has never been operated because the company had no valid franchise for its use. Under the dual system contracts the tunnel was sold to the city and became a part of the city's rapid transit system. It will be operated as a part of that system by the Interborough company. Eventually it is to be extended in Manhattan westward to Times Square and in Queens northeasterly to the Queensboro Bridge Plaza. Pending the completion of these extensions the contracts provide for temporary operation, and this will probably be effected by the use of trolley cars with free transfers to and from the existing subway at the Grand Central Station.

A large portion of the travel to and from Brooklyn will be benefited by the temporary operation of the Centre Street loop subway. This subway connects the Williamsburg, Manhattan and Brooklyn Bridges, and as soon as connection can be made with the tracks over the Williamsburg Bridge Brooklyn elevated trains, which now discharge their passengers at the Manhattan end of that bridge, will be brought through the subway down to the City Hall. There are stations at the Bowery, Canal Street and Chambers Street, so that many passengers who now have to pay an additional fare to get downtown from the Williamsburg Bridge will be enabled to travel without change of cars to their destinations. The greater part of this subway has been completed for some years, but the completion of the southernmost section was delayed by the construction of the Municipal Building, in the basement of which the terminal station is located. Eventually the subway will be extended down Nassau Street to Broad Street and through Broad Street to a connection with the Whitehall-Montague Street tunnel to Brooklyn. It will be operated by the New York Municipal Railway Corporation as a part of the dual system.

The Public Service Commission for the First District has approved the assignment of the dual system contract with the New York Municipal Railway Corporation to the New York Consolidated Railroad. The latter company is the owner and present operator of the Brooklyn elevated railroads, which are to become part of the dual system. The New York Municipal Railway Corporation made the contract with the city and now transfers it to the New York Consolidated Railroad, which will be the operating company. The Municipal Railway Corporation will provide the money to carry out the terms of the contract with the city, and the Consolidated company will pay to it all earnings up to but not exceeding 6 per cent of the par value of the Municipal corporation's stock. The Consolidated company also guarantees the Municipal corporation's bonds as to principal, interest and sinking fund.

The Public Service Commission for the First District of New York has adopted and sent to the Board of Estimate and Apportionment a certificate granting to the Manhattan Railway the right to build and operate certain additional tracks on the Second, Third and Ninth Avenue elevated lines in Manhattan and the Bronx. This is popularly known as the third-tracking certificate and will enable the Interborough Rapid Transit Company, which leases the Manhattan Railway, to complete the third-track on those lines and operate through express service from the southern part of Manhattan to the terminals at the Harlem River and in the Bronx. The grant of the third-track privileges to the Manhattan Company is the last of the contracts necessary for the completion of the dual system of rapid transit to be adopted by the commission. It also ends the dispute over the question whether the certificate should be made out to the Manhattan Railway or to the Interborough Rapid Transit Company. Following the refusal of the former company to accept the grant, negotiations between the two were begun and an understanding was reached by which the Manhattan Railway agreed to accept the certificate and the Interborough company agreed to pay the Manhattan Railway $25,000 a year for twenty years in addition to the $10,000 now payable under the lease for expenses of maintenance, etc. This was followed by the formal withdrawal of the Interborough company's application, which left the commission free to issue the certificate to the Manhattan Railway Company.

Detroit United Railway Appeals to United States Supreme Court

The Detroit (Mich.) United Railway has appealed to the Supreme Court of the United States from the decision of the Supreme Court of Michigan empowering the city to eject the company from Fort Street, Detroit. In the writ of error filed in the Supreme Court, which resulted in the granting of a stay of execution to the company, it is set forth that the city has no jurisdiction over the Detroit United Railway using the city's streets, as the street railway lines in Detroit constitute part of a system operating under a State franchise. The company argues further:

"Prior to the decision of the State Supreme Court it was settled law in the State (1) that a State franchise granted to a railroad to construct, maintain and operate a railroad becomes attached to and a part of the physical property and is as permanent and perpetual as that property, and (2) that the terms and conditions of the local contract are not a part of the State franchise and quo warranto will not lie as a violation thereof. As the 'local consent' as distinguished from the terms and conditions of the 'local contract' necessarily adheres to and becomes a part of the State franchise, to maintain and operate, making it complete and effective and an individual State franchise, it follows that this State franchise (including the local consent) is property within the meaning of the due process of the law clause of the Fourteenth Amendment, and the owners of that property cannot be deprived of it by a decision of a State court any more than by legislative enactment."

The general trend of the company's arguments is to the effect that the decision of the State Supreme Court empowering the city to eject the company from Fort Street is a violation of the Fourteenth Amendment to the Constitution of the United States, which provides that no person or company shall be deprived of property without due process of law. The company also maintains that the act gives the city the right to impair the obligation of a contract, which is also in violation of the Federal Constitution.

Power Improvements of the British Columbia Electric Railway

The British Columbia Electric Railway, Ltd., Vancouver, B. C., is constructing a receiving station which will regulate the distribution of current to the company's territory on the southern mainland of British Columbia. The site for the building is on the boundary line of the city of Vancouver, where the company has a large tract of land. The total expenditure which will be made on the property is estimated at $250,000. A main receiving station and a small substation, both of steel and reinforced concrete type, are being put up. They will be one story in height, with an additional story for the transformer galleries. Four incoming lines will deliver current to the receiving station at 60,000 volts. The electrical equipment will consist of four banks of three transformers, each with a total capacity of 36,000 kw, by which the current will be stepped down from 60,000 volts to 11,000 volts. The substation which will be erected in connection with the receiving station will be equipped with two motor-generator sets and a bank of 11,000-2200-volt transformers. The supply of current for railway purposes and for public and private lighting in the vicinity of the station will be regulated from this station.

At the present time the current from the company's generating station is sent to the Vancouver substation and other substations at high voltage. When the new substation is completed the Vancouver station and other stations now connected with the transmission lines will be used as substations, receiving their current at 11,000 volts from the Burnaby station. In connection with the new arrangement the British Columbia Electric Railway will reconstruct its transmission system from the power house on the North Arm of Burrard Inlet to Burnaby to carry current at 60,000 volts. As soon as the Burnaby receiving station has been completed the company will erect a similar station near Sapperton, on the outskirts of New Westminster. The equipment of this plant will be almost identical with the Burnaby station, and the plans call for an expenditure of about $200,000. From the Sapperton station power will be sent to the company's substations in the South Fraser Valley, which cover the supply of the Fraser Valley interurban line and the demands of private parties for light and power in the district. Arrangement has been made whereby in case of accident to the transmission line current from either the Burnaby or Hastings station may be supplied to any point in the company's territory.

The company is now erecting in Vancouver a substation to cover the west end of the city, the residential and the apartment house center. This building will be 60 ft. x 68 ft., one story in height, with an additional story for the transmission gallery, and fireproof throughout. Structural steel with brick curtain walls and a concrete roof are planned. The estimated expenditure on the station will be in the neighborhood of $100,000. Current will be fed to this substation at 11,000 volts, and transmission lines will be arranged from the Vancouver substation as well as the Burnaby receiving station to afford an alternate base of supply in case of accident to either line. The electrical equipment of the Vancouver substation will consist of two 1000-kw motor-generator sets, consisting of 11,000-volt motors and 600-volt generators, this equipment regulating the current for the electric railways in the section. The station will also be equipped with one bank of three transformers of 7500 kw capacity to regulate the private and street lighting of the district.

New Road Opened in Tennessee.—The Nashville-Gallatin Interurban Railway has been placed in operation between Nashville and Gallatin.

Reply Soon to Demands of Akron Council.—Charles Currie, general manager of the Northern Ohio Traction & Light Company, Akron, Ohio, stated recently that the company will reply shortly to the demand of the City Council of Akron for extension and improvements.

Ordinance with Service Requirement for Motormen Vetoed.—Mayor John J. Irving's veto of the ordinance requiring motormen and conductors to have at least fifteen days' experience on lines of the Binghamton (N. Y.) Railway before being allowed to operate cars has been sustained by the Council of Binghamton.

Cleveland Railway Removes Offices.—The Cleveland (Ohio) Railway has removed its offices from the Electric Building, Cleveland, to the seventh floor of the Leader-News Building on Superior Street. This is a new building which was erected by Dan R. Hanna, who controls both the Cleveland *Leader* and the Cleveland *News*.

Great Northern Railway Electrification Work.—According to statements recently made public the Great Northern Railway will begin the work of construction on the Chelan River power site by April 15. The power generated will be used by the company to operate the electrified line east of the Cascade Mountains to Spokane. Plans are being made to electrify the main line from Seattle to Spokane, but no details in regard to this work have been announced.

Maine Utility Bill Signed.—Governor Haines of Maine has signed the bill creating a public utility commission in that State and on March 28 made public his appointments to the commission, which is to consist of L. B. Deasy, Bar Harbor, chairman; W. B. Skelton, Lewiston, and Joseph Williamson, Jr., Augusta. Mr. Deasy and Mr. Skelton are Republicans and Mr. Williamson is a Democrat. All three are lawyers and have had considerable experience in corporation matters.

Proposed Line Between Battle Creek and Grand Rapids.—It is stated that the Michigan & Chicago Railroad, which proposes to construct an interurban electric railway between Battle Creek and Grand Rapids, Mich., has entered into negotiations with the Michigan Central Railroad looking to the electrification of a part of the Allegan division of the road and its operation in conjunction with the line which the Michigan-Chicago Railroad plans to build. H. H. Crowell, Grand Rapids, is president of the Michigan & Chicago Railroad.

Operation of Trailers Introduces New Problems.—The installation of trailers at Cleveland, Ohio, may affect the agreement between the Cleveland (Ohio) Railway and its employees. It has been necessary to have some of the motormen do part-time duty as conductors on the trailers. They object to this. It is said that under the agreement between the company and the men no change of duties can be made except on May 1 and then only when fifteen days' notice has been given by the party desiring the change. A committee has been appointed to formulate demands and the organization will vote on the question of reopening the agreement on May 1.

Great Demand for Linemen and Electricians in Devastated Districts.—Appeals have been sent out from the flood-stricken districts for all available linemen and electricians to aid in the work of making electrical repairs. There was a great deal of repair work to be done to electrical structures in a large area west of Chicago, owing to recent windstorms, and there is still more to be done in a still larger territory, generally east of Chicago, owing to the floods. As far as Duluth, Minn., the word was sent that "every man who can climb a telegraph pole and twist a wire is wanted at Dayton and other flooded cities in Ohio and Indiana." It is said that more than seventy-five men responded from Duluth alone.

Pleasing the Public.—The *Interborough Bulletin*, published in the interests of the employees of the Interborough Rapid Transit Company, New York, N. Y., contains in its March, 1913, issue two pages of letters from satisfied patrons of the company under the title "Pleasing the Public." These pages are illustrated with line cuts depicting the acts of courtesy and honesty on the part of the employees of the company which prompted the sending of the letters to the company. They are a fine commentary on the efficiency and loyalty of the employees. The cover of the March issue of the *Interborough Bulletin* contains half-tone reproductions from five photographs showing the interior of the first of the employees' stores.

More Employees' Stores in New York.—The Interborough Rapid Transit Company and the New York Railways, New York, N. Y., have announced that two additional stores for their employees, at which groceries and other food stuff will be sold at cost, are to be opened about April 10. One of these stores is to be located immediately north of the northwest corner of Lexington Avenue and Ninty-eighth Street and the other at the southeast corner of Eighth Avenue and One Hundred and Fifty-second Street. As previously noted in the Electric Railway Journal, the first employees' store was opened at 816-818 Eighth Avenue on March 12. The extent to which it has been patronized by employees and their families has been beyond expectation.

City Planning in Montreal.—A general plan of public improvements for Montreal and the island of Montreal was discussed at the meeting of the Metropolitan Parks Commission recently. The commission is working on a general plan for Montreal and the island of Montreal, with a view of laying down certain lines of improvements which should be carried out during the next few years. Included in the details are provisions for streets, boulevards, playgrounds and an underground system of railways. Considerable discussion took place on the necessity of an underground railway in Montreal. The prevailing opinion was that such a system would undoubtedly be required in a few years. The suggestion submitted was that the underground should extend to full width of the street from the head of St. James Street at the Champ de Mars to Bonaventure station.

Transit Matters in Toronto.—It is reported that a settlement of the differences between the city and the Toronto (Ont.) Railway may be reached without recourse to the Ontario Railway & Municipal Board. The corporation counsel, however, has so far refused to confirm the terms which it is reported have been made with the company. The city is asking for more cars and for certain extensions of the lines. The portion of the report of the traffic expert of the city published some time ago recommended thirty-three additional lines for various parts of the city and six radial lines. The report also recommended a subway on Terauley Street from Queen Street to North Toronto with a loop at Richmond Street. The transportation committee has decided in favor of underground lines on Terauley Street and along Bloor Street to the Bloor Street viaduct to connect with the Danforth Avenue car line.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

Representative Washburn has introduced into the House the bill enlarging the powers of the Railroad Commission to a membership of five under the name of the Public Transportation Commission. The bill provides that the board shall have jurisdiction over all transportation companies classified as railroads, electric railways, express companies and steamship lines, and transfers the regulation of telephone and telegraph companies to the proposed new board from the Massachusetts Highway Commission. The statute also provides that three members of the board shall constitute a quorum and that a quorum shall sit upon all contested matters. The commission is authorized to expend not more than $150,000 annually in salaries, exclusive of the compensation of members of the board, and has greatly enlarged powers of inquiry and authority to employ expert assistance. It may appraise properties, pass upon security issues, institute investigations and prescribe rates, with the usual provisions regarding returns to be filed with the board. An enlargement of the board's powers is found in the provision that it may upon its own initiative institute inquiries into the reasonableness of rates. The bill gives the Supreme Court of the State jurisdiction in equity over decisions of the board in cases of appeal and of enforcement.

NEW JERSEY

Senator Pierce's indeterminate franchise bill has passed the Senate. The bill provides that hereafter every franchise or privilege granted by any municipality to any public utility shall be an indeterminate permit. The bill repeals the limited franchise act of 1906, the supplement thereto passed the same year; the supplement of May 8, 1907, providing that the limited franchise act shall not apply to second, third and fourth class counties, except in cities having a population of 12,000 or more, and the act of 1912 extending the limit of franchises that may be granted to fifty years.

OHIO

It is said that the arguments against the Mills public utilities bills have brought about a change of mind on the part of the Governor and that another bill may be formulated that will omit the objectionable portions. The proposed new bill will provide for the reorganization of the commission and for the valuation of all public service properties.

It is stated that the Supreme Court will be asked to interpret the home rule amendment, adopted last summer. Some members of the Legislature argue that it merely confers on cities the right to adopt their own form of government and that it was not meant to turn over all the powers the State had formerly exercised to municipalities. The public service companies have inquired whether the Public Service Commission or the municipal commission will have authority in a case where the property of a company lies partly within and partly without the boundaries of the municipality. The status has also been asked of an inter-city utility or a public service corporation that serves a number of cities, such as the interurban electric railways. Senator E. F. Weiser is reported to have said: "Home rule seems to shut the State out except when the home rulers want something. Then they come trotting up here to the General Assembly."

WISCONSIN

The Holmes bill providing for the joint use of a street railway tracks has been concurred in by the Senate and has been sent to Governor McGovern for final consideration. The bill gives the State Railroad Commission the right to declare for the joint use of tracks and also to fix what the commission considers a fair and equitable consideration for the use of the tracks. It will be particularly beneficial to interurban roads entering cities. The Legislature is now considering the numerous bills introduced during the last two months. Practically no measures are being introduced.

PROGRAM OF ASSOCIATION MEETING

American Society of Mechanical Engineers

The special committee on railroads of the committee of meetings of the American Society of Mechanical Engineers announces a meeting on steel passenger car design, to be held in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, on April 8, 1913, at 8.15 p.m. sharp. The meeting is intended to bring before the society the latest development of the art by specialists in each feature of steel passenger car design. The program follows:

"Introduction to General Discussion of Steel Passenger Car Construction," H. H. Vaughn, assistant to vice-president Canadian Pacific Railway.

"Problems of Steel Passenger Design," W. F. Kiesel, Jr., assistant mechanical engineer Pennsylvania Railroad Company.

"Underframes for Steel Passenger Cars," J. McE. Ames, of American Car & Foundry Company.

"Roof Structure for Steel Cars," C. A. Seley, mechanical engineer Rock Island Lines.

"Suspension of Steel Cars," E. W. Summers, president Summers Steel Car Company.

"Six-Wheel Trucks for Passenger Cars," J. A. Pilcher, mechanical engineer Norfolk & Western Railway.

"Steel Interior Finish for Steel Passenger Cars," Felix Koch, assistant mechanical engineer Pressed Steel Car Company.

Financial and Corporate

Stock and Money Markets

April 2, 1913.

Trading on the New York Stock Exchange to-day was quiet and moderate losses were noted in most of the leading issues. The recession was regarded as natural after the recent upward tendency. There were, however, some strong features to-day. Brooklyn Rapid Transit, for instance, made a substantial advance on the strength of the revived rumors of a probable increase in the dividend rate. Interborough-Metropolitan preferred advanced a fraction and a moderate gain was made in Third Avenue Railway. Rates in the money market to-day were: Call, 3¾@4½ per cent; sixty days to six months, 4½@4¾ per cent.

The Philadelphia market was broad and active to-day. The price changes were very irregular. The demand for bonds was good.

The Chicago market was broad to-day, but the volume of transactions was small. There was little demand for bonds.

The Boston market was very irregular to-day and was much less active than for several days past.

In the Baltimore market the feature was the new high record established by the United Railways common and the 5 per cent notes of the company.

Quotations of traction and manufacturing securities as compared with last week foilow:

	Mar. 23.	April 2.
American Brake Shoe & Foundry (common)	90½	90⅛
American Brake Shoe & Foundry (preferred)	130½	130
American Cities Company (common)	43	42
American Cities Company (preferred)	71½	73½
American Light & Traction Company (common)	345	400
American Light & Traction Company (preferred)	105	107
American Railways Company	39	38½
Aurora, Elgin & Chicago Railroad (common)	43½	43½
Aurora, Elgin & Chicago Railroad (preferred)	37½	37½
Boston Elevated Railway	105½	106½
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	a66	*66
Boston & Worcester Electric Companies (common)	7¼	7¼
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	88¾	91
Capital Traction Company, Washington	120	121
Chicago City Railways	150	150
Chicago Elevated Railways (common)	26	26
Chicago Elevated Railways (preferred)	88	88
Chicago Railways, ptcptg., ctf. 1	88	85
Chicago Railways, ptcptg., ctf. 2	21¼	21½
Chicago Railways, ptcptg., ctf. 3	6	6½
Chicago Railways, ptcptg., ctf. 4	*3½	*3½
Cincinnati Street Railway	*112	111
Cleveland, Southwestern & Columbus Ry. (common)	*5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred)	*30	*30
Cleveland Rai'way	103½	*103½
Columbus Railway & Light Company	*18	18
Columbus Railway (common)	*69½	a69½
Columbus Railway (preferred)	*82½	82½
Denver & Northwestern Railway	*108	*108
Detroit United Railway	74¼	80
General Electric Company	137½	140¾
Georgia Railway & Electric Company (common)	118	119
Georgia Railway & Electric Company (preferred)	84	83¾
Interborough Metropo'itan Company (common)	16⅞	17⅞
Interborough Metropolitan Company (preferred)	58	60
International Traction Company (common)	*35	*35
International Traction Company (preferred)	*95	*95
Kansas City Railway & Light Company (common)	15	15
Kansas City Railway & Light Company (preferred)	*30	*30
Lake Shore Electric Railway (common)	*6½	*6½
Lake Shore Electric Railway (1st preferred)	*91	*91
Lake Shore Electric Railway (2d preferred)	*25½	*25½
Manhattan Railway	127	128½
Massachusetts Electric Companies (common)	16½	17½
Massachusetts Electric Companies (preferred)	74	75½
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*25¾	*25¾
North American Company	75	77
Northern Ohio Light & Traction Company (common)	70½	75
Northern Ohio Light & Traction Company (preferred)	*105	105
Philadelphia Company, Pittsburgh (common)	44½	43½
Philadelphia Company, Pittsburgh (preferred)	40	33¼
Philadelphia Rapid Transit Company	24½	26
Port'and Railway, Light & Power Company	*67	*67
Public Service Corporation	115	114
Third Avenue Railway, New York	36¾	37¾
Toledo Railways & Light Company	2⅝	2⅝
Twin City Rapid Transit Co., Minneapolis (common)	103½	105½
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	23⅛	27
United Rys. Inv. Company (common)	27½	27¾
United Rys. Inv. Company (preferred)	50½	49½
Virginia Railway & Power Company (common)	51¾	52
Virginia Railway & Power Company (preferred)	89	92
Washington Ry. & Electric Company (common)	94	91¾
Washington Ry. & Electric Company (preferred)	89	90¼
West End Street Railway, Boston (common)	76	78
West End Street Railway, Boston (preferred)	a95	a96
Westinghouse Elec. & Mfg. Company	63½	66
Westinghouse Elec. & Mfg. Company (1st preferred)	116	115

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*Last sale. a Asked.

ANNUAL REPORTS

Georgia Railway & Power Company

The Georgia Railway & Power Company, Atlanta, Ga., reports earnings as follows for the year ended Dec. 31, 1912:

Gross earnings		$5,218,913
Operating expenses		2,427,621
Net operating revenue		$2,791,291
Less taxes		349,198
		$2,442,093
Dividend on treasury stock	$41,168	
Other miscellaneous income	36,109	77,277
		$2,519,370
Less interest on bonds	$751,844	
Less interest on notes	7,342	759,187
		$1,760,183
Less rental dividends on Georgia Railway & Electric Company and Atlanta Gas Light Company stock		801,168
		$959,015

H. M. Atkinson, chairman, and P. S. Arkwright, president, say in part:

"All of the properties statements of whose operations are included were not in operation during 1911, and consequently it is impracticable to attempt to give comparative figures. After the payment of operating expenses, taxes, interest and sinking funds on the bonds of the Atlanta Water & Electric Power Company, the Blue Ridge Electric Company and the Savannah River Power Company, and the rentals, consisting of the taxes, interest, sinking funds and dividends of the Georgia Railway & Electric Company, the surplus earnings of the consolidated properties for the calendar year amounted to $874,689.

"A dividend on the $2,000,000 of first preferred stock of the company accruing from the date of its issuance, March 18, 1912, at the rate of 6 per cent per annum to Jan. 1, 1913, and amounting to $94,000, or 4.7 per cent, was declared and paid. A dividend amounting to $30,000 on the common stock of the Atlanta Water & Electric Power Company was declared and paid by that company prior to the conveyance of its property to this company and covered the period from the payment of the last dividend on such stock to the date of such conveyance.

"The surplus for the calendar year, after the payment of all charges, rentals and dividends in respect to the consolidated properties, amounted to $750,689. The surplus earnings of the Georgia Railway & Power Company for the period from March 18, 1912, to Dec. 31, 1912, amounted to $505,447, which has been credited to profit and loss.

"The construction of the hydroelectric development at Tallulah Falls and of the transmission lines and substations in connection therewith has continued during the year under the contract made before the formation of this company between the Georgia Power Company and the Northern Contracting Company. Payment for this work is being made out of the proceeds of the sale of $8,315,000, par value, of Georgia Power Company. bonds set aside for this purpose. The interest on these bonds is paid as a part of the construction cost. This work is proceeding as satisfactorily as is reasonably practicable and is expected to be completed during 1913. This is the principal hydroelectric development of the company, and the company will not receive the benefit of any earnings from this source until the latter part of the year 1913.

"Charges to construction for 1912 for additions to the property of the Georgia Railway & Power Company other than the work being done by the Northern Contracting Company above referred to aggregate $145,107.

"Expenditures for additions to the property of the Georgia Railway & Electric Company, including the Atlanta Gas Light Company, during 1912 and charged to construction aggregate $1,250,864.44.

"As part payment, in accordance with the lease, on account of expenditures made for additions to the property of the Georgia Railway & Electric Company, the $250,000, par value, refunding and improvement mortgage bonds of the Georgia Railway & Electric Company in its treasury at the date of the lease were sold and the proceeds applied toward reimbursing this company on account of such expenditures. The balance of such expenditures, it is contemplated, will be reimbursed from additional refunding and improvement mortgage bonds of the Georgia Railway & Electric Company. In accordance with the sinking fund provisions of the respective mortgages, $25,000, par value, bonds of the Atlanta Consolidated Street Railway, $25,999, par value, first consolidated mortgage bonds of the Georgia Railway & Electric Company and $20,000, par value, refunding and improvement mortgage bonds of the Georgia Railway & Electric Company were redeemed and canceled, and the sum of $7,590 was paid into the sinking fund under the mortgage of the Atlanta Gas Light Company and the sum of $5,000 was paid into the sinking fund under the mortgage of the Atlanta Water & Electric Power Company. All rentals due the Georgia Railway & Electric Company under the lease covering this property were duly and promptly paid.

"On Dec. 31, 1912, the total mileage of railway tracks (on a single-track basis) controlled and operated by the company was 198,785. During the year 4.553 miles of new track were built and 1.073 miles of track were abandoned and taken up.

"The construction of the interurban railway from Decatur to Stone Mountain was entered upon and it is expected that same will be completed and put in operation during 1913.

"The properties formerly belonging to the Georgia Power Company, the Atlanta Water & Electric Power Company, the Interstate Power Company, the Savannah River Power Company and the Atlanta Hydroelectric Company were conveyed to the Georgia Railway & Power Company, and a lease of the properties and franchises of the Georgia Railway & Electric Company for a term of 999 years was executed and delivered to the Georgia Railway & Power Company, and the Georgia Railway & Power Company has entered into the possession and control of all of the properties so conveyed and leased

"Beginning Jan. 1, 1913, in accordance with the contract entered into with the city of Atlanta by which the city consented to the lease of the Georgia Railway & Electric Company, a reduction in the rates charged for electric light and power in the city of Atlanta became effective.

"The rate of wages paid motormen and conductors of the company has been voluntarily increased approximately 10 per cent, such increase becoming effective Jan. 1, 1913."

Chicago City Railway

The income account of the Chicago (Ill.) City Railway for the year ended Jan. 31, 1913, follows:

GROSS EARNINGS	
Passenger receipts, including Southern Street Railway	$10,838,713
Receipts from other sources	405,267
	$11,243,981
TOTAL EXPENSES	
*Operating expenses, taxes and renewals, of combined systems, interest on capital investment of Chicago City Railway and net earnings of Southern Street Railway	9,485,823
Net earnings of Chicago City Railway	$1,758,158
City's proportion, 55 per cent, as per ordinance	966,987
Company's proportion, 45 per cent, as per ordinance	$791,171
Interest on capital, as certified by board of supervising engineers	2,217,265
Income from operation	$3,008,436
Other income, net	260,172
	$3,268,608
Interest on bonds outstanding	1,286,102
Net income	$1,982,506
Regular dividend, 10 per cent	1,800,000
Surplus for twelve months ended Jan. 31, 1913	$182,506
Percentage of net income to capital stock at par	11.01

*Includes contingent reserve fund of $60,000 to apply on account of increase in wages of trainmen and barnmen from Aug. 1, 1912, to Feb. 1, 1913, as a result of the arbitration still pending on Jan. 31, 1913.

L. A. Busby, president, says in part:

"Your property has produced a net income of $1,982,506, from which four quarterly dividends of 2½ per cent have been paid, aggregating a total of 10 per cent upon the $18,000,000 capital stock, and leaving $182,506 surplus earnings for the year.

"Sufficient reserves having been set aside under the provisions of the 1907 ordinance to provide for the maintenance and renewal of the property, it was decided by your board of directors to distribute from earnings an extra dividend of 1 per cent upon the capital stock. The balance in surplus account at the close of the fiscal year was $12,114.

"During the year the company has built and acquired by purchase, authorized by ordinance, 25.42 miles of single track. The total mileage of single track now owned is 292.07 miles.

"The three-year contract with the employees expired on Aug. 1, 1912. Negotiations for a new contract resulted in a tentative agreement between the company and association, dated Aug. 24, 1912. This agreement was submitted to a vote of the men and rejected by them. Thereupon the company and the association entered into an agreement to arbitrate all questions in controversy. The company appointed as its representative H. B. Fleming, our vice-president; the association appointed Judge Kickham Scanlan, of the Circuit Court of Cook County, and the two so appointed selected Judge Orrin N. Carter, of the Supreme Court of Illinois, as the third member of the board of arbitrators. The board handed down its findings on March 29, 1913, giving the men an approximate increase of 2 cents per hour, to take effect as of Aug. 1, 1912."

Duluth-Superior Traction Company

The annual report of the Duluth-Superior Traction Company, Duluth, Minn., for the year ended Dec. 31, 1912, compares as follows with the previous year:

	1912	1911
Gross earnings	$1,083,259	$1,135,299
Operating expenses	630,187	608,135
Net earnings	$453,071	$527,164
Taxes, interest and dividends	454,295	443,161
	$1,224*	$84,003
Depreciation appropriation	70,114	58,288
	$71,338*	$25,715

*Deficit 1912.

C. G. Goodrich, the president of the company, said in part:

"The deficit for the year 1912 is the result of the carmen's strike during September and October. On Sept. 9 your company was forced into a controversy with union labor and suffered from an expensive strike. Union labor organizers, entirely outside the ranks of the company's employees, made a determined effort and partially succeeded in organizing the company's employees.

"The new organization made a demand in the middle of the night for the reinstatement of a number of undesirable employees who had been discharged and, upon this demand not being immediately granted, called a strike to take effect the following morning. By means of the usual tactics and with the assistance of unrestrained violence, which broke out on the first evening, all but about sixty of the conductors and motormen were either drawn into the new organization or temporarily driven from their positions by fear.

"To have yielded to the demands of the new organization would have been unfair to 90 per cent of the loyal employees of the company, who appeared to be as much averse to being put under the control of union labor leaders as the company was.

"The directors, believing that it was necessary to meet the issue squarely and make the company's position perfectly clear to all concerned, instructed the management to stand firmly for the open shop principle for which the citizens of Duluth had already waged one expensive struggle.

"The strike lasted from Sept. 9 to Nov. 6, being officially declared off on the latter date, but normal earnings were not completely restored until about Dec. 1.

"Your directors believe that the company must control the selection of employees for whose acts it is alone responsible to the public. This is the first labor trouble the company has experienced since 1899.

"All damage to property during the strike has been fully repaired. New cars, construction and extensions of the system aggregating $180.022 have been added during the year as follows:

New cars and equipment	$75,287
New track	66,547
Conduit and feed wires	18,301
Real estate and buildings	14,570
Miscellaneous	5,317
Total	$180,022

"There was expended for renewals and charged against depreciation reserve $45,067. The appropriation to depreciation reserve for the year was $70,114. Depreciation reserve now amounts to $310,269.

"During the year 276 general mortgage twenty-year 5 per cent gold bonds of the Duluth Street Railway have been authenticated by the trustee and sold and the proceeds applied against the cost of construction, new cars, etc.

"Regular quarterly dividends of 1 per cent upon the preferred stock and 1¼ per cent upon the common stock of your company have been declared and paid."

Athol & Orange Street Railway, Athol, Mass.—The Railroad Commission has approved the petition of the Athol & Orange Street Railway for authority to issue 905 shares of common stock and 1500 shares of 6 per cent cumulative stock of a par value of $100, proceeds to be used to pay indebtedness incurred in the purchase of the Templeton Street Railway.

Belt Line Railway Corporation, New York, N. Y.—The Belt Line Railway Corporation, the successor to the Central Park, North & East River Railroad, has elected officers as follows: Frederick W. Whitridge, president; Edward A. Maher, vice-president and general manager; Frederick J. Fuller, secretary; Alfred D. Sage, treasurer; Reune Martin, auditor; James F. Feely, assistant secretary and assistant treasurer.

Berkshire Street Railway, Pittsfield, Mass.—The Railroad Commission of Massachusetts has approved the petition of the Berkshire Street Railway for authority to issue 10,000 shares of additional capital stock, of a par value of $100.

Boston & Worcester Street Railway, Boston, Mass.—The Boston & Worcester Street Railway has petitioned the Railroad Commission for authority to issue $150,000 of 4½ per cent twenty-year first mortgage gold bonds.

Brooklyn (N. Y.) Rapid Transit Company.—Application has been made to the Public Service Commission of the First District of New York by the Coney Island & Gravesend Railway, a subsidiary of the Brooklyn Rapid Transit Company, for permission to buy all or any part of the shares of the Coney Island & Brooklyn Railroad, which has been operated for many years as the only independent railway of importance in Brooklyn outside of the Brooklyn Rapid Transit System. The Coney Island & Brooklyn Railroad has $2,983,900 of stock outstanding. About a year ago it was understood that the Hyde estate had parted with 25,000 shares of the stock, and a few weeks ago it became known that 25,531 shares of the stock were held in trust in the name of W. H. Ludlum, who is connected with the Central Trust Company. At the present time the Coney Island & Gravesend Railway proposed to buy about 25,841 shares of stock of the Coney Island & Brooklyn Railroad and to take up at par as many of the remaining shares as may be offered. To finance the purchase the Coney Island & Gravesend Railway has also asked the commission to authorize the company to pledge the acquired stock and its own property as collateral for ten-year 6 per cent notes up to the amount of $2,983,900, subject to redemption at sixty days' notice at their face value and accrued interest.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky.—Julius Fleischmann, Cincinnati, has been succeeded as a director of the Cincinnati, Newport & Covington Light & Traction Company by James Ellis, Cincinnati.

Columbus Railway & Light Company, Columbus, Ohio.—It is announced that the Public Service Commission of Ohio will act on the application of the Columbus Railway & Light Company for permission to consolidate its various subsidiaries as soon as Linden G. White, engineer for the commission, has completed the investigation which he is making of the affairs of the company.

Kansas City, Ozark & Southern Railway, Ava, Mo.—A. P. Miller and J. A. Reynolds have been appointed receivers of the Kansas City, Ozark & Southern Railway on the application of the Ozark Construction Company, which has begun suit against the railroad to recover for work done in constructing the line. The road has been in operation for some time between Ava and Mansfield, 8 miles distant. J. B. Quigley has been named by the receivers to manage the road.

New York, New Haven & Hartford Railroad, New Haven, Conn.—Lewis Cass Ledyard has resigned as a director of the New York, New Haven & Hartford Railroad.

Northern Electric Railway, Chico, Cal.—The order of the Railroad Commission of California authorizing the Vallejo & Northern Railroad to sell its property to the Northern Electric Railway, referred to in the Electric Railway Journal of March 1, 1913, page 396, follows in part: "The Railroad Commission does hereby authorize the applicant (Vallejo & Northern Railroad) to sell, assign, and dispose of the whole of its railroad system, property, franchises and permits as more fully described and set out in an indenture made and entered into Jan. 21, 1913, between the Vallejo & Northern Railroad and the Northern Electric Railway. Said transfer shall be made upon the terms and conditions set out in an agreement made and entered into on Jan. 21, 1913, between the Vallejo & Northern Railroad and the Northern Electric Railway. Said property to be transferred free of incumbrances, except that the Northern Electric Railway is to assume all outstanding obligations of applicant for the payment of all amounts remaining due for said real property or rights-of-way upon which payment in part has been made by applicant, provided that as a condition precedent to the effectiveness of this order applicant shall enter into an agreement, to be approved by this commission, with said Northern Electric Railway, by which agreement it shall be provided that in the event that the bonds delivered to applicant in consideration of the transfer of the property herein mentioned shall be sold within a reasonable time for more than 80 per cent of their face value, the money above 80 per cent of the face value received on the sale of said bonds shall be immediately delivered to said Northern Electric Railway."

Pennsylvania Railroad, Philadelphia, Pa.—The directors of the Pennsylvania Railroad have approved the proposed long-term lease of the West Jersey & Seashore Railroad on terms prescribed by that company, namely, a guaranteed rental of 6 per cent per annum on the common stock and the interest on its bonds, taxes and other fixed charges. The lease is to become effective July 1, 1913. On July 1 a dividend of 1½ per cent in cash will be paid to common stockholders. The lease will be submitted for approval to the West Jersey & Seashore Railroad at a special meeting on April 30.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—The Petaluma & Santa Rosa Railway has applied to the Railroad Commission of California for authority to issue $80,000 of bonds and $64,000 of notes, the proceeds to be used to construct an electric railway from Liberty to Two Rock.

Poland (Ohio) Street Railway.—The Poland Street Railway has been authorized by the Public Service Commission of Ohio to issue capital stock of the par value of $50,000 and twenty-year 5 per cent gold bonds of the par value of $200,000 at not less than 85, the proceeds to be used in the construction and equipment of an interurban electric railway between Central Square, Youngstown, and the village of Poland, a distance of 4.7 miles.

Reading Transit & Light Company, Reading, Pa.—A charter has been granted in Delaware to the Reading Transit & Light Company with a capital stock of $4,150,000. This is the new lessee of the Reading group of the Interstate Railway properties and is part of the plan of the Eastern Power & Light Corporation to take over a number of electric railway and light properties, including the Reading Transit Company, the United Traction Company of Reading, the Lebanon Valley Street Railway and others, as mentioned in the Electric Railway Journal for March 15, 1913, page 532.

Toledo Railways & Light Company, Toledo, Ohio.—The reorganization committee of the Toledo Railways & Light Company announces that the voting trust certificates for the common and preferred stocks of the Toledo Traction, Light & Power Company are now ready in temporary form and will be delivered to depositing stockholders by the New York Trust Company upon surrender of the certificates issued for the deposit of Toledo Railways & Light Company stock. Fractional certificates of interest will be issued for new stock of less amounts than $100 par value, convertible into voting trust certificates of the company when surrendered by the holders in aggregate amounts of $100 or multiples.

Dividends Declared

Auburn & Syracuse Electric Railroad, Syracuse, N. Y., quarterly, 1½ per cent, preferred.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., quarterly, 1½ per cent, preferred.

Boston (Mass.) Suburban Electric Companies, quarterly, $1, preferred.

Cincinnati, Newport & Covington Light & Traction Company, Cincinnati, Ohio, quarterly, 1⅛ per cent, preferred; quarterly, 1⅜ per cent, common.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., quarterly, 1¼ per cent, prefererd.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1½ per cent, preferred.

Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md., quarterly, 1½ per cent, preferred.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1½ per cent, common.

Youngstown & Ohio River Railroad, Youngstown, Ohio, quarterly, three-quarters of 1 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
JACKSONVILLE (FLA.) TRACTION COMPANY							
1m.,	Jan.,	'13	$49,823	*$33,567	$16,256	$11,037	$5,219
1 "	"	'12	49,878	*31,948	17,930	9,275	8,655
12 "	"	'13	562,482	*380,131	182,352	120,751	61,601
12 "	"	'12	564,660	*349,437	215,223	101,222	114,001
NEW YORK (N. Y.) RAILWAYS							
1m.,	Feb.,	'13	$1,074,890	$597,575	$477,315	$373,879	$103,435
1 "	"	'12	1,063,340	657,364	405,976	366,188	39,788
8 "	"	'13	9,562,410	5,253,184	4,309,226	3,700,350	608,876
8 "	"	'12	....	....	....	....	....
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.							
1m.,	Jan.,	'13	$137,048	*$93,973	$63,075	$24,037	$38,238
1 "	"	'12	114,695	*70,842	43,852	20,846	23,006
12 "	"	'13	1,833,115	*964,820	868,295	270,065	598,230
12 "	"	'12	1,613,561	*887,282	726,279	251,038	475,241
PADUCAH LIGHT & TRACTION COMPANY, PADUCAH, KY.							
1m.,	Jan.,	'13	$26,666	*$17,227	$9,439	$7,335	$2,104
1 "	"	'12	24,693	*18,313	6,381	7,073	†692
12 "	"	'13	288,509	*191,589	96,921	86,615	10,306
12 "	"	'12	268,202	*166,307	101,895	81,653	20,242
PENSACOLA (FLA.) ELECTRIC COMPANY							
1m.,	Jan.,	'13	$26,317	*$16,480	$9,838	$6,301	$3,537
1 "	"	'12	22,261	*15,418	6,843	6,377	466
12 "	"	'13	289,485	*177,521	111,965	76,393	35,572
12 "	"	'12	286,608	*180,463	106,145	62,823	43,322
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.							
1m.,	Jan.,	'13	$701,640	*$437,914	$263,726	$165,797	$97,929
1 "	"	'12	720,786	*412,354	308,433	153,465	152,968
12 "	"	'13	8,294,702	*2,797,859	3,496,843	1,986,582	1,510,261
12 "	"	'12	......	......	......	......	......
SAVANNAH (GA.) ELECTRIC COMPANY							
1m.,	Jan.,	'13	$67,792	*$50,077	$17,716	$17,710	$6
1 "	"	'12	56,359	*42,399	15,960	15,956	4
12 "	"	'13	756,492	*558,730	197,762	196,548	1,214
12 "	"	'12	701,224	*515,261	185,963	184,812	1,151
TAMPA (FLA.) ELECTRIC COMPANY							
1m.,	Jan.,	'13	$68,157	*$34,738	$33,419	$4,794	$28,625
1 "	"	'12	60,752	*32,448	28,304	4,551	23,753
12 "	"	'13	761,241	*396,920	364,320	53,999	310,321
12 "	"	'12	698,851	*380,038	318,813	59,210	259,603
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.							
1m.,	Feb.,	'13	$635,321	*$354,258	$281,063	$140,094	$140,969
1 "	"	'12	616,536	*340,750	275,786	143,079	132,708
2 "	"	'13	1,325,831	*730,016	295,815	288,669	307,146
2 "	"	'12	1,252,944	*705,683	546,361	283,158	263,203

*Includes taxes. †Deficit.

Traffic and Transportation

Statement by Rhode Island Company of Its Attitude Toward Organization of Employees

A note in part as follows had been addressed to the employees of the Rhode Island Company, Providence, R. I., over the signatures of D. F. Sherman, vice-president, and A. E. Potter, general manager:

"During the past few weeks our attention has been directed to the fact that an attempt was being made secretly to unionize the employees of this company. A considerable number of employees have expressed themselves as strongly in favor of the continuance of their present relations with the company and their membership in the Mutual Aid Association, as against the organization of a union. Under the mutual agreement, in connection with such Mutual Aid Association, the company has paid out during the last eleven years approximately $250,000 on account of sick benefits and pensions for employees and in part consideration thereof the employees of the transportation department gave their signed agreement to refrain from joining a labor union while in the employ of the company. A violation of this agreement will require dismissal from service or discontinuance of the Mutual Aid Association, as in the judgment of the company may be for the best interest of all concerned. The company has always maintained a standard of wages equal to that of any other similar property in this territory, and wages have been advanced from time to time without either request or suggestion from the employees, and the same policy will be pursued in the future, under the conditions which have existed heretofore. The management of the company feels that it would be for the best interests of the employees and the company to continue the present relations, but should a majority of the employees decide at any time that their interests would be better protected by the organization of a union and the dissolution of the Mutual Aid Association, the proper method would be for that majority to request the company to release it from the present agreement and discontinue the Mutual Aid Association. On the other hand, should the majority desire a continuance of the present relations, it would be the duty of the company to protect that majority's interest in the Mutual Aid Association."

Letter from Dairymen Complimenting the Chicago, Ottawa & Peoria Railway

A letter has been written to the Chicago, Ottawa & Peoria Railway by the officers of the Illinois Dairymen's Association and representatives of the different State institutions commending the action of the officers of the company in endeavoring to promote the dairy interests in the community served by the railway. The special service furnished by the railway was operated over the line on Feb. 28 and March 1, 1913. There were eight speakers on board the car, which carried a number of exhibits. The letter to the company from the dairymen follows:

"By request of the men who accompanied the 'Dairy Special' over your line and in behalf of the dairymen in the section as well as the dairy interests of Illinois, we desire to express the highest appreciation of the innovation on the part of your company and especially the courtesy extended us on that trip by your representative.

"Your road is one of the first electric railways to manifest an interest in a substantial way in the advancement of the agricultural interests of your patrons, and I am sure you will be rewarded. The greatest civilizer and the most certain forerunner of prosperity is the railroad, and we do not hesitate to say that in this particular the electric railway is pre-eminent.

"When large corporations such as yours anticipate the people's needs and show by their actions that their motto is 'The greatest good to the greatest number,' then will a spirit of corporations be encouraged and the benefit be mutual. All prejudice will be removed. Antagonism will subside and a community of interest will be maintained to the satisfaction of everybody. When we can be of service to you do not hesitate to command us."

Increase in Wages.—An increase averaging 5 per cent has been made in the wages of the employees of the operation department of the Philadelphia & Westchester Traction Company, Upper Darby, Pa., effective on April 1.

Near-Side Stops in Spokane.—The officers of the Spokane Traction Company and the Washington Water Power Company, Spokane, Wash., arranged with the Spokane City Commissioners to stop their cars on the near side of the street after April 1, 1913, in the paved district.

Re-routing Suggested in Nashville.—The Nashville Railway & Light Company, Nashville, Tenn., following the action of that municipality in issuing bonds valued at $400,000 for the erection of a new city hall, has been asked to re-route its lines so that every car will pass the Public Square.

St. Louis Car Service Bill Defeated.—The City Council of St. Louis on March 25, 1913, voted against the bill to provide for the addition of 330 cars to the service of the United Railways and for other changes in the methods of operation based on the report of the Public Service Commission of St. Louis. The original bill was then reintroduced in the House of Delegates and it was hoped to present it again to the Council.

New Passenger Tariff on Long Island Railroad.—The Long Island Railroad has received permission from the Public Service Commission for the First District to put into effect immediately a new tariff of passenger fares to and from Union Hall Street station at Jamaica. The new tariff will have the effect of making the rates to and from that station the same as the existing rates to and from the Jamaica station. The new rates between Union Hall Street station and the Pennsylvania Station in Manhattan will be as follows: Ten-trip ticket, $2.45; twenty-trip ticket, $4.80; fifty-trip ticket, $11.00; sixty-trip monthly ticket, $8.00; forty-six-trip school monthly ticket, $6.15.

Service Questions in Atlanta.—In compliance with an order from the Georgia Railroad Commission, the Georgia Railway & Power Company, Atlanta, has filed with the commission a detailed statement of the company's lines and their operation. The company has been ordered by the commission to establish the following schedule on the Ponce de Leon Avenue line: From 6.30 a.m. to 7 p.m. cars every ten minutes, and at all other hours, cars every twenty minutes. The commission ordered several weeks ago that the ten-minute schedule should obtain from 6.30 a.m. to 9 a.m., from noon to 3 p.m. and from 4.30 p.m. to 7 p.m., and that a fifteen-minute schedule should obtain during other hours. A new order, directing the ten and twenty-minute schedules, has since been issued.

Report on Traffic Congestion in Newark.—G. B. Ford and E. P. Goodrich, the experts employed by the City Planning Commission of Newark, N. J., have presented to Mayor Haussling of that city a report in which they recommend that the congestion of traffic in the center of the city should be relieved. A conference between the city officials and the officers of the Public Service Railway is suggested looking to the relief of congestion at Broad and Market Streets. According to the Newark *Call*, the report of Messrs. Ford and Goodrich and the more detailed reports submitted by their associates, Harland Bartholomew and F. Van Zandt Lane, lay the blame for the congestion largely to the lack of co-operation on the part of the citizens with the company.

All-Day Express Service in Denver.—The Denver (Col.) City Tramway has established all-day express service on its Montclair and Aurora lines. The new service is operated continuously from 7 a.m. until 8 p.m., almost entirely within the corporate limits of the city. It introduced also the skip-stop system between Fillmore Street and the ends of the two lines. Under the skip-stop system all Montclair and Aurora cars east of Fillmore Street stop only at every second block, outgoing and incoming cars alternating. The limited express service previously in effect on these lines, which was operated between 7 a.m. and 9 a.m. and 4 p.m. and 6.15 p.m., except Sundays, provided for stops at all streets between the central loop and Broadway and east of Broadway at every fourth block to and including Fillmore Street.

Baltimore Suburban Rate Case Settled.—The controversy over commutation rates on the suburban lines of the United Railways & Electric Company, Baltimore, Md., has been closed, the Public Service Commission having dimissed the petition of the Woodlawn Improvement Association for an opportunity to show cause why the order issued on Dec. 24, 1912, shall be modified. The commission has approved the agreement entered into by the company and a committee representing the ,improvement and protective associations of Baltimore County concerning terms under which commutation books are to issued. The agreement between the commuters' committee and the company was held by the commission to be "for the public interest." The agreement modifies the commutation terms prescribed in the commission's order.

Annual Passes Suggested in Toronto.—R. J. Fleming, manager of the Toronto (Ont.) Railway, has replied in part as follows to the request of Commissioner Harris in regard to the attitude of the company in the matter of issuing annual passes: "The rates of fare to be charged by this company were settled by the City Council at the time the franchise was sold. Consequently we have no power to depart from these rates. However, if the Council would like to make a change, I should prefer that the members of Council discuss the question among themselves and after they have concluded that the charge proposed would be in the best interests of the citizens, we will do our best to comply with the judgment of the Council. Of course, the rate proposed to be charged for annual passes would influence us very largely in considering the question."

Electric Railway Luncheon Club in Vancouver.—The members of the Social Club connected with the office organization of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C., have organized a luncheon club to furnish a daily luncheon at moderate cost to its members. The management of the company loaned the club the entire initial outfit, including the full equipment for a gas kitchen, china, cooking utensils, furniture, etc., and provided the funds for alterations incident to the arrangement of the kitchen and dining room, the outlay being about $1,500. The Social Club gave part of its games room for use as a kitchen and the rest of this room is used during the lunch hour for dining quarters, the room being changed again for the purpose of games at night. The price charged for meals is $1 for the five days of the week. Tickets are not sold for less than one week. The government of the club is in the hands of a committee of five, which includes a representative of the company and a representative of the Social Club. A chef and helper are the only salaried employees, the lunch room being arranged on the cafeteria plan, each member waiting upon himself. The plan has now been in operation for several weeks and the results seem to indicate that it will be successful.

"Safety First" Campaign in Toledo.—E. R. Kelsey, manager of the passenger and publicity departments of the Toledo Railways & Light Company, Toledo, Ohio, has been appointed chairman of the first "safety first" league to be organized in Toledo. The Toledo Railways & Light Company proposes to conduct a "safety first" campaign with its inspectors, in its carhouses with its employees, in the schools, in the newspapers and in its cars. For the next few weeks it intends to install a series of twenty-five posters in its cars, changing the posters every other day for about six weeks. In commenting on the plan of the company Mr. Kelsey said: "Of course no move like this can be successful if the public does not assist, for figures show that almost 85 per cent of street car accidents are due to carelessness of the public. The company is preparing a series of twenty-five car posters concerning the 'safety first' idea which will be placed in all cars for the next few weeks. The company recently distributed 'Accident Don'ts' for the children to the schools. Very soon the children will start playing marbles, baseball, spinning tops and roller skating on streets, and this is believed the most opportune time for the formation of a 'Safety First' League." The leage will endeavor to secure the co-operation of automobile drivers and owners by having them bring machines to a dead stop before passing an electric railway car that is taking on or discharging passengers."

Personal Mention

Mr. R. J. Smith, formerly with J. G. White & Company, Inc., New York, N. Y., has been appointed chief engineer of the Tri-City Railway & Light Company, which operates more than 120 miles of railway.

Mr. Gaylord Thompson, formerly chief engineer of the Ohio Electric Railway, with headquarters at Springfield, Ohio, has resigned to become vice-president and general manager of the New Jersey & Pennsylvania Traction Company, Trenton, N. J.

Mr. A. J. Davis has been appointed chief clerk to Mr. H. S. Potter, superintendent of the El Paso (Tex.) Electric Railway, to succeed Mr. W. V. Neal, who has been appointed superintendent of the interurban electric railway under construction between Beaumont and Port Arthur, by Stone & Webster.

Mr. W. V. Neal has been appointed superintendent of the interurban electric railway being built by Stone & Webster between Beaumont and Port Arthur, which will be controlled by the Beaumont-Eastern Texas Electric Company. Mr. Neal has been chief clerk to Mr. H. S. Potter, superintendent of the El Paso (Tex.) Electric Railway.

Mr. W. O. Ingle has been appointed auditor of the Rochester lines of the New York State Railways. Mr. Ingle has been connected with this company and its subsidiaries for the past nineteen years as bookkeeper, chief clerk and assistant auditor. Mr. Ingle has presented several papers at the meetings of the New York Electric Railway Association.

Mr. Frank B. Lasher was on April 2, 1913, appointed auditor of the New York State Railways and the Mohawk Valley Company with headquarters at the Grand Central Terminal, New York, N. Y. Mr. Lasher has been connected with electric railways, gas and electric light properties for fifteen years. He started as bookkeeper of the Albany & Hudson Railway & Power Company, in which capacity he served for three years and was then appointed assistant auditor. He resigned his connection with that company in 1904 to become auditor of the Oneonta, Cooperstown & Richfield Springs Railway. In 1906 he was appointed secretary, treasurer and auditor of the railway, lighting and gas properties at Pottsville, Pa., controlled by J. G. White & Company, Inc. In 1907 he became connected with the New York State Railways and the Mohawk Valley Company as chief accountant and statistician to Mr. A. L. Linn, Jr., then general auditor of the company. Mr. Lasher has served on important committees of the American Electric Railway Accountants' Association and is now third vice-president of the association and co-chairman of the joint committee on engineering accounting and a member of the committee on education.

Mr. B. S. Josselyn resigned as president of the Portland Railway, Light & Power Company, Portland, Ore., on April 3, 1913, effective on July 1, 1913. Mr. Josselyn has been president of the Portland Railway, Light & Power Company, Portland General Electric Company, Portland Railway, Oregon Water Power & Railroad Company, Union Traction Company, Portland & Sandy River Electric Company, Willamette Falls Company, Cazadero Real Estate Company and Kenton Construction Company since July 1, 1907. His resignation was accepted with regret by the directors. Mr. Josselyn was born at Heyworth, Ill., on Feb. 7, 1858. He left school at the age of fourteen and entered railroad service as a ticket clerk, advancing through a number of positions during the following years. In 1893 he was appointed general manager of the Kansas City, Osceola & Southern Railway. In 1898 he became general superintendent of the Omaha & St. Louis and the Omaha, Kansas City & Eastern lines, but resigned the next year to report on various railroads for Eastern capitalists. From 1900 to 1902 he was manager of the Kentucky & Indiana Bridge & Railway Company, Louisville. During 1902 and 1903 he was general manager of the Hudson Valley Railway, Glens Falls, N. Y. From 1903 to 1906 he was general manager of the Union Terminal Railway, Sioux City, Ia., and during 1906-1907 he was vice-president and general manager of the Maryland Telephone & Telegraph Company and the Baltimore Electric Power Company.

H. L. Reichart

Mr. Howard L. Reichart was on April 2, 1913, appointed assistant secretary of the New York State Railways and the Rochester Railway & Light Company, with headquarters in Grand Central Terminal, New York, N. Y. Mr. Reichart was born in Troy, N. Y., and has been connected with the electric railway and lighting business since May 1, 1906, at which time he entered the employ of the companies named, serving in the capacity of chief clerk of the New York office. Prior to this time, during 1903 and 1904, he was with the Central New York Car Service Association at Albany, N. Y., resigning this employment on Dec. 1, 1904, to accept a position in the office of the secretary of the New York Central & Hudson River Railroad, New York City.

Mr. J. C. Collins was on April 2, 1913, appointed general auditor of the New York State Railways, the Mohawk Valley Company and the Rochester Railway & Light Company in addition to being secretary of the New York State Railways and the Rochester Railway & Light Company. Mr. Collins has always been in the accounting field and has been connected with the New York State Railways and its subsidiaries for the last ten years. He also served as secretary of the Street Railway Association of the State of New York, the predecessor of the New York Electric Railway Association, and is an active member of the American Electric Railway Accountants' Association, serving for two years as co-chairman of the committee on freight and express accounting and being now a member of the joint committee on engineering accounting. The New York State Railways owns and operates street and interurban electric railways in Rochester, Syracuse, Utica and vicinity and owns a half interest in the Schenectady Railway, which operates the electric railways in Schenectady and the interurban electric railways between Schenectady, Albany, Troy and Saratoga. The Rochester Railway & Light Company owns and operates all the electric light, power and gas plants in Rochester and vicinity. The New York State Railways operates about 340 miles of electric railway. Mr. Collins succeeds Mr. R. A. White as general auditor of the companies previously mentioned, Mr. White having resigned to devote all his time to the New York Central & Hudson River Railroad. The position of assistant general auditor, from which Mr. A. L. Linn, Jr., has resigned, as noted in the Electric Railway Journal of March 29, 1913, has been abolished in the new scheme of organization of the accounting forces of the companies.

F. B. Lasher

J. C. Collins

Mr. H. C. Eddy, who was recently appointed engineer of the Public Utilities Commission of the District of Columbia, was born in Morristown, N. J., on Aug. 13, 1870. Mr. Eddy attended Lehigh University and later took a special course in electricity at Columbia University, New York City. On the completion of this course in 1892, he entered the employ of the New Jersey Traction Company at Newark, N. J., in connection with power station operation, and was later employed in a similar capacity by the Newark & South Orange Railway. After spending several years in electric railway work and in lighting construction, inspection and operation in various localities, Mr. Eddy was appointed assistant superintendent and electrical engineer on the staff of J. G. White & Company, in connection with the contract for installing a complete and extensive street railway system in the city of Auckland, New Zealand. Returning from New Zealand on the completion of the work, Mr. Eddy was employed for a time on the engineering staff of the Boston & Northern Street Railway and was later employed by J. G. White & Company as superintendent of overhead construction on the installation of the Rochester, Syracuse & Eastern Railway. Some time later he was employed as superintendent of underground construction for the Potomac Electric Power Company, Washington, D. C., which position he resigned to become assistant electrical engineer for the District of Columbia. In 1908, when Congress passed the act giving the Interstate Commerce Commission jurisdiction over the electric railways of the District of Columbia, Mr. Eddy was selected as executive officer in charge of this jurisdiction for the commisison, which position he retained until March 11, 1913, when he was appointed engineer to the Public Utilities Commission of the District of Columbia, created by act of Congress approved on March 4, 1913. By the terms ot this act the jurisdiction over the local street railways, formerly given to the Interstate Commerce Commission, was transferred to the District Commissioners.

OBITUARY

James McCrea, formerly president of the Pennsylvania Railroad, died at his home in Philadelphia, Pa., on March 28, 1913. Mc McCrea retired as president on Nov. 13. He had been in the service of the company forty-eight years.

George B. Kerper, who was well known in electric railway circles in Ohio, is dead. Mr. Kerper was president of the Mount Adams & Eden Park Inclined Plane Railway, Cincinnati, and was one of the promoters of the Toledo, Bowling Green & Southern Traction Company. Mr. Kerper was an associate of the late Charles Kilgour and was connected with electric railway developments in and about Cincinnati. He was a native of Reading, Pa.

C. Edgar Titzel, manager of the Lancaster County Railway & Light Company, Lancaster, Pa., which controls through stock ownership the Conestoga Traction Company, Edison Electric Company and Lancaster Gas Light & Fuel Company, died early on Sunday, March 30, 1913, following a cerebral hemorrhage. Mr. Titzel was born at Irwin on May 4, 1875. He was a son of the late Rev. John M. Titzel. He entered the employ of the Edison Electric Illuminating Company, Lancaster, as a clerk when he was fifteen years old and was promoted through the various departments of the company and finally made manager of the controlled companies and the holding company, the Lancaster County Railway & Light Company. He was a member of the American Electric Railway Association, the National Electric Light Association and the American Gas Institute. Mr. Titzel is survived by a widow and two daughters.

James Bricker, superintendent of transportation of the Philadelphia (Pa.) Rapid Transit Company, whose death on March 20, 1913, was noted briefly in the Electric Railway Journal of March 22, 1913, had been connected with the street railways in Philadelphia for thirty-five years. He was born in Cumberland County, Pa., on Dec. 1, 1843. He served during the latter part of the War of the Rebellion and was honorably discharged at its close. He then entered business in Harrisburg and subsequently went to Philadelphia. Mr. Bricker became a conductor with the West Philadelphia Railway during horse car days and rose gradually to be superintendent of the Union, Electric and People's Traction Companies and eventually became general superintendent of the Union Traction Company. He was subsequently appointed superintendent of transportation of the company and held that position at the time the company was taken over by the Philadelphia Rapid Transit Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***St. John (N. B.) Suburban Railway.**—Chartered in New Brunswick to build electric lines in the suburbs of St. John. Incorporators: James Ross, president; John R. Graham, president of the Bangor Railway & Electric Company, and Henry W. Cushman, president of the Merrill Trust Company, St. John.

***Beaufort (N. C.) Terminal Railway.**—Incorporated in North Carolina to build a 12-mile interurban railway between Beaufort and Cape Lookout and to construct terminals there. Incorporators: E. C. Duncan, a director of the Norfolk Southern Railroad, and F. L. Nicholson, Norfolk.

***Oakland, Geistown & Arbutus Park Railway, Geistown, Pa.**—Application for a charter will be made by this company to build an electric railway between Oakland, Geistown and Arbutus Park. Incorporators: William H. Sunshine, O. P. Thomas and Albert Stenger.

***Schuylkill County Railway, Harrisburg, Pa.**—Application for a charter has been made in Pennsylvania by this company to build an electric railway in Schuylkill County. It is proposed to extend the lines to Frackville, where connection will be made with the lines of the Pottsville Traction Company, thus completing the line between Sunbury and Philadelphia.

***Shenandoah & Wiggans Railway, Harrisburg, Pa.**—Application for a charter has been made by this company in Pennsylvania, as a subsidiary company of the Schuylkill Railway, to build an electric railway in Schuylkill County. It is said that Philadelphia capitalists are behind the project.

***Reading Transit & Light Company, Reading, Pa.**—Chartered in Pennsylvania with a capital stock of $4,500,000. This is the new lessee of the Reading group of the Interstate Railway properties and is part of the plan of the Eastern Power & Light Corporation to take over a number of electric railway and light properties, including the Reading Transit Company, the United Traction Company, Reading, Lebanon Valley Street Railway and others, as mentioned in the Electric Railway Journal for March 15, 1913, page 552.

***West Virginia Light & Traction Company, Charleston, W. Va.**—Chartered in West Virginia to operate electric railways and other public utilities. Capital stock, $500,000. Incorporators: Angus McDonald, O. P. Fitzgerald, V. L. Black, L. G. Summerfield and John Wehrle, all of Charleston, W. Va.

FRANCHISES

Birmingham, Ala.—J. B. Coyle, acting as chairman of a committee of West End citizens, has asked the Council for a franchise for an electric line from Osceola station, Birmingham, on the North Bessemer line, to Berney station, on the South Bessemer line, making a West End loop and connecting Ensley with the former suburb. It is said the Birmingham Railway, Light & Power Company is willing to build this line.

Los Angeles, Cal.—The Los Angeles Railway has asked the Council for a twenty-one-year franchise over Mission Road from Keith to a point easterly of the railway in Los Angeles.

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the Council on Avenue Sixty-four to connect with the company's tracks at Pasadena Avenue in Los Angeles.

San José, Cal.—F. E. Chapin, general manager of the electric lines in Santa Clara County for the Southern Pacific Company, has asked the Board of Supervisors for a fifty-year franchise over Alum Rock Avenue from the easterly city limits of San José to the New San José Golf and Country Club, a distance of 5 miles.

San José, Cal.—The San José Terminal Railway has asked the Council for a franchise over Delmas Avenue and also on East Santa Clara Street in San José. Sealed bids will be received by the city clerk of the Council up to April 21 for the sale of franchise to the highest bidder.

Athens, Ga.—The Athens Railway & Electric Company has asked the Council for a franchise to extend its line to Barberville.

Atlanta, Ga.—The Georgia Railway & Electric Company has asked the County Commissioners for a franchise out the Howell Mill Road to the Collier Road in Atlanta.

Gary, Ind.—The Gary & Interurban Railway has asked the Council for a franchise on four streets in addition to those covered by the present lines in Gary.

Cedar Rapids, Ia.—The Cedar Rapids & Iowa City Railway & Light Company has received a twenty-five-year franchise to build eight extensions and double-track some of its lines in Cedar Rapids.

Clinton, Ia.—The Clinton Street Railway has received a twenty-five-year franchise from the Council in Clinton.

Henderson, Ky.—The Southwestern Electric Railway, Light & Power Company will ask the Henderson County Fiscal Court for a franchise through Henderson County to Henderson, Marion, Smithland and other points in Henderson County.

Winchester, Ky.—The Clark County Fiscal Court, of Winchester, Ky., has sold to the Kentucky Utilities Company, Lexington, a franchise for the construction of an electric railway line as well as electric light and power lines in that county. It is said that the company will begin the construction of an interurban railway embracing Winchester, Mount Sterling and other Eastern Kentucky towns in the near future.

Abbeville, La.—The Southwestern Traction & Power Company has asked the Council for a franchise over certain streets in Abbeville.

Pittsfield, Mass.—The Berkshire Street Railway has asked the Council for a franchise to extend its line from the present terminus of the Elm Street line in Pittsfield easterly to the junction of Elm Street with the Dalton division road, thence northerly on the Dalton division road along East Street to the company's tracks at the Junction.

Minneapolis, Minn.—The City Council has been asked to grant a franchise for a cross-town line in North and Northeast Minneapolis by the special committee on railway extensions in Minneapolis.

Elizabeth, N. J.—The Public Service Railway, Newark, has received a franchise from the Council to operate the Short Line through Elizabeth.

Trenton, N. J.—The New Jersey & Pennsylvania Traction Company has asked the Council for a franchise to build a double-track line from the Calhoun Street bridge to the feeder on Calhoun Street in Trenton.

Rome, N. Y.—The New York State Railways has received franchises from the Common Council in East Dominick Street and West Dominick Street in Rome.

Yonkers, N. Y.—The Yonkers Railroad has asked the Mayor for permission to double-track, construct additional turnouts and extend some of its lines in Yonkers.

Cleveland, Ohio.—The Cleveland Railway has accepted an ordinance giving it authority to extend its Union Street line from East Ninety-third Street to East 116th Street in Cleveland.

Brantford, Ont.—The Lake Erie & Northern Railway will ask the Dominion Railway Board, which will hold a session in Brantford April 7, for a route between Brantford and Galt.

El Paso, Tex.—The El Paso Electric Railway has asked the Council for a franchise from the Fort Bliss line on Boulevard to Manhattan Heights. The company will build another extension up North Oregon Street and over the mesa and one along Tenth Street to the El Paso Milling Company's plant in El Paso.

Richmond, Va.—The Richmond & Henrico Railway has received two franchises from the Council for extensions of its Fulton Hill and Thirty-fifth Street lines and extensive trackage rights in the West End of Richmond.

Richmond, Va.—The Virginia Railway & Power Company has received a franchise from the Council for a line west on Broad Street from the Boulevard to the corporate limits of Richmond.

TRACK AND ROADWAY

San Francisco-Oakland Terminal Railways, Oakland, Cal.—About 9.4 miles of double track will be built by this company during the year.

Geary Street Municipal Railway, San Francisco, Cal.—The Board of Works has approved the plans and specifications for the construction of the western extension of this line in San Francisco from Thirty-third Avenue to the ocean beach and has requested the Supervisors to set aside $57,400 to bear the expense of the construction.

Stockton Terminal & Eastern Railroad, Stockton, Cal.—This company plans to build an 11-mile line between Ballota and Jenny Lind during the year.

Denver (Col.) City Tramway.—A 2-mile extension of the Sixth Avenue line eastward from the present terminus at Madison Street, with other extensions and construction work in different parts of Denver, is an improvement proposed for the summer by this company.

Rome Railway & Light Company, Rome, Ga.—This company will build 2 miles of new track in Rome this year.

Caldwell (Idaho) Traction Company.—Plans are being made by this company for an extension around the south side of Deer Flat reservoir in Caldwell.

Quincy (Ill.) Railway.—About 2 miles of new track will be built in Quincy by this company during the year.

Union Traction Company of Indiana, Anderson, Ind.—An 18-mile line between Muncie and Newcastle will be built by this company during the year.

Oskaloosa Traction & Light Company, Oskaloosa, Ia.—This company plans to build about 1 mile of new track during 1913.

***Topeka-Kansas City Interurban Railway, Topeka, Kan.**—Plans are being considered to build an electric railway between Lawrence, Kansas City and Topeka this spring. Among those interested are F. H. Thomas and R. E. Townsend, Topeka.

Louisville (Ky.) Railway.—Extensions of importance are being considered by this company. Upon the urgent suggestion of residents of the western section of Louisville the company is considering the extension of either its Walnut or Jefferson Street lines to Shawnee Park.

New Orleans & Western Railway, Gretna, La.—Plans have been completed by this company for an extension from Amesville to Westwego. The company also plans to build a belt line around the new Harvey and Marrero additions in New Orleans. C. D. Warren, Gretna, president. [E. R. J., Nov. 9, '12.]

Portland, Gray & Lewiston Railroad, Portland, Me.—A 10-mile line between Lewiston and Portland will be built during 1913 by this company.

Electric Short Line Railway, Minneapolis, Minn.—This company, which is now constructing its line from Minneapolis to Winsted, Minn., is considering a proposition made by men identified with the Commercial Club of Watertown, S. D., to construct, independently and at this time, a line from Watertown to Lake Kampeska, to be a part of the system when the line shall have reached South Dakota on continued construction from Minneapolis.

Laurel Light & Railway Company, Ellisville, Miss.—Grading has been begun by this company on its line between Laurel and Ellisville. M. H. Thomasson has the contract for grading, and it is understood that the Hewes Contracting Company will construct the line. [E. R. J., Feb. 1, '13.]

Hattiesburg (Miss.) Traction Company.—Among the improvements planned by this company during the year will be the extension of the Mobile Street line along Seventh Street to Boule Street. The company has ordered for installation sufficient 70-lb rails to take the place of the light rails on Hardy Street.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—This company plans to build about 2 miles of new track during 1913.

Public Service Railway, Newark, N. J.—A petition will be presented shortly to this company by a committee from the borough councils of Cresskill, Demarest and Closter for a 4-mile extension from Tenafly to Closter.

Elmira Water, Light & Railway Company, Elmira, N. Y.—This company expects to build about 4 miles of new track in Elmira and about 1 mile in Watkins and Millport on the Glen Route.

North Carolina Traction Company, Danbury, N. C.—It is reported that this company plans to construct soon an electric line from Rutherfordton to Asheville, via Chimney Rock, to cross there on a bridge 100 ft. high. Thence it will extend up Reedy Catch Creek to a point near Slick Rock Inn; thence it loops and gradually climbs alongside and around Bear Wallow Mountain, at an elevation of 250 ft. above the valley, going on the Hickory Nut gap. Directly from there it goes to Fairview, then to Biltmore, passing near St. Genevieve's College to the Cox estate building, with a terminal station in front of the Southern Express office in Biltmore.

Grand Forks (N. D.) Street Railway.—Among the improvements planned by this company during the year will be the relaying of the line between Grand Forks and the University and an extension into East Grand Forks.

Pittsburgh & Cincinnati Traction Company, Cincinnati, Ohio.—The survey for this line between Cincinnati, Ohio, and Pittsburgh, Pa., has been made as far as Ironton. The company has secured an extension of one year on its franchise in Portsmouth, Ohio, and is considering plans to build a Pittsburgh terminal. H. A. Kirshner, Pittsburgh, is interested. [E. R. J., March 16, '12.]

Lake Shore & Michigan Southern Railroad, Cleveland, Ohio.—Plans are being made by this company to build a gasoline line between Cleveland and Conneaut.

Oklahoma (Okla.) Railway.—Plans are being made by this company to build an extension from Moore to Norman.

Sand Springs (Okla.) Railway.—This company plans to build 10 miles of new track during the year.

Toronto & Eastern Railway, Toronto, Ont.—This company has secured a location for a line through Pickering. The contracts have been let for the building of that section of the line between Pickering and West Hill.

***Toronto, Ont.**—A deputation from the Associated Boards of Trade presented to the Ontario government the resolution determined upon by the Associated Boards at their annual meeting in London on Feb. 27 and 28, 1913. Five of the resolutions deal with the question of railway development, particularly in northern Ontario. The extension of the provincial railway northward to James Bay and south to Toronto is recommended, and in connection therewith the establishment of a complete system of electric radial railways east and west.

***Grant's Pass, Ore.**—A $200,000 bond issued to be used in building an electric line from Grant's Pass to Crescent City, via the Illinois Valley, was recently sold. The line will be municipally owned and operated. Nearly all the right-of-way has been secured and twenty-six acres of terminal ground has been purchased.

Portland, Eugene & Eastern Railway, Portland, Ore.—The Southern Pacific Railroad's steam line on Fourth Street, a unit of the Portland, Eugene & Eastern Electric Railway, will be converted into an electric line. Material has been ordered and work will be started within a month.

Portland Railway, Light & Power Company, Portland, Ore.—Plans are being made by this company to begin work at once on its new East Harrison Street line in Portland. The proposed line would run on East Thirty-ninth Street from Sellwood past the Reed College and thence north to the Columbia Boulevard, connecting all the east and west lines of the company.

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—This company will build about half a mile of new track during 1913.

Northwestern Railways Company, Meadville, Pa.—During the year this company will build 3½ miles of new track between Venango and Cambridge.

Philadelphia (Pa.) Rapid Transit Company.—This company has been asked to consider plans to build a 1½-mile extension of its lines on Torresdale Avenue from Cottman Street to Blakiston Street in Philadelphia.

Pottstown & Reading Street Railway, Pottstown, Pa.—Contracts will soon be awarded by this company for excavating its line from the Power Pottsgrove township line to Linfield. The ties, tracks and overhead work will be laid by the company. Bids will soon be asked by the company to build the bridge which will span the Schuylkill River at Linfield. This extension will be built to Spring City.

Philadelphia & Western Railway, Upper Darby, Pa.—Surveys have been begun by this company for the extension from Valley Forge to Bridgeport. An order has been placed with the Pennsylvania Steel Company for 750 tons of 70-lb. steel rails and a contract for 15,000 cross ties has been placed with Bush & Company, Wilmington. The Phoenix Bridge Company has the contract for a bridge over Valley Creek, and Daniel E. O'Connell & Company, Avondale, will build the concrete piers and abutments. The company has purchased 8 acres adjoining the park at Valley Forge.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—During 1913 this company plans to build 1 mile of new track between Highfield, Md., and Blue Ridge Summit, Pa.

Montreal (Que.) Tramway Company.—This company has under consideration an elaborate program for the improvements of its lines in Montreal, which includes an expenditure of $10,000,000.

***Battleford, Sask.**—A project to build an electric railway to connect Battleford and North Battleford, Sask., has been submitted to the people of these two towns. F. P. Alywin, Ottawa, is the representative of the syndicate making the proposal, and the proposition he submitted is on the lines of the contract made between the Moose Jaw Electric Railway and the city of Moose Jaw. Mr. Alywin stated that the capital is ready to build the line as soon as an agreement is entered into.

Knoxville Railway & Light Company, Knoxville, Tenn.—During 1913 this company plans to build 4 miles of new track from Knoxville to Bearden.

Memphis (Tenn.) Street Railway.—This company plans to build 5 miles of new track during 1913.

Murfreesboro (Tenn.) Electric Railway.—Work will soon be begun by this company on its line between Nashville, Woodbury and Murfreesboro. J. L. Parkes, Murfreesboro, local representative. [E. R. J., Jan. 11, '13.]

Jefferson County Traction Company, Beaumont, Tex.—Contracts have been awarded by the Stone & Webster Engineering Corporation, which is building this line, for the grading, fencing, culverts and bridges for the interurban line between Beaumont and Port Arthur. [E. R. J., March 29, '13.]

Bryan & College Interurban Railway, Bryan, Tex.—Surveys have been made by this company on its 35-mile line between Bryan and Stone City.

Southern Traction Company, Dallas, Tex.—Tracks are being laid by this company on its line between Waco, Elm Mott and Dallas.

Texas Traction Company, Dallas, Tex.—Work has been begun by this company on its extension from Dallas to Corsicana.

Blue Ridge Interurban Railway, Greenville, Tex.—About 12 miles of track has been laid by this company on its line between Anna, Blue Ridge and Greenville. A. R. Nicholson, Greenville, is interested. [E. R. J., Oct. 12, '13.]

Longview Junction Street Railway, Longview, Tex.—During 1913 this company plans to build 1½ miles of new track.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—Surveys are being made by this company from Austin to Lockport and Seguin and from New Braunfels to San Antonio. Power is to be furnished by three dams across the Guadalupe River. The county has granted permission for the use of bridges for crossing the streams, and the city has granted franchises for the use of such streets as are necessary. Vories B. Brown, San Antonio, president. [E. R. J., March 8, '13.]

Charlottesville & Albemarle Railway, Charlottesville, Va.—During 1913 this company will build 2 miles of new track.

Grafton (W. Va.) Traction Company.—This company plans to build a line to Pruntyville in the near future.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Work has been begun by this company rebuilding, raising the grades and repaving some of its lines.

***Milwaukee (Wis.) Traction Company.**—Plans are being made to incorporate this company to build an electric line from the end of the railway at Green Bay Avenue and Keefe Avenue in Milwaukee to a point 2½ miles north. This line will furnish transportation facilities to Evergreen Park and vicinity and will be owned and controlled by citizens of Milwaukee exclusively. Among those interested is Lorenz Wagner, Milwaukee.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by this company to build an addition to its repair shop and carhouses in Burnaby, in addition to the repair shops which the company has at New Westminster. This company has called for bids for the construction of a building for the use of employees stationed in Vancouver. The building will be at the corner of Main and Prior Streets and directly opposite the principal carhouse in Vancouver and the repair shops maintained at that point. The structure will be 25 ft. x 60 ft. and five stories in height. The type of construction will be of reinforced concrete with facings of brick and artificial stone.

Northern Electric Railway, Chico, Cal.—It is reported that after July 1 this company will begin the construction of a new passenger and freight depot at the corner of Second Street and E Street in Marysville.

Springfield (Mass.) Street Railway.—This company, which has plans drawn for a new carhouse for the Hadley lot in Ward 1, Springfield, will have to secure a new location as the city plans to use this property for a park.

Hattiesburg (Miss.) Traction Company.—This company will soon build an office building on West Pine Street in Hattiesburg. The company will also build an addition to its carhouse to include woodworking shops and blacksmith shops, wheel press and a complete plant for repairing its cars.

Grand Forks (N. D.) Street Railway.—This company plans to build soon a new carhouse in Grand Forks.

Oklahoma Public Service & Interurban Lines, Stillwater, Okla.—Plans are being made by this company to build new repair shops in Stillwater.

Portland Railway, Light & Power Company, Portland, Ore.—Plans have been prepared by this company to build a one-story reinforced concrete station at Thirteenth Street and Ochoco Avenue in Portland. The cost is estimated to be about $4,000.

Washington-Oregon Corporation, Vancouver, Wash.—This company has completed an office and depot at Third Street and Columbia Street in Vancouver and has removed the traffic department offices there.

POWER HOUSES AND SUBSTATIONS

Glendale & Eagle Rock Railway, Los Angeles, Cal.—A new substation is being built by this company in Montrose.

Hattiesburg (Miss.) Traction Company.—This company's motive power will be more than doubled by the installation of an 1800-hp turbine with condenser and cooling tower. Additional switchboard facilities will be provided and a 200-kw generator will be added to the equipment.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company plans to build a power house in Elmira in the near future.

Toledo Railway & Light Company, Toledo, Ohio.—This company has placed an order with the General Electric Company for a 12,500-kw turbo-generator to be installed in its power plant on Water Street, Toledo.

Oklahoma Public Service & Interurban Lines, Stillwater, Okla.—Plans are being made by this company to build a power house in Stillwater.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for a 1000-kva water-cooled transformer for the Tacoma substation and for two 1000-kva air-blast transformers for its substation in Seattle.

Manufactures and Supplies

ROLLING STOCK

York (Pa.) Railway is reported to be in the market for two cars.

Cleveland (Ohio) Railway has ordered 100 trail cars with trucks from the G. C. Kuhlman Car Company.

International Railway, Buffalo, N. Y., has ordered 100 near-side cars from the G. C. Kuhlman Company.

Portland, Gray & Lewiston Railroad, Lewiston, Maine, has ordered one flat-car body from the Wason Manufacturing Company.

Northampton (Mass.) Street Railway has ordered two fourteen-bench open car bodies from the Wason Manufacturing Company.

Toledo Railway & Light Company, Toledo, Ohio, is in the market for twenty center-entrance trail cars similar to those now in use in Cleveland.

Virginia Railway & Power Company, Richmond, Va., has ordered twenty cars from the Cincinnati Car Company. They will be equipped with Brill 51-E-1 trucks.

Sioux Falls (S. D.) Traction System has ordered from the St. Louis Car Company one 26-ft. 6-in. car body with T-post construction, mounted on a 12-ft. Warner truck.

Boston (Mass.) Elevated Railway will call soon for bids upon the construction of thirty articulated cars similar to that described in the Electric Railway Journal for March 29, page 583.

Philadelphia (Pa.) Rapid Transit Company has ordered 600 additional near-side cars from The J. G. Brill Company and fifty additional elevated and subway cars from the Pressed Steel Car Company.

Chicago (Ill.) Railways will be in the market in the near future for from 100 to 150 new cars, either to purchase outright or buy the material and manufacture them in its own shops. No definite decision has been reached as to the details of the design.

Tidewater Southern Railway, Stockton, Cal., has specified the following details for the four combination passenger, baggage and smoking cars which are being built by the Jewett Car Company.

Seating capacity	50
Weight (car body only),	35,000 lb.
Length over vestibule,	50 ft. 0 in.
Length over all	51 ft. 0 in.
Width over sills	9 ft. 3 in.
Body	wood
Interior trim	mahogany
Headlining	Agasote
Roof	arch
Underframe	composite
Couplers	radiating MCB
Curtain fixtures	Cur. S. Co.
Curtain material	Pantasote
Motors	inside-hung
Sanders	Jewett
Seats	H & K
Seating material	rattan
Trucks	MCB

TRADE NOTES

Day & Zimmerman, Philadelphia, Pa., have opened new engineering offices at 611 Chestnut Street, Philadelphia.

D. C. & Wm. B. Jackson, Boston, Mass., engineers, have moved their Boston office from 84 State Street to 248 Boylston Street.

Page & Hill Company, Minneapolis, Minn., has moved its general offices from the Lumber Exchange to 812-814 Plymouth Building, Minneapolis.

Track Necessities Company, Chicago, Ill., has been incorporated with a capital stock of $5,000 to manufacture and deal in railway supplies. The incorporators are: L. C. Hurley, H. A. Fischer and Richard Y. Hoffman.

Electric Products Company, Cleveland, Ohio, manufacturer of Wotton automatic battery-charging panels, has moved into its new building at 10514 Dupont Avenue, Cleveland. During the past year the company has shown 227 per cent increase in sales.

Electric Storage Battery Company, Philadelphia, Pa., reports its total net income for the year ended Dec. 31, 1912, as $1,125,279. The dividends on the common and the preferred stock amounted to $649,964. The surplus for the year was $475,315.

J. W. Paxson Company, Philadelphia, Pa., has introduced a novel method of displaying its products to its patrons. This is done by means of a small electric stereopticon machine which is carried by the salesman. It can be attached to any electric lamp socket and thus the salesman can show the complete line of foundry facings, supplies and equipment manufactured by the company.

Pressed Steel Car Company, Pittsburgh, Pa., announces the following appointments, effective April 1, 1913: Charles A. Lindstrom, formerly chief engineer, has been appointed assistant to the president, with headquarters in the Farmers' Bank Building, Pittsburgh. B. D. Lockwood, formerly assistant chief engineer, has been appointed chief engineer. J. F. Streib, formerly mechanical engineer, has been appointed assistant chief engineer. Felix Koch has been appointed mechanical engineer.

N. W. Halsey & Company, New York, N. Y., announce that after March 31, 1913, their business in the New England States will be handled by Halsey & Company, Inc., 55 Congress Street, Boston, Mass. Halsey & Company, Inc., will act as fiscal agents for municipalities, corporations and estates and will deal in government, municipal, railroad and public utility bonds, with special reference to the requirements of the New England market. F. Monroe and George A. Lyon, Jr., will be in charge.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received the following orders for railway motors: Shreveport (La.) Traction Company, three quadruple equipments of No. 306 motors and K-36-J control; Michigan Railway Engineering Company, Jackson, Mich., six quadruple equipments of No. 333-B-2 motors and HLF control; Lehigh Valley Transit Company, Allentown, Pa., two quadruple equipments of No. 303-A motors and type AL control; Detroit (Mich.) United Railway, one quadruple equipment of No. 303-B-2 motors and US control.

Western Electric Company, New York, N. Y., reports gross sales for the year ended Dec. 31, 1912, as $71,727,329. This compares with $66,211,795 in the preceding year. The surplus after deduction of manufacturing costs and other expenses was $4,853,265, which compared with $3,280,292 in 1911, and is equivalent to 32.36 per cent on the $15,000,000 capital stock, against 21.87 per cent in the previous year. The surplus for the year was $1,067,410, as compared with $890,292 for the year ended Dec. 31, 1911. The company has received an order from the Western Maryland Railroad for telephone train-dispatching equipment to be installed over a circuit extending from Hagerstown to Cumberland, a distance of 80 miles. The apparatus to be used is the No. 102 type selector set containing the No. 50 selector.

Hale & Kilburn Company, Philadelphia, Pa., has issued its annual report for the year ended Dec. 31, 1912. After payment of dividends at the rate of 7 per cent on the first and second preferred stocks and 4 per cent on the common stock, aggregating $460,538, the balance of profits added to surplus account amounted to $125,411. Manufacturing operations during the year have been hindered owing to difficulties incident to construction of an addition to the plant. This addition consists of a five-story steel and concrete building now nearing completion. On Dec. 31, 1912, unfilled orders amounted to $3,720,040, as compared with $820,211 on Dec. 31, 1911. In addition to the capital expenditure for extension to manufacturing plant, the company purchased real estate worth $55,000 necessary to complete its holdings on Sixth Street, Philadelphia.

C. P. Howard and Shelby S. Roberts, formerly connected with the engineering department of the Illinois Central Railroad, have opened an office in the Transportation Building, Chicago, Ill., for the general practice of civil engineering, specializing in both steam and electric railway and yard and terminal surveys, location, plans, estimates, valuations and studies of economies of operation. Mr. Howard was formerly assistant chief engineer of the Deepwater Railroad and chief engineer of the Tidewater Railroad. Recently he has been engaged in location and special investigation for the Lake Shore and the Illinois Central Railroads. Mr. Roberts was division engineer of construction of the Illinois Central Railroad, designing and supervising construction of the Centralia gravity yards and those at Champaign.

ADVERTISING LITERATURE

Western Electric Company, New York, N. Y., has issued special Bulletin No. 54.20, in which the many types of Hill knife switches are listed and illustrated.

Industrial Works, Bay City, Mich., have issued Bulletin No. 209, in which their various types of wrecking, locomotive, construction and freight cranes are illustrated.

Cleveland Fare Box Company, Cleveland, Ohio, has issued a booklet which describes its various types of fare boxes. Several illustrations are shown of cars which are equipped with Cleveland fare boxes.

W. N. Matthews & Brother, St. Louis, Mo., have issued two circulars in which Matthews fuse switches are briefly described and illustrated. Another circular issued by the company is devoted to Matthews guy anchors.

Reliance Electric & Engineering Company, Cleveland, Ohio, has issued Bulletin No. 1010, which describes the advantages and characteristics of the Reliance adjustable speed motor of the armature-shifting design. The bulletin also contains illustrations showing the various forms of speed control of this type of motor.

Stone & Webster, Boston, Mass., have issued a booklet of information for the year 1913, covering the companies under their management. The publication is a model of its kind. A statement of the combined earnings for the year ended Dec. 31, 1912, of the companies under the manageemnt of Stone & Webster was published in the ELECTRIC RAILWAY JOURNAL of March 1, 1913, page 394.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin E-28, which briefly describes and illustrates its line of Duntley track drills, heavy-duty side-spindle drills, heavy-duty center-spindle drills, portable electric grinders and electric spike drivers. Circular No. 143 issued by the company describes and illustrates its electric signal bonding outfit and Circular No. 145 gives a description of the triple-ignition Rockford motor car built by the company.

Delos F. Wilcox, chief of the bureau of franchises of the Public Service Commission of the First District of New York, addressed the City Club of Cleveland recently. Mr. Wilcox is reported to have said in part:

"I believe in ultimate public ownership of all important public utilities. We recognize that the operation of a public utility is a public function. If public utilities in their nature are public the country must decide that either stringent public regulation or public ownership is necessary. Regulation is an additional cost of operation. To make regulation effective you need as capable men as would be needed to operate the utility. The only argument left against public ownership is in the fear that graft makes it best to leave operation of utilities to private enterprise. The answer to this is that no one says that we should turn the police force over to operation by a detective agency, or the fire department to the insurance companies, or abandon public education. The argument that the city is unfit to manage public utilities includes the assumption that city government is growing worse, and that we are going to destruction. No one asserts that. Control such as the city of Cleveland exercises over the street railway company must be continuous, and intimate to be effective.

"In controlling public utilities in many states and cities existing laws which have their basis in charters make it impossible to begin as if the problem were new. For this reason Cleveland, now writing its own charter, is in a fortunate position. One of the principles which should be kept in mind is that capital honestly invested should be adequately protected. Another is the necessity from the public viewpoint of making extensions of a service easy. In ownership or control of a public utility it is a poor policy for a city to make money out a public utility for the benefit of taxpayers at large. Money earned should be put into reduction of rates and improvement of service. My view is that improved service should come before reduction in rates. It is a mistake to cut fares or rates excessively at the expense of service. It is of the utmost importance to the city that it should have a department of public utilities to see that franchise obligations are respected and in all ways to maintain an intimate control over public utilities."

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, APRIL 12, 1913 No. 15

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office..........................1570 Old Colony Building
Philadelphia Office........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

TIMETABLES FOR OUTLYING LINES

Much has been said in the past regarding the desirability of furnishing time cards for electric railway lines upon which the service is infrequent and irregular, and it has been pointed out that the generous distribution of such data is one of the most profitable forms of advertising. Under the circumstances it is somewhat surprising to find that this apparently obvious course should not be followed universally. On two branches of a comparatively large surface system where traffic is light, such time cards have been printed, but possibly from motives of economy so few have been distributed that most people on the routes do not know of their existence. The service is largely that of meeting trains on a suburban railroad. In consequence, the schedules are extremely irregular; so much so, in fact, that the conductors themselves are hardly able to carry them in mind. Neither electric line is sufficiently long to compel its use by possible patrons except in bad weather, and naturally many prospective passengers walk to their destination rather than face a wait of unknown length. The cost of printing enough time cards to provide a dozen for every household on either route would hardly amount to one week's return from the ensuing increase in business from people who seldom use the cars at present, and if a supply was kept at all times in a rack on each car the problem of distribution would be negligible.

SAFETY SHOULD BE FIRST

The safety bureau of the Middle West Utilities Company, which we mentioned in a recent issue, is really in part a continuation and enlargement of a work which was started in a smaller way on some of the subsidiary properties of this new holding organization. Because of the wider scope of its operations it has an opportunity to accomplish much more than merely to carry on the work begun by some of the individual companies. No intelligent efforts to impress the necessity for caution and safety upon either the public or the employees of a public utility corporation is wasted, but the real problem is to approach this question in a way that is as comprehensive as the possibilities are large. Many companies are now trying to solve that problem. Trainmen are taught rules in order that they may do the right thing under all circumstances. If they are reliable trainmen, they come in time to do as a matter of habit what they ought to do. But new trainmen enter the service and new residents settle in the community so that the teaching of both trainmen and public is a work that, once started, should never be abandoned.

ACTIVITIES OF THE A. E. R. A.

Attention was recently drawn in these pages to the noteworthy growth of the American Electric Railway Association with respect to the mileage represented by its company membership. More important, and also more in the nature of cause than effect, are the increasing activities of the parent and affiliated associations. A comparison of the list of committees of the American Association now and in 1905 shows that these committees have increased in number from twelve to eighteen and the committee membership from fifty-four to 187. The work of the added units is, of course, of more significance than the number of these units. Committees created since 1905 deal with such subjects as electrolysis, federal relations, rates and fares, taxation and welfare work. This list indicates the broadening scope of the association and its adaptation to the changing exigencies of the industry. In the same measure, the accountants', engineering, claims and transportation associations have expanded to cover increasing needs. The total number of all committees has increased in the past eight years from twenty-four to sixty-four and the membership in these committees from 109 to 450. In the same period the number of member companies has gone up from 183 to 400. The individual membership is now 2800. It should be more than this. Personal representation in an association that is doing for the common good the work performed by the A. E. R. A. is a privilege as well as a duty that electric railway men should hasten to discharge for their own good and for the good of the industry as a whole.

EFFECTIVE UNORGANIZED STRIKING

One feature of the Buffalo strike deserves particular attention from managers of electric railways in big cities. This feature is the success of a handful of men in tying up a system the great majority of whose employees are non-union and entirely unorganized. Such a condition too often leads to a feeling of security which the Buffalo and other experiences show to be unwarranted. Under circumstances favorable to their purposes a very small minority of employees can by intimidation make effective a wholly informal and unreasonable strike call simply by pulling a few crews from their cars and leaving it to the hoodlum element to do the rest. After that, men who would not vote for a strike or willingly join one are kept off the cars partly by fear of violence and partly by the abhorrence of the name of "scab." It is not meant by this to imply that avoidance of labor troubles on electric railways is impossible. But it is pertinent to say—and the Buffalo incident proves it to be true—that the mere fact that the motormen and conductors of a system are not formally organized or have among them only a very few union propagandists is no reason whatever for believing that the property cannot be tied up by a sudden strike. The methods pursued by the Buffalo trouble makers are, in fact, becoming increasingly popular with the Amalgamated for the obvious reason that during the suspension of work it is always possible to enrol hundreds of men who in time of peace would not join the union. That such methods only intensify opposition to organization—opposition of a kind which would not exist to reasonable and responsible trades unionism—is something that the leaders of electric railway men will, it is to be hoped, learn in time.

NUMBERED ROUTE SIGNS

A feature of car operation on the Pacific Coast is the use by many of the companies of numbered route signs. This is due, perhaps, to the fact that most of the Far Western cities, especially in California, are visited annually by a great many strangers. Indeed, it is common in these cities to instruct a stranger who wishes to reach a certain point to take a car with a certain route or destination number, and this avoids the necessity of a much longer explanation. But these signs are equally useful to the regular passengers, who are relieved of the necessity of reading two or three signs on the front or side of the car to learn whether the car which they are about to board is on the route which they wish to take and whether it goes to the end of the route.

The numbered sign in California is always carried on the hood of the car and is illuminated at night by lamps within the sign, but the types of signs employed in the different cities vary somewhat in details. In one city the two sides which are seen from the street are of ground glass, which has a black painted background to allow the numerals to show white by day and illuminated at night. In another city a perforated metal plate is used instead of the glass, and in still another there is ground glass behind the perforated plate. An advantage of both of the latter methods is that when the route of the car is changed metal plates and not glass plates have to be shifted. The perforated metal side is, of course, painted with the numeral so that it is as legible by day as at night.

These signs are not used to the exclusion of all others, but they reduce the number which would otherwise have to be employed to indicate the route, and they are certainly a convenience to the public in identifying different cars. As we have said before in connection with route signs, we believe that most cars in this country are inadequately marked and that many strangers who want to travel only short distances are discouraged from patronizing the street cars for this reason. Any way of getting additional business is worth looking into, and the success of the California roads with the numbered signs may be worth adoption in some instances elsewhere.

PASSENGER INTERCHANGE

Among the subjects to be considered by the committee on train operation of the Engineering Association is that of the effect of car design upon duration of stops. It would be difficult to find a more interesting subject for consideration or one with more potential value to the electric railways of the larger cities. The complexity of the problem which confronts the committee is unusual. Few records exist in a form which make them directly available, for the reason that no standard basis for establishing the time required for passengers to board and alight has ever been generally accepted. Records of this kind have been made in various cities and have been published in this paper, but the time per passenger varies so greatly that it looks as if the same basis was not used in all cases. There is, in fact, some question as to what constitutes a stop, as in many cases cars only slow down for single passengers, and it is the practice of many alighting passengers to step off the car before it actually comes to rest.

Recently there has appeared a tendency toward the use of the interchange time rather than the straight loading time as a basis for such records. By this method the total duration of all stops which are made to take on or let off passengers in a trip is divided by the total number of passengers boarding the car. This gives an accurate measurement of the time required for passenger interchange for any particular run—or, in other words, the average time required for each passenger to board the car plus the time required for him to alight—thus eliminating the necessity for special consideration of stops where passengers are getting on and off at the same time. Such figures, unfortunately, are not capable of indiscriminate comparison.

Figures obtained on a run where passengers board the car in groups of five or six at different points along the route and alight in similar groups at the same points will naturally be lower than those obtained on runs where all passengers are loaded at one point with prepayment operation and then let off singly along the route. If, however, records are compared only when they cover trips which are made under approximately similar operating conditions, such as the number of stops per mile, the average duration of each stop, the difference between the total number of fares and the maximum load at any one time, and the average number on and off at each stop, the time of passenger interchange gives a reasonably accurate means of expressing operating results. There is, of course, the possibility that of two similar trips one may happen to have interchanges take place at every stop and the other have only boarding passengers who alight together at the end of the line. In this case the latter, while having only one more actual stop, would have considerably more time charged to stops and a consequently higher interchange time in case the trip was not long enough to absorb the difference.

There is ample opportunity for thorough investigation of the matter of a standard method of expressing results.

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

Even the matter of nomenclature is in need of standardization. Once these points are satisfactorily settled it would seem quite possible, either through the work of the committee or else through that of some independent investigator, to establish a formula which would briefly and satisfactorily explain the chief reasons for the extraordinary discrepancies occurring in existing records of passenger interchange.

"THE VALUE OF VALUATION"

A reader of the ELECTRIC RAILWAY JOURNAL takes exception to the opinions expressed in the editorial note on this subject in our issue of March 15, which voiced doubt as to the usefulness of the valuation of interstate railways provided for in the law passed in the closing days of the last session of Congress. As this critic's views may be those of other readers, we welcome the request to state the facts and theories on which was based the statement that the proposed plan will cost more than it will be worth.

First among the reasons for railway valuation, not only as stated by the ELECTRIC RAILWAY JOURNAL's correspondent but by nearly all advocates of the plan finally adopted by Congress, is that "wherever the actual value of such property has been investigated, it has been found that it bears little or no relation to the value of securities on which returns are expected, over-capitalization being the universal, not the occasional, condition, and that the carriers demand to be allowed to make rates that will earn dividends on more than actual investments or values."

The idea that both the value and the investment of the interstate roads are far less than the capitalization is one which is quite generally held but is purely a gratuitous assumption. We believe that if it was possible to determine the investment or to approximate the present fair value of these roads the contrary would be found to be the case. The outstanding securities of all steam roads total $18,417,132,238. As against these stocks, bonds and notes, it is estimated by experts that a fair valuation of all the roads would aggregate $20,000,000,000. In individual cases where the investigation has been made an excess of assets over capitalization has been found to be the case. Thus the system of the New York, New Haven & Hartford Railroad, when appraised by the Massachusetts Railroad Commission, was valued at 25 per cent in excess of its capitalization, and in several cases of electric railway companies, notably in that of the Coney Island & Brooklyn Railroad, where the investment for a period of more than forty years was carefully calculated in connection with the Coney Island fare case, not only the investment but the cost of reproduction new were shown to be more in amount than the present aggregate of stocks and bonds. In the States of Washington, Minnesota and Wisconsin, where official state valuations were made some time ago of the steam railroads in the State, both the cost of reproduction and the present value were found to be considerably in excess in each case of the capitalization.

The second claim made by our correspondent is that "ever from the standpoint of the carriers themselves, a valuation will be worth all it will cost. A little experience in valuations will demonstrate to any engineer that railroad officials have only the most vague idea of what their property is really worth. When brought face to face with a tabulated inventory they invariably begin by declaring it incomplete and usually find it to be rather liberal. The value of a complete inventory is recognized by all business men. It is only the large corporations that can, by reason of their bulk, afford to be inefficient in the control of income and expense, and every engineer who is or has been in the service of a large corporation can call to mind many cases where they are highly inefficient. No small proportion of this inefficiency is due to the fact that the responsible officials do not have and cannot obtain accurate information regarding the property they control."

We do not deny that an appraisal of the physical property, or all of the property, of a railway, made upon almost any basis, would be of some value "as an inventory" to the companies. But in most cases it is very doubtful whether it would be worth as much as it cost because practically it would be obsolete before it was finished, and unless it included an accurate valuation of all of the property of the company and the cost of establishing its business it would, of course, be of little use for rate-making purposes.

But this raises the question as to what is to be considered the "value" of a railroad. Is it the cost of reproduction new, or the original investment, or some one of the many other bases which have been suggested for this purpose? Are its terminals and rights-of-way to be valued simply as real estate or as railroad property? What is the value of the Pennsylvania Railroad's intrenched position in Pittsburgh or the New York Central's terminal in the heart of New York City? Should that terminal be valued either for rate-making purposes or for taxation at the same amount as though it were the site of twenty-story hotels and office buildings? There are replies so numerous to these questions that up to this time it has been impossible to get a generally accepted definition of valuation, much less valuation itself. Fortunately the importance of reaching definite conclusions on this subject, based upon correct accounting principles, is being realized to a greater extent now than ever before, and we trust that rapid progress will be made in this direction within the next few years.

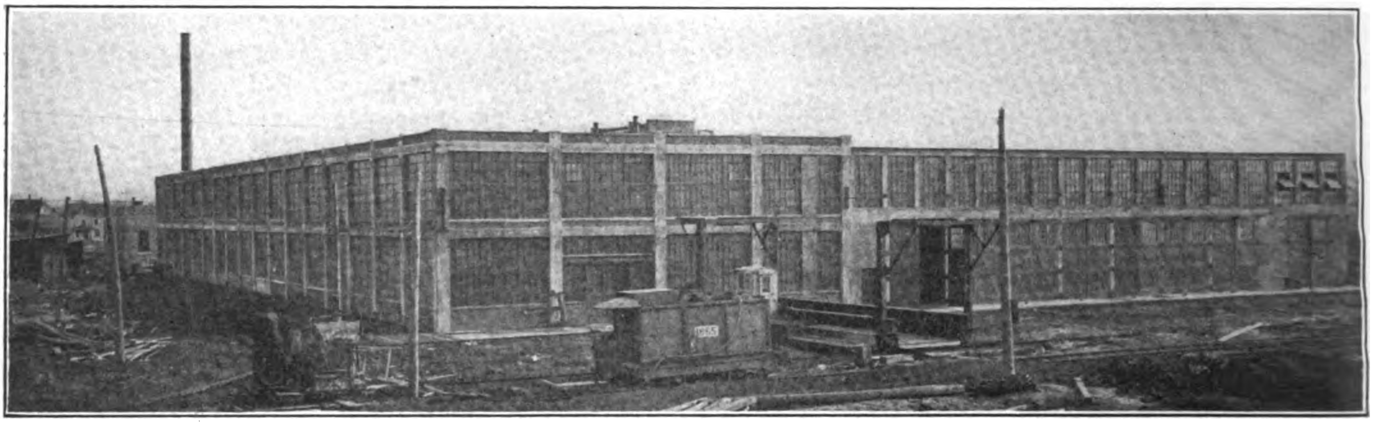
One provision of the law signed by President Taft on March 1 requires that "the original cost of all lands, rights-of-way and terminals" shall be separately ascertained. Aside from the fact that it will be found impossible to get this information in many cases more than twenty or twenty-five years back, the requirement quoted creates the fear that no appreciation is to be allowed for in the value of railroad property. Every other property owner has so far enjoyed the unquestioned right to increase in the value of his holdings, and so to the extent that railways should be deprived of the same right they would suffer confiscation. The courts would doubtless protect the carriers against this, but the threat embodied in the provision is not calculated to inspire confidence either in the fairness or good intentions of the framers of the law.

These are some of the reasons why the railroad valuation project does not promise to repay the money it will cost. And the more the project is examined the more hopeless appears the prospect that the results will be useful—certainly not until there is some agreement as to what "valuation" means.

New Paint Shop of the Detroit United Railways

A Paint Shop of Modern Design Has Been Constructed as the First of a Series of Structures Which When Finally Completed and Occupied Will Constitute One of the Largest Repair Shop Layouts in the Country

With the completion of a large paint shop building, the Detroit United Railway has begun the construction of general repair shops which will be among the largest and most substantially built in the country. This property now includes over 777 miles of track and operates more than 2000 cars for city and interurban service, and the demands on the existing shops have increased to such an extent that additional facilities are required to meet them. It has also been found that as the track mileage has grown, the location of the old shops at Monroe and Dequindre Streets, in Detroit, has become more and more disadvantageous. This is due to the fact that the present shops are situated approximately a mile from the center of the business district where property is held at prices too high to warrant its purchase for additional shop facilities. The present location while convenient to the different city and interurban lines is at the wrong end of the city from an operating standpoint, and at the same time it is not in the vicinity of any important carhouse.



Detroit Paint Shop—General View of Building

GENERAL LAYOUT

The new shop site is situated in Highland Park, a suburban district approximately 6 miles north of the center of the city. The Woodward Avenue carhouse and storage yards already occupy approximately one-half of the property, which fronts 800 ft. on Woodward Avenue and extends 2616 ft. west, containing about 48 acres. The general repair shops will occupy the west half of the tract, being constructed on both sides of Third Avenue, which crosses the property from south to north.

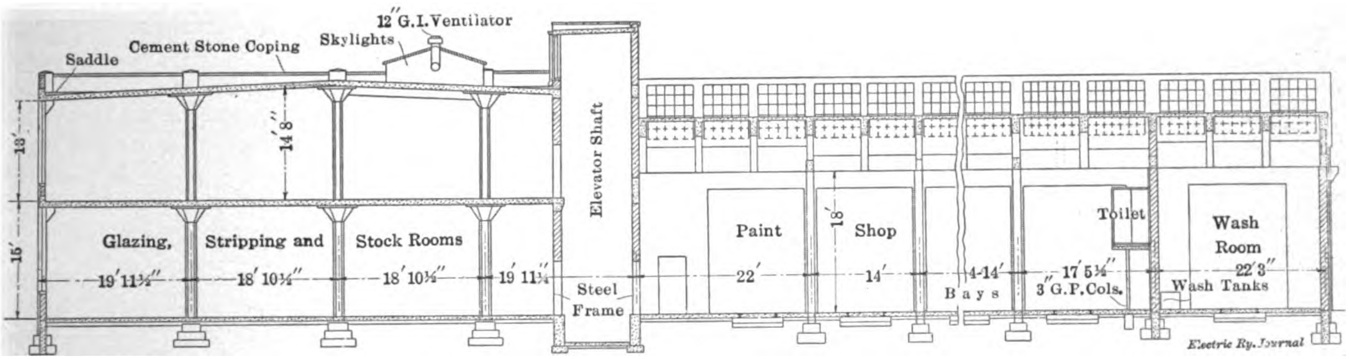
The double-track line on Woodward Avenue is one of the main trunk lines of the city railway and it is also used by the interurban cars entering Detroit from the towns of Pontiac and Flint. Cross-town lines in the outlying sections of the city tap the Woodward Avenue line, making the new shop site easily accessible for all city lines as well as for the six interurban lines radiating from the city. Direct track connections to the Detroit Terminal Railroad, which handles practically all interchange traffic between the steam roads entering Detroit, were obtained at the time the Woodward Avenue carhouse was completed. Five leads from this steam road connection, included in the proposed repair shop track layout, will make it possible to deliver material direct to any one of the four general repair shop buildings.

As shown on the general layout plan, the group of buildings includes a paint shop, a stock room, a machine and truck shop and a carpenter and wood shop. It is the intention to follow one type of construction in all four buildings. The stock room will be a three-story building and portions of each of the three other shop buildings will be provided with second stories. The heating plant, which has been installed temporarily in a building on the proposed site of the stock room, will be permanently located in the space between the wood and machine shop buildings. A reinforced concrete tunnel leading from the heating plant, of which a portion has already been constructed, will serve to carry both the feed and return mains of the heating system to the four buildings in the group.

TRACK ARRANGEMENT

The arrangement of the buildings has been planned to make movement of equipment through the different departments continuous and in one direction. Cars for general overhauling will be run into the truck shop, the bodies removed, placed on temporary trucks and passed over the transfer table to the carpenter shop. From there they will be moved to the paint shop. In order to provide the maximum area for building purposes it was decided that no tracks should lead directly into any of the buildings, and this will necessitate the installation of six flush transfer tables and runways to replace the customary ladder tracks and the accompanying special work. These transfer tables will be reached from both the east and west by two double tracks, one branching off Woodward Avenue at the south property line and extending west to the interurban line from Detroit to Farmington and the other branching off the Woodward Avenue line at the north edge of the property and extending full length, terminating in the connection to the Detroit Terminal Railroad near the west end of the shop site. Four leads from each of these two double tracks will form approaches to four through tracks which will parallel both sides of each pair of shop buildings. Paralleling each of these through tracks and connected to them by crossovers a second track will serve as an approach to the transfer table. Each transfer table runway will extend approximately 20 ft. beyond the face of the building served by it, thus permitting the table to be set in line with these approach tracks which are stub-ended at the runway. Two Y tracks, one at each end of the center transfer table runways, afford facilities for turning cars when required.

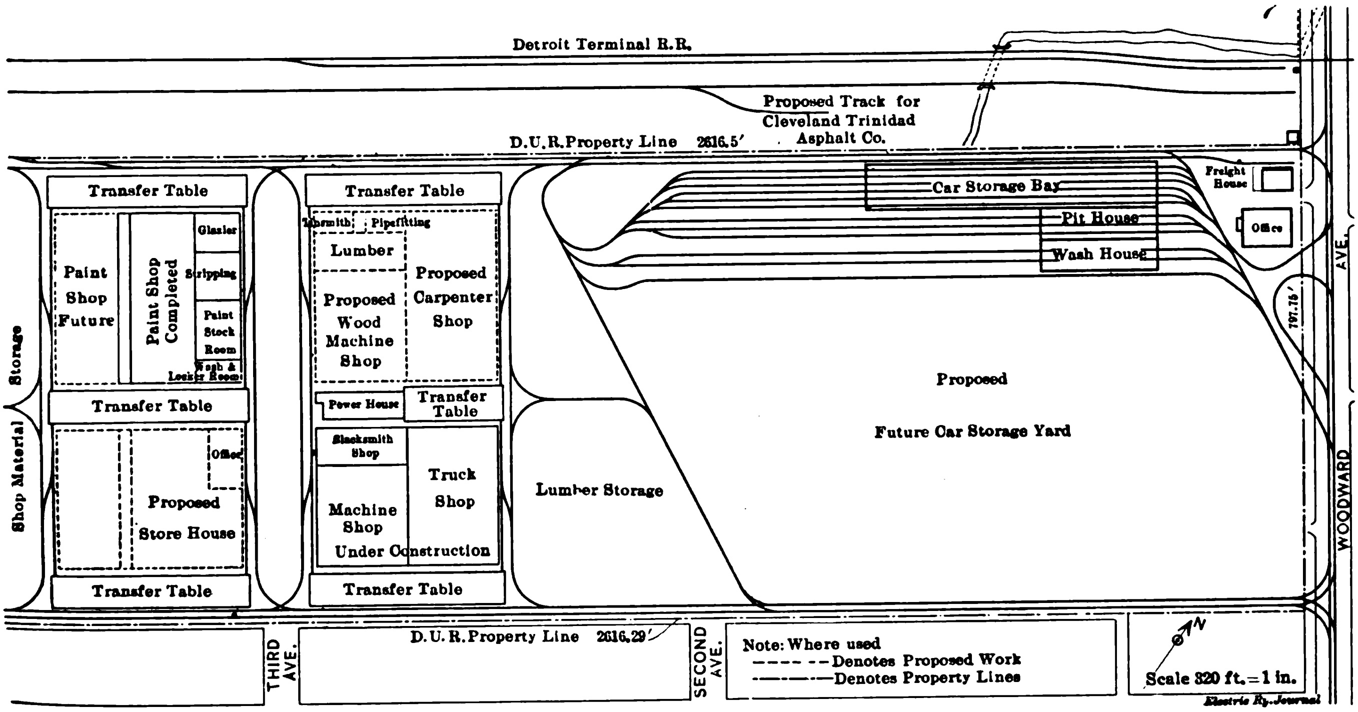
In planning the general shop layout it was necessary to keep both the track approaches and buildings clear of the building line on Third Avenue, which cuts through the property. To meet this condition a 126-ft. aisle was left between the paint shop and the stock room and between the machine shop and the wood shop. The presence of this thoroughfare made it impossible to have continuous transfer table runways across two buildings, but the number of tracks each table has to serve, as well as the elimination of track special work, was considered to warrant an installation of this character. According to the proposed plans, ten tracks will pass through the truck shop and carpenter shop buildings, while fifteen tracks will pass through the present paint shop and the future addition to it.


12" G.I. Ventilator
Skylights
Cement Stone Coping
Saddle
13'
14'8"
15'
Glazing,
Stripping and
Stock Rooms
19'11½"
18'10½"
18'10½"
19'11¼"
Elevator Shaft
Steel Frame
Paint
18'
Shop
22'
14'
4-14'
Bays
17'5¼"
3" G.P.Cols.
Toilet
Wash Room
22'3"
Wash Tanks
Electric Ry. Journal

Detroit Paint Shop—Cross-Section of Building

PAINT SHOP BUILDING

To avoid the necessity for stopping all repair work in the old shops while moving into the new ones, the company decided to construct the new buildings one at a time. The paint shop was the first one to be completed, and as soon as it was fully equipped the force from the car-painting department of the old Monroe Street shops was moved into it. Although this will result in temporary inconvenience, it was considered more economical to disorganize only one department at a time than to invite the confusion incident to a complete transfer of all departments. Work has now been begun on the machine shop building, which will be the second one of the four shop structures to be completed.


Detroit Terminal R.R.
Proposed Track for Cleveland Trinidad Asphalt Co.
D.U.R. Property Line 2616.5'
Transfer Table
Paint Shop Future
Paint Shop Completed
Glazier
Stripping
Paint Stock Room
Wash & Locker Room
Transfer Table
Office
Proposed Store House
Transfer Table
Shop Material Storage
Transfer Table
Smith
Pipefitting
Lumber
Proposed Wood Machine Shop
Proposed Carpenter Shop
Power House
Transfer Table
Blacksmith Shop
Machine Shop
Truck Shop
Under Construction
Transfer Table
Lumber Storage
Car Storage Bay
Pit House
Wash House
Freight House
Office
197.75'
Proposed
Future Car Storage Yard
WOODWARD AVE.
D.U.R. Property Line 2616.29'
THIRD AVE.
SECOND AVE.
Note: Where used
- - - - Denotes Proposed Work
———— Denotes Property Lines
N
Scale 320 ft. = 1 in.
Electric Ry. Journal

Detroit Paint Shop—Plan of Property

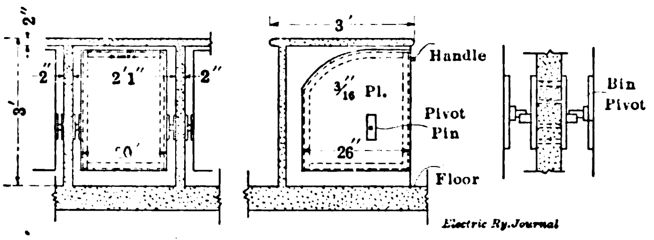
In planning the paint shop building the arrangement received careful consideration with a view to eliminating lost motion, which necessarily requires continuity of movement of material and work through the different departments. Conforming to this plan, the locker and washroom, as well as the time clock, were installed in the southeast corner of the building, this location being on Third Street, at the end nearest the residence section, from which direction all employees approach the shops. The paint stock room adjoins the wash and locker room, being the next point to which many of the men must go after entering the building.

The cars enter the structure from the north. Just inside the entrance they are stripped, the sashes and doors being sent to the glazing room on the ground floor at the left of the north entrance, and thence to the scraping room on the second floor by way of a 2-ton electric elevator. From the scraping room the sashes, doors and other finished material are passed on to the adjoining room on the second floor, where they are varnished and again returned to the stripping room, which also serves for a storage room for finished work.

The manufacture and repair of signs for more than 2000 cars requires a small force of men especially delegated for the work and considerable space for storage of signs as well as that required for manufacturing and repairing. As soon as signs are removed from the cars they are placed on the elevator in the stripping room and taken to the sign room, which adjoins the scraping room on the south. This room is large, light and convenient, thus meeting all the requirements of the sign department.

Directly over the wash and locker room on the second floor a spacious, well-lighted room has been provided with benches, tables and drinking fountains for use as a lunch and lounging room. The ban on smoking in the paint shop is removed so far as this room is concerned. In addition to furnishing a certain amount of comfort for the men during the lunch hour, this room makes it unnecessary for them to spend that hour amid the litter from the cars undergoing repairing.

A car-washing aisle adjoins the general car-painting room on the west. This location carries out the principle of continuous movement through the shop, as soiled car bodies will be run into this department before entering the car-painting department where they are stripped for general painting.



Detroit Paint Shop—Swinging Bins for Paint Stock

BUILDING CONSTRUCTION DETAILS

The preparation of the general plans, including the general shop layout, building and track facilities and the location and size of the various rooms required by the different departments of a general repair shop, was supervised by the engineering staff of the Detroit United Railway, but the preparation of the detailed plans and specifications, as well as supervision of building construction, was carried out under the direction of the company's architects, Smith, Hinchman & Grylls, of Detroit. In plan the paint shop building is 210 ft. wide by 287 ft. 6 in. long. A second story, 77 ft. x 287 ft. 6 in., over the Third Street side of the building supplies additional floor space, at a minimum cost, for phases of paint shop work which can be done just as economically on the second floor as the ground floor. The design of the building included reinforced concrete columns, floors and roof, with brick partition walls and steel sashes. The latter practically replace the brickwork in the exterior walls. Reinforced concrete girders support the roof and floor between the columns, bricking in being required only to close the wall panels below the sash areas. This style of construction made it unnecessary to provide heavy foundations under the curtain walls, but it did involve substantial construction in the foundation pedestal design.

Both exterior and interior walls are built of common brick, 13 in. thick. All reinforced concrete columns in the exterior walls are of a rectangular section reinforced with ¾-in. round bars vertically and 5/16-in. ties at 10-in. centers horizontally. Interior building columns are both round and rectangular. The former were employed where they were exposed and the latter when incased in the partition walls. In either type the reinforcing is approximately 1½ in. from the surface of the column. They are reinforced vertically by ⅝-in. round bars and horizontally either by 5/16-in. or ⅜-in. hooping spaced 3-in. centers. The column height in the two-story section is 14 ft. 2½ in. in the first story exclusive of a 2½-in. projection of the shear slab capping the column and the 7-in. floor slab. The columns on the second floor supporting the reinforced concrete roof are approximately 14 ft. 8 in. in height.

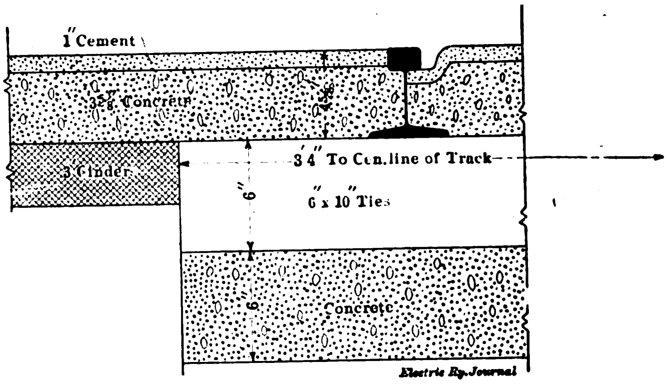
In designing the columns supporting the saw-tooth roof over the car-painting bay, the size and character of reinforcing received careful consideration. It was not only important to reduce the column section to a minimum to provide for maximum car clearance, but it was necessary to reinforce them heavily to support the dead load coming from the roof. It was finally decided that 13 in. was the minimum diameter consistent with practical design. This section permitted placing the reinforcing so as to leave a 10-in. core, with reinforcing of six ⅝-in. round bars and 5/16-in. hooping on 3-in. centers. A clear head room of 18 ft. 3 in. between the finished floor and the underside of the bottom of the roof trusses was allowed.

Preparatory to laying the floors on the ground level, the track forces of the company laid the seven house tracks through the building. These were built with 70-lb. A. S. C. E. rail laid on 6-in. x 10-in. x 7-ft. ties. To assure the permanency of track surface, 6 in. of concrete was laid under the ties and brought up between them to the base of the rail. The floor construction between the tracks, which was made exactly similar to that used throughout the first floor of the building, included 3 in. of cinders, on which was laid 3⅝ in. of ordinary concrete, covered with a 1-in. sand and cement wearing surface. The flangeways were formed by slightly beveling the floor to meet the underside of the ball of rail.

In designing the second floor and roof in the two-story section of the building, the girderless type of construction was employed. The columns in this section were spaced approximately 16 ft. 9 in. apart longitudinally and 18 ft. 10 in. transversely. The lengths of these spans were materially reduced by flaring the column at the top, giving a circular bearing 4 ft. in diameter to the shear slabs, which are 5 ft. 6 in. square. The floor slabs are 7 in. thick and heavily reinforced around the columns. The roof slab over this section of the building is of a design similar to the floor but 6 in. thick.

Seven tracks on 14-ft. centers pass entirely through the paint shop section of the building. Continuous overhead trolley troughs supported on 6-in. I-beams are embedded in the lower cords of the reinforced concrete roof trusses. A malleable-iron trough of small section supported at the outer end by two cable guys attached to eye-bolts embedded in the concrete building columns projects from each entrance. This trough practically meets the overhead bracket on the end of the transfer table. Swinging doors made it unnecessary to provide any special method of carrying the trolley through the entrance. A complete overhead dry sprinkler system supplied from the city water mains has been installed in every department of the building.

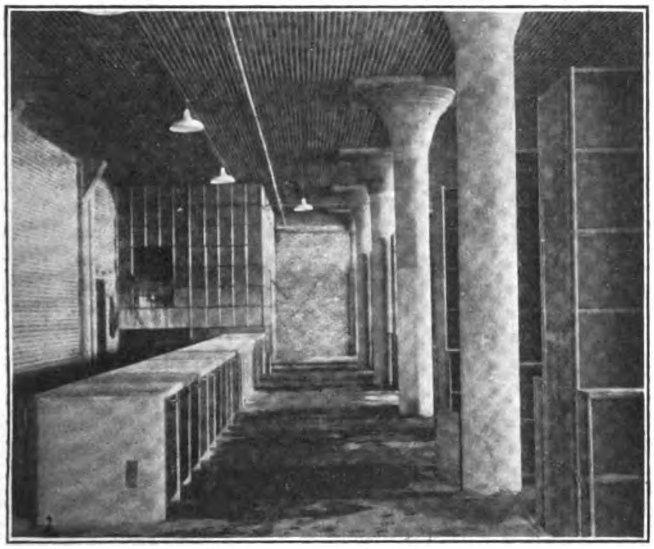
Roof drainage to the shop sewerage system is provided by 4-in. leaders attached to the building columns. Slight hips and valleys on the roof surface were obtained by depositing small quantities of cinder concrete at proper points to carry the water to the 4-in. conductor heads. Floor drainage in the car-washing room was provided by pitching the concrete floors from all directions toward three cesspools. The intake to each cesspool is by way of a perforated cast-iron manhole cover, the top of which is set slightly below the floor level. The design of these cesspools is somewhat similar to an ordinary catch basin, the outlet to the shop drainage system being approximately 2 ft. 10 in. above the floor of the basin.



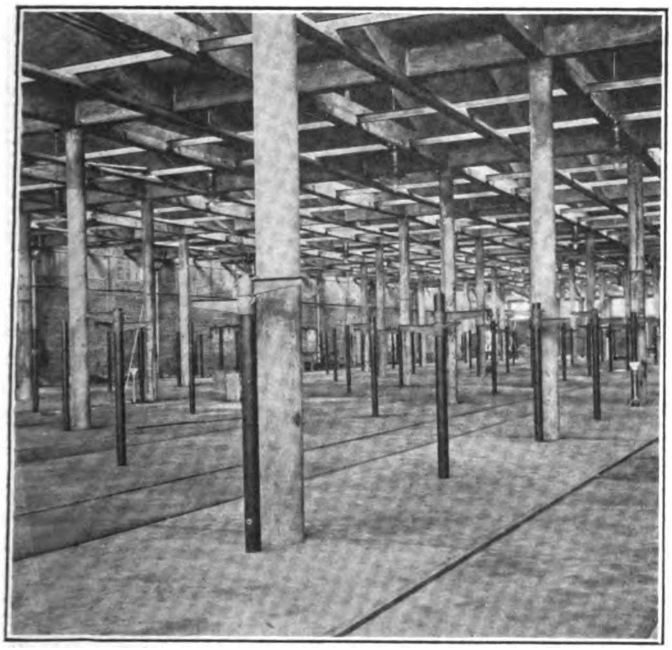
Detroit Paint Shop—Cross-Section of Floor at Tracks

ILLUMINATION, VENTILATION AND HEATING

To provide for the maximum natural illumination and ventilation in the paint shop and washroom sections of the building, the architects resorted to saw-tooth roof construction. The supporting frame embraces reinforced concrete trusses and girders designed to carry a 40-lb. live load in addition to the dead load. As in the exterior wall construction, steel sashes provided with pivoted panels constitute the glass area and ventilating features. The roof slab is 3 in. thick reinforced with expanded metal. This type of reinforcing made it unnecessary to use forms in placing the concrete, it being supported at intervals with temporary rafters and the top coating of concrete applied. After the concrete had set the undercoating was put in place by plasterers. This concrete sheathing is covered with a composition roofing coated with tar.

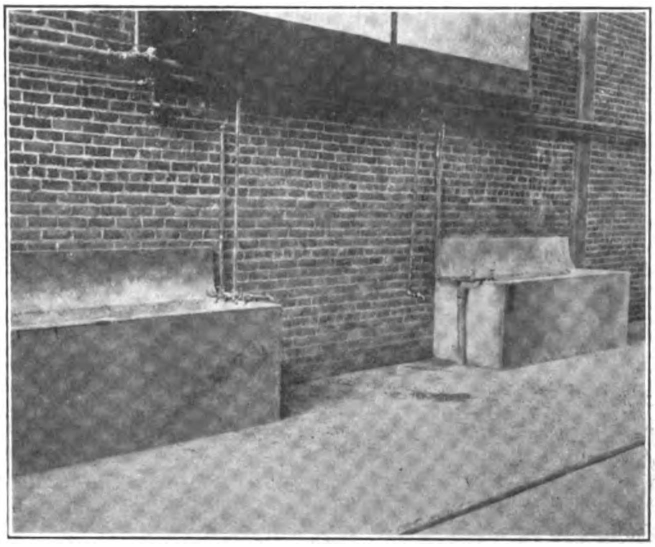


Detroit Paint Shop—Concrete Bins and Counter in Paint Stock Room



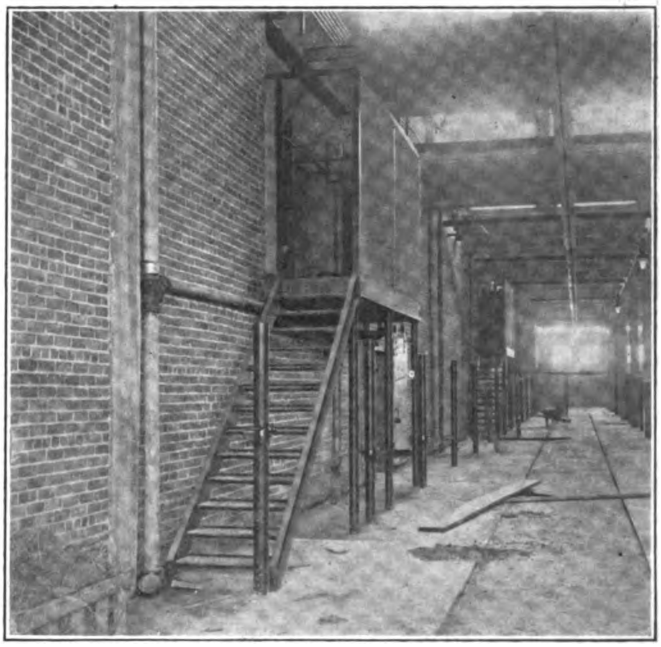
Detroit Paint Shop—Interior View Showing Racks for Adjustable Scaffolding

All door and window frames are formed of steel channels anchored to the walls, and except in a few instances all doors conform to underwriters' specifications. The car entrance doors, which inclose openings 12 ft. 6 in. wide and 16 ft. high, are of heavy wood construction. Each door contains a fixed sash in the upper panel and is reinforced by ½-in. x 3½-in. wrought-iron strap hinges which extend across its full width. These hinges are securely anchored to the reinforced concrete building columns, which were built with 12-in. channels to form the door jambs. All stairways and landings between the first and second floors are built of reinforced concrete in wells inclosed with 13-in. brick partitions.



Detroit Paint Shop—Concrete Vats for Washing with Hot Water and Lye

Ventilation for the paint shop and washroom sections is obtained by pivoting a nine-light panel of each steel sash in the saw-tooth roof. These pivoted sashes are operated from the floor level by a continuous operating device. On the ground floor in the two-story section ventilation is obtained in a similar way by pivoting six-light panels of the steel sashes at an elevation above the floor convenient for individual operation. In addition to this method of ventilating and providing natural illumination for the second floor, there are six skylights, each 13 ft. x 17 ft. in section and provided with two 12-in. ventilators.



Detroit Paint Shop—Elevated Toilet Rooms Along Building Wall

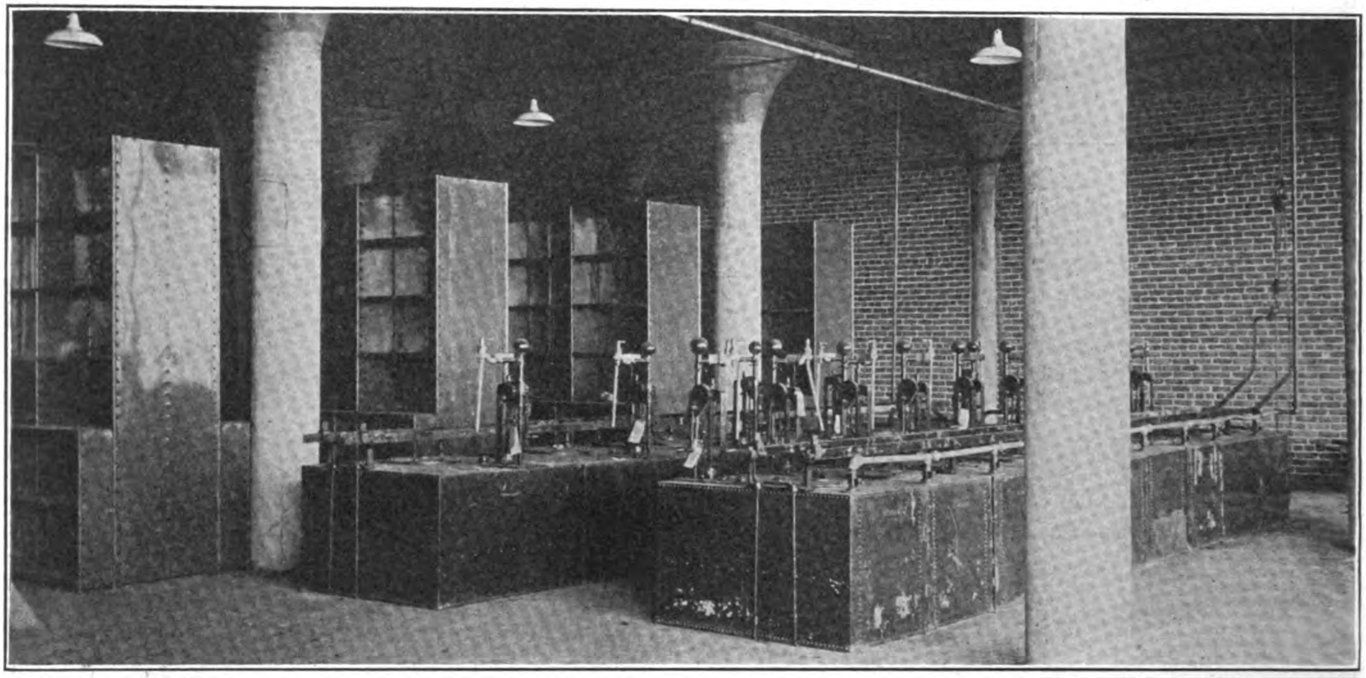
The heating system is of the direct-radiation type with built-up pipe coils supported on the building walls and on the saw-tooth roof cross-girders in the paint shop and washroom and hung from the ceiling in the two-story section of the building. A hot-water system was also included in the heating plant and the hot water is piped to various points where required. As mentioned before, the feed and return mains from the heating plant enter the paint shop building from a reinforced concrete tunnel, 8 ft. x 10 ft. inside.

Artificial illumination is supplied in the paint shop and washroom by installing one d.c. multiple-series, flaming carbon arc lamp to every 14-ft. x 26-ft. section of floor space. The two-story section of the building, as well as points where individual lighting is required, is artificially illuminated by a liberal installation of tungsten lamps with deep bell shades. All lighting and power circuits are inclosed in pipe conduits attached to the roof trusses and ceilings.

SHOP FACILITIES AND EQUIPMENT

Sanitary drinking fountains are liberally provided throughout the shop, and four toilet rooms of moderate size, two on each floor of the two-story section, have been installed. In addition to these, three toilets slightly larger in size have been provided on balconies supported on the partition between the paint shop and washroom.

In planning the new paint shop it was the intention of the company's engineers to equip it so completely that it would be necessary only to move the paint shop force and rolling stock when the transfer was made from the old Monroe Street shop. With this idea in mind a complete equipment of Lyon Metallic Company's steel shelving was installed in the storeroom, as well as an elaborate Bowser oil-tank storage system. The latter installation is complete for paint shop requirements and includes fourteen tanks, nine of 170-gal., four of 280-gal. and one of 550-gal. capacity. It is the intention that the oil storage in the 170-gal. tanks shall include boiled oil, brown shellac, wood alcohol, Murphy japan, light oil, carbon varnish, locomotive black, scraper's oil and Niles engine varnish. The brown shellac tank is fitted with a manually operated agitator. The 280-gal. tanks provide storage for outside and inside varnish, varnish remover and raw oil, and turpentine is stored in the largest tank, which has a capacity of 550 gal.


Detroit Paint Shop—Oil Storage Tanks in Paint Stock Room

A reinforced concrete counter has been installed on the paint shop side of the stock room with a complete equipment of tilting bins. These bins are built of 3/16-in. steel plates, and they are 20 in. x 26 in. x 27 in. in size. Each bin is provided with pivot pins which rest in bearings in the reinforced concrete partitions under the counter. These bins are pivoted slightly off center so that they may be tilted easily to remove with a scoop the paint powder which will be stored in them.

In line with the general idea of permanency in all the construction features in this building, four solid concrete washing tanks 2 ft. 2 in. wide, 8 ft. long and 2 ft. 6 in. high were built into the car-washing room. A paint-mixing bench, a wash sink and a lye tank of similar construction were built along the Third Street wall of the paint stock room. A small platform of car height, built along the same wall with a gentle incline at one end, permits the paint and oil stock to be unloaded from a car set on the track outside of the building directly into the paint stock room.

Permanent scaffolding standards and brackets have been installed in the aisles between the tracks in the paint shop. These brackets consist of 4½-in. standard wrought-iron pipes set 2 ft. 6 in. into the concrete floor. Each pipe is fitted with a pair of pulleys mounted in the casting at its top, over which passes a continuous chain supporting an iron counterweight within the pipe. This arrangement permits the cast-iron runway brackets to be raised and lowered to any elevation without undue effort. A manually operated locking handle fixes the position of the bracket on the pipe standard. Each standard between tracks is fitted with two runway brackets and those on the outside aisles with a single bracket. These permanent scaffolding standards are spaced at 13-ft. 1-in. intervals and the cast runway support is provided with lugs which limit horizontal movement of the runway plank to 12 in.

FLUSH TRANSFER TABLE

Although the flush transfer table is not new in its application to electric railway shops, novel features in the design of the ones purchased for the Detroit United Railway shops warrant a brief description at this time. Primarily these tables were designed for double-end operation, as it was intended that the tracks entering the paint shop building should extend across the table runway and connect into the double-track approaches to the shop site by way of ladder tracks. After reconsidering the first plan the company's engineers decided that it would be more economical to eliminate track special work, which included a number of crossing frogs in the table runways, by making the table serve in its place.

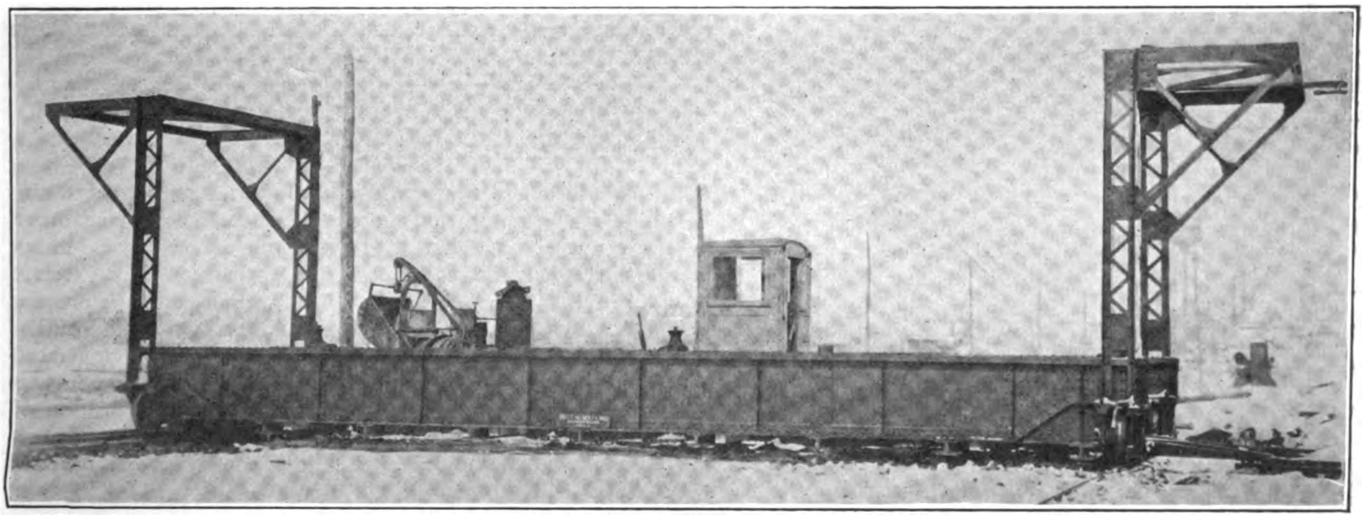
Essentially the table comprises a pair of shallow-floor, through girders with a flanged wheel at both ends of each girder connected through worm gears and shafting to a 20-hp motor. These girders are 51 ft. long with 12 ft. 6 in. between centers. Compactly built floor beams 8¼ in. in depth make the height of the table rail 9½ in. above the track rail at either end. The specifications called for a capacity sufficient to carry a loaded freight car, or approximately 70 tons.

At each end of the table is a structural steel trolley support which carries the trolley wire over the table. This bracket also extends beyond the end of the table so that it practically engages with the channel-iron trolley trough extending out from the building. It also carries the table trolley stand through which the propelling current is obtained. Just outside the girders is a walkway in the center of which a small cab to accommodate the operator has been constructed.

The table is moved by a Westinghouse 7-kw, 20-hp motor, which gives 400 ft. per minute travel loaded or 550 ft. per minute light. An ordinary controller is set up in the cab, and by shifting a level just outside the entrance the motor is thrown off the propelling gears and shafting on to a winch which was included in the equipment. Mounted on vertical bearings at each end of one of the girders are two idler niggerheads which, in combination with the winch and a cable, are used to pull cars onto the table.

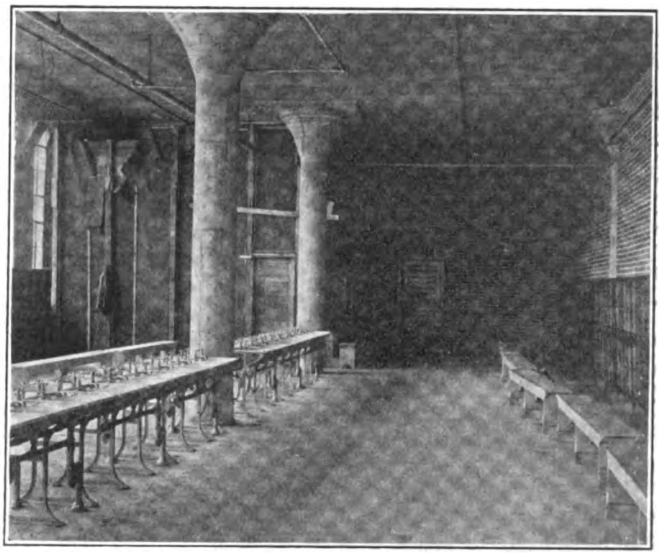
The novel features in the design of these tables, which were built under the patents of George P. Nichols & Brother, include mounting the table wheels directly under the ends of the girders. This is done by a special cast bearing set under the girder end, which has been notched out to receive it.

The automatic aprons which are used as approaches to the table from the track rail are designed so that they are always in working position, either for movement of the table or to transfer a car. Each end of the table is equipped with these aprons, but only one is being used. They extend 7 ft. beyond the runway rail, and as a car takes the incline to or from the table the apron is forced down to a continuous bearing on the track rail. After the car has passed over, the apron raises to the normal or clear position. This is accomplished through a simple pair of levers, at the end of which a heavy coil spring is mounted so as to take compression when the load is on the apron. The flush transfer tables naturally do not require pits, thus their use permits the track rails to be continuous across the runway without interfering with the operation of the table. The weight of each table and its equipment without load is approximately 35 tons.



Detroit Paint Shop—View of Flush Transfer Table

Before any steps were taken to prepare plans and specifications for this general repair shop layout, the engineers of the company, including Sylvester Potter, master mechanic; E. J. Burdick, superintendent of power, and John Kerwin, superintendent of tracks, under the direction of F. W. Brooks, general manager, visited a number of the most important general repair shops in the Central West to study the details of design and arrangement. Requirements of each department of the old shop, both for the present and future, were carefully considered, and as a result the detailed plans embody a number of novelties in equipment and arrangement.



Detroit Paint Shop—Interior View of Employees' Locker and Washroom

Considerable interest is usually attached to the amount of floor space devoted to the various departments of any shop building as well as to the different departments of a general repair shop taken as a whole. From the detailed building plans completed up to this time by the company's architects, tables have been prepared showing the relative percentage and square feet of floor space devoted to the four shop buildings, as well as that devoted to the various departments of the paint shop and machine shop buildings. These tables are shown below.

Building Areas of New Shops, Detroit United Railways

PAINT SHOP

	Floor Space, sq. ft.	Per Cent.
Car washing room	6,325	7.7
Car painting room	31,625	38.5
Wash and locker room	2,695	3.3
Paint stock room	7,700	9.4
Stripper room	6,470	7.8
Glazier room	5,310	6.4
Varnish room	5,310	6.4
Scraper room	6,470	7.8
Sign room	7,700	9.3
Lunch room	2,695	3.4
Total	82,300	100

MACHINE SHOP

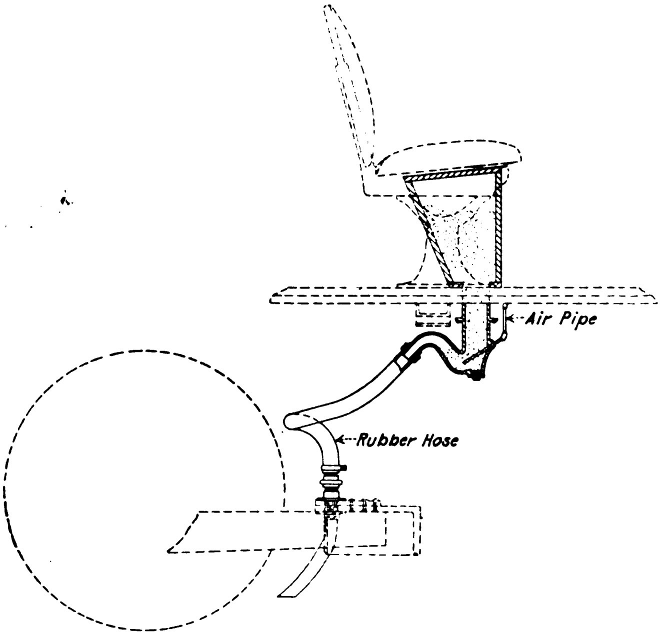
	Floor Space, sq. ft.	Per Cent.
Blacksmith shop	10,920	11.4
Machine shop	25,680	26.8
Truck shop	36,300	38.2
Motor and controller repair shop	22,500	23.6
Total	95,500	100

GENERAL

	Floor Space, sq. ft.	Per Cent.
Paint shop	82,300	18.35
Stock room	131,835	29.4
Machine shop	95,500	21.3
Carpenter shop	133,000	29.65
Heating plant	6,000	1.30
Total	448,635	100

SIMPLE SANDING DEVICE IN USE AT ROCHESTER

The Rochester (N. Y.) lines of the New York State Railways have equipped a number of their new cars with the simple sanding device shown in the accompanying illustration. A description of these cars was given in the Electric Railway Journal for April 5. Sand boxes are provided under four of the cross seats of each car and an outlet is provided in front of each driving wheel, the car being designed for single-end operation. Each sand box is equipped with an air-tight cover so that sand will not be blown into the car even if the sand pipe should become stopped up. Malleable-iron castings are bolted to the boxes below the floor, their form being like that of a sewer-pipe trap, and air is discharged into the sand at the bend of the trap. The sand pipe is carried on the truck frame, and it is connected to the trap by a length of hose. It thus assures the delivery of sand on the rail at the point of contact of the wheel regardless of the alignment of the body with the trucks. The design is due to G. M. Cameron, master mechanic at Rochester.



New Sanding Device for Rochester Cars

BUFFALO RAILWAY MEN ON STRIKE

An almost complete suspension of service for four days followed the strike, called Sunday, April 6, of the motormen and conductors of the International Railway Company of Buffalo. Employees of the Buffalo & Lake Erie Traction Company and the Buffalo Southern Railway Company joined the International men by going out on Tuesday and Wednesday. Altogether about 1850 men, most of them motormen and conductors, quit work either as strikers or through fear.

Violence by street mobs quickly began, and in the first three days of the strike 400 cars were more or less damaged by missiles. In most cases the damage consisted only of broken glass. Tuesday night, on the admission of the police authorities that "the situation had got beyond their control," 2200 state troops were ordered out on a call issued by Justice Charles H. Brown of the Supreme Court of the State. The militiamen patrolled the principal streets and were massed at all carhouses, but even with this protection such effort as was made to run cars on Wednesday was unsuccessful. In many places the track was piled high with loads of dirt, bricks, tree stumps and refuse of all kinds. The overhead wires were frequently cut, and for a short time the main supply cables of the Cataract Electric Company were out of service, having been cut between Niagara and Buffalo. This company supplies electrical energy for the operation of the traction lines in Buffalo.

Forest Ave
10¢

Buffalo Strike—Auto-Truck Fitted with Seats and Used for Temporary Bus Service

STRIKE PRECEDED ORGANIZATION

An unusual feature of the Buffalo strike is that there was no formal organization among the men, who in fact have not yet received a charter or even a number as a local union of the Amalgamated Association of Street and Electric Railway Employees. The agitation which led to the present troubles was begun about six months ago by a local socialist newspaper publisher who lately induced two Amalgamated organizers to come to Buffalo. The union propaganda was started by resolutions adopted by the Central Federation of Labor asking for a conference with officers of the International. No employees of the company were directly represented in this move, and the company refused to treat with other labor representatives. About twenty-five employees who had been particularly active in their support of the Amalgamated organizers had been discharged up to April 5. These men, aided by less than 100 others, declared the strike and by the usual methods of intimidation induced the majority of motormen and conductors to leave their cars. Inspection of the company's depots showed them to be crowded with new men, many of whom were recognized as participants in the Philadelphia and other more recent strikes.

DEMANDS OF THE MEN

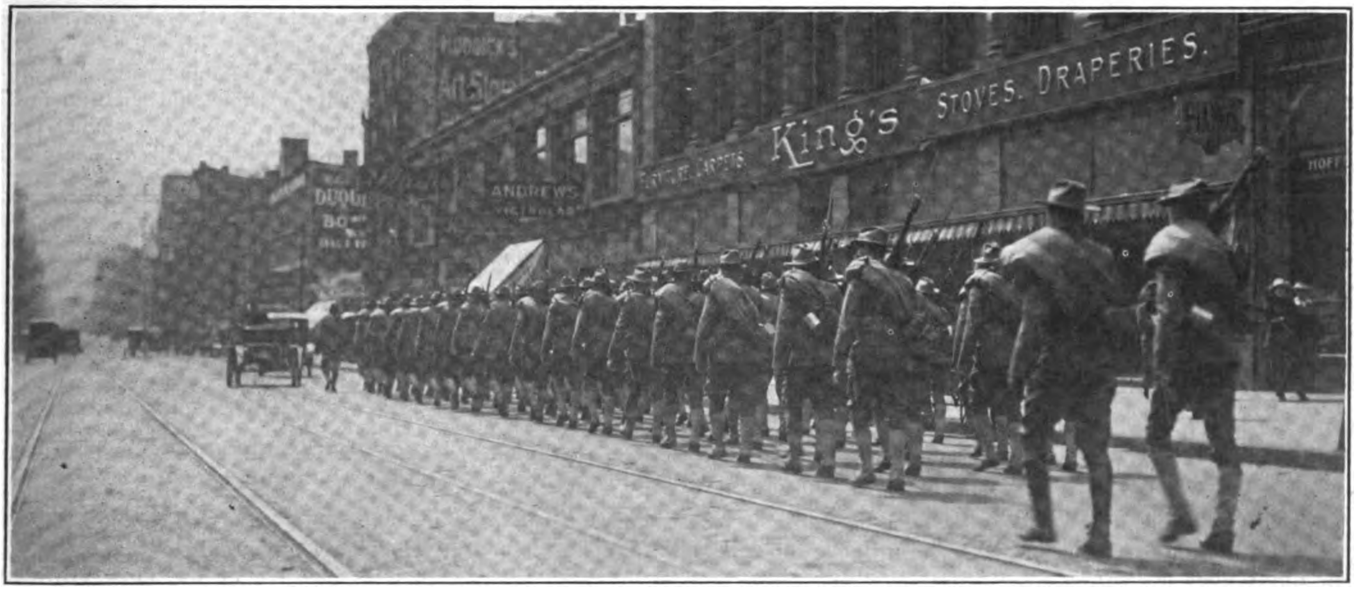
ARE YOU IN FAVOR OF THE FOLLOWING:

1st. 75 per cent of all runs on the schedules to be known as Earlies and Lates, and to be completed within 11 consecutive hours.
2nd. Swing runs to be completed within 13 consecutive hours.
3rd. All runs working less than 9 hours to pay 9 hours' time.
4th. Time and one-half for all time worked over the daily schedules.
5th. A flat rate of wages, 32 cents per hour.
6th. The right to have your grievances presented to the company by a committee of your organization.

If so, send in your application and one (1) dollar to W. F. Cattell, 52 W. Eagle St., Buffalo, N. Y.—The American Federation of Labor and the public in general are with you.

Fraternally yours,
W. F. Cattell, Pres. of Organizing Committee.
J. J. Thorpe, 1st Vice-President.
Wm. B. Fitzgerald, Member of General Executive Board.
W. D. Mahon, Int. Pres. Amalgamated Ass'n of Street and Electric Railway Employees of America.

No formal demands were presented to the company, either before or after the strike, but the notice reproduced, which, according to its authors, embodies "what the men would have asked for if they had had a chance," was placed in circulation.



Buffalo Strike—Militia Entering City for Strike Duty

The wages at present paid by the International Railway Company for platform work are: First year, 22 cents; second year, 23 cents; third year, 24 cents; fourth year, 25 cents; fifth year, 26 cents; sixth year, 26½ cents; seventh year, 27 cents; eighth year, 27½ cents; ninth year, 28 cents.

Following the customary practice in disputes of this kind, the Almagamated representatives assert that when the men reach the higher scales of wages they are unjustly discharged, only to be shortly re-employed as new men or displaced entirely. While disproved by the company's records, this assertion has made a deep impression upon the public mind.

The W. F. Cattell signing the notice above quoted is the socialist leader and publisher who initiated the organization movement among the car men. His authority for using the name of the American Federation of Labor was questioned by labor men in Buffalo whose attention was called to this feature of the notice.

THE COMPANY'S POSITION

President E. G. Connette of the International Railway Company maintained from the beginning of the trouble that he would confer regarding a settlement only with employees. Acting on this policy, he declined to meet the Amalgamated representatives on Tuesday at the request of the Mayor, who, however, has been in constant conference with them, including W. D. Mahon, international president of the Amalgamated, when he reached the city early in the week. Mr. Connette's first statement was issued on Tuesday and said that he would be glad to confer with former employees of the company at any time "after they have returned to work and resumed the regular operation of the cars." To a representative of the ELECTRIC RAILWAY JOURNAL Mr. Connette stated that he intended to adhere to this policy in spite of the pressure exerted by city officials, the press, the Chamber of Commerce and other agencies to induce the company to enter into conferences, an agreement or arbitration with the outside forces which had brought on the strike.

To proposals made Thursday through the Mayor for a settlement of the strike on a basis involving the reinstatement of all the men and negotiation by the company with "a committee of our association to take up grievances, requests and complaints," President Connette offered to agree if the proposals were changed so as to provide simply for a committee of employees. This offer was refused by the union representatives.

Governor Sulzer has instructed the State Labor Department to conduct a public investigation into the causes of the Buffalo strike.

A correspondent in *Power* remarks that while the regulation of the Diesel oil engine is excellent, his experience does not agree with the popular belief that "any kind of fuel" is good enough to use in it. Usually crude oil was found to hold too much water in suspension, and a small amount of water passing through the atomizer while the engine was under heavy load would cause the speed to vary very appreciably. The distillate known as fuel oil he found to be too thick, especially in the winter, as it would not run of its own accord. The arrangement of the suction valve on the usual Diesel engine governor would not seat itself except by the aid of springs and these did not act quickly enough with the heavy fuel oil to give good results. Kerosene, he said, was good but expensive, and in central Kansas the distillate known as "solar oil" had been found to be the only thoroughly satisfactory fuel. Its use, moreover, gave very low fuel costs.

Report on Traffic Conditions in St. Louis

The St. Louis Public Service Commission Presents an Analysis of Traffic Conditions in the Congested Sections of St. Louis —It Recommends Certain Increases in Service Within Eight Months and Suggests the Trial of Trail-Car Service

The St. Louis Public Service Commission, composed of Joseph L. Hornsby, chairman, James A. Waterworth and James E. Allison, chief engineer, submitted on Feb. 17 to the Municipal Assembly of St. Louis Volume II of its report on the United Railways of St. Louis. Volume I, dealing with the finances of this railway, was abstracted in the ELECTRIC RAILWAY JOURNAL for Feb. 8. The following paragraphs summarize the principal features of Volume II, which relates to traffic conditions and recommendations for improved service:

TABLE I.—LOAD CONDITIONS (CONGESTED DISTRICT)

In Direction of Greatest Travel During Periods of Greatest Load

	Entering—Morning 6:30 A.M. to 9 A.M.		Leaving—Afternoon 4:30 P.M. to 7 P.M.	
	Cars	Per Cent of Total	Cars	Per Cent of Total
Cars observed	1358	......	1475	......
Cars with seats for all passengers	375	27.6	534	36.2
Cars with seats all filled and passengers standing	983	72.4	941	63.8
Cars with no load (less than six passengers)	6	.4	19	1.3
Cars with load, but not loaded beyond seating capacity	369	27.2	515	34.9
Eight or less passengers standing in aisle	367	27.1	364	24.7
Eight to twenty passengers standing in aisle	503	37.0	434	29.4
Over twenty passengers standing in aisle	113	8.3	143	9.7

The congested district of St. Louis has running into it twenty-one different lines of street railway track radiating into twenty-seven different routes. On account of this fortunate condition, the surface transportation problem of St. Louis does not present the insuperable difficulties met with in some of the other large cities. The limits of the service have not yet been reached and there are possibilities for very great improvement.

TABLE II.—LOAD CONDITIONS, ENTERING AND LEAVING CONGESTED DISTRICT

	6:30 A.M. to 9 A.M.		9 A.M. to 4:30 P.M.		4:30 P.M. to 7 P.M.		7 P.M. to 6:30 A.M.	
	Cars	Per Cent of Total	Cars	Per Cent of Total	Cars	Per Cent of Total	Cars	Per Cent of Total
Cars observed	2,660	....	4,768	....	2,831	....	3,443	....
Cars with seats for all passengers	1,619	60.8	4,297	90.1	1,827	64.5	3,211	93.3
Cars with seats all filled and passengers standing	1,041	39.2	471	9.9	1,004	35.5	232	6.7
Cars with no load (less than six passengers)	392	14.7	159	3.3	277	9.8	306	8.9
Cars with load, but not loaded beyond seating capacity	1,227	46.1	4,138	86.8	1,550	54.7	2,905	84.3
Eight or less passengers standing in aisle	416	15.6	393	8.2	398	14.1	164	4.8
Eight to twenty passengers standing in aisle	510	19.2	75	1.6	462	16.3	55	1.6
Over twenty passengers standing in aisle	115	4.3	3	.1	144	5.1	13	.4

NOTE.—In this table the empty or lightly loaded cars leaving the congested district in the morning and entering it in the evening are taken into account.

While a very decided improvement in the service is feasible from the standpoint of the capacity of the tracks and possible looping facilities, and from the standpoint of a reasonable return on the actual investment, yet the commission does not wish to belittle the difficulties to be met by the company, and in making its recommendations for an improved service, it recognizes that for a number of years past the company and the public have had the benefits of an operating management of marked efficiency. There has in many respects been improvement in the service to the public and in the attitude of the management toward the public. Still, it is too much to expect of any management, however skilled and efficient and however desirous of obtaining the public's good will, that when forced to bend every effort toward making earnings on over-capitalization, it can at the same time give the service to which the public is entitled on the basis of a reasonable return on the actual investment in the service. Therefore, in order to obtain the service to which the public is entitled, it becomes necessary to set up by law the standards of service and to provide for the enforcement of these standards by the proper officials.

TABLE III.—LOAD CONDITIONS, CARS OPERATED ON CROSS-TOWN LINES

	6:30 A.M. to 9 A.M.		9 A.M. to 4:30 P.M.		4:30 P.M. to 7 P.M.		7 P.M. to 6:30 A.M.	
	Cars	Per Cent of Total	Cars	Per Cent of Total	Cars	Per Cent of Total	Cars	Per Cent of Total
Cars observed	877	....	1,874	....	1,020	....	1,701	....
Cars with seats for all passengers	682	77.8	1,820	97.1	732	71.8	1,469	86.4
Cars with seats all filled and passengers standing	195	22.2	54	2.9	288	28.2	232	13.6
Cars with no load (less than six passengers)	95	10.8	250	13.3	74	7.2	249	14.6
Cars with load, but not loaded beyond seating capacity	587	66.9	1,570	83.8	658	64.5	1,220	71.7
Eight or less passengers standing in aisle	97	11.1	37	1.9	118	11.6	151	8.9
Eight to twenty passengers standing in aisle	73	8.3	16	.9	116	11.4	68	4.0
Over twenty passengers standing in aisle	25	2.9	1	.1	54	5.3	13	.8

PRESENT AND REQUIRED SERVICE

In order to make an intelligent report on the crowd conditions of the service of the United Railways Company of St. Louis, it has been found necessary to make a thorough investigation of the present car service and the extent of crowding existing at different times of the day and night on each of the several lines operated by the company.

The ideal car service is one by which every passenger will obtain a seat, but in a large city with points of great congestion and hours at which great numbers are demanding service at once, it is hardly possible that such an ideal condition can be fully attained, no matter how many cars are operated, as the congested crowds will probably fill some cars to over-crowding and leave others immediately following comparatively empty. Nevertheless, if cars are run as closely together as possible at the most crowded periods and points of congestion, the investigations of the commission show that much may be done to approach the ideal service. Especially is this true if proper use is made of trailers, which double the capacity and do not require a time interval or "headway" between the car and its trailer.

During the course of the investigation into the service the commission's staff made and recorded more than 44,000 observations of the crowd conditions of cars, and also made a large number of observations of the routing at different points in the city. Tables I to V show in condensed form the present conditions of the service as observed by the commission's inspectors.

In making its observations of the load conditions of the present service, the commission established five grades or classes of load to be recorded.

First—The O class, in which were recorded all cars containing six or less passengers. Second—The S class, in which the cars were well filled as to seating capacity but had no passengers standing in the aisle. Third—The X class, in which the cars had eight or less passengers standing in the aisle. Fourth—The XX class, in which there were from eight to twenty people standing in the aisle. Fifth—The XXX class, in which there were more than twenty people standing in the aisle.

TABLE IV.—LOAD CONDITIONS, CARS OPERATED ON ALL LINES

	6:30 A.M. to 9 A.M. Cars	6:30 A.M. to 9 A.M. Per Cent of Total	9 A.M. to 4:30 P.M. Cars	9 A.M. to 4:30 P.M. Per Cent of Total	4:30 P.M. to 7 P.M. Cars	4:30 P.M. to 7 P.M. Per Cent of Total	7 P.M. to 6:30 A.M. Cars	7 P.M. to 6:30 A.M. Per Cent of Total
Cars observed	3,537	....	6,642	....	3,851	....	5,144	....
Cars with seats for all passengers	2,301	65.1	6,117	92.1	2,559	66.5	4,680	91.0
Cars with seats all filled and passengers standing	1,236	34.9	525	7.9	1,292	33.5	464	9.0
Cars with no load (less than six passengers)	487	13.8	409	6.1	351	9.1	555	10.8
Cars with load, but not loaded beyond seating capacity	1,814	51.3	5,708	85.9	2,208	57.3	4,125	80.2
Eight or less passengers standing in aisle	513	14.5	430	6.5	516	13.4	315	6.1
Eight to twenty passengers standing in aisle	583	16.5	91	1.4	578	15.0	123	2.4
Over twenty passengers standing in aisle	140	3.9	4	.1	198	5.2	26	.5

The commission then determined, by a series of observations and the application of averages, that making due allowance for persons voluntarily standing on the platforms, the average of involuntary standing passengers for class X was five persons, for class XX was fifteen persons and for class XXX was thirty-five persons. Having thus arrived at the number of passengers to be considered as involuntary standing passengers, the commission calculated the number of cars in each half-hour or hour period necessary to accommodate these standing passengers, allowing fifty passengers to each extra car required.

This requirement of an extra car for each fifty standing passengers seems to approach very closely to the standard of seats for all passengers, but an ordinance requiring extra cars on this basis differs materially from one requiring seats for all passengers, in that it does not place upon the company the responsibility of furnishing seats to passengers who board cars already filled when seats are obtainable in cars closely following.

TABLE V.—LOAD CONDITIONS, CARS OPERATED ON ALL LINES FOR TWENTY-FOUR HOURS

	Cars	Per Cent of Total
Cars observed	19,174	(Record from maximum load points only)
Cars with seats for all passengers	15,657	81.6
Cars with seats all filled, and passengers standing	3,517	18.4
Cars with no load (less than six passengers)	1,802	9.3
Cars with load, but not loaded beyond seating capacity	13,855	72.3
Eight or less passengers standing in aisle	1,774	9.3
Eight to twenty passengers standing in aisle	1,375	7.2
Over twenty passengers standing in aisle	368	1.9

A condensed statement of the present and required service is shown, as follows:

From the footing of Tables 17 to 19 (not reproduced) it is seen that:

The most crowded half hour of service entering the congested district in the morning is from 7:30 to 8 a. m.

Cars observed in present service	365
Cars required	461
Extra cars required	96
Per cent increase required	26.3

The most crowded half hour of service leaving the congested district in the evening is from 5:30 to 6 p. m.

Cars observed in present service	381
Cars required	495
Extra cars required	114
Per cent increase required	29.9

The most crowded two hours of service entering the congested district in the morning is from 6:30 to 8:30 a. m.

Cars observed in present service	1142
Cars required	1398
Extra cars required	256
Per cent increase required	22.4

The most crowded two hours of service leaving the congested district in the evening is from 4:30 to 6:30 p. m.

Cars observed in present service	1273
Cars required	1527
Extra cars required	254
Per cent increase required	19.9

TWENTY-FOUR-HOUR SERVICE WEEK DAYS

	Present Service	Required Service
Cars entering congested district	6825	7422
Cars passing observation points (both ways) on lines not entering the congested district.	3741	3896

TWENTY-FOUR-HOUR SERVICE SUNDAYS AND HOLIDAYS

Cars entering congested district	4823	5025
Cars passing observation points (both ways) on lines not entering the congested district	3828	3913

CAPACITY OF TRACKS

The question of the capacity of the tracks of the United Railways Company, especially in what may be called the looping district bounded by Clark Avenue, Twelfth Street and Franklin Avenue, becomes an important one in connection with any requirement of additional car service. Observations showed that the maximum number of cars entering or leaving this congested district in any half hour was 381 cars, leaving between 5:30 p. m. and 6 p. m., and the highest number in the required service is 495 between 5:30 p. m. and 6 p. m. These two figures show that under the required service there will be an increase of approximately 114 cars operating in the looping district in the half hour of maximum service, or an increase of 30 per cent over the maximum half hour of the present service.

That this extra requirement is not an impossibility is shown by the fact that only every third car leaving or entering the district is required to have a trailer attached during the maximum half hour. Within the maximum half hour no line (with one or two negligible exceptions) will be required to have more than one trailer for every two cars now operated. The unknown factors which will enter on account of the use of trailers and the factor of interference from and interference with ordinary vehicle traffic make a detailed prearranged plan inadvisable, if not impossible. It may be necessary, however, for the city to grant freely any reasonable privileges for new looping facilities within the looping district which may be asked for by the company, and it is recommended by the commission that such privilege be granted without other conditions than will guard against an extension of already existing franchises in their present form.

COST OF ADDED SERVICE

Having the extra car service needed to establish the desired standard, there remains one important question to be determined, viz., whether or not the city can require said service and leave the company a reasonable return upon the investment in the service of the public.

From the data embodied in Tables 1 to 24 (not reproduced), the engineers of the commission have calculated the number of car miles necessary in addition to the present service in order to give the required service. It was found that in order to give the required service the company will have to add to its present operation approximately 3,276,264 car miles per year. The company's books show an average cost of operation over its whole system, including depreciation as charged on its books, of 18.25 cents per mile. The commission estimates that this cost per car mile as per the books should be slightly higher for the city than for the county, and places that figure deducible from the books for city operation at 18.45 cents per car mile. By its correction of operating expenses in the items of taxes and depreciation, the commission increases the cost of operation over book cost 8.6 per cent, which would make an average cost of operation within the city of 20 cents per car mile. In this estimate of cost per car mile there enter from the books of the company a number of items of general overhead expense, such as salaries of general officers, legal expense, certain reserve funds, etc., which would not in all probability be increased in proportion to the added car service. Nevertheless, the commission prefers to leave these items (about 2 cents per car mile) as a part of its estimate to offset the fact that in attempting to operate a greater number of cars in the morning and evening congested periods the company will find difficulty in obtaining a sufficient number of conductors and motormen as "trippers" at regular wages to operate the extra cars.

The operating cost of 20 cents per mile is calculated upon the basis of cars operating with their own motors and carrying a crew of two men, but in recommending the car service to be required the commission believes that it will be not only possible but very desirable to operate at least half of the added service by means of trailers, in which case the operating charges will be diminished by the wages of a motorman or 2.4 cents per car mile, making the estimated cost of operating trailers 17.6 cents per car mile.

If we assume that at least one-half of the 3,276,264 added car miles necessary to give the required car service will be from trailers (it will probably be a greater proportion), we have the total yearly extra cost to be:

1,638,132 added car miles at 20 cents	$327,626.40
1,638,132 added car miles at 17.6 cents	288,311.23
	$615,937.63

It will be necessary also to add to the investment the cost of equipment to provide for the increased car service, and a return on this investment must be taken into account. The commission estimates the total number of extra cars needed will be 330. If one-half of these cars are assumed to be trailers and one-half to be the highest type cars of the present equipment, we will have an extra investment of:

165 motor cars at $6,500	$1,072,500	
165 trailer cars at $3,500*	577,500	
Extra loops	150,000	
Total extra investment	$1,800,000	
Investment charges at 6 per cent		$108,000
Taxes, 2.22 on 60 per cent		23,976
		$131,976

*Note.—$3,500 is estimated to include cost of extra equipment necessary in the motor car to which trailer is attached.

The depreciation charges and insurance on the added investment are provided for in the car-mile cost.

Adding the estimated cost of operation of the required added car service ($615,937.63) to the added annual taxes and investment charge ($131,976) gives the total estimated annual additional expense of $747,913.63, to furnish a service approximating the track capacity and of a standard of comfort beyond that of any large city. The commission believes that this estimate is high, but even if it is not, it has been shown in Volume I of this report that $1,069,480.59 per year can be required in extra service from the company without depriving it of a reasonable return upon its real investment in the service of the public. The margin of more than $300,000 here shown makes it safe for the city to require the added service here recommended without risk of doing the company an injustice.

FRANCHISE AND REGULATION

Under the present form of franchise the city has practically no power to enforce any regulatory ordinance until after years of litigation, if the company chooses to contest the measure in the courts. However, the city can, with perfect justice, obtain efficient control and prompt obedience to all fair and reasonable regulation by a change in the franchises which would substitute for the right of absolute repeal, and the consequent confiscation, a right of transferable option on the property at a fair valuation. With such an option the city could at any time, when it is dissatisfied with the service, transfer the ownership of the property to a new owner, who would be required to reimburse the present owner for the fair value of the property. Such a provision would not only tend to produce prompt obedience to fair and reasonable regulation, but it would also tend automatically to limit regulation to what is fair and reasonable, for should the city enact unreasonable ordinances it would then find that no other set of investors would be willing to pay the fair value of the property and continue to operate it.

FORM OF ORDINANCE

In concluding its report, the commission submits a form of ordinance which does not attempt to specify the exact headways of cars or rigidly define routings and other matters subject to frequent variation but which simply fixes the amount of service to be given each day, and makes it incumbent upon the company to submit for the approval of supervising officials the details of operation of the cars required by law, giving the supervising officials power to order such changes in the schedules and routes submitted as they may think best for the service of the public. The power is also given to said officials to require a standard of maintenance of track and cars, and to require that the cars be kept well painted and clean.

The draft of ordinance as recommended fixes the time of the going into effect of Sections 1 and 2 at eight months from its enactment. In this draft the duties of supervision and enforcement are placed upon the Public Service Commission. The services specified are those referred to as "required" in the condensed statement hereinbefore printed.

APPENDIX

The report is accompanied by an appendix which contains the thirty-nine diagrams and twenty-seven tables upon which the recommendations made by the commission were based.

ANSWER OF COMPANY

An abstract of the reply of the United Railways to this report is published in the news columns of this issue on page 688.

CARS WITH 57-VOLT TUNGSTEN LAMPS

The Colorado Springs & Interurban Railway is equipping all of its cars with 57-volt, 25-watt tungsten lamps similar to those used in lighting steam railroad cars. Ten of these lamps are used in series, and as they have a thicker filament than the ordinary 100-volt tungsten lamps the company believes that they will have a much longer life than these. Already more than 1000 hours have been had from lamps which the company has been using in the two or three cars which have been equipped in this way, and no lamps as yet have burned out or broken. The only objection to the plan is that if one filament should break ten lamps would go out. The company provides for this by carrying in the car an extra lamp, which can quickly be inserted in place of the burned-out lamp, and also by having one circuit of five carbon lamps on the car. Two of these carbon lamps are inside of the car, two are under the hood of the rear platform and over the step so that they light the entrance, and one is in the front destination sign. Owing to this position of the carbon lamps the difference in the color of the illumination between them and the tungsten lamps is not conspicuous in the car. In the tungsten circuit there are also two lamps above the step so that this portion of the car is well lighted.

Additional Reports from the Recent Floods

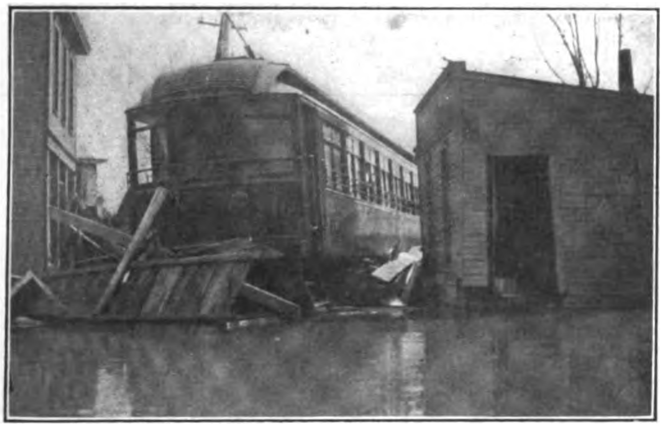
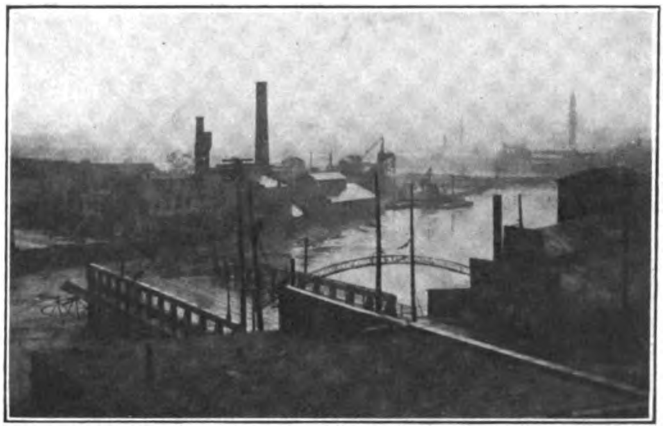
A Number of Reports Have Been Received from Electric Railways Which Were Not Included in the Accounts of the Recent Floods in Indiana and Ohio Published in Last Week's Issue—These Reports Are Given, Together with Descriptions of Conditions in the Cities of Cincinnati and Dayton

In the last issue of the ELECTRIC RAILWAY JOURNAL an account was given of the disastrous floods occurring in the Middle West two weeks ago. At that time it was impossible, owing to the difficulties of communication, to obtain advices from all of the electric railways which were affected by the high water, and reports from several of these properties appear below.

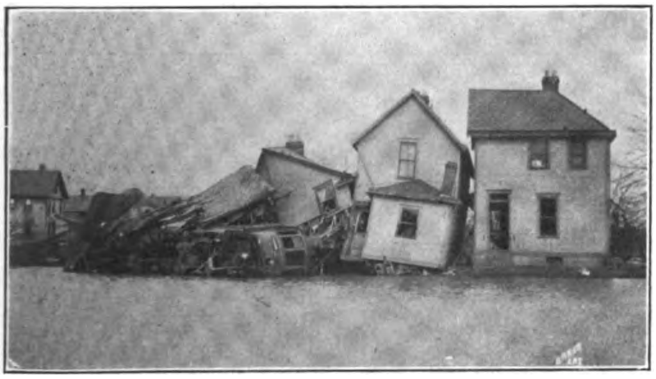
Late reports indicate that the electric railways in general were decidedly fortunate in suffering no greater damage than that which has actually occurred, as the flood was without exception the worst in the history of the States of Ohio and Indiana. Conditions in the cities which, like Dayton and Columbus, suffered heavy damage are by no means normal as yet, and, indeed, it is likely that several weeks will go by before the destruction wrought by the high water is sufficiently repaired to permit the majority of the inhabitants to pursue their usual occupations. In all cases, however, it would appear that the electric railways throughout the flooded district have by extraordinary efforts succeeded in resuming service, and in many cases cars are even being operated on their regular schedules.

CONDITIONS IN OHIO

At Dayton the People's Railway reported that it had lost but two cars and that only one generator was damaged by water. Fifty to sixty poles were thrown down and destroyed. The company states that if it had coal it would be ready for service at any time, but the coal which was in the bunkers at the power house was washed away. At present it is impossible to get the coal en route for Dayton into the city. The loss is estimated at not more than $10,000, as the tracks in the city were not damaged to any great extent. A reasonable amount of warning enabled the company to get its cars off the streets and into the carhouse, where the highest point reached by the flood was only 18 in. above floor level. However, the water rose to a height of 10 ft. in the power house, shutting down the boilers and washing away the coal. The generator floor, being about 10 ft. above ground level, escaped serious damage.

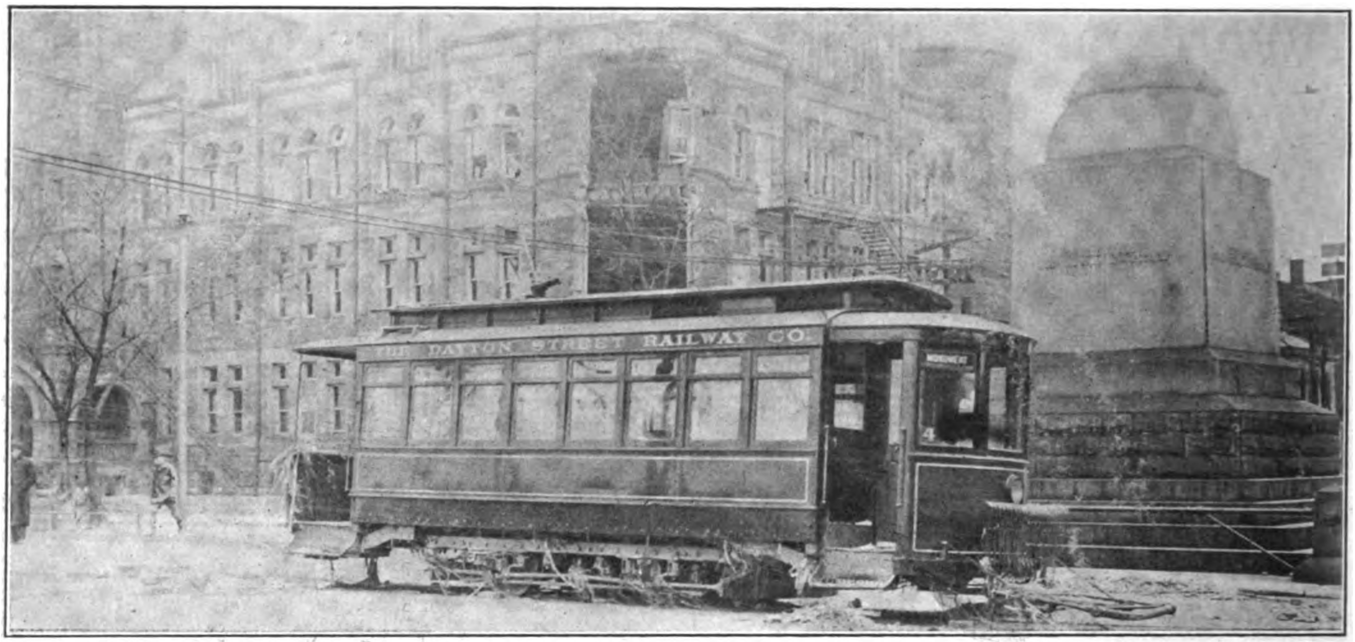



The Recent Floods—Interurban Car and Street Railway Bridge in Columbus

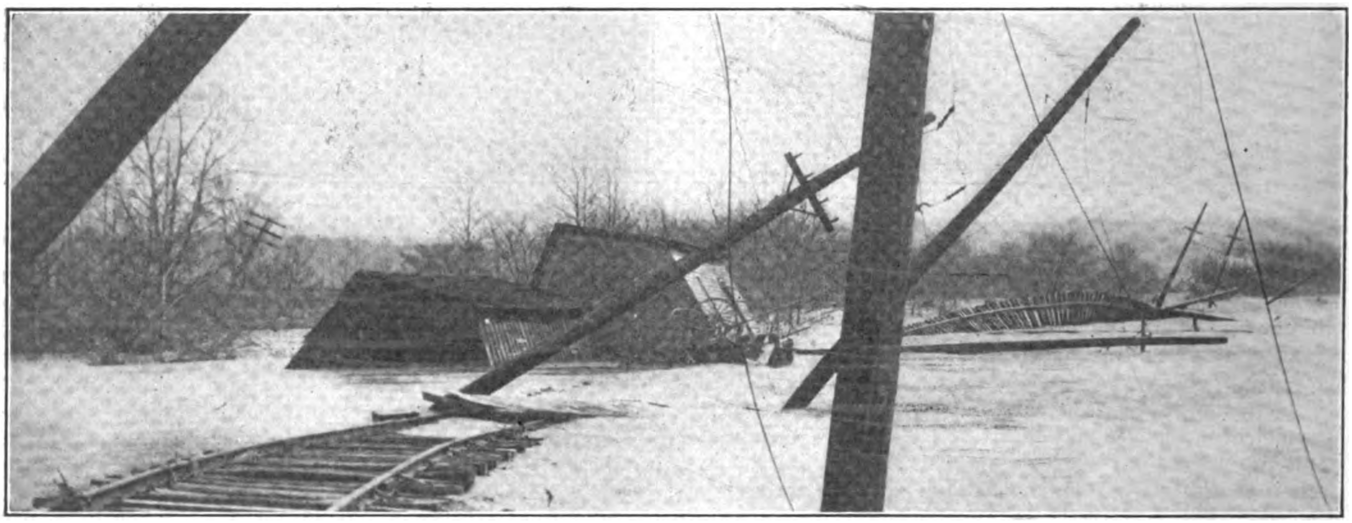


The Recent Floods—Parts of Railway Wreckage in or Near Columbus

The Dayton, Covington & Piqua Traction Company did much in relieving the situation at Dayton, and after making temporary repairs to bridges and at washouts some of its cars reached Dayton with two carloads of boats and several carloads of provisions, clothing, etc. These cars were the first to enter Dayton, either steam or electric, and much relief was given to the flood sufferers, as there was no food or clothing to be had. As this line was the only inlet or outlet, the work of T. J. Brennan, general superintendent, together with the assistance of the farmers and residents of West Milton, was greatly appreciated. More than 100 people volunteered their services, and with flat cars and work trains the wreckage was taken out to make possible a regular schedule into the city of Dayton from all points. In addition to this, boats were taken from Overlook Park, which is operated by the Dayton, Covington & Piqua Traction Company, and used in rescue work in Dayton.

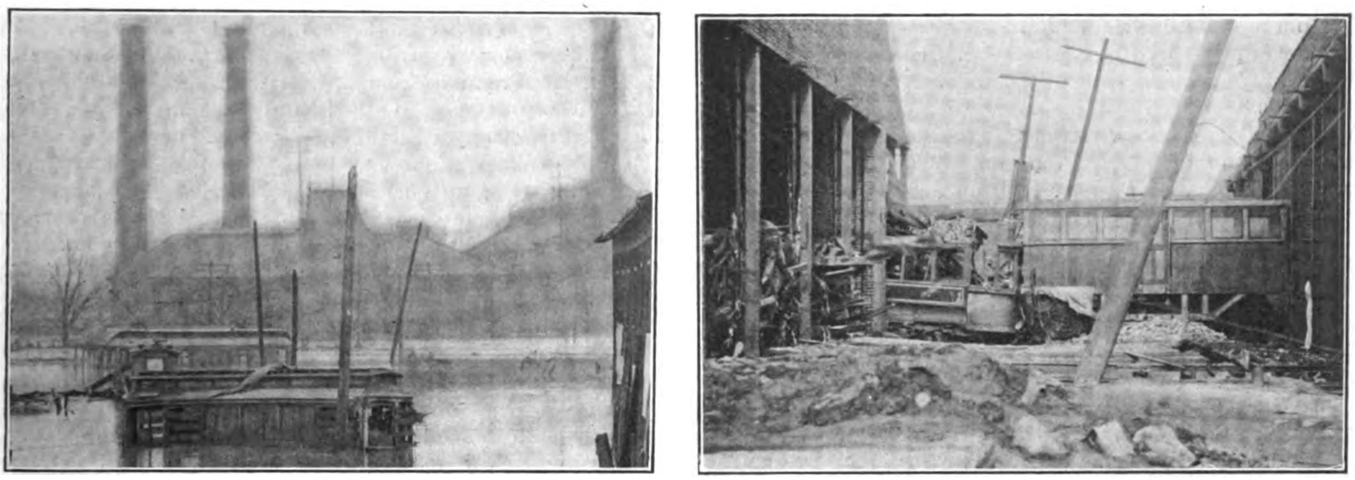


View in Dayton After the Flood, Showing Break in Walls of High School Building

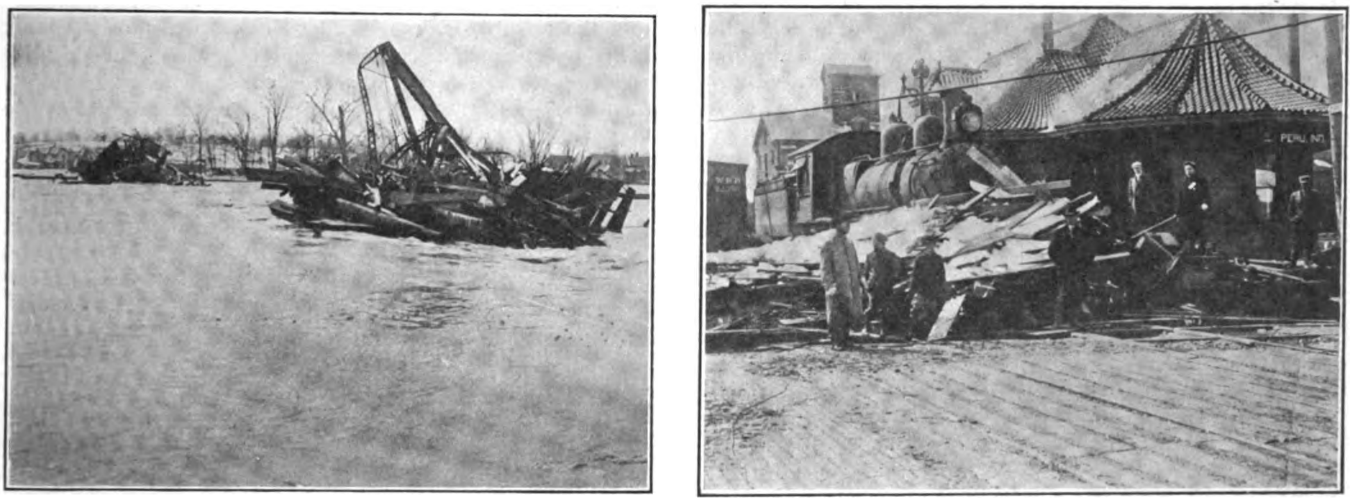


View Near Clinton, Ind., Showing Interurban Tracks Turned Completely Over

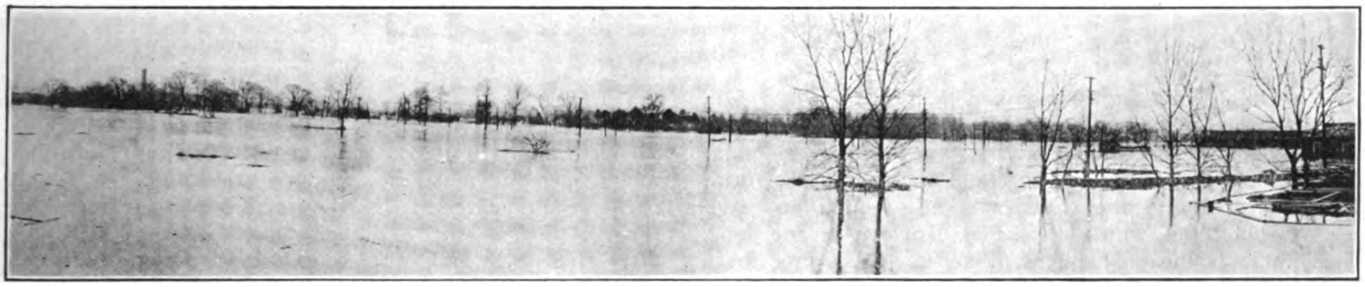
Terre Haute, Indianapolis & Eastern Tracks Under Water Alongside of Steam Railroad Trestle



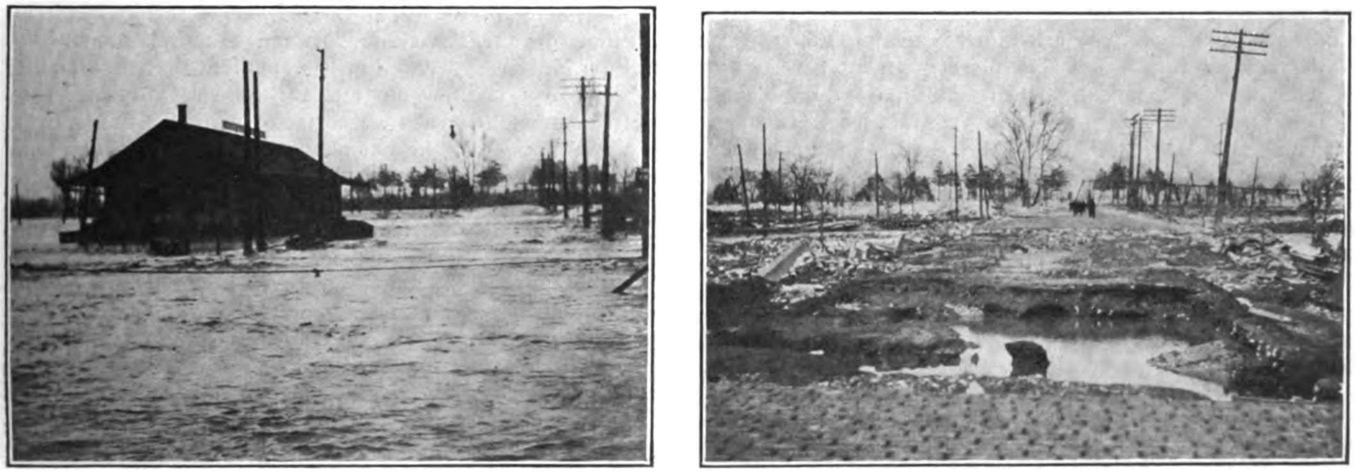
Scenes Near Municipal Lighting Plant and in the West Broad Street Carhouse at Columbus, Ohio



Ruins of Bridge and Scene at Joint Station of Union Traction Company and C. & O. Ry. at Peru, Ind.



Inundated Section of Anderson, Ind., Between Power House and Freight House of Union Traction Company



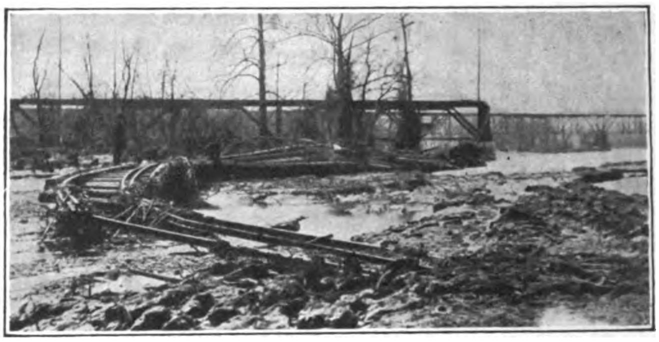
Freight House and Washed-Out Street and Track of Union Traction Company at Anderson, Ind.

Hourly service was maintained from the flood district, and several hundred people were carried out along the line to safety. Carloads of potatoes, bread, cornmeal and cooked food were sent daily into the city as well as relief cars to take care of the flood victims. Provision and relief trains are still running into Dayton and Piqua in addition to the regular schedule of passenger trains.

At Cincinnati the Cincinnati Traction Company has not suffered much loss from the recent floods except the loss in earnings and the increase in expenses due to the cutting off of some lines by the high water. In that city there were no such conditions as existed in cities in the upper Miami Valley, where bridges, tracks and structures were swept away. A number of the city lines were cut in two, some of them in several places, by the rise in the Ohio River and its tributaries, but the water did not reach the power houses. Aside from the necessity for making connections by boats, high-water cars, temporary bridges and other means between the disconnected portions of the lines the company has kept operating, all things considered, very satisfactorily. The high-water cars referred to are somewhat of a novelty, although they have been in use at Cincinnati for some years, as the bodies, together with the electrical equipment, are raised some 4 ft. or 5 ft. above the trucks, chained gears connecting the motors with the axles.

The Ohio Traction Company, which operates the Mill Creek Valley lines, has in no way been injured or reached by the flood except at its extreme northern end in Hamilton, Ohio. From Glendale to Hamilton this line was utilized exclusively in the transportation of food and supplies to Hamilton, which was badly damaged by the flood. This line was the only means of access to the city for a period of almost a week, and as many as eighteen and twenty carloads of foodstuffs and supplies were transported by it daily during that time, the supplies being shipped by the Mayor's citizens' relief committee. The Ohio Traction Company should not be confounded with the Ohio Electric Railway Company, which also operates an interurban line, of which a part extends between Hamilton and Cincinnati.

The Columbus, Marion & Bucyrus Railroad Company reports from Marion, Ohio, that it has been much more fortunate than its neighbors. The loss on account of the flood will not exceed $6,000, the most serious trouble being the loss of a 72-ft. steel bridge, one end of which dropped into the river. This the company is now engaged in restoring to the proper level on cribbing, preparatory to the construction of a new abutment. There is no difficulty in securing men for the extra work along the company's lines, but bridge timbers are decidedly scarce. As the mills were generally located in the lowlands, the high water carried off logs and practically everything else, and the company has been compelled to secure heavy material from a distance and to depend on the uncertain deliveries on the steam road.


The Recent Floods—High Water at Lafayette, Ind., and Remains of Wild-Cat Trestle on the Fort Wayne & Northern Indiana Traction Company's Lines

REPORTS FROM WESTERN INDIANA

Further reports regarding the Terre Haute, Indianapolis & Eastern Traction Company state that the interurban tracks and trolley poles in the vicinity of Clinton, Ind., were completely demolished for a distance of about 1½ miles. One of the illustrations on page 680 shows the site of the interurban track to the left and parallel to the Chicago & Eastern Illinois railroad track, the cars on it appearing above the water. At the time this picture was taken a wooden trestle several hundred feet long was submerged and a terrific current from the right passed over the Chicago & Eastern Illinois tracks and carried the stringers, ties and rails from the interurban trestle a considerable distance downstream. The reason that the steam railroad trestle was not carried away was that the piers were incased in concrete for quite a depth into the earth. The depth of water is indicated by the top of the telegraph pole which appears just above the driftwood at the left of the cars.

Further north from this point the rails, still fastened to the ties, were twisted into a complete spiral and washed off from the right-of-way. Another illustration shows a view of the overturned tracks and trolley poles in this locality after the water had partially receded.

To avoid lengthy delay in traffic while waiting for the waters to recede, T. F. Grover, general manager of the Terre Haute division of this company, ordered a pontoon foot bridge to be built over the submerged section of the Clinton line, and passengers were carried to this point on the cars, unloaded and allowed to walk the remaining distance over the most direct route to Clinton. Through schedules on nearly all lines were, however, restored on April 8.

At Vincennes, Ind., the Vincennes Traction Company was obliged to discontinue the operation of one line for a part of one day, but otherwise the company was not affected by the flood.

On account of the rapid rise of water, service was discontinued by the Muncie & Portland Traction Company at dark on March 24. When it was apparent that the flooding of the power plant, shops and carhouse at Portland, Ind., was imminent, the cars were run to a high hill just west of the buildings of the company. Five minutes after this was done, the water reached the grates and put out the fires in the power plant. The water reached a height of 40 in. or 50 in. in the boiler room, but did not get to the engine room. It was 15 in. or 20 in. high in the carhouse and 18 in. high in the shop. However, no damage was done in the shops as everything possible had been removed from the floor. Operation was suspended entirely for two days and then four trains were placed in service between Portland and Albany, where the bridge had been damaged so that it could not be used for several days. About 2500 ft. of track was washed out and poles fell near Albany for a distance of 3000 ft., but the wires were not broken and the overhead work was ready for service without much delay.

Regular operation has been resumed. The damage to property is estimated at $10,000, exclusive of the loss due to interruption of the service.

REPORTS FROM NORTHERN INDIANA

It was supposed that conditions on the Fort Wayne & Northern Indiana Traction Company would be serious at many points, as one of the interurban lines of this company extends through the valley of the Wabash River, but later accounts show that less trouble developed than was anticipated. There were two small washouts between Fort Wayne and Bluffton, but full operation on this line was resumed on March 29. It had been discontinued from March 25. The track from Fort Wayne to Huntington was not affected except at the Fort Wayne city line, where, however, the back-water did not cause damage. From Huntington to Logansport about 35 miles of track were under water. The depth of the water varied, but it reached as much as 8 ft. in some places. The only real damage done was that gravel ballast was washed out in a great many places, and the company has been replacing that with stone ballast. At some points where there was stone ballast no washouts occurred. Operation was suspended on this line on March 24, but on March 31 operation was resumed between Huntington and Wabash. The following day it was extended to Peru and the day after that it was extended on to Logansport. At Logansport the city service was discontinued from March 24 to March 29 on account of power trouble. The power plant at Lafayette was unable to furnish all the power required at Logansport and the power could not be transmitted from Fort Wayne. There was 8 ft. of water in the joint interurban station at Logansport.

At Logansport two spans of 124 ft. each of the bridge over the Wabash River went out. This left a space between Lafayette and Logansport where no service could be given and where no cars were available for service. The Wabash Railroad took an interurban car for the company to a point where there was a connection between the tracks of the two companies, and that was placed in service on March 28.

Just south of Lafayette the company lost 380 ft. of trestle over Wild Cat Creek. The flood swept the piling out, but all the bents were saved. The Lafayette Engineering Company has been driving piles, and it was expected on April 4 that this trestle would be in operation by the end of a week, permitting operation of the entire interurban line except over the bridge at Lafayette.

About 12,000 ties were distributed along the line, but it is estimated that not over 2000 of these were lost. At the Lafayette power plant the company lost coal bunkers and about thirty carloads of coal. The water reached the floor of the power house. The gas company and electric lighting plant at Lafayette were compelled to discontinue operation and the plant of the Fort Wayne & Northern Indiana Traction Company handled the entire load. City service was discontinued at Lafayette for only half a day. At Fort Wayne about forty men were kept working in twelve-hour shifts to protect the plant. They remained at the power house continually and food was sent to them by boat.

Service between Lafayette and West Lafayette has been discontinued as a pier of the joint county and interurban bridge went out and the bridge was no longer safe for operation. On the levee at West Lafayette about 1400 ft. of fill was washed out, but that has been restored so that operation can be resumed on both sides of the river and a ferry will be established until the question of improvement of bridge conditions is decided.

W. H. Fledderjohann, president Fort Wayne & Springfield Railway, estimates the loss of that company at $20,000. This does not include the loss due to the suspension of traffic for the greater part of two weeks. The water in the St. Mary's River at Decatur, Ind., rose to a height 6 ft. above anything ever known before and flooded the property of the company at this point. Trouble began after midnight on the night of March 24, when the water reached the boiler room in the power plant and put the fires out. As no power could be secured, the cars could not be moved from the carhouse. Three motor passenger cars, one motor freight car and the carhouse and shops had 3 ft. of water in them. The water did not go down for two days, and as soon as the equipment could be cleaned fires were built under the motors and they were dried out by this emergency method.

Partial operation was resumed at the end of about twelve days and full operation in a little over two weeks. The water did not damage the engine room at the power plant, as a pump was kept in operation in order to protect the equipment, which is surrounded by a concrete wall. A bridge over the St. Mary's River at Decatur was protected from damage by logs and debris by the employees, who organized to guard it. About half a mile of track north of Decatur was washed out by the water and there were one or two washouts of less importance. The Westinghouse Electric & Manufacturing Company sent two men to assist in the work of drying out the motors, and the employees of the company worked in twelve-hour shifts until this was completed.

The Marion, Bluffton & Eastern Traction Company had the abutments of a one-span 50-ft. bridge at Liberty Center washed out, but when these are repaired the bridge can be replaced. There was a short interruption to service on account of the flooding of the power plant of the Marion Light & Heating Company, from which power is purchased. An account of the experiences of the power plant was published in the ELECTRIC RAILWAY JOURNAL for last week.

The Chicago, South Bend & Northern Indiana Railway Company had a frame iron-clad carhouse, approximately 200 ft. x 250 ft. in size, blown down, and this damaged to a greater or less extent some fifteen cars which were stored there and also put out of commission a substation which was operated in one end of the carhouse. In addition to this six or eight shelter sheds were blown over and completely destroyed and a temporary end of the carhouse at Laporte was blown down. The company was not, however, affected by the high water.

After a hearing on April 9, the Railroad Commission of Indiana announced that it would employ an engineer to make a survey of the Wabash River at Peru to ascertain the needs of the river with respect to bridges. The expenses of making this survey will be borne jointly by the city of Peru, the Union Traction Company of Indiana and probably the Chesapeake & Ohio Railroad.

CONDITIONS AT LOUISVILLE

The Louisville Railway Company took precautions to protect its power plant from high water and thus prevented serious damage. The water in the Ohio River at Louisville on the highest day during the flood, April 2, was 1½ ft. below the high mark of 1884. Ample warning of the expected rise in the river had been received, however, so that preparations were made for meeting the emergency. This condition was due to the fact that floods are expected each spring in the Ohio River and Mississippi River cities, whereas with the companies in the northern and central parts of Ohio and Indiana the conditions that developed were without precedent.

The basement of the power plants at Campbell and Finser Streets, Louisville, is 6 ft. below the stage reached by the water in the river. The boiler room, however, is about 2 ft. 4 in. above the high point reached by the water, while the engine room is about 3 ft. above it. A brick wall was built around the condensers in the basement and drain pumps were operated continuously. Plans had been made to build a dike around the entire plant should that be necessary. When the water reached its high point in Louisville the operation of some lines was discontinued and some of the other lines were re-routed temporarily, as the city sewers were unable to carry off the large amounts of surface water which collected.

A NEW TYPE OF ELECTRIC LOCOMOTIVE.

The New York Central & Hudson River Railroad recently placed in service an electric locomotive of novel form, and as a result of an exhaustive series of tests upon it a contract has been awarded the General Electric Company for nine additional locomotives of the same design. The electric locomotives at present in service in the New York Terminal weigh approximately 115 tons, and while the new locomotive is considerably lighter, as it weighs but 100 tons, it is much more powerful, being provided with ample forced-air ventilation and designed with a view to continuous high-speed service. All the weight is carried on motor-driven axles, while the original locomotives have but 70 tons weight on the driving wheels. The new engines will exert sufficient tractive effort to haul a train weighing 1000 tons at 60 m.p.h. In regular service they have a capacity for developing 1400 hp continuously and can develop as high as 5000 hp for short periods.

The original New York Central electric locomotives had guiding wheels in the form of a pony truck with 28,000 lb. on the axle. There were four driving wheels, each carrying the armature of a direct-current, bipolar, gearless motor. To improve the riding qualities a bogie truck having two axles was substituted for the pony truck. A further development in a subsequent type was made by increasing the distance between the guiding trucks and the rigid wheelbase. The riding qualities were improved, but at a loss in mechanical efficiency; for about 40 tons of surplus weight had been added and were being carried by the bogie trucks for the sole purpose of guiding the locomotive. The addition of motors to the bogie trucks and the elimination of this ineffective weight was the next step, so that every pound of the locomotive weight would be instrumental in producing adhesion and tractive effort. A still greater separation of the fixed wheelbase and the guiding trucks has now been introduced in the new type, and this has lengthened the machine so as to necessitate constructing the running gear in two halves with a spring-connected articulated joint between the frames.

At the present time the New York Central & Hudson River Railroad is operating forty-seven electric locomotives in the New York Terminal service. Of these, thirty-five were built in 1906 and twelve in 1908. They are all of the 115-ton 4-8-4 type and each is equipped with four GE-84 bipolar, gearless motors. The new locomotive also has the bipolar gearless design, but it is equipped with eight GE-89 motors and is of the 4-4-4-4 type. Each of the motors has approximately three-fourths the capacity of the GE-84 motor used on the previous engines, making the aggregate capacity of the locomotive approximately 50 per cent greater than before and affording approximately 25 per cent higher speed.

In general, the locomotive may be described as having an articulated frame with bogie guiding tracks at each end. The cab containing the engineer's compartment and that for the operating mechanism is supported between the two parts of the frame on the center pins. Each section is equipped with two two-axle trucks having a driving motor mounted on each axle. These cannot be distinguished as main driving or leading trucks, since all the axles are driving axles, but they are termed for clearness rigid trucks and swivel trucks respectively.

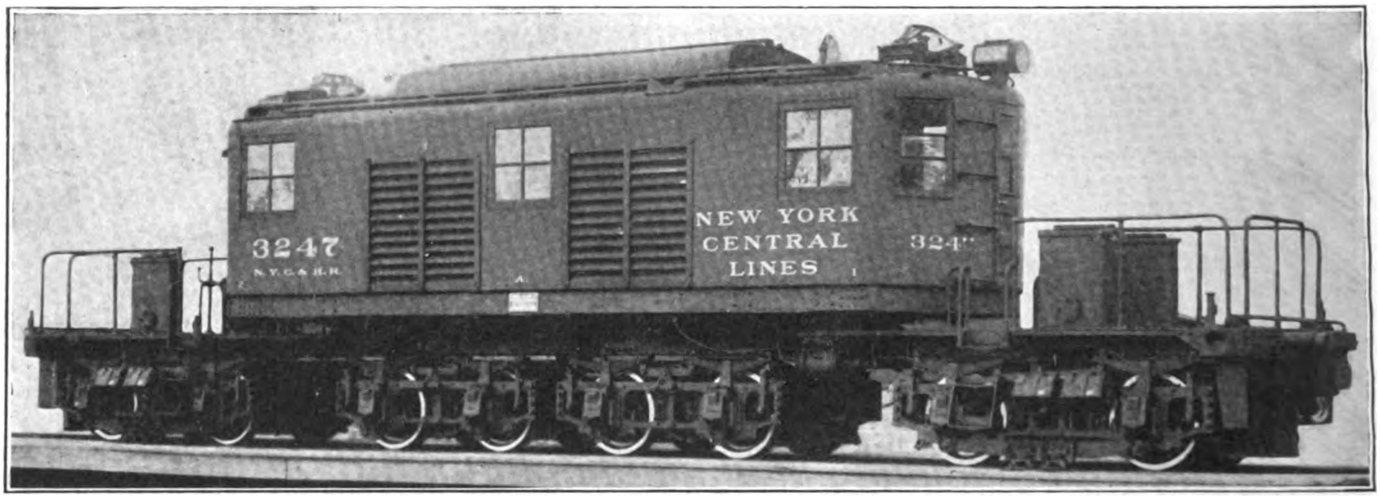
The rigid truck is built up of heavy steel castings, the side frames being of a truss pattern with heavy top and bottom members and pedestal tie bars. The end frames and center cross frames are steel castings securely bolted to the side frames and supporting the magnet poles. The magnetic circuit of each truck consists of the armatures mounted on the axles, the magnet poles carried on the end frames, the side frames and an additional magnet bar forming a path in parallel with the side frames. The whole weight of the truck is carried on semi-elliptic and coil springs resting on the journal boxes and equalized together.

The main frame or backbone of the locomotive is a box girder built of 10-in. channels with ¼-in. top and bottom plates. It is approximately 10 in. deep by 36 in. in width and 22 ft. in length. The frame is bolted to the top member of the rigid truck and extends forward over the center plate of the leading truck and backward to the heavy hinge which connects the two halves of the frame. The main frame carries in its top plate the center pin which supports the weight of the operating cab. All these center pins are hollow and serve as air passages, the main box girder frame acting as a distributing reservoir for the air delivered from the blower in the upper cab through the upper center pins and conducting it to the eight motors below.

The construction of the swivel or leading truck is similar to that of the rigid truck, except that it carries a center pin and is connected to the main frame through this center pin instead of being bolted rigidly to it.

This type of design affords a long flexible wheelbase with eight axles but restricts the length of any rigid portion to not more than 6 ft. 6 in. All the axles are equipped with motors, but the magnetic circuit for each truck or pair of motors is self-contained and relates only to the two axles in that truck.

The cab, carried on the two center pins as stated, has its weight distributed between the two halves of the locomotive frame. It is the box type 35 ft. in length and 10 ft. wide. The interior is divided into three sections. A motorman's compartment is located at either end and contains



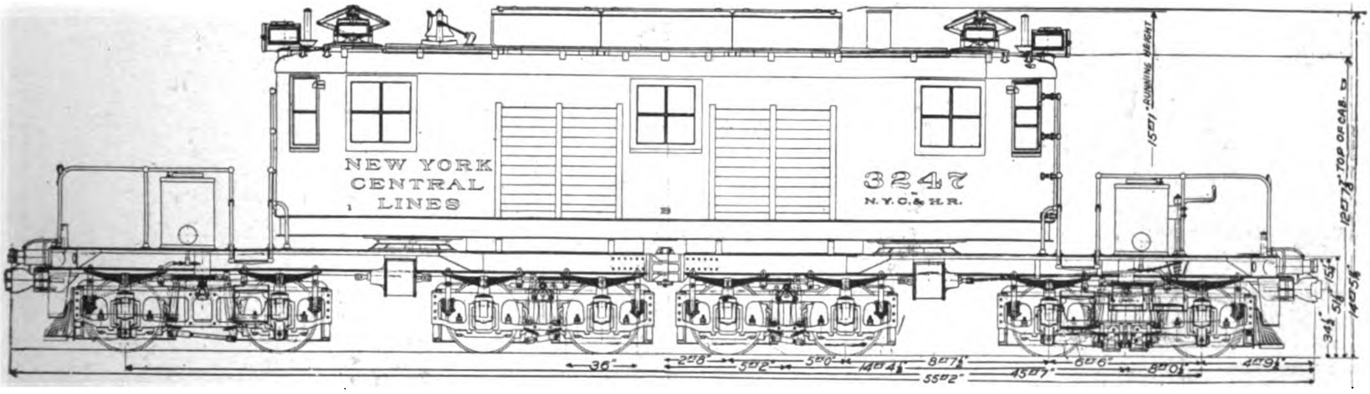
High-Speed Locomotive—General View Showing Arrangement of Cab and Trucks

the motorman's seat, controller, air brake, valves, bell and whistle rope handles and such parts of the control apparatus as have to be within reach of the operating engineer. In the central section of the cab are the air compressors, blowers, contactors and rheostats, grouped so that they are conveniently accessible for inspection and repair and separated from the direct reach or attention of the operating engineer. The advantage of this arrangement is that it removes from the sight of the engineer running apparatus which might serve to distract his attention from the actual work of handling the locomotive and which can be inspected and attended to by his assistant. This general type of construction leaves a fairly long platform on either end of the locomotive. Access to the cab is obtained through doors opening onto the platform.

The principal dimensions of the locomotive are shown in the accompanying line cut, the extreme over-all width being 10 ft. The total weight is 200,000 lb. and the weight per axle is 25,000 lb., of which 6395 lb. is dead weight.

There are four independent magnetic circuits in the locomotive corresponding to the four trucks. The magnetic flux path on each truck passes in series through the fields and armature of one motor, through the center transom and the fields and armature of the second motor to the end frame and then returns to the starting point through the two side frames and a reinforcing magnet bar lying parallel with the frames.

The motor is practically inclosed, and the field coils are waterproofed and armored. Each field coil is wound in a brass shell, the windings being in two decks of flat-ribbon copper laid side by side. The outside turn is covered with insulation, and an armor of sheet steel is clamped over it, filling the space between the sides of the shell in such a way as to protect the windings from water or mechanical injury. End shields are provided for each motor, which render it dust-tight and as nearly water-tight as is possible in any motor designed with necessary outlets for forced ventilation.



High-Speed Locomotive—Elevation Showing General Dimensions

Each motor at its one-hour rating has a capacity of 325 amp on 600 volts, or a continuous rating of 260 amp on 600 volts under forced ventilation. For the complete equipment of eight motors this corresponds to a capacity of 13,500 lb. tractive effort at 54 miles per hour for the one-hour rating and 10,000 lb. tractive effort at 60 m.p.h. continuously.

Electrically the motors are connected permanently in parallel in pairs, and the pairs can be connected in three combinations: viz., series, series-parallel and parallel. They are insulated for 1200 volts, so that if at any future time it should be desired to operate the locomotive on 1200 volts, the permanent connections for the four pairs of motors could be changed from parallel to series and the same speeds and control combinations as on 600 volts could then be obtained.

The control equipment on the locomotive is the Sprague-General Electric type M. The external regulating resistance, divided into four parts, is directly connected, each part to a pair of motors permanently grouped in parallel. The pairs of motors with their respective resistances are connected all in series on the first point of the controller. The resistance is varied through eight points on the controller and finally short-circuited on the ninth or running point. The pairs are then operated similarly in series-parallel with all resistance cut out on the seventeenth point. Finally all the pairs are connected in parallel, with the twenty-fourth step a running point. This provides a control with nine steps for series, eight steps for series-parallel and seven steps for parallel.

The transition between series and series-parallel is effected without opening the motor-circuit, and there is no appreciable reduction in tractive effort during the change. The smooth transition between points, both rheostatic and transitional, permits motor operation close to the slipping point of the wheels. The locomotive weight on the drivers is so proportioned that the motors operate safely up to the slipping point, which serves as a limit to prevent overloading. The transition between all four pairs of motors in series to series-parallel is accomplished by short-circuiting two of the pairs of motors during the instant of transfer. The transition between series-parallel and parallel is effected by means of the standard bridge method.

The motor cut-out switches are connected so that any pair of motors may be cut out of circuit. The locomotive will operate when a pair of motors is cut out with two groupings of the motors, the first with two pairs of motors in series and the second with three pairs of motors in parallel. An ammeter is located at each engineer's position and records the current in the circuit of one pair of motors. The ammeter and air gages are illuminated by a gage light connected in the headlight circuit, so that the headlight switch simultaneously turns on the headlight and the gage light at the same end of the locomotive.

Current is collected by eight underrunning third-rail shoes, or by two overhead trolleys when on gaps in the third-rail. The overhead trolleys are the pantograph type and are pneumatically operated. They can be put into service from either engineer's position by a foot-operated valve. The trolley is designed for intermittent use and is therefore arranged to be held in a raised position only while the valve is held open by the engineer's foot.

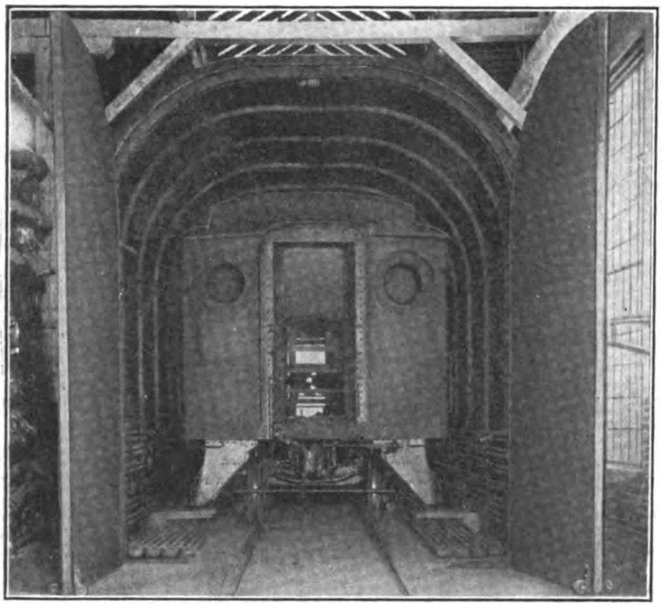
The blower set provided for ventilating the driving motors is located in the central compartment. It has a capacity of 24,000 cu. ft. of air per minute and is driven by a series-wound motor of the railway type. The air compressor is the CP-26 type. It is a two-stage motor-driven compressor with a piston displacement of 100 cu. ft. of air per minute when pumping against a tank pressure of 135 lb. per square inch. The air is taken from the interior of the central compartment through a screen, which prevents the entrance of particles of dust.

BAKED ENAMEL FOR PAINTING STEEL CARS

At a meeting of the American Society of Mechanical Engineers in New York on April 8 the general subject of the design of steel passenger cars for steam railroads was discussed. Among the papers presented was one by C. D. Young, who included a description of the process of baked enamel painting which has just been introduced at the Altoona shops of the Pennsylvania Railroad.

The process is similar to that introduced some time ago on the Hudson & Manhattan Railroad and described in the Electric Railway Journal for Jan. 25, 1913, except that on the Pennsylvania Railroad both the exteriors and interiors of the cars are baked. In addition, steam heat is used instead of electric heat, as in the case of the Hudson & Manhattan process. In part, Mr. Young's paper is as follows:

Artificial driers and gums are used with air-drying paints to hasten the time of drying and hardening of the various coats and to permit the necessary rubbing. These ingredients continue the hardening action for a long time so that the paints and varnish increase in hardness and brittleness, becoming susceptible to cracking and chipping. This action is heightened by the excessive expansion and contraction of the steel surfaces as compared with wood, as the linear expansion of steel is more than twice that of wood, and consequently the use of more elastic coatings than formerly used for wooden cars seems necessary.



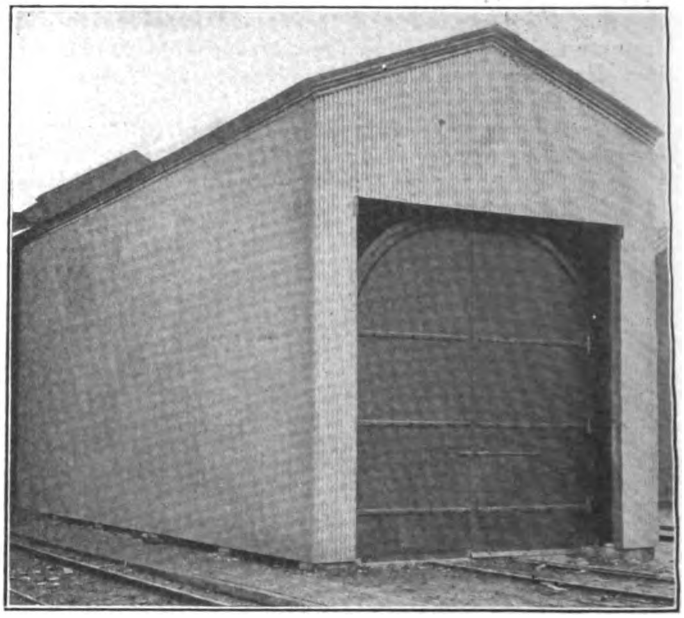
Baked Enamel Painting—Interior View of Kiln

This fact has been borne out in a recent investigation where it was noticed that when some of the equipment had been in service about four months the interiors of the cars were showing varnish cracks and checks. Some 400 cars were carefully examined, special attention being paid to choose cars built by various manufacturers, where different makes of surfacers and varnishes had been employed.

The result showed that the exteriors, including the sides, ends and vestibules, were in fair condition. There were a few exceptions to this, but they amounted to less than 6 per cent of the total which had serious varnish and surface cracks. Interiors were found generally to be in a poor condition. About 80 per cent of the equipment examined had the varnish checked through to the surface. Some of these conditions developed after four to eight months' service, indicating that either an entirely new system of painting would be necessary to overcome these troubles or that a more elastic paint would have to be used for interior finishing under the present existing practice of painting steel.

To obtain data indicating what should be done to meet the conditions, preliminary experiments were made by painting a number of panels and baking them in a heated oven. Repeated experiments along this line indicated that artificial driers could almost, if not entirely, be eliminated in the paint formulas and that more elastic materials could be used without the aid of artificial oxidizing agents. It was also observed that the elastic varnish used on the exterior of the cars could, under this system, be used to advantage on the interior, and by the aid of the heat of the oven they could be dried to the desired hardness, permitting the rubbing with oil and pumice to get the "flat finish."

The outcome of the experiments indicated that it would be desirable to extend the experimental panels to a full-size car and therefore a proper baking oven was planned that would accommodate one of the largest existing steel passenger cars for the purpose of baking each coat as applied to the exterior and interior surfaces.



Baked Enamel Painting—Exterior View of Kiln

This oven, as designed and built by the Pennsylvania Railroad Company at its Altoona shops, is 90 ft. 3 in. long, 13 ft. wide and 15 ft. high. The framework of the structure is made up of 3-in. I-beams for the sides, spaced 5-ft. centers. The roof framing is made of the same sections and is curved to conform closely to the contour of the car roof. Each end of the oven has two large doors which can be readily opened and closed for the baking operation. The oven is lined on the inside with 1/8-in. steel plate and on the outside with galvanized iron of 22 gage. The 3-in. space is filled with magnesia lagging, thus effecting the needed insulation. The doors are insulated in a similar manner.

Along the walls of the interior of the oven are placed sixteen rows of 1½-in. steam pipes, and along the floor, close to the walls, are arranged manifold castings with small lengths of pipe tapped into them at right angles. By this means over 2000 sq. ft. of heating surface is provided. A steam pressure of approximately 100 lb. to the square inch is used, thus making it possible to get an oven temperature of over 250 deg. Fahr. Rectangular openings, made adjustable, are provided on the sides near the floor line, allowing the necessary admission of air for circulation. Four 8-in. Globe ventilators are spaced at equal distances in the roof, likewise provided with dampers to regulate the size of the opening. By this means of ventilation, fresh air, which is required for the proper drying of paint, is obtained and the egress of the volatile matter present is provided for. Automatic ventilation and steam regulation have not at the present time been applied, but these have been considered advisable if the result of the experiment seems to warrant a more extended application of the practice.

A track is placed on the floor of the oven and connected at each end of the oven with other tracks leading into the regular paint shop, where the different coats of paint are applied to the car before each baking operation.

The outline of the work of painting a car is briefly as follows: First, a priming coat is given to the exterior and interior of the car, which is then moved into the oven and baked for three hours. The temperature at the start is about 160 deg., but rapidly rises at about 1 deg. per minute until a temperature of 250 deg. is reached, requiring about one and one-half to two hours. The oven is held at this temperature until the lapse of three hours, when the car is withdrawn and allowed to cool sufficiently to work upon, after which the surfaces are glazed and depressions and uneven places puttied. The car then receives its first coat of surfacer, is returned to the oven for three hours, and is baked and removed for additional coats, which vary from two to three in number as the needs of the case require.

After the last coat of surfacer has been applied and baked, the outside surface of the body of the car is rubbed down with emery cloth and oil to produce a flat and smooth surface. The various color coats used, such as tuscan red on the outside, pale green, bronze and bronze green on the inside, are then put on. Two coats of each color are required to get standard shades. Each coat of color is likewise baked.

The car then receives the required lettering, striping, etc., after which the outside and inside surfaces get three coats of a high-grade finishing varnish especially adapted for the baking process. Each coat of varnish is baked at a temperature from 120 deg. Fahr. at the start to 150 deg. Fahr., which is maintained until the expiration of three hours. The interior surfaces of the car are then rubbed with pumice and oil, giving the "flat-finish" effect desired, thus completing the painting of the car.

All of the work done by the baking process of painting for steam railroad coaches can be accomplished in six to eight days, thus effecting a saving in time of about ten days as compared with the standard or present air-drying system. Further, the paints and varnishes have been worked up so that they are especially adapted for this baking process, having greater elasticity. Exact formulas for the various mixtures are well defined, so that uniformity in material is expected, thus giving greater durability, better appearance and longer life for the paint work.

The checks and cracking previously found will be considerably lessened, if not almost removed. By oven painting the work is done under more uniform conditions, which at the present time are so hard to control. It enables the surfaces of the car to be heated uniformly and dried thoroughly, thus removing any objectionable moisture before the first priming coat is applied, which is a very desirable feature of the new method.

A considerable saving will be effected by the shorter time that cars will be held out of service when undergoing repairs and repainting in the shops. It is expected that dirt, soot, etc., will not adhere or embed themselves so readily and that the general appearance of the car will be improved by the baking method.

This oven was placed in service the early part of this year and the results of the complete car at this time seem to justify the experiment. They seem to indicate that the results obtained from a small panel can be duplicated in the full-size passenger equipment car and that, if this is the case, this method of painting can be used not only to advantage for the painting of steel passenger cars but for the painting of any other full-size steel structure of a similar character where protection and finish are desired.

The all-important point in the painting of iron or steel surfaces is first to have the surfaces thoroughly cleaned and rendered free from scale and rust, as this is as important as the painting itself. To accomplish this sand-blasting, where possible, is resorted to, supplemented by the use of wire brushes and emery cloth in the more obscure places and the more uneven surfaces. The sand-blasting, however, is confined largely to the outside surfaces and the latter practices to the inside portion of the car.

Iron and steel, while not presenting to the eye the same porous condition as wood, are full of finely divided pores, and the same atmospheric influences which enter the pores of wood and cause it to decay are ever ready to attack the unpainted surfaces of iron and steel; in fact, the metal surfaces more readily combine with the oxygen and moisture of the air, forming rust. Therefore, immediately after the sand-blasting and cleaning of the surfaces should come the application of the first or primary coat, as this is the most important one from the preservative standpoint.

FINAL HEARINGS ON NINE-HOURS-IN-ELEVEN BILLS

In the April 5 issue of the Electric Railway Journal, page 640, an abstract was given of the testimony of Vice-president C. S. Sergeant of the Boston Elevated Railway Company upon the proposed bills limiting a day's work of motormen and conductors on Massachusetts street railways to nine hours' service performed in eleven consecutive hours, the measures being before the Legislature at the present session. Among the other opponents of these bills is the Massachusetts Street Railway Association, representing substantially all the companies in the State outside the Boston Elevated. Among the officials who appeared last week before the legislative committee on street railways, which has the matter in charge, was Robert S. Goff, president of the Massachusetts association and vice-president and general manager of the Bay State Street Railway. Prof. Albert S. Richey, of the Worcester Polytechnic Institute, who has been employed by the company for the past three years as a transportation expert, with special work in the field of schedule making, also appeared before the committee and discussed the probable effect of the proposed legislation upon the Bay State system, which now includes nearly 1000 miles of track in eastern Massachusetts and its borders.

Both of these officials showed that it would be impossible to supply the crews for taking care of both peaks of traffic without the employment of a large number of extra men for short periods only. This would mean that these extra men as well as the regular men would work short periods and the plan would reduce the total number of men who could have a full day's work. Similar testimony in regard to their respective roads was presented by Henry C. Page, general manager Worcester Consolidated Street Railway; Elton S. Wilde, vice-president Union Street Railway, and other street railway officials. Final arguments of counsel were heard on April 8 and were presented for the Boston Elevated Railway by Arthur A. Ballantine and for the Massachusetts Street Railway Association by Bentley W. Warren.

The Mississippi River Power Company, Keokuk, Ia., announces that the water-power plant now nearing completion in the Mississippi River at Keokuk will be turned over to the operating department in June of this year. Already the water has been raised 12 ft. behind the dam, while the power house building itself is practically completed. Three units are now in place, and one of the exciters is ready for operation.

News of Electric Railways

Provision of the Maine Utility Bill

The bill passed by the recent Maine Legislature creating a public utilities commission and signed by the Governor of that State abolishes the present Railroad Commission and vests authority over the railroads in the new commission. The authority of the commission extends to street railways, electric railways, railroads, express companies, gas companies, electric light and power companies, telephone companies, water companies and other public utilities, and these companies are defined in the act, which goes into effect on July 1, 1913. The commission is to consist of three members to be appointed by the Governor with the advice and consent of the Council. One of the members is to be designated as chairman. The salary of the chairman is to be $5,000 a year, and the salary of each of the other members $4,500 a year. The salaries of the assistant clerk and other employees are fixed by the measure. The first chairman is to hold office for seven years and the other members are to hold office for five and three years respectively. Each of the members thereafter appointed is to hold office for seven years.

All corporations which come under the jurisdiction of the act are to furnish such information as may be desired by the commission to carry on its work or are to give their reasons for failure to supply such information. The commission is authorized to require the production of books, records, etc., and to subpœna witnesses. Every public utility is to render to the commission in prescribed form accounts of all business transacted. The commission is empowered to prescribe the form in which books, accounts, papers and records are to be kept. Such accounts are to be closed annually on June 30 and the balance sheet, together with such other information as the commission may prescribe, verified by an officer of each company, is to be furnished to the commission on or before Sept. 1 following. All items are to be allocated to the separate accounts in the manner prescribed by the commission.

Schedules, rates, tolls and charges are to be filed with the commission and the rates, tolls and charges which were in force on Jan. 1, 1913, are to be the rates, tolls and charges in force when the new act goes into effect. Such schedules as the commission may order are to be printed and open to the public. Changes in rates are not to be made except upon ten days' notice to the commission and all the schedules are to be printed and open to the public. There is to be no unreasonable preference or rebate. No franchise or permit is to be granted to any person, association or corporation to operate a utility in any city or town where a similar utility exists except the commission deems the second utility a public convenience and necessity.

Accidents are to be reported to the commission, which is to conduct an investigation and to make such recommendations as in its judgment may seem reasonable. The commission is empowered to ascertain the physical valuation of public utility property. All issues of stocks, bonds and notes by public utilities must be authorized by the commission. Section 37 of the act says that "no public utility shall declare any stock, bond or scrip dividend or divide the proceeds of the sale of its own or any other stock, bond or scrip among stockholders without the consent of the commission." The utilities are prohibited from selling, leasing or mortgaging their property without an order from the commission and are not to acquire the stock of other companies without permission.

The commission is empowered to order physical connections between different lines and also the joint use of facilities and equipment. The details are set forth at length in regard to the procedure in connection with complaints brought before the commission. Full and complete records are to be kept of all proceedings before the commission. The burden of proof is to be on the party adverse to the commission or seeking to set aside any order of the commission. Penalties are fixed for the failure or refusal of public utilities or their officers to obey orders of the commission or to refuse to allow the commission to investigate their affairs. Every failure to obey an order is to be considered a distinct offense. Penalties are provided for misappropriation of proceeds of the sale of stock, bonds, etc. Appeal to the courts is provided on questions of law which may be raised.

Statement of United Railways, St. Louis, to Public

In an advertisement which was published recently in the daily newspapers of St. Louis, Mo., the United Railways of that city dealt at considerable length with the recommendations accompanying the final report of the Public Service Commission of St. Louis upon the company, published on pages 676-678 of this issue. This report contained the draft of an ordinance so to increase the rush-hour service as to provide a seat for every passenger. The commission recommended the installation within the next eight months of 165 motor cars, 165 trail cars and extra loops at a total cost of $1,800,000. The company said that many important items had been omitted from the cost as estimated by the commission and that additional power plants, substations, feeders, carhouses and shops costing $1,750,000 more would be needed. The company concluded its statement to the public in part as follows:

"The amount to be raised and expended is $3,550,000. The present mortgage debt of the United Railways is in round numbers $59,000,000. This mortgage debt has been legally issued, is outstanding in the hands of the investing public, and must be recognized by the company. Any indebtedness now created by the company must be subject to this mortgage debt. The Public Service Commission has reported the value of the property of the company to be only (in round figures) $38,000,000, or $21,000,000 less than the mortgage debt. Whom could the commission find that would lend to a company so insolvent as it reports this one to be the $3,550,000 at 6 per cent with or without security? This shows the inconsistency of the report and recommendation of the commission.

"This company does not concede the correctness of the commission's valuation of its property. Nevertheless, the valuation of the commission has impaired the credit of the company and depreciated its securities in the hands of investors. It is idle to say now that the company is overcapitalized. It has issued its securities and they are now in the hands of the public. It must pay or repudiate its obligations. If it repudiates them all the consequences of insolvency must follow. Every attack upon the company, every unjust or unfair criticism, every impracticable suggestion or operation or exaction, makes its task more difficult.

"The mill tax has been a great impediment to progress. No person or corporation in Missouri pays as much in special and general taxes as the United Railways, the taxes of which, apart from the mill tax, amounted in 1912 to $652,222, or about $2,000 per day.

"The public generally does not understand the mill tax, and in consequence misjudges the company for resisting the collection of the tax. The company feels that this tax is unjust and illegal. It has been so advised by its own counsel and by other eminent lawyers. Our general counsel requested the city counsel to participate in a joint motion to advance the mill tax cases in the Supreme Court and that court has upon such joint request advanced the cases and set them for hearing next October. It would be useless and improper to discuss these cases further. We beg, however, to call attention to the fact that a special committee of the Council and House more than two years ago, after a thorough investigation of this matter, recommended a compromise. The committee did not begin its investigation with any bias in favor of the company.

"The condition of the company is heritage of the present management. It is bound to deal with conditions as they are, and while rendering to the public a fair and reasonable service the management cannot overlook the fact that it must also manage for those who have their money invested in the securities of the company."

The members of the Public Service Commission, J. L. Hornsby, James A. Waterworth and James C. Allison, issued a statement dealing with the subjects discussed by the company in its advertisement. This statement the members of the commission concluded as follows:

"The commission feels certain after most careful examination and consideration of the subject that in its recommendations for additional service it has suggested nothing that is not easily within the power, physically and financially, of the company to provide from the approximately $12,000,000 gross revenue which it is collecting annually from the people of this city, and still leave a fair return to the company on its investment in the service of the public."

Recommendations in Regard to Service in Rochester

The report filed with the Public Service Commission of the Second District of New York by Charles R. Barnes, electric railroad inspector of the commission, who has been investigating street railway conditions in Rochester, is concluded with the following recommendations affecting the New York State Railways, Rochester lines:

1. That it immediately order thirty cars.
2. That it equip fifty-eight cars of 355 to 449 series with air brakes within one year.
3. That it report to this commission what means it will employ to reduce the number of delays to cars caused by power failure.
4. That it run twenty-four additional trips between the hours of 6.30 a. m. and 9 a. m. and thirty-one additional trips between the hours of 5 p. m. and 6.30 p. m. on lines specified.
5. That it run six additional trips in the morning and five additional trips at night at the times and on lines specified.
6. That after the service has been increased in compliance with recommendations Nos. 4 and 5 any material reduction made in it, except those to conform to ordinary fluctuations in travel, shall be reported to this commission.
7. That it reduce the headway on the Blossom Road, Arnett and Clifford and North Goodman and Emerson lines to less than fifteen minutes between 6 a. m. and 8 p. m. and notify this commission to what extent such headways have been reduced.
8. That it enforce a rule requiring passengers to leave cars, except P-A-Y-E, in the business section by the front end. Co-operation of the public in this matter is asked.
9. That it adopt the method of trailer operation experimentally on some of the heavy carrying lines.
10. That it cause all cars to be equipped with side route signs.
11. That it enforce its rule requiring conductors to announce streets.
12. That it double-track the designated single-track portion of the lines mentioned under the heading "Single-Track Lines."
13. That it cause the switches from Plymouth Avenue to Allen Street, South Clinton to Monroe Avenue, Central Avenue to Joseph Avenue, Caledonia Avenue to Bronson Avenue and East Main to North Goodman to be operated by switchmen during the evening rush hours until such time as they are replaced by automatic switches.
14. That it rearrange the passenger stops in the business section as suggested under the heading "Passenger Stops."
15. That it notify this commission within three months what it proposes to do to furnish relief to the Lake Avenue local travel and the Kodak Park travel, as is shown necessary under heading "New Trackage Crosstown Routes and Changes in Routes," which might make it unnecessary for this commission to recommend the connection of the Dewey Avenue and Lake Avenue tracks at or near the Ridge Road.
16. That within six months it notify this commission what action has been taken by it in the matter of relocation of the Park Avenue route west of Alexander Street.
17. That it provide a suitable terminal for interurban cars, property located on private property. That it notify this commission within thirty days what steps have been taken to accomplish this result.
18. That it move the northbound track in front of the State Street carhouse 2 ft. to the east for the purpose of reducing the delays to car movement now caused by the movement of cars in and out of this carhouse. That it notify this commission within thirty days what progress has been made in the accomplishment of the result mentioned.
19. That it cause checks of local riders to be made at various intervals, Saturday afternoons, Sundays and holidays during the summer season on Lake Avenue, St. Paul Street, South Avenue, Plymouth Avenue and Portland Avenue; that it furnish during the summer adequate service for the local travel on these lines and that the result of checks made with the service run be furnished this commission.
20. That it use its best endeavors to bring about the construction of tracks through Clarissa Street. That within three months it report to this commission what has been done in compliance with this recommendation.

Mr. Barnes says in the report:

"In this report a fair and impartial discussion of transportation conditions has been attempted. Commendation has been given the company where warranted and criticism made where justified. Defects in the system have been pointed out with recommendations for improvements, compliance with which will cost the company large amounts of money. It is believed that all of the expenditures suggested are necessary and when made Rochester will have a street car system equal to any other in this country."

Railroad Crossing Controversy in Illinois Settled

It may be of interest to review briefly the history of the railroad crossing controversy arising from the application by the Illinois Traction System for a grade crossing with the Illinois Central Railroad and the Chicago & Alton Railroad at Lincoln, Ill. Acting on this application, which was made in 1907, the Illinois Railroad & Warehouse Commission after several hearings ordered a separation of grade at this point. The local authorities at Lincoln, Ill., were very much interested in the result of hearings, and immediately following the order of the commission, which was specific as to the height the steam roads were to be elevated to allow the electric railway to build under them, they questioned the commission's jurisdiction within the corporate limits of the city.

The objection raised by the city authorities was due wholly to topographical conditions. The Illinois Traction System paralleled the Chicago & Alton Railroad on a public street approximately 150 ft. away, and if the grade separation had been carried out according to the order of the commission it would have been necessary to depress a portion of this street to provide an approach to the electric railway under crossing. To depress the street was undesirable, as its grade was already some 4 ft. below the top rail on the steam railroad and surface drainage at the existing elevation was a problem. Existing street crossings on the steam railroad were also considered dangerous, as several limited trains passed through the city without stopping, and buildings occupied both sides of this street, obstructing the view until the steam road right-of-way was reached. Local authorities also questioned the order, as they believed that the crossing between the two steam roads already protected by an interlocker was safe and could very easily be enlarged to include similar protection for the electric railway.

After considerable delay, the Railroad Commission decided to grant the electric railway temporary crossings with both steam roads, until such time as the question of jurisdiction had been settled by the court. Neither the commission nor the city authorities took the question at issue to the court, and the steam railroads refused to consider elevating their tracks any more than had already been ordered by the commission. As a result, nothing was done to relieve the situation until December, 1912, when a change in the organization of one of the steam railroads brought with it a change in policy as to grade separations. After several conferences between the engineers of the Illinois Traction System and the steam railroads satisfactory arrangements were made allowing the grade crossing and the enlargement of the interlocking plant to provide additional protection. This agreement was submitted to the Railroad & Warehouse Commission and was approved by it.

Comparative Statistics of Illinois Roads for Year

The following is a statement of the mileage of surface and elevated electric railways owned in the State of Illinois by such companies as reported to the Railroad and Warehouse Commission for the fiscal year ended June 30, 1912:

Classification	Miles Owned
Main line and branch	1449.20
Second, third, fourth and additional main tracks	208.47
Industrial tracks	34.24
Yard tracks and sidings	121.41
Total	1813.32

The following is a comparison of the mileage of surface and elevated electric railways in the State of Illinois, ending with the fiscal years as of June 30, 1911 and 1912, respectively:

Year	Main Line and Branches	Additional Main Tracks	Industrial Tracks	Yard Tracks and Sidings	Total
1912	1449.20	208.47	34.24	121.41	1813.32
1911	1441.47	206.41	33.56	121.20	1802.64
Total increase	7.73	2.06	.68	.21	10.68

The mileage not reported to the commission in 1912 that has been previously included follows: 12.89 miles of the Chicago Southern Traction sold to the Chicago City Railway, 6.50 miles of the Freeport Railway, Light & Power Company, and 1.75 miles of the Murphysboro Electric, Light, Heat & Power Company, which are organized under the general incorporation act and do not come under the jurisdiction of the commission.

The following is a comparison of the capitalization of surface and elevated electric railway companies, representing the entire mileage of such companies as reported to the commission, ending with the fiscal years as of June 30, 1911 and 1912, respectively:

Year	Capital Stock	Funded Debt	Total
1912	$130,671,580	$144,274,001	$274,945,581
1911	129,541,120	137,072,737	266,613,857
Total increase	$1,130,460	$7,201,264	$8,331,724

The following statistics are gathered from the income accounts and a comparison is made with the fiscal years as of June 30, 1911 and 1912, respectively:

Classification	1911	1912
Operating revenue	$20,586,694	$21,227,138
Operating expenses	12,624,208	12,395,438
Net operating revenues	$7,962,486	$8,831,700
Miscellaneous income	1,464,514	1,616,165
Gross income less operating expenses	$9,427,000	$10,447,865
Deductions from income	7,679,957	8,472,172
Net income	$1,747,043	$1,975,693

The following is a comparison of dividends paid ending with the fiscal years as of June 30, 1911 and 1912, respectively:

Name of Company	1911	1912	Per Cent on Common Stock	Per Cent on Preferred Stock
Aurora, Elgin & Chicago R. R.	$279,000	$279,000	3	6
Bloomington, Decatur & Champaign R. R.	14,596	26,250	..	5
Coal Belt Electric Ry.	6,214	15,000	5	..
East St. Louis & Suburban Ry.	201,483	144,375	3¼	..
Kankakee Electric Ry.	3,480			
Kankakee & Western Electric		1,700	11⅓	..
Metropolitan West Side El. Ry.	261,237	370,084	4½	..
North Kankakee Electric Light & Ry.	3,260	6,520	20	..
Northwestern Elevated R. R.	200,000	98,888	2	..
Rockford & Interurban Ry.	73,000	100,000	2½	..
Rock Island Southern R. R.	20,000	10,000	2	..
St. Louis Electric Terminal Ry.	24,166	50,000	5	..
St. Louis, Springfield & Peoria R. R.	83,162	113,750	5	..
South Side Elevated R. R.	230,203	422,020	4⅛	..
Terre Haute, Indianapolis & Eastern Traction	455,000	455,000	..	5
Terre Haute & Western Ry.	13,000	15,000	3	6
White Hall Ry.	......	2,400	6	..
Total	$1,867,801	$2,109,987		

The mileage traffic and miscellaneous statistics for the years ended June 30, 1911 and 1912, follow:

Classification	1911	1912
Passenger car mileage	73,241,728	74,285,717
Freight, mail and express car mileage	3,990,943	3,546,438
Total car mileage	77,232,671	77,832,155
Fare passengers carried	239,490,181	243,768,649
Transfer passengers carried	6,014,744	6,165,383
Total passengers carried	245,504,925	249,934,032
Passenger revenue	$15,467,008	$15,703,136
Average fare, revenue passengers (cents)	6.45	6.44
Average fare, all passengers, including transfer passengers (cents)	6.30	6.28
Operating revenue per car mile (cents)	22.58	22.97
Operating expenses per car mile (cents)	13.82	13.27

The equipment in use is classified by the commission as follows:

Passenger cars:	1911	1912
Closed cars	2,309	2,403
Open cars	188	161
Combined cars, closed and open	23	44
Total	2,520	2,608
Other cars:		
Freight	1,848	1,965
Express	163	164
Baggage	..	6
Combination	2	71
Work	144	175
Snow plows	20	15
Sweepers	15	12
Miscellaneous	104	94
Locomotives (electric)	22	20
Locomotives (steam)	2	9
Total all cars and locomotives	4,840	5,139

Injunction Sought to Prevent Municipal Ownership Amendment Vote

The Circuit Court of Wayne County, Mich., denied the petition of George H. Barbour, Fred T. Moran and Charles Ducharme, taxpayers of Detroit, for an injunction against the city election officials to prevent them from putting the municipal ownership amendment to a vote on April 8. The court explained that the matter could not receive proper consideration, because of lack of time to present it to the Supreme Court, and that the question can be taken up later if the constitutionality of the movement is in doubt. It is not fair, the court said, to attempt to render a decision in such a brief time.

Corporation Counsel Lawson represented the city. He claimed that the Verdier law is constitutional and presented the journal of the Legislature to show that the amendments had been concurred in by more votes than were necessary for adoption.

Hinton E. Spaulding represented the taxpayers who brought the suit. He asserted that the Verdier law is not constitutional, because it did not remain in the House of Representatives the five days required before being put to a vote and also because the Senate did not have printed copies of the amendments for the proper length of time before the vote was taken on them. He also believes that the provision for extending the bond limit is unconstitutional. Attorney Allen Frazer presented an argument for the city and Attorney A. C. Angell closed for the plaintiffs.

Mayor Marx has been campaigning in favor of the municipal ownership principle incorporated in the proposed charter amendments. However, if the suggestions of the Circuit Court should be followed, the law under which these amendments are drafted will be tested and nothing can be done until a final decision is reached.

Corporation Attorney Lawson and Special Counsel Lucking have gone to Washington to prepare a motion to be presented to the United States Supreme Court, asking for the dismissal of the case in which the Detroit United Railway seeks to prevent the city from ousting it from Fort Street, under the decision rendered by the Michigan Supreme Court. They will argue that no federal question is involved in the case.

The average daily deficit of the municipal bus line for the first thirty days has been $60. The administration has decided to continue the line for thirty days more.

An ordinance has been introduced in the City Council giving the company the right to build a single track on Manchester Avenue from the plant of the Ford Automobile Company to the present terminus of Hamilton Street, a single track from Victor and Oakland to Manchester and a double track on John R. Street under a day-to-day agreement. The company asked this right in order to accommodate the 15,000 people employed in the Ford plant and at the same time relieve congestion in the downtown section. It is said that additions will be built to the plant that will necessitate the employment of 6000 additional people within a short time.

Wisconsin Tax Assessment

The final assessments made by the State Tax Commission of Wisconsin on the property of the electric railway, light, heat and power companies total $51,590,000, as compared with $47,365,000 a year ago, and the total tax is an increase over 1912 of $85,307. The total tax revenue, $610,435, is divided between the State and the municipalities in which the utilities operate at the ratio of 15 to 85, the amount going to the State being $91,565, while the towns, villages and cities get $518,870. The assessments of the principal electric railways follow:

	Assessment	Tax Revenue
Ashland Light, Power & Street Railway	$450,000	$5,324.60
Bay Shore Street Railway	20,000	236.65
Beloit Traction Company	220,000	2,603.14
Chicago & Milwaukee Electric Railway	200,000	2,366.49
Chicago & Wisconsin Valley Railway	25,000	295.81
Chippewa Valley Railway, Light & Power Company	2,300,000	27,214.61
Duluth Street Railway	1,150,000	13,607.30
Eastern Wisconsin Railway & Light Company	1,300,000	15,382.17
Grand Rapids Street Railroad	100,000	1,183.24
Ironwood & Bessemer Railway & Light Company	125,000	1,479.06
Janesville Traction Company	50,000	591.62
Kenosha Electric Railway	400,000	4,732.98
LaCrosse City Railway	20,000	236.65
La Crosse & Onalaska Railway	540,000	6,389.52
Manitowoc & Northern Traction Company	110,000	1,301.57
Menominee & Marinette Light & Traction Company	310,000	3,668.06
Merrill Railway & Lighting Company	165,000	1,952.30
Milwaukee Electric Railway & Light Company	27,500,000	325,392.02
Milwaukee Light, Heat & Traction Company	7,500,000	88,743.28
Milwaukee Northern Railway	1,600,000	18,931.90
Rockford & Interurban Railway	300,000	3,549.73
Sheboygan Railway & Electric Company	950,000	11,240.82
South Wisconsin Railway	1,000,000	11,832.44
Waupaca Electric Light & Railway Company	80,000	946.60
Wausau Street Railroad	775,000	9,170.14
Wisconsin Electric Railway	650,000	7,691.09
Wisconsin Public Service Company	1,900,000	22,481.63
Wisconsin Traction, Light, Heat & Power Company	1,850,000	21,896.61
Totals	$51,590,000	$610,435.43

Pittsburgh-Wheeling Electric Railway

This paper has learned from an authoritative source that the West Penn Traction & Water Power Company has no plans for connecting its lines with the Wheeling properties which are controlled by the West Penn, as mentioned in the issue of this paper of March 22. The information published in the previous note was based upon reports in the local newspapers, and the statements therein contained are found to be erroneous.

Proposed Compromise Agreement for Joint Use of Tracks in San Francisco

The Board of Supervisors and the Mayor of San Francisco, Cal., have issued a statement in part as follows, setting forth reasons why the electors should approve at the special election on April 22, 1913, the proposed compromise agreement for the joint use of the lower Market Street tracks by the United Railroads and the Municipal Railway:

"By the proposed compromise litigation is terminated and the cars of the Municipal Railway obtain immediate access to that great source of revenue, the ferry terminal.

"The inhabitants of the territory served by the Sutter Street Railway system get the advantage of a direct service to the ferry. It must be kept in mind that the municipal government is something more than a corporation controlling a publicly owned street railway competing with the United Railroads. The municipal government must consider the needs of every district, including the districts not yet served by the municipal railway.

"The agreement provides expressly that it is without prejudice to the general powers of the municipality to regulate street railways, and that it shall not be construed to validate any rights, privileges or franchises of the United Railroads or the Sutter Street Railway that have become invalid."

Development Plans in Montreal

The Montreal (Que.) Tramways has drawn up plans which, if agreed to by the Council, will result in the expenditure of between $8,000,000 and $10,000,000 by the company. The directors are prepared to enter into a new contract with the city, provided the company obtains new routes. E. A. Robert, the president, makes eleven suggestions, which include double-tracking and the building of subways under the Lachine Canal. He says the company is prepared to discuss the opening up of Vitre Street, extend the Guy and Beaver Hall line, straighten Guy Street, open up Sherbrooke Street, extend the Beaver Hall line to St. Lawrence Boulevard, grant new routes to the north side of the city, extend the Papineau Avenue line, open up William Street, construct subways under the Grand Trunk Railway at various points and open up Decarie Avenue, Notre Dame de Grace, to the back of the mountain. Duncan McDonald, former manager of the company, has suggested the construction of a subway and the opening of seven new routes.

Members of the A. S. M. E. to Visit Europe

About 200 mechanical engineers of the United States will go to Europe this summer to attend the fifty-fourth annual meeting of the Verein Deutscher Ingenieure in Leipzig and to inspect the educational and industrial establishments of Germany. The party will sail on June 10 on the Hamburg-American Line S.S. *Victoria Luise*. The official party will consist of 200 members of the American Society of Mechanical Engineers, accompanied by 100 ladies. On arriving in Hamburg on June 21 the shipyards will be visited. The party will then proceed next day by special train to Leipzig. Here the King of Saxony will welcome the visitors and the Verein Deutscher Ingenieure will tender an official reception at which the president of the American Society of Mechanical Engineers, Dr. W. F. M. Goss, dean of the College of Engineering of the University of Illinois, will make the principal address. The party will leave on June 25 for a tour of industrial Germany, visiting Dresden, Berlin, Cologne, Düsseldorf, Frankfort, Heidelberg and Munich.

Denver Bus Ordinance Vetoed.—Mayor Arnold of Denver, Col., has vetoed a second time the ordinance permitting the Denver Motor Bus Company to operate omnibuses on certain streets and alleys of Denver.

Portland Fender Ordinance Extended.—The Council of Portland, Ore., has passed an ordinance granting the Portland Railway, Light & Power Company an extension of time until July 31 in which to equip its cars with fenders.

Franchise Extension Ordinance Passed in Shreveport.—The proposal to extend the various franchises of the Shreveport (La.) Traction Company so that all of them will expire in 1954 was carried at the recent referendum.

Boston Chamber of Commerce Adopts Railroad Report.—The Boston Chamber of Commerce has adopted the report of its directors with regard to the New England railroad situation. The recommendations contained in the report were referred to briefly in the Electric Railway Journal of April 5, 1913, page 650.

Suit Brought in Ohio Supreme Court to Oust Company.—Herbert C. Pontius, prosecuting attorney of Stark County, has brought suit in the Supreme Court to oust the Northern Ohio Traction & Light Company, Akron, Ohio, from its franchise between Canton and Massillon on the ground that it has not complied with the requirements of the grant given by the county. The suit was brought under the Wise law, recently enacted.

Extension of Toronto Civic Line.—Under the authority received by Commissioner Harris, the Works Department of Toronto, Ont., plans to proceed with the extension of the civic railway and is preparing to call for tenders for equipment and arranging to purchase sites for the carhouses, etc. The station for stepping down the hydroelectric power will be located in the carhouse or at the West Toronto station. The contract has been let for building the bridge over St. Clair Avenue.

Preliminary Report on Traffic in Winnipeg.—R. M. Fenstel, who is connected with the Railroad Commission of Wisconsin, has submitted a preliminary report to the Public Utilities Commission of Manitoba on street railway traffic in Winnipeg. He stated that recommendations in regard to the general character of the service furnished by the Winnipeg Electric Railway can be made only after an exhaustive study of all the conditions, but that special problems can be considered before a general study is made.

Decision of Lower Court in Baltimore Paving Suit.—Judge Bond in the City Court has decided that the United Railways & Electric Company, Baltimore, Md., should pay the cost of repaving the streets between the car tracks and 2 ft. either side of its lines. The case will be carried to the Court of Appeals. A director of the company is reported to have said: "The company's counsel has little doubt of winning the case before the Court of Appeals. The suit before Judge Bond was a friendly one brought with the idea of getting the question before the April term of the Court of Appeals. The language of the act is very doubtful."

Southern New England Railroad Offered to Rhode Island.—President Chamberlin of the Grand Trunk Railway has offered to turn over to Rhode Island the Southern New England Railway as it stands on condition that the State shall complete the road and operate it in one of two ways. The alternatives are set forth as follows: "If the State desires to operate the railroad we will grant running rights on reasonable terms over the New London Northern from Palmer to Brattleboro, Vt., so as to make the line sufficiently long to constitute an operating division, and we will also make a traffic agreement between the Central Vermont and the State-owned railroad for a division of through rates on a mileage basis, with a reasonable additional allowance for terminal charges. Or the Central Vermont will lease the State-owned railroad for a rental equivalent to 5 per cent interest on the actual cost to the State of completing the whole line." Mr. Chamberlin says almost $2,500,000 has been expended on the line, and its completion will require several millions more than was originally estimated.

First Construction Under Dual Contracts.—The first actual construction work under the contracts for the dual system of rapid transit in New York began during the week in the Centre Street loop subway, which is to be operated by the New York Municipal Railway Corporation. Under direction of the commission the company began the work of equipping two tracks in this subway for temporary operation until it can be completed and all four tracks put into operation. The temporary operation will consist in running the Brooklyn elevated trains now coming over the Williamsburg Bridge into this subway and down to the City Hall. At present these trains stop at the Manhattan end of the Williamsburg Bridge, where they are turned back to Brooklyn and the passengers have to transfer to other lines to get down town in Manhattan. As soon as the two tracks in the loop subway are properly equipped these trains will continue through the loop, making stops at stations at the Bowery, Canal Street and Chambers Street. The head wall separating the subway from the Williamsburg Bridge has been broken through and the bridge tracks have been connected with new tracks just laid in the subway. The work of track-laying is proceeding rapidly, and it is expected to have two tracks of the loop ready for operation by July 1, 1913.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

COLORADO

The conference committee of the Colorado Legislature has reported back to both the House and the Senate on the subject of the proposed public utilities bill, restoring the terms of the California law practically intact by the elimination of the House amendments from the Wisconsin law, particularly those relating to municipal ownership and indeterminate franchises. Both branches have concurred in the action of the conference committee and the bill is now before the Governor for signature.

ILLINOIS

Governor Dunne was reported at work on April 4 on the final draft of the proposed public utility bill for Illinois. Only one commission is provided for, although the Governor was understood at first to favor a separate commission for Chicago. Whenever the people desire to vote to decide to pass under or withdraw from the provisions of the act, the council is to be required to submit the question to a referendum, upon petition of 10 per cent of the voters. The measure is made to apply to all steam railroads, electric railways, street railways and other transportation lines, gas companies, electric light, heat and power companies, etc. Should it be decided to abolish the Railroad & Warehouse Commission, the number of members for the new commission will be fixed at five persons. The commissioners are to be appointed by the Governor. Their salaries are fixed tentatively at $10,000 a year. A secretary is provided for at a salary of $5,000 per annum and an attorney at $6,000 per annum.

Representative George C. Hilton, Chicago, has introduced a bill in the House which fixes 5 cents as the maximum fare for any steam, electric or other railroad operating in and through municipalities. The measure is aimed at the steam roads of Chicago which handle suburban business.

NEW JERSEY

The bill of Senator Gaunt to permit electric railways to carry freight under regulations by the Board of Public Utility Commissioners without concurrence by municipal authorities has been killed in the House, where it was introduced by Mr. Kates. The House has also voted against the bill to permit electric railways to appeal to the Board of Public Utility Commissioners in cases where franchises are refused such companies by municipalities. The Assembly has passed the franchise tax act.

NEW YORK

Governor Sulzer has signed the bill changing the name of the Interstate Bridge Commission to the New York State Bridge and Tunnel Commission. This bill provides that the commission, co-operating with the New Jersey State Commission, shall consider the subject of additional tunnel communication between the city of New York and the State of New Jersey.

The franchise committee of the Board of Estimate held a hearing recently in New York City on the bill which has been introduced at Albany to extend its powers with regard to the right to issue franchises for bus lines. The Electric Coach Corporation, which is backed by George W. Loft, and in which E. P. Hulse and Charles Bergh are interested, has offered to establish new bus lines at a 5-cent fare if the bill is passed and the city gives it a franchise. President Shonts, representing the New York Railways, protested against the establishment of any more bus lines. He said additional bus lines would materially cut down the profits of the surface railways. A hearing was held at Albany on April 9 on the bill. M. B. Hoffman, representing the Brooklyn Rapid Transit Company, protested against the passage of the measure.

PENNSYLVANIA

Attempts to fix a date for the adjournment of the General Assembly have thus far resulted in failure. Although the General Assembly has been in session three months only two of the measures called for in the Republican state platform have been passed, one providing for direct election of United States Senators and one for the reorganization of the auditor general's department. The Governor signed the latter bill on April 9. Progressive measures that have not been passed as yet by either body include the public utilities bill and bills for taxation of corporations for local purposes and for the equal assessment and collection of all State taxes on corporations. It is believed that a public utilities measure will be favorably reported from committee in the House within the next ten days. As amended the measure will provide for seven commissioners to serve ten years.

Among new bills introduced in the House is one by Representative Dickinson providing in effect for a board of conciliation or arbitration to be appointed by the public service commission, which board shall have power to adjust labor disputes affecting public service corporations. The bill provides strict penalties for any street railway employee who goes on strike before the board has passed upon the merits of the controversy. The bill is a companion bill to the public utilities measure and is modeled after the Canadian law.

The bill permitting the licensing of dining, club and café cars on railroads for the sale of liquor was defeated in the House on April 8 by a vote of 111 to 75. One of the chief arguments against the bill was that it would not place the railroads in a very consistent light before the public if they were to sell liquor to their patrons on such cars while at the same time they enforced the rules against their employees drinking either on or off duty.

The House has passed the bill creating a bureau of utilities in second-class cities. The bill prohibiting trespassing upon railroad engines, cars, rights-of-way or other railway property under penalty of a fine of $25 or thirty days' imprisonment has been sent back to committee.

The bill providing a commission form of government for third-class cities of the State has passed the Senate. This bill will give cities of this class more power over public service corporations. The Senate has also passed finally the three measures paving the way for the construction of subways in Philadelphia. Among the measures reported from committee of the House favorably were the Magee bills enabling second-class cities to acquire, construct or lease street railways or other utilities. The House has referred back to committee the Carter bill prohibiting the appointment of railroad employees as conductors, flagmen or engineers without at least eighteen months' service in subordinate positions.

PROGRAMS OF ASSOCIATION MEETINGS

Arkansas Association of Public Utility Operators

The date of the meeting of the Arkansas Association of Public Utility Operators has been changed from May 13, 14 and 15, as formerly announced, to May 5, 6 and 7, bringing the sessions one week earlier than at first scheduled. The meeting will be held at Little Rock.

Iowa Street & Interurban Railway Association

The following program of papers has been announced for the meeting of the Iowa Street & Interurban Railway Association which is to be held at Waterloo, Ia., April 24, 25 and 26, 1913, inclusive:

Paper, "Is the Expenditure of Money on Amusement Parks to Stimulate Traffic on City Lines Justifiable?" by E. W. Walker, general manager and purchasing agent of the Union Electric Company, Dubuque, Ia.

Paper, "Interurban Terminals," by F. J. Hanlon, secretary and general manager of the Mason City & Clear Lake Railroad, Mason City, Ia.

Paper, "Modern Methods of Reducing Generating Costs," by D. W. Gilbert, superintendent of power stations of the Omaha & Council Bluffs Street Railway, Omaha, Neb.

Paper, "Effective Shop Equipment for Maintenance of Equipment," by G. A. Mills, electrical engineer of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.

Paper, "Successful Methods of Preventing Accidents," by Arthur G. Rippey, claim attorney of the Des Moines City Railway and the Inter Urban Railway, Des Moines, Ia.

Southwestern Electrical & Gas Association

The ninth annual convention of the Southwestern Electrical & Gas Association will be held at Galveston, Tex., on May 21, 22, 23 and 24—a four-day meeting instead of three days, as heretofore, as the association has so increased in scope and numbers as to necessitate more time for its proceedings. In addition it has been found necessary to have sessions for the gas members and the accountants which will parallel the regular sessions on subjects not of interest to those in attendance at the gas and accounting sessions. One full session will be given up, as heretofore, to the supply men. This will be followed, in the evening, with a rejuvenation of the Sons of Jove, at which the national deities will preside. Two special cars have been reserved from St. Louis to Dallas, from which point it is expected to make a solid convention train to Galveston. The program in detail will be published later. Full information as to railroad rates and routes, hotel accommodation, exhibits, etc., may be obtained by addressing H. S. Cooper, 405 Slaughter Building, Dallas, Tex., secretary.

Financial and Corporate

Stock and Money Markets

April 9, 1913.

Advances were made in many issues in the early trading on the New York Stock Exchange to-day despite the fact that the market was called upon to sustain influences of a disturbing character such as the announcement of the new issue of $45,000,000 of Pennsylvania stock and the disapproval of the Union Pacific dissolution plan by Attorney General McReynolds. Brooklyn Rapid Transit was in demand, advancing to 92¼. Interborough-Metropolitan moved up half a point to 60⅜. A small gain was also made in Third Avenue. Rates in the money market to-day were: Call, 3½ @ 3¾ per cent; sixty days to six months, 4½ @ 5 per cent.

The Philadelphia market to-day was broad but not very active. There was little demand for bonds.

The Chicago market was both narrow and dull, but there was a slight improvement in the demand for bonds.

In the Boston market the railroad issues were dealt in sparingly. The demand for bonds was light.

The Baltimore market was extremely dull except for United Railway issues. The demand for bonds was good.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 2	April 9
American Brake Shoe & Foundry (common)	90⅛	93¼
American Brake Shoe & Foundry (preferred)	130	132½
American Cities Company (common)	42	38¾
American Cities Company (preferred)	73½	70
American Light & Traction Company (common)	400	400
American Light & Traction Company (preferred)	107	107
American Railways Company	38½	38½
Aurora, Elgin & Chicago Railroad (common)	43½	42½
Aurora, Elgin & Chicago Railroad (preferred)	85	85
Boston Elevated Railway	106½	105½
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	*66	a66
Boston & Worcester Electric Companies (common)	7¼	7½
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	91	91¼
Capital Traction Company, Washington	121	122½
Chicago City Railways	150	*150
Chicago Elevated Railways (common)	26	*26
Chicago Elevated Railways (preferred)	88	*88
Chicago Railways, ptcptg., ctf. 1	85	*85
Chicago Railways, ptcptg., ctf. 2	21½	*21½
Chacago Railways, ptcptg., ctf. 3	6½	*6½
Chicago Railways, ptcptg., ctf. 4	*3½	*3½
Cincinnati Street Railway	111	111
Cleveland, Southwestern & Columbus Ry. (common)	*5½	5½
Cleveland, Southwestern & Columbus Ry. (preferred)	*30	30
Cleveland Railway	*103½	104¾
Columbus Railway & Light Company	18	18
Columbus Railway (common)	a69½	69½
Columbus Railway (preferred)	82½	82½
Denver & Northwestern Railway	*108	*108
Detroit United Railway	80	a80
General Electric Company	140¾	141
Georgia Railway & Electric Company (common)	119	118¼
Georgia Railway & Electric Company (preferred)	83¼	84½
Interborough Metropolitan Company (common)	17⅞	17⅞
Interborough Metropolitan Company (preferred)	60	59⅞
International Traction Company (common)	*35	*35
International Traction Company (preferred)	*95	95
Kansas City Railway & Light Company (common)	15	*15
Kansas City Railway & Light Company (preferred)	*30	*30
Lake Shore Electric Railway (common)	*6½	*6½
Lake Shore Electric Railway (1st preferred)	*91	*91
Lake Shore Electric Railway (2d preferred)	*25½	*25½
Manhattan Railway	128½	129
Massachusetts Electric Companies (common)	17½	18
Massachusetts Electric Companies (preferred)	75½	77
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*25¾	*25¾
North American Company	77	79
Northern Ohio Light & Traction Company (common)	75	75
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	43½	44¼
Philadelphia Company, Pittsburgh (preferred)	33¼	40
Philadelphia Rapid Transit Company	26	25¼
Portland Railway, Light & Power Company	*67	67
Public Service Corporation	114	115
Third Avenue Railway, New York	37¾	38
Toledo Railways & Light Company	2⅝	2½
Twin City Rapid Transit Co., Minneapolis (common)	105½	105⅛
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	27	27⅝
United Rys. Inv. Company (common)	27¾	28¼
United Rys. Inv. Company (preferred)	49½	51
Virginia Railway & Power Company (common)	52	52
Virginia Railway & Power Company (preferred)	92	92
Washington Ry. & Electric Company (common)	91¾	92
Washington Ry. & Electric Company (preferred)	90¼	90⅜
West End Street Railway, Boston (common)	78	77
West End Street Railway, Boston (preferred)	a96	*96
Westinghouse Elec. & Mfg. Company	66	65⅛
Westinghouse Elec. & Mfg. Company (1st preferred)	115	116⅜

*Last sale. aAsked.

ANNUAL REPORTS

North American Company

The following is a comparative statement of income and undivided profits of the North American Company for 1911 and 1912:

	1912	1911
Interest received and accrued	$537,327	$659,995
Dividends received	1,517,953	1,392,448
Profits and compensation for services	289,189	53,549
Net increase in book value of assets	......	1
Total	$2.344,469	$2,105,993
Salaries, legal expenses, net rentals and all other expenses of administration	$76,217	$87,361
Taxes	11,654	13,234
Interest and commissions paid and accrued	107,674	142,923
Sundry accounts written off and reserves	17,697	5,609
Total	$213.242	$249,127
Net income	$2,131,227	$1,856.866
Dividends paid and accrued during year	1,489.665	1,489,665
Balance carried to undivided profits account	$641,562	$367,201

James Campbell, the president, says in part in the report:

"During the year the North American Company acquired the capital stock and bonds of the Kenosha Electric Railway, a company owning and operating the street railway system in the city of Kenosha. The acquisition of this property permitted the extension of the route and operation of interurban cars of the Milwaukee Light, Heat & Traction Company into the center of Kenosha, with transfer privileges over the local lines.

"The North American Company also acquired from the Milwaukee Light, Heat & Traction Company the capital stocks of the Racine Gas Light Company, Kenosha Gas & Electric Company and Watertown Gas & Electric Company. It consolidated the Racine Gas Light Company with the Kenosha Gas & Electric Company and the Kenosha Electric Railway in the Wisconsin Gas & Electric Company. Your company acquired the capital stock and indebtedness of the Burlington (Wis.) Electric Light & Power Company.

"For the purpose of affording an additional market for Keokuk hydroelectric power and extending the range of activity of this company's properties in the St. Louis district, there were acquired all the shares of capital stock of the following companies: American Light & Power Company, Union, Mo.; Commercial Telephone Company, Union, Mo.; Tibbe Electric Company, Washington, Mo.; Franklin Independent Telephone Company, Washington, Mo., and Pacific Electric Company, Pacific, Mo. The telephone companies referred to are operated in connection with the electric light companies in the same towns, having poles in common, and their acquisition was advisable and necessary.

"In the latter part of the year the Wisconsin Edison Company, Inc., was organized under the laws of the State of New York to provide an additional means of financing the future cash requirements of the properties whose stock it acquired from the North American Company. The Wisconsin Edison Company, Inc., has an issued capital stock of 100,000 shares of preferred stock, of a par value of $100 each, and 200,000 shares of common stock, without nominal or par value. It owns or controls by stock ownership the following companies: Milwaukee Light, Heat & Traction Company, The Milwaukee Electric Railway & Light Company, Wisconsin Gas & Electric Company, Watertown Gas & Electric Company, North Milwaukee Light & Power Company, Wisconsin General Railway and Burlington Electric Light & Power Company. Loans and advances consist of money loaned to corporations upon their notes, with ample collateral security, together with advances to subsidiary companies.

"The five-year 5 per cent collateral trust notes, dated May 1, 1907, of which there remained outstanding on Dec. 31, 1911, $1,910,000, principal amount, were paid at maturity on May 1, 1912, and the indenture securing them was satisfied and canceled.

"The company has no contingent liabilities, except an instrument of guaranty, dated March 1, 1906, executed to the Trust Company of America, as trustee under the first mortgage of the West Kentucky Coal Company, whereby it has guaranteed the payment by that company of the interest upon $2,000,000, principal amount, of its first mortgage bonds and of the sinking fund payments pertaining thereto. The principal amount of these bonds, $151,000, has been retired through the sinking fund, leaving $1,849,000, principal amount, outstanding.

"Out of the surplus and net profits, four quarterly dividends, each of 1¼ per cent, upon the capital stock were declared and paid during the year.

"The operating revenues of The Milwaukee Electric Railway & Light Company, including the Milwaukee Central Heating Company, aggregated $5,682,355, an increase of 10.7 per cent over the previous year; operating expenses increased 11.8 per cent; gross income aggregated $1,813,483, an increase of 11.6 per cent, and net income $1,098,277, an increase of 9 per cent. As between the various departments, operating revenues of railway department increased 4.1 per cent, light and power 31.7 per cent and steam heating 40.6 per cent. During the year there was expended on additions to physical property the sum of $1,979,900.

"Effective on Jan. 1, 1912, The Milwaukee Electric Railway & Light Company established a pension or service annuity system, the benefits of which are open to all employees. It provides, until the death of the annuitant, monthly payments upon retirement of an amount equal to 1½ per cent of the average monthly wage or salary (excluding amounts of salary in excess of $1,500 per year) for each year of service. The pension system is available to all employees who have been in the continuous service of the company for fifteen years or more and is optional to those of sixty years of age or more. Retirement is compulsory upon reaching the age of seventy.

"During the year the company assisted in the formation of the Employees' Mutual Benefit Association, the principal purpose of which is to supply medical attendance to its members and to make payment of benefits in case of sickness. The company contributes to the association an amount equal to that paid as fees and dues by members.

"In 1906 the city of Milwaukee applied to the Railroad Commission of Wisconsin for a reduction in the rate of street railway fare. In 1906 and 1907 and 1911 applications were made to the Railroad Commission for the extension of the Milwaukee city fare limits to Wauwatosa, West Allis and East Milwaukee. After an extended investigation and numerous hearings, the Railroad Commission handed down a decision in August, 1912, requiring the company to discontinue the present ticket rate of twenty-five for $1 and to sell thirteen tickets for 50 cents. It also entered an order requiring the extension of the city single fare limits to Wauwatosa, West Allis and East Milwaukee. On the ground that the company was a party to a contract evidenced by a franchise granted in the year 1900, which provided for the rate of fare within the limits of the city of Milwaukee during the life of the franchise, the company secured a temporary injunction in the Circuit Court, on which an appeal was taken to the Supreme Court of Wisconsin. The outcome of the appeal is important to the company, not so much on account of the immediate effect of the ordered fare reduction, but rather on account of the effect on the company's revenues should greater fare reductions be ordered at a later date.

"The operating revenues of the Milwaukee Light, Heat & Traction Company aggregated $1,237,383.78, an increase of 10 per cent over those of the year 1911; operating expenses increased 16 per cent; gross income aggregated $1,204,530, a decrease of 2 per cent, and net income $538,824.29, a decrease of 4 per cent. During the year there was expended on additions to physical property $267,688.

"The Wisconsin Gas & Electric Company acquired the property and business of the Kenosha Gas & Electric Company and the Kenosha Electric Railway. All of the bonds of the constituent companies were retired and in place of these bonds there were issued $2,000,000, principal amount, of 5 per cent forty-year first mortgage gold bonds, which the company sold. In addition to this mortgage debt, the company has an issued capitalization consisting of $200,000 of 6 per cent cumulative preferred stock and $1,000,000, par value, of common stock. The operating revenues of the Wisconsin Gas & Electric Company aggregated $683,966, an increase of 17 per cent over those of the companies to which it is successor during the previous year; gross income aggregated $205,665, an increase of 11 per cent; net income $99,692, an increase of 19 per cent. During the year there was expended on additions to physical property $157,205.

"The Mississippi River Power Distributing Company is under contract to purchase from the Mississippi River Power Company and to sell to the Union Electric Light & Power Company and the United Railways, St. Louis, 60,000 hp of Keokuk hydroelectric power. The construction work has so far progressed as to enable the distributing company to receive from the Mississippi River Power Company power at any time the latter may be able to deliver it, and to be in full operation by July 1, the date upon which the power company expects to commence regular delivery of Keokuk hydroelectric power.

"The operating revenues of the United Railways of St. Louis aggregated $12,251,090, an increase of 2.79 per cent over those of 1911; gross income $3,835,284, a decrease of 3.79 per cent; net income $1,139,087, a decrease of 7.27 per cent. The principal causes of the increase in operating expenses are increase in cost of additional electrical power purchased for operation of cars, increases in wages of trainmen and increases in reserves for injuries and damages, taxes and depreciation. During the year there was expended on additions to physical property $130,678.

"During the year the lower court decided the mill tax cases against the company. An appeal from these decisions has been taken to the Supreme Court of Missouri. The company has in its treasury sufficient funds, represented largely by United States government bonds, with which to make payment of accrued mill tax should the court of last resort decide against it.

The income account of the United Railways, St. Louis, for the year ended Dec. 31, 1912, follows:

Operating revenue	$12,251,090
Operating expenses	$6,508,924
Depreciation (reserve credit)	1,319,576
Taxes (reserve credit)	652,222
Net operating revenue	$3,770,367
Non-operating revenue	64,917
Gross income	$3,835,284
Interest charges	2,696,196
Net income	$1,139,087

The income account of The Milwaukee Electric Railway & Light Company, Milwaukee Light, Heat & Traction Company, Wisconsin Gas & Electric Company, Watertown Gas & Electric Company, Burlington Electric Light & Power Company and North Milwaukee Light & Power Company, all subsidiaries of the Wisconsin Edison Company, Inc., for the year ended Dec. 31, 1912, follows, with inter-company dividends eliminated:

Operating revenues	$7,733,150
Operating expenses	$3,998,479
Maintenance and depreciation (reserve credit)	768,811
Taxes (reserve credit)	516,278
Net operating revenues	$2,449,581
Non-operating revenues	48,197
Gross income	$2,497,779
Interest charges	1,507,574
Net income	$990,204
Preferred stock dividends	275,500
Balance	$714,704

Winnipeg Electric Railway

The statement of earnings of the Winnipeg (Man.) Electric Railway for the year ended Dec. 31, 1912, follows:

Gross earnings	$3,765,384	
Gross expenses	2,004,148	
Net earnings for year		$1,761,236
Fixed charges	$566,773	
Dividends	720,000	
		1,286,773
Surplus for year		$474,463

William MacKenzie, the president, said in part in the report:

"Your directors beg to submit a statement of the past year's business, showing gross earnings of $3,765,384, as compared with $3,829,749 last year.

'After providing for the percentage on earnings accrued to the city and interest on bonds, your directors declared four quarterly dividends, amounting to $720,000, leaving a surplus of $474,463, which has been transferred to the credit of profit and loss account, making a total credit to this account to Dec. 31, 1912, of $2,091,236.

"In accordance with the plan of extensions adopted at the last annual meeting, the following improvements and additions to the company's equipment and system have been made in the various departments.

"Track and Roadbed.—9.235 miles of track was laid as follows: 6.92 miles with 80-lb. rails with concrete foundation and asphalt pavement; 2.157 miles with gravel ballast; 0.158 mile with creosote block pavement. Rolling Stock.—Thirty-three large double-truck closed motor cars with wide vestibules, equipped with air brakes and all other modern appliances to insure the comfort and safety of passengers and trainmen, were constructed in the company's Winnipeg shops and put in service. Two new snow sweepers and one 5000-gal. pneumatic street sprinkler were purchased and put in service.

"Owing to the increase in the company's business, the directors thought it advisable for the company to secure its own office premises and therefore purchased a lot on the corner of Notre Dame Avenue and Albert Street, in the heart of Winnipeg, and on June 13 commenced the construction of a fully modern ten-story fireproof office building. The company will use the basement and two first floors for its offices, the remainder will be rented, and on account of the great demand for office space it is estimated that the rentals received from the building will make it self-sustaining. The company expects its portion of the building to be ready for occupation by April 1, and the portion to be rented by May 1, 1913."

Ardmore (Okla.) Traction Company.—On June 15, 1913, the property of the Ardmore Traction Company will be sold at public auction by the receiver for cash. The property consists of 4.7 miles of trackage, including 1 mile in paved district, the paving being paid for; five standard cars, a fifty-year franchise, amusement and baseball park and approximately 190 acres of townsite property adjoining the city intersected by cars in operation. C. L. Byrne is the receiver of the company.

Bay State Street Railway, Boston, Mass.—William A. Read & Company, Boston, have purchased $266,000 of Boston & Northern Street Railway 4 per cent bonds, due in 1954, and $163,000 of Old Colony Street Railway 4 per cent bonds, due in 1954, authorized recently by the Railroad Commission of Massachusetts.

Belt Line Railway Corporation, New York, N. Y.—The Belt Line Railway Corporation has filed its new mortgage in favor of the Central Trust Company, New York, N. Y., to secure an authorized issue of $4,000,000 of thirty-year 5 per cent gold bonds. The present issue is $1,750,000.

Central Illinois Public Service Company, Mattoon, Ill.—F. S. Peabody has been elected vice-president of the Central Illinois Public Service Company to succeed C. H. Cox. R. B. Donnelly, treasurer, has also been made secretary, succeeding E. C. Beatty, who becomes assistant secretary. Samuel Insull, chairman; A. J. Authenreith, George W. Hamilton, Martin J. Insull and F. S. Peabody have been elected directors to succeed L. F. Ter Bush, C. H. Cox and A. J. Stahl.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—The Charleston-Isle of Palms Traction Company is reported to have taken over the Seashore division of the Charleston Consolidated Railway & Lighting Company on March 15, 1913, at midnight. The Seashore division of the company has been operated since Feb. 1, 1913, for the account of the Charleston-Isle of Palms Traction Company, pending the settlement of details connected with securing a release of the property embraced in the division from the trustees of the mortgage.

Georgia Railway & Electric Company, Atlanta, Ga.—Charles H. Harrison, Jr., & Company, Philadelphia, Pa., are placing at 98½ and interest, yielding about 5.10 per cent, their new block of $800,000 of refunding and improvement mortgage sinking fund gold bonds of the Georgia Railway & Electric Company, sold to them to pay in part for additions and improvements made during 1912. There are now outstanding $2,801,000 of this issue and $10,524,000 of prior liens.

Kansas City Railway & Light Company, Kansas City, Mo.—The holders of the $10,200,000 of first lien refunding 5 per cent bonds of the Kansas City Railway & Light Company, which mature on May 15, 1913, have been requested to deposit their holdings for mutual protection on or before May 1, 1913, with the New York Trust Company, New York, N. Y., or the Old Colony Trust Company, Boston, Mass. The protective committee for the first lien refunding 5 per cent bonds consists of John B. Dennis, Acosta Nichols, James J. Storrow and Paul M. Warburg, with C. M. Travis as secretary. Mr. Dennis, Mr. Storrow and Mr. Warburg are also members of the committee formed to represent the holders of the notes of the Metropolitan Street Railway.

Lehigh Valley Transit Company, Allentown, Pa.—A large percentage of the stockholders of the Easton Consolidated Electric Company have agreed to accept the offer of the Lehigh Valley Transit Company to purchase the $750,000 of paid-in capital stock of the Easton Consolidated Electric Company at $30.83 per share, payment to be made in 6 per cent collateral trust bonds of the Lehigh Valley Transit Company. The authorized capital stock of the Easton Consolidated Electric Company is $1,500,000, and the par value of the shares is $50.

Montreal (Que.) Tramways.—The directors of the Montreal Tramways announce that a dividend of 5 per cent has been declared on the paid-up capital stock and that a new issue of $1,000,000 of stock at par will be made immediately. The 5 per cent just declared on the outstanding stock is the first dividend distribution to shareholders.

New Hampshire Electric Railways, Haverhill, Mass.—The details have all been concluded in connection with the plan to consolidate the seven Massachusetts and the three New Hampshire subsidiary companies of the New Hampshire Electric Railways. The necessary legislation was obtained last year and the plan to consolidate the companies was referred to in the Electric Railway Journal of July 6, 1912.

New York, Auburn & Lansing Railroad, Ithaca, N. Y.—The hearing before the Public Service Commission of the Second District of New York on the application for the approval of a plan of reorganization for the New York, Auburn & Lansing Railroad, proposed by the reorganization committee of bondholders of the company and bondholders of the Ithaca Street Railway, will be continued at Ithaca on April 24. The plan of reorganization provides for a successor company to take over the properties after foreclosure sale, the new company to be authorized to issue new securities as follows: $1,450,000 of cumulative preferred stock to be exchanged dollar for dollar for such of the $475,000 of consolidated 5 per cent bonds of the Ithaca Street Railway and the $975,000 of the first mortgage bonds of the New York, Auburn & Lansing Railroad as shall assent to the plan; $1,000,000 of common stock to be sold along with the $900,000 of new bonds, and $4,000,000 of first and refunding 5 per cent gold bonds, of which $900,000 will be sold forthwith and $310,000 reserved to retire at maturity $275,000 of underlying bonds of the Ithaca Street Railway. Of the first and refunding 5 per cent gold bonds $2,000,000 will also be held to provide for future extensions and additions. The proceeds of the immediate issue of $900,000 of bonds are to be used to take up the receiver's certificates and to cover the cost of reorganization, etc. The reorganization committee consists of H. W. Fitz, Pawtucket, R. I., chairman; Edward Gunster, Wilkes-Barre, Pa.; J. H. Caldwell, Troy, N. Y.; Howard Bayne and A. H. Flynn, New York, N. Y.; U. R. Chaplin, Bangor, Maine, and Jared T. Newman, Ithaca, N. Y.

New York, Westchester & Boston Railway, New York, N. Y.—De Witt Cuyler and George F. Baker have been elected directors of the New York, Westchester & Boston Railway to succeed Lewis Cass Ledyard and G. M. Miller.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—A. B. Leach & Company, New York, N. Y., who have in the past sold a considerable amount of the bonds of the Omaha & Council Bluffs Street Railway, carried an advertisement in the principal daily papers in New York recently giving a statement of the damage to the property of the railway so as to relieve the bondholders of any anxiety respecting their investment. The statement follows: to overhead construction, $10,000; to cars, $2,500; to shops, $1,000; to expense of clearing tracks, $1,500; total, $15,000. According to Leach & Company, the receipts of the railway for the first seven days following the tornado show an increase of approximately $18,000 over the corresponding week of last year, or $15,000 above normal. The damage at Omaha was referred to at length in the Electric Railway Journal of April 5, 1913, page 638.

Port Arthur & Fort William Electric Railway, Port Arthur, Ont.—The city of Fort William will take over on Dec. 1, 1913, the portion of the lines of the Port Arthur & Fort William Electric Railway within its own borders now operated by a joint commission with Port Arthur. The lines to be taken over are 14.875 miles. The remaining mileage, 10.45, is within the boundary of Port Arthur. After the date mentioned each city will operate the lines within its own boundary and the present joint commission will be dissolved.

Rock Island (Ill.) Southern Railway.—It is reported that the Rock Island Southern Railway is negotiating with the People's Traction Company for the purchase of the interurban electric railway between Galesburg and Knoxville.

Seattle, Renton & Southern Railway, Seattle, Wash.—On April 30, 1912, William R. Crawford, former president of the Seattle, Renton & Southern Railway, brought suit against the company and Peabody, Houghteling & Company, Chicago, asking for a receiver for the railway and for damages from Peabody, Houghteling & Company on the ground of conspiracy and fraud. The suit was tried during February and March, 1913, before Judge Kauffman, in the Superior Court of King County, Washington, who has rendered an opinion which he concludes as follows: "It is my opinion that Peabody, Houghteling & Company have acted with the richest good faith toward Mr. Crawford and this property; that the charges of fraud have not been proved, but on the contrary have been overwhelmingly disproved; that they do not now want the property and never have wanted it; that their only object throughout their entire connection with this property has been to help it pay its debts and to this end they have devoted their time, their efforts and their money, and that this suit is unwarranted and should never have been brought. Let judgment and decree be drawn and entered accordingly." The court has since ordered the sale of the property of the railway by the receivers appointed by the State courts.

Third Avenue Railway, New York, N. Y.—The Third Avenue Railway has applied to the Public Service Commission for the First District of New York for permission to purchase the entire capital stock of the Third Avenue Bridge Company, which operates cars over the Queensboro Bridge. The Bridge company was organized by Third Avenue Railway interests with a capital stock of $20,000. The construction and equipment of the road cost the Third Avenue Railway more than $100,000, and the Third Avenue Bridge Company now proposes to give its note to the Third Avenue Railway for the amount due and the Third Avenue Company proposes to acquire all the stock of the bridge company and to operate the road of the latter as a part of the Third Avenue system.

Toledo Railways & Light Company, Toledo, Ohio.—At a meeting of the directors of the Toledo Railways & Light Company held on April 3, 1913, Morris Allen was elected president and L. E. Beilstein general manager of the company, to succeed F. R. Coates, who remains a director. Mr. Allen is an attorney at Toledo and son-in-law of Barton Smith, counsel for the company and attorney for the stockholders' reorganization committee. It is said that the action taken at the directors' meeting was contrary to the advice of Henry L. Doherty & Company, representing more than 80 per cent of the stock of the company. Rumor has it that a difference arose between the attorneys of the bondholders' and the stockholders' reorganization committees, and that Henry L. Doherty & Company, as representatives of the new interests, have declined to take part in the controversy. This action has nothing to do with the ownership of control of the Toledo company or with the eventual operation of the property by Henry L. Doherty & Company.

West Shore Electric Railway, Goderich, Ont.—The municipalities of Goderich, Ashfield, Huron and Kincardine in Huron County, Ont., purpose to apply to the Ontario Railway & Municipal Board to have the West Shore Electric Railway turned over to them. The West Shore Electric Railway was to extend from Goderich to Kincardine, a distance of 35 miles. It received a charter in 1902 and the company says that $797,550 was spent on construction and equipment. The municipalities mentioned guaranteed bonds of the company to the extent of $400,000, all of which have been sold and the interest has become a charge on the municipalities.

Dividends Declared

Brooklyn (N. Y.) City Railroad, 2 per cent, quarterly.

Dallas (Tex.) Electric Corporation, 3 per cent, first preferred; 2½ per cent, second preferred.

Fort Smith Light & Traction Company, Fort Smith, Ark., quarterly, 1¾ per cent, preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, quarterly, 1¼ per cent, preferred; 1 per cent, common.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1 per cent, common.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1¼ per cent, common.

Ottawa (Ont.) Electric Railway, 3 per cent, quarterly.

Stark Electric Railroad, Alliance, Ohio, quarterly, ¾ of 1 per cent.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BATON ROUGE (LA.) ELECTRIC COMPANY							
1m.,	Jan.,	'13	$13,427	*$8,472	$4,955	$1,734	$3,221
1 “	“	'12	12,161	*6,313	5,848	1,730	3,118
12 “	“	'13	148,647	*90,065	58,582	20,772	37,810
12 “	“	'12	121,801	*76,039	45,761	20,719	25,042
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.							
1m.,	Jan.,	'13	$7,873	*$7,190	$683	$1,091	$408
1 “	“	'12	7,163	*6,878	285	1,055	770
12 “	“	'13	120,718	*91,184	29,534	12,590	16,944
12 “	“	'12	118,893	*90,975	27,918	12,850	15,068
CAPE BRETON ELECTRIC COMPANY, SYDNEY, N. S.							
1m.,	Jan.,	'13	$31,835	*$17,760	$14,075	$5,823	$8,252
1 “	“	'12	28,327	*17,495	10,832	5,636	5,196
12 “	“	'13	363,685	*195,146	168,539	68,292	100,247
12 “	“	'12	336,439	*183,969	154,470	67,811	86,659
COLUMBUS (GA.) ELECTRIC COMPANY							
1m.,	Jan.,	'13	$57,598	*$27,514	$23,008	$19,919	$3,089
1 “	“	'12	50,107	*23,579	20,736	18,408	2,328
12 “	“	'13	620,848	*272,964	274,607	228,274	46,333
12 “	“	'12	564,072	*248,413	249,189	193,255	55,934
DALLAS (TEX.) ELECTRIC CORPORATION							
1m.,	Jan.,	'13	$170,815	*$106,094	$64,721	$23,635	$40,086
1 “	“	'12	135,170	*86,242	48,929	19,614	29,315
12 “	“	'13	1,857,207	*1,112,647	744,560	295,278	449,282
12 “	“	'12	1,632,281	*1,105,548	526,734	244,035	282,698
EL PASO (TEX.) ELECTRIC COMPANY							
1m.,	Jan.,	'13	$80,922	*$41,843	$39,079	$1,971	$37,108
1 “	“	'12	69,775	*35,619	34,156	7,156	27,000
12 “	“	'13	804,466	*436,441	368,025	64,477	303,548
12 “	“	'12	699,613	*406,888	292,725	81,705	211,020
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.							
1m.,	Jan.,	'13	$169,615	*$105,104	$64,491	$33,660	$30,831
1 “	“	'12	146,007	*90,736	55,271	34,119	21,152
12 “	“	'13	2,051,265	*1,197,070	854,195	405,197	448,998
12 “	“	'12	1,558,010	*978,121	579,889	245,328	334,561
HOUGHTON (MICH.) COUNTY TRACTION COMPANY							
1m.,	Jan.,	'13	$24,379	*$15,776	$8,603	$5,752	$2,851
1 “	“	'12	22,125	*18,345	3,781	5,227	†1,446
12 “	“	'13	309,760	*172,166	137,593	67,758	69,835
12 “	“	'12	299,832	*179,445	120,387	62,703	57,684

*Includes taxes. †Deficit.

Traffic and Transportation

Decision by I. C. C. in Case Affecting the Washington, Baltimore & Annapolis Electric Railway

The Interstate Commerce Commission has dismissed the complaint of the Cal Hirsch & Sons Iron & Rail Company against the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., submitted on Jan. 16, 1913. The report of the commission follows:

"Complainant, a corporation, deals in railway material and scrap iron at St. Louis, Mo. By petition, filed May 31, 1912, it alleges that the defendants assessed unreasonable charges for the transportation of a less-than-carload shipment consisting of school desks, high stools, iron legs for desks, tin typewriter covers, copy presses and stands and rolls of cocoa matting, from Annapolis, Md., to East St. Louis, Ill. The establishment of a reasonable rate for the future and reparation are asked.

"Complainant purchased the articles comprising the shipment at Annapolis at a sale of condemned government property. The goods were shipped in the name of the drayman who delivered them to the carrier, and the several articles were specified in the bill of lading. Defendants assessed charges, based upon the first-class rates of 7½ cents from Annapolis to Odenton, Md., and 70 cents from Odenton to East St. Louis, aggregating 77½ cents, which have not been paid by complainant.

"It is the contention of complainant that the rate on this shipment should not exceed the scrap-iron rate or that a rating lower than first-class should be made applicable to condemned government stores. In answer to the first contention it is to be said that the shipment did not consist of scrap iron. It was more nearly analogous to second-hand furniture or household goods. Had the household goods rating been applied, however, the charges would have been the same as those assessed.

"Complainant also contends that the defendants should establish a rate on condemned government stores not exceeding fourth-class in less than carloads from and to the points involved, and that their failure to do so resulted in unreasonable charges. The basis of this contention seems to be that the articles are second-hand and worth less than new goods of the same kind. It is obvious that application of a different rating to new and second-hand articles of the same kind would be impracticable. (Whitcomb v. C & N. W. Ry., 15 I. C. C., 27.) The evidence shows that the shipment in question is the first one of the kind ever made from Annapolis, and that there has never before been a demand for a specific rate on condemned stores from that point. It appears that from Rock Island, Ill., where there is a government arsenal, lower rates are made to Chicago, Ill., and St. Louis, Mo., on condemned government ordnance than apply on new articles of the same kind. The purpose appears to be to provide low rates for shipments of condemned arms, cannon, etc., which are bought for the purpose of reducing the articles to junk.

"Under the facts here presented, we are of opinion and find that the rates applicable to the shipment here involved have not been shown to have been unreasonable or otherwise unlawful, and the complaint will be dismissed."

Baggage Checking on the Aurora, Elgin & Chicago Railroad.

The Aurora, Elgin & Chicago Railroad has provided an unusually liberal baggage service, and in an eight-page folder just issued the traffic department has pointed out to patrons the safe and expeditious means of baggage checking which it offers. An arrangement has been made with the United States Express Company whereby a patron may call on an agency for a wagon to be sent to any address for delivery or collection. The ordinary system of checking in baggage transfer is used except that provision is made not only for collection but delivery at destination. The rates charged for this service are 40 cents per 100 lb. for the first 25 miles and 50 cents per 100 lb. for any other point beyond on the company's line.

In calling attention to the reasonable charge for this service the folder states:

"An ordinary trunk weighs from 100 lb. to 150 lb. Transfer charge under old system from or to house to or from railroad station is usually 50 cents at each end of the line, making a total of $1. Under our system this shows a saving of from 25 cents to 50 cents on trunks and a larger amount on suitcases and satchels, to say nothing of the fact that your property is in responsible hands all the time and you are saved trouble as well as expense."

In addition to this service, baggage is received and delivered at points where the express company does not maintain agents. Baggage may be delivered to the railway company's express or compartment cars at stations, and it is then forwarded promptly at a rate of 25 cents per piece. Under this system the owner of the baggage arranges for pick-up and delivery in the same manner as if traveling by a steam railroad.

Reduction on Fare by the Jamestown Street Railway.—The Jamestown (N. Y.) Street Railway has agreed to double-track its Lakewood line and reduce the fare between the western limits of Lakewood and Jamestown from 10 cents to 5 cents.

Ban on Roller Skates in Louisville.—The Louisville (Ky.) Railway has posted an order in all its cars forbidding anyone wearing roller skates to enter the company's cars. This is a precautionary measure to prevent accidents to skaters in boarding and alighting from cars.

Abandonment of Part of Line Authorized.—The Public Service Commission of the Second District of New York has consented to the abandonment of a part of the Binghamton Railway Company's line on Eldridge Street between Chenango and State Streets, Binghamton. There was no opposition to the granting of this application.

Restoration of Stops to Be Asked.—Councilman Moylan will ask that all original stops be restored by the Cleveland (Ohio) Railway on the West Fourteenth Street line between the Central viaduct and Scranton Road. The destruction of the West Third Street bridge by the flood and other damages make the restoration of the stops necessary to furnish proper service, according to Mr. Moylan.

"Safety First" Meeting Postponed.—The meeting of employees of the Louisville & Northern Railway & Lighting Company of New Albany, Ind., at which Alexander Shane, of Chicago, was to explain the idea back of the "Safety First" campaign was postponed on March 31, both on account of the absence of Mr. Shane from the scene and the enforced overtime labor of the L. & N. crews during flood time.

Seeing the Flood at Louisville by Electric Railway.—Thousands viewed the early April flood in the Ohio River at the falls via the "Big Red Car," which is run by the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company. The flood at Louisville, Ky., and New Albany and Jeffersonville, Ind., was the worst since 1884. The electric railways pointed out through the newspapers that a round trip of the three cities on the "Big Red Car" at a total cost of 20 cents afforded the best and safest view of the flooded falls.

Advance in Wages of Platform Men at Akron.—Charles Currie, general manager of the Northern Ohio Traction & Light Company, Akron, Ohio, has announced an advance in wages of 1 cent an hour for the new men and 2 cents an hour for those who have been in the service for some time. The new scale is as follows: First year, 23 cents an hour; second year, 24 cents; third year, 25 cents; fourth year, 26 cents; fifth year, 27 cents; sixth year and thereafter, 29 cents. The scale for those employed on city cars is 1 cent less than that of the men on the interurban lines, except the maximum, which is 2 cents less.

New Fare Collecting System in Helena.—The Interurban Railway, Helena, Mont., carried a card 7 in. wide by 13½ in. high in the Helena *World* recently, announcing the installation on all of its cars on March 30 of the Rooke system of fare collection. The advertisement was concluded in part as follows: "This system is identical with collection principles on pre-payment cars. Please have your nickels ready. Read the notice posted in our cars. The passenger tendering 5 pennies will be handed a nickel in exchange, for insertion. Metal tickets will be inserted the same as nickels."

London & Port Stanley Railway Electrification.—The City Council of London has decided to submit the question of the electrification of the line to the people at the earliest possible date. Application has been made to the Ontario Legislature by the city for power to lease the line, to authorize its electrification and to operate it by commission or otherwise, after the passing of the necessary by-laws. The Council had previously referred to its finance committee a motion to authorize the city to apply to Parliament for an act which would enable the city to foreclose the mortgage which it holds secured by property of the company.

Apprehending "Dips" on New York Railways.—Secret service men in the employ of the Interborough Rapid Transit Company, New York, N. Y., have succeeded in apprehending and convicting a considerable number of criminals lately. From July 1, 1911, to March 17, 1912, thirty-four pickpockets were arrested by special officers. Thirty-six were sent to State prison for terms ranging from one year to twelve years. The Grand Jury failed to indict four and four were acquitted. From March, 1912, up to and including April 4, 1913, twenty-three pickpockets were arrested on property of the company by the company's detectives. Seventeen were convicted, three were discharged and three are now under bail awaiting proceedings.

Report on Lockport Accident.—In the report of the chief inspector of safety appliances on the investigation of the accident on the International Railway near Lockport, N. Y., on Jan. 25, 1913, the Interstate Commerce Commission lays the blame on Motorman Mack, who was killed in the accident, and who failed to see and obey stop signals given by a flagman who was back a distance sufficient to protect his train had his stop signals been observed and obeyed. Motorman Mack also failed to obey the rule providing that all trains must reduce speed and be under full control in yard limits. The commission recommends that the rules require the use of torpedoes in signaling under all conditions, saying that if trainmen are asleep the detonation of the torpedoes will awake them in time to avert collision.

Interurban Terminal Plans at Nashville.—At a recent conference between H. H. Mayberry, president of the Nashville-Gallatin Interurban Railway, Nashville, Tenn., and Percy Warner, president of the Nashville Railway & Light Company, it was decided that the interurban railway should use the transfer station of the Nashville Railway & Light Company and that the Nashville Railway & Light Company will pay 3 per cent of the gross receipts from this service to the municipality. It is expected that only temporary use of the transfer station will be made by the interurban railway, as Mr. Mayberry is considering plans for a terminal station in Nashville suitable for the use of the two existing interurban lines and the proposed line of the Nashville-Gallatin company to Murfreesboro and Woodbury, Tenn.

Train Schedule Held to Be a Contract.—The Northern Central Railway has been ordered by the Public Service Commission of Maryland to cease sidetracking local trains in order to give the right-of-way to through trains which have been delayed. The commission holds that local trains, of right, should be operated upon their published schedule, and that halting the schedule of locals, occasioned by giving the track to delayed through trains, is discriminatory and unjust. The decision does not apply to those sidetrackings of local for through trains which are provided for in the schedules of the local train. Philip D. Laird, chairman of the commission, who wrote the opinion in the case, says: "The position of this commission is that the train schedule published by the railway is the contract which the company makes with the public to place it at destination at a given time. The schedule is arranged to provide for through traffic and local traffic, and if the proper and necessary running time of the respective kinds of traffic is maintained there is no interference with either. The time allotted to a particular train belongs to it to the exclusion of all others, and the passengers on that train are entitled to be carried to their detsination upon the schedule time. The fact that a through train is late does not give its passengers a right to consume the time assigned to a local train and subject the passengers on the latter to inconvenience."

Personal Mention

Dr. Eugene F. Roeber, editor of *Metallurgical and Chemical Engineering*, one of the McGraw papers, has just been elected president of the Electrochemical Society.

Mr. Frank B. Schneider, formerly general passenger agent of the Galveston-Houston Electric Railway, Galveston, Tex., has been promoted to the position of clerk to Mr. E. T. Moore, representing Stone & Webster in Dallas.

Mr. Fred Buffe, manager of the publicity department of the Illinois Traction System, Peoria, Ill., and Mr. Fred A. Stowe, general agent of the company at Chicago, resigned, effective on April 1, to become part owners of the Peoria *Herald-Transcript*.

Mr. George W. Esslinger has been appointed chief engineer of the Lackawanna & Wyoming Valley Power Company, Scranton, Pa,. vice Mr. O. D. Havard, resigned, to engage in manufacturing. Mr. Esslinger will have charge of power station, substations and electric line.

Mr. A. A. Anderson, formerly general manager of the Springfield (Ill.) Consolidated Railway, the entire stock of which is owned by the Springfield Railway & Light Company, has become associated with the Middle West Utilities Company, Chicago, Ill., with offices in the Merchants' Loan & Trust Building, that city.

Mr. H. B. Whitehouse, formerly attached to the claim department of the Boston (Mass.) Elevated Railway and later identified with the claim divisions of accident insurance companies, has accepted the position of claim agent of the New Hampshire Electric Railways, Haverhill, Mass., to succeed the late Edward S. Eells.

Mr. F. W. Sweeny, who has been examiner in charge of the Chicago office of the division of accounts of the Interstate Commerce Commission, has been appointed chief examiner of accounts of the commission to succeed Mr. Charles A. Lutz, resigned, who has become comptroller of the United States Express Company.

Mr. David Daly has been appointed manager of the Galveston-Houston Electric Railway, Galveston, Tex., in addition to manager of the Houston Electric Company. Mr. Daly succeeds with the Galveston-Houston Electric Railway Mr. L. C. Bradley, who, as previously announced in the ELECTRIC RAILWAY JOURNAL, has assumed the duties of assistant district manager for Stone & Webster in Texas. No successor to Mr. Bradley as manager of the Galveston Electric Company has as yet been appointed.

Mr. Franklin T. Griffith, general attorney of the Portland Railway, Light & Power Company, Portland, Ore., was on April 8, 1913, elected by the board of directors vice-president of the company and on July 1 will succeed Mr. B. S. Josselyn, resigned, as president of the company. Mr. Griffith has been a resident of Oregon for twenty-two years and has practised law there for that length of time. He has been connected with the Portland Railway, Light & Power Company and its subsidiaries for nineteen years. He is forty-three years of age and is one of the most prominent men in the State. On account of his long connection with the company he is thoroughly acquainted with its policies and operating methods.

Col. Timothy S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, was the guest of honor at a banquet at the Hamilton Club, Brooklyn, on the evening of March 26, 1913. The speakers, in addition to Colonel Williams himself, were Borough President George McAneny of Manhattan; Mr. Lewis H. Pounds, Commissioner of Public Works of Brooklyn; General George W. Wingate, counsel for the Long Island Railroad, and Public Service Commissioner George V. S. Williams. Mr. Frank Lyman, president of the Hamilton Club, under whose auspices the dinner was given, acted as toastmaster. Among the guests were Mr. C. D. Meneely, Mr. W. O. Wood, Mr. G. D. Yeomans, Mr. J. F. Calderwood, Mr. J. T. Crabbs, Mr. George S. Coleman, Mr. C. L. Rossiter, Mr. J. L. Greatsinger, Mr. S. W. Huff, Mr. H. A. Bullock, Mr. A. M. Williams, Mr. A. R. Piper, Mr. W. S. Menden, Mr. C. L. Crabbs and Mr. Lincoln Van Cott.

Mr. S. W. Barnes, whose appointment as traffic manager of the Central California Traction Company, Stockton, Cal., was noted in the ELECTRIC RAILWAY JOURNAL of March 22, 1913, began his career with the Santa Fé Railroad and was connected with both the traffic and operating departments of that company from 1891 to 1900. In 1900 he was appointed to the traffic department as traveling freight and passenger agent and later served as contracting freight agent. During 1907, 1908 and 1909 Mr. Barnes engaged in work other than railroading, but he returned to the railroad field with the traffic department of the Tonopah & Tidewater Railroad. In February, 1910, he accepted the position of chief clerk to the traffic manager of the Las Vegas & Tonopah Railroad, which position he held until July, 1911, when he was appointed general agent of the Tonopah & Tidewater Railroad at Los Angeles. He continued in the last-mentioned position until his appointment to the Central California Traction Company. With the exception of the short time that he was in Nevada, all of Mr. Barnes' railroading has been in California.

Mr. E. H. McHenry has resigned as vice-president of the New York, New Haven & Hartford Railroad and as vice-president of the Connecticut Company and other affiliated companies. Mr. McHenry began his railroad work as a civil engineer on the Northern Pacific Railroad in 1883, rising by successive promotions until he became chief engineer of the company. He was receiver of the company through the two-year period of its reorganization and was later chief engineer of the reorganized company. In 1902 he became chief engineer of the Canadian Pacific Railway but resigned from the company two years later to become connected with the New York, New Haven & Hartford Railroad. He has had charge of engineering, maintenance and construction work of the New York, New Haven & Hartford Railroad, including the original electrification work between New York and Stamford and the extension of the electric zone from Stamford to New Haven, which work is now under way. Mr. McHenry's resignation takes effect on May 1. It is understood that the duties which he performed with the company will be divided following his retirement from the company.

Mr. Mason D. Pratt has been appointed to the United Railways & Electric Company, Baltimore, Md., as engineer under Mr. J. M. Hood, Jr., consulting engineer of the company. Mr. Pratt was graduated from Lehigh University with the class of 1887 and was for a time after graduation a draftsman with the Phœnix Bridge Company. He afterward became associated with the Johnson Company at Johnstown, Pa., which later became the Lorain Steel Company. He served this company first as designing engineer on the new mill buildings at Moxham and later as engineer in charge of construction of electric railroads at Lancaster, Pa., and Washington, D. C. In 1889 he became assistant engineer under Mr. M. Tschirgi at Dubuque, Ia., where he had supervision of much municipal work, including the construction of a complete system of sewers. Mr. Pratt was connected for thirteen years with the Pennsylvania Steel Company, first as street railway engineer and later as engineer in charge of construction of new shops for the frog and switch department of the company. He was also a member of the water board of Steelton. In 1904 he opened an office as consulting engineer at Harrisburg, Pa., prepared to make surveys, plans and specifications for the construction of electric railways, power plants, water works, etc.

Mr. B. S. Josselyn, who is to retire on July 1, 1913, as president of the Portland Railway, Light & Power Company, and Mr. C. M. Clark, chairman of the board of directors of the company, had a testimonial luncheon at the Commercial Club, Portland, tendered to them recently by the other officers of the company and about 200 business men of that city. In replying to Mr. Edgar B. Piper, president of the Commercial Club, who acted as toastmaster, Mr. Josselyn said: "In winding up the work in which I have been engaged for the last six years, it is worth more than anything else to feel that I hold the respect and confidence of the entire community." Following the resignation of Mr. Josselyn Mr. Clark said: "I wish to express the most sincere appreciation of the service Mr. Josselyn has rendered to this company, with unfailing devotion and industry, over a period of almost six years. It is rarely in the history of any man's business career that he is called upon to concentrate in any six years such an amount of difficult work as has fallen to Mr. Josselyn's lot in handling the affairs of this company since he took charge in July, 1907. Whatever success may have come in the upbuilding and development of the company's property and business it is largely due to his devoted efforts." The Portland *Journal* in a recent issue contained an editorial headed "Benage S. Josselyn," in which it reviewed the progress of the company during the last six years under Mr. Josselyn and referred particularly to his interest in the employees and the steps taken by him in their behalf. This editorial it concluded as follows: "It is satisfactory to know that in his intended resignation of the presidency of the Portland Railway, Light & Power Company Mr. Josselyn's citizenship and residence here and his interest in Oregon will not be severed. He has been in the past and, it is hoped, will be in the future an important factor in the development of the State."

H. C. Donecker

Mr. H. C. Donecker, who since February, 1910, has been secretary of the American Electric Railway Association, has accepted the position of assistant general manager of the Public Service Railway, Newark, N. J. His resignation from the association will take effect on July 1, but by special arrangement with President McCarter of the Public Service Railway he will continue in charge of association matters until after the next convention and will give as much time to this work as may be necessary. Mr. Donecker has been a most efficient secretary and during his occupancy of the office which he has just resigned the association has gained rapidly in prestige and work accomplished. Previous to his appointment as secretary he had been office manager of the association for two years so that he was well acquainted with the needs of the organization. He has been engaged in the electric railway field since 1890. In that year he entered the employ of the Johnson Company, Philadelphia and Johnstown, later the Lorain Steel Company. Four years later, or in 1894, he became associated with Tom L. Johnson, Cleveland, and his brother, Albert L. Johnson, in the construction and operation of the Nassau Railroad, Brooklyn, N. Y., and in 1899 entered the employ of the St. Louis (Mo.) Transit Company under Mr. J. J. Coleman, general manager of the company. In 1900 Mr. Donecker became connected with Col. Giles S. Allison of the Security Register Company, St. Louis, Mo., with whom he remained until 1906, when he entered the employ of Ford, Bacon & Davis, New York, N. Y., where his work was largely the compilation and classification of electric railway financial statistics. The office to which Mr. Donecker has been appointed is a new one on the Public Service Railway.

OBITUARY

William Belden Reed, Jr., treasurer of the Miller-Reed Company, New York, N. Y., and vice-president of the Otsego & Herkimer Railroad, Cooperstown, N. Y., is dead. Mr. Reed was born in 1876 and was graduated from Princeton University in 1896. For a few months he was with Mr. William B. Parsons, consulting engineer, New York, after which he spent a year with the Metropolitan Street Railway, New York, as rodman and leveler. Subsequently he was connected with the New York & Pennsylvania Brick, Tile & Terra Cotta Company and the Terry & Tench Construction Company, but returned to the Metropolitan Street Railway as assistant to the engineer of maintenance of way in 1899 and 1900 under Mr. W. Boardman Reed, engineer of maintenance of way. In 1901 he was elected vice-president of the White Manufacturing Company, New York, and in 1906 he was elected vice-president and treasurer of the White Plains Construction Company, White Plains, N. Y. This last position he held until his association a few months ago with the Miller-Reed Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Edmonton, Stony Plain & Wabamun Railway, Edmonton, Alta.**—Incorporated in Alberta to build an electric railway from Edmonton to Stony Plain, thence to the shores of Lake Wabamun. Directors: A. Boileau, E. S. McQuaid, Edmonton, Alta., and A. V. Pujebet, Paris, France.

***Tramways Company, Ltd., Edmonton, Alta.**—Incorporated in Alberta to build the following lines: From Edmonton northerly to Bon Accord, with a branch to Fort Saskatchewan Settlement; from Edmonton northeasterly to Fort Saskatchewan Settlement, and from Edmonton easterly and northerly on the south bank of the Saskatchewan River to Fort Saskatchewan Settlement, with branch lines not exceeding in any one case 6 miles in length. The provisional directors are: G. Cresswell, S. Carson, W. Golley and S. H. Smith, Edmonton, Alta.

Lewiston-Clarkston Valley Railway, Lewiston, Idaho.—Incorporated in Idaho to build an electric railway to connect Lewiston, Idaho, and Clarkston and Asotin, Wash. Capital stock, $1,000,000. Incorporators: F. L. Sturm, C. F. Osners, S. L. Alford, J. E. Nickerson, Lewiston, Idaho, and J. E. Hoober, Clarkston, and E. S. Florence, Asotin, Wash. [E. R. J., March 15, '13.]

***Benwah Railway, St. Marie's, Idaho.**—Incorporated in Idaho to build an interurban railway with about 10 miles of main track and about 18 or 20 miles of branch lines in the Benwah country, near to Benwah Lake. Capital stock, $25,000. Incorporators: William A. Monroe, Spokane, and S. Parker and H. H. Boomer, St. Marie's.

***Monroe, Louisiana & Gulf Railway, Monroe, La.**—Chartered in Louisiana to build an interurban railway from Monroe in a southwesterly direction to Winnfield. Capital stock, $1,000,000. Officers: J. M. Parker, New Orleans, president; T. J. Sheldon, vice-president, and Percy Sandel, secretary and treasurer.

Portage Radial Railway & Canal Company, Portage la Prairie, Man.—Incorporated in Manitoba to build a railway from Portage la Prairie to Winnipeg; from Portage la Prairie to Delta, all in Manitoba, with branch lines, and a canal from Lake Manitoba through the municipality of Portage la Prairie to the Assiniboine River. The company may develop and distribute hydroelectric power and use the same, steam or any other motive power for the operation of its railway. The provisional directors are: W. Richardson, H. Stephens, F. G. Taylor, Portage la Prairie; B. L. Grant, St. Francis Xavier; A. H. Oakes, Winnipeg.

***Belmont & Northern Traction Company, Lincoln, Neb.**—Incorporated in Nebraska to build a 3-mile electric railway from Thirteenth Street and P Street in Lincoln to Belmont. Capital stock, $40,000.

***Wilmington-Carolina Beach Railway, Wilmington, N. C.**—Incorporated in North Carolina to build a 15-mile railway between Wilmington and Ocean Beach. Construction will be begun within the next six months. Incorporators: Iredell Meares, George F. Meares and William H. Green.

Chambersburg & Shippensburg Railway, Shippensburg, Pa.—Chartered in Pennsylvania to build a 9-mile electric railway between Shippensburg and Chambersburg. Capital stock, $250,000. T. M. Mahon, Chambersburg, president. [E. R. J., March 8, '13.]

FRANCHISES

Birmingham, Ala.—The Birmingham Railway, Light & Power Company has received three franchises from the Council to extend the Norwood, Lewisburg and West End lines in Birmingham.

Lethbridge, Alta.—The Lethbridge Municipal Railway has asked the City Council for a franchise to build 4 miles of new track in Lethbridge.

Corona, Cal.—The Pacific Electric Railway has asked the Council for a franchise over Third Street in Corona.

Los Angeles, Cal.—The Los Angeles Railway has received a franchise from the Council for an extension of its West Tenth Street line in Los Angeles.

Shreveport, La.—The Shreveport Traction Company has received an extension of time on its franchises in Shreveport, so that all its franchises will expire in 1954. In return for these extensions the company is to build a double-track line to the main entrance of the State Fair grounds and will connect the Highland Park line with the double track on Texas Street in Shreveport.

***Lincoln, Neb.**—The Belmont & Northern Traction Company, the incorporation of which is noted elsewhere in this issue, has received a franchise from the Council for a 3-mile line from Thirteenth Street and P Street in Lincoln to Belmont.

St. John, N. B.—The St. John Railway has asked the City Council for a franchise to extend and double-track some of its lines in St. John.

McGregorville, N. H.—The Manchester Street Railway has asked the Council for a franchise to double-track its lines on the West Side in McGregorville.

Syracuse, N. Y.—The Public Service Commission, Second District, has granted its approval of the construction by the New York State Railways of additional tracks in Syracuse, consisting of an additional single-track railway in certain portions of South Crouse Avenue and also of a double-track railway to begin at the intersection of South Crouse Avenue and University Place and there to connect with the present single track and the proposed additional track in South Crouse Avenue, thence extending westerly in University Place to Irving Avenue, and from thence southerly in Irving Avenue, a distance of 1625 ft.

***Hamilton, Ont.**—The Hamilton Incline Railway has asked the City Council for a franchise to build an inclined railway from Wentworth Street, Hamilton, to the top of the mountain. The gradient will be 35 ft. x 100 ft., and the line will be equipped to carry electric cars, as well as vehicles and pedestrians.

Medford, Ore.—The interurban franchise granted to M. T. Minney, Oakland, last January by the city of Medford has been transferred by that company to F. B. Waite, Roseburg, Ore., and associates. The new company will carry out the proposed improvements of the old company and will immediately begin the construction of an electric railway from Medford to Ashland. The company also contemplates the purchase and electrification of the Barnum Railroad to Jacksonville. [E. R. J., March 8, '13.]

Salt Lake City, Utah.—The Utah Light & Railway Company has accepted the franchise granted it by the Council for a line north on Beck Street from the Warm Springs to the Davis County boundary line.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has accepted the franchise granted it for the extension of the Kinnear Park line and has announced that work on the extension will be begun at once.

Morgantown, W. Va.—The Morgantown Interurban Railway has received a thirty-nine-year franchise from the Council for a line to connect Morgantown with Point Marion. This line will connect Morgantown, Point Marion and Star City. J. H. McDermott, president. [E. R. J., Dec. 14, '12.]

TRACK AND ROADWAY

Birmingham & Gulf Railway & Navigation Company, Tuscaloosa, Ala.—A temporary arrangement has been made whereby this company will electrify its line in Tuscaloosa from the Central Foundry Company's plant at Holt. As soon, however, as the company can erect its own power plant it will furnish its own electric power.

Alberta Interurban Railway, Calgary, Alta.—About 20 miles of track will be built by this company during the year.

***East Edmonton, Alta.**—The East Edmonton property owners have formed a permanent organization to further the proposition of a 7-mile electric railway to extend east from Watt Street, in Forest Heights, to Alberta College grounds, thence south to Clover Bar road and east to the Great West coal mine and to Clover Bar Heights and west to meet the city extension south.

International Railway & Development Company, Vancouver, B. C.—Surveys have been completed by this company for a line through the Delta district to New Westminster, B. C. G. R. McDuff, engineer. [E. R. J., Aug. 24, '12.]

Vancouver Island Hydroelectric & Tramway Company, Ltd., Victoria, B. C.—The plans of this company are said to include the construction of a tramway from Nanaimo to Nanoose and Departure Bay on Vancouver Island. It is understood that these two branches, of 16 miles and 3 miles respectively, are to be part of a project to construct 200 miles of railway in the Nanaimo district. [E. R. J., Jan. 11, '13.]

San Joaquin Light & Power Company, Fresno, Cal.—Plans are being considered by this company to extend its railway to the Kern River oil fields and to the new Standard Oil refinery on the north side of the Kern River.

Glendale & Eagle Rock Railway, Los Angeles, Cal.—Grading has been completed and rails are being laid by this company on its 6-mile extension to Montrose.

Tidewater & Southern Railroad, Stockton, Cal.—Work will be begun at once by this company on its line to Merced. The right-of-way has been secured and surveys have been begun.

Big Four Electric Railway, Tulare, Cal.—Plans are being made by this company to begin the construction of its 45-mile electric railway to connect Porterville, Lindsay, Tulare and Visalia. The work will be done by the W. H. Hahn Construction Company. Orders for rails and ties have already been placed. [E. R. J., Dec. 21, '12.]

Orlando (Fla.) Interurban Traction Company.—Plans are being made by this company to raise the necessary money to build this 45-mile electric railway to connect Orlando, Kissimmee and Sanford. W. C. Temple, president. [E. R. J., Dec. 21, '13.]

Tampa (Fla.) Electric Company.—This company will spend $400,000 for improvements to its power plant and track extensions during the year.

Athens Railway & Electric Company, Athens, Ga.—The citizens of Barberville and East Athens have asked this company to consider plans to extend its lines to those sections of Athens.

Sand Point & Interurban Railway, Sand Point, Idaho.—A 5-mile line between Sand Point and Dover will be built by this company during the year.

East Side Electric Railway, Centralia, Ill.—This company will begin construction at once on its 2½-mile electric railway between Centralia and Irvington. Capital stock authorized, $25,000. The power station and repair shops will be located in Centralia and the company will operate four cars. Officers: C. F. Lender, Centralia, president; H. C. Higgins, vice-president; S. A. Frazier, secretary; W. M. Grisson, treasurer; H. C. Higgs, purchasing agent, and Lee S. Traener, engineer. [E. R. J., March 29, '13.]

Northern Illinois Electric Railway, Chicago, Ill.—A 24-mile line between Middlebury and DeKalb will be built by this company during the year.

Freeport Railway & Light Company, Freeport, Ill.—About 1 mile of new track will be built by this company in Freeport during the year.

People's Traction Company, Galesburg, Ill.—This company contemplates a 25-mile extension between Galesburg and Galva during the year.

Chicago, Peoria & Quincy Traction Company, Quincy, Ill.—Satisfactory agreements have been made by this company and the city officials of Quincy to build an electric line in Quincy. J. L. Soebbing, president. [E. R. J., Feb. 22, '13.]

Joplin & Pittsburg Railway, Pittsburg, Kan.—About 2 miles of track will be built by this company during 1913.

Louisville (Ky.) Railway.—Plans are being considered by this company to extend its Preston Street line, a distance of 1¼ miles, south to Audubon Park.

Baton Rouge (La.) Electric Company.—An agreement has been made by this company and the city authorities as to the location of the new line in Baton Rouge. It will be built in the center of Florida Street and on the east side on the East Boulevard.

Livermore & Augusta Street Railway, Augusta, Maine.—This company states that it has been incorporated but has not yet organized permanently nor decided when it will begin the construction of its electric railway to connect Augusta, Manchester, Winthrop, Readfield, Mount Vernon, Fayette, Chesterville and Livermore. The company will furnish power for lighting purposes. Capital stock authorized, $250,000. Charles P. Hatch, Augusta, is interested. [E. R. J., March 8, '13.]

Aroostook Valley Railroad, Presque Isle, Maine.—A 7.13-mile line between Carson and Caribou will be built by this company during 1913.

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—During 1913 this company will build 6 miles of city track and an 18-mile line between Middlechurch and Stonewall.

Holyoke (Mass.) Street Railway.—Plans have been made by this company for the extension of its Pleasant Street line across Highland Park to Northampton Street in Holyoke.

Nahant & Lynn Street Railway, Lynn, Mass.—This company has begun double-tracking part of its line in Lynn.

Berkshire Street Railway, Pittsfield, Mass.—About 30 miles of new track will be built by this company during 1913.

Benton Harbor & St. Joe Railway & Light Company, Benton Harbor, Mich.—Plans are being made by this company to begin work on its extension to Watervliet. Contracts for grading will be let at once. Orders for rails have been placed.

Iron River, Mich.—Plans are being made to organize a company to build an electric railway to connect Iron River, Stambaugh, Mich., and Ashland, Wis., and other towns on the Menominee Range. F. D. Sullivan, 1023 Seventh Avenue, West, Ashland, Wis., is interested. [E. R. J., March 29, '13.]

Meridian Light & Railway Company, Meridian, Miss.—Work has been begun by this company on its East End line and West End line extensions in Meridian.

St. Louis, Afton & Sunset Railway, Afton, Mo.—This company, which is building a 10-mile electric railway from St. Louis to Fenton, has filed a mortgage at Clayton securing an issue of bonds amounting to $300,000. The American Trust Company, St. Louis, is trustee for the bondholders. The bonds were authorized Feb. 29, 1913. They become due in 1963 and bear 5 per cent interest. John M. Storm, president. [E. R. J., March 8, '13.]

Berkshire & Canaan Street Railway, Canaan, N. Y.—A bill reincorporating this company, with a capital of $100,000, has been favorably reported in the Legislature. The charter in this state lapsed ten years ago through the failure of the company to build its entire line.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company plans to build 2100 ft. of new track during the year.

Jamestown (N. Y.) Street Railway.—Plans are being made by this company for a line over Willard Street and to double-track Winsor Street in Jamestown. New and heavier rails will be laid in West Third Street in concrete.

Schenectady (N. Y.) Railway.—This company plans to build about 0.47 mile of city track during 1913.

Halifax (N. S.) Electric Tramway.—It is proposed to build about 1 mile of new track on Quinpool Road, from Oxford Street to the Arm Bridge, Halifax, N. S., during this year. Application has been made to the City Council to build a second track on about 1 mile of existing lines in Halifax.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company plans to build 7 miles of double track during 1913.

Columbus Railway & Light Company, Columbus, Ohio.—Work has been begun by this company on the 2-mile extension to the plant of the Interstate Lumber Company north of Lake Park.

Ohio River Electric Railway & Power Company, Pomeroy, Ohio.—During the year this company plans to extend its tracks 1 mile to Hobson shops.

Oklahoma (Okla.) Railway.—This company plans to build about 5 or 10 miles of new track during 1913.

Kingston, Portsmouth & Cataraqui Railway, Kingston, Ont.—An agreement has been signed between this company and the Kingston City Council under which the Princess Street line is to be reconstructed.

Ottawa (Ont.) Electric Railway.—About 4 miles of city track will be built by this company during 1913.

Niagara, St. Catharines & Toronto Railroad, St. Catharines, Ont.—This company will build 20 miles of new track during the year.

Mount Hood Railroad, Portland, Ore.—Plans are being made by this company to electrify the 12-mile section of its line between Gresham and Bull Run. Recently the 8-mile section between Montavilla and Gresham was electrified. Until March 1, 1913, this 20-mile line between Montavilla and Bull Run was operated by steam.

Portland Railway, Light & Power Company, Portland, Ore.—This company is asked to consider plans to build a crosstown line on East Thirty-ninth Street in Portland.

Erie (Pa.) Traction Company.—This company, which recently purchased the rights of the new electric railway to be built between Erie and Corry, via Waterford, Le Boeuf and other points, plans to begin the construction soon of this proposed line.

Hummelstown & Campbellstown Street Railway, Hershey, Pa.—This company will build 4 miles of new track during the year.

Pottstown & Phoenixville Railway, Philadelphia, Pa.—This company plans to build a new bridge which will cost about $100,000.

West Penn Railways Company, Pittsburgh, Pa.—During 1913 this company will build 9½ miles of new track from Latrobe to Hecla.

Wilkes-Barre (Pa.) Railway.—This company is asked to consider plans to extend its lines to Browntown and Yatesville.

Saskatoon (Sask.) Electric Railway.—Sealed bids, addressed to the City Commissioners, Saskatoon, will be received up to 12 o'clock noon on April 24, 1913, for double-tracking certain streets in Saskatoon for the municipal street railway. Specifications, instructions to bidders and tender forms can be obtained on application to E. Hanson, superintendent of street railway, Saskatoon, Sask. F. .E. Harrison, Mayor, chairman of commissioners.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—Grading has been begun by this company on Wofford Street, Greenville. The company plans to have the section of its line between Greenville and Spartanburg in operation during the year.

Sioux Falls (S. D.) Traction System.—This company will build about 2 miles of new track during the year.

Houston (Tex.) Electric Company.—This company plans to build 5.4 miles of new track during 1913.

Lynchburg Traction & Light Company, Lynchburg, Va.—Work has been begun by this company double-tracking and extending some of its lines in Lynchburg.

Virginia Railway & Power Company, Richmond, Va.—Plans are being considered by this company to double-track High Street from Chestnut Street to the city limits.

Mount Vernon, Wash.—A delegation of business men of the local Commercial Club recently petitioned Jacob Furth, head of the Stone & Webster Corporation, to construct an interurban line from Mount Vernon to Everett, the connecting link in the Tacoma-Bellingham electric interurban railway. Mr. Furth refused to commit himself on the proposition but stated that a line would be built in the future between the two cities.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—During the year this company plans to build 5 miles of new track.

Fayette Traction Company, Fayetteville, W. Va.—This company states that it has completed 2 miles of the roadbed for its 4-mile electric line between Fayette, Fayetteville and Oak Hill. The company will be supplied by the Virginia Power Company. Capital stock authorized,

$60,000. Capital stock issued, $60,000. Officers: C. W. Dillon, president; M. M. Malcolm, vice-president; James Abott, secretary and treasurer, and Phillip Conrad, chief engineer, all of Fayettevillle.

Shenandoah Valley Railway, Martinsburg, W. Va.—Surveys will be begun at once by Dudley Britt, Clarksburg, on this company's 16-mile electric line from Martinsburg, W. Va., to Williamsport, Md. Clarence E. Martin, Martinsburg, is interested. [E. R. J., Nov. 9, '12.]

Madison, Wis.—The Rogers Park Engineering & Construction Company is making a survey for a proposed interurban railway between Janesville and Madison by way of Indiana Ford, Edgerton and Stoughton.

SHOPS AND BUILDINGS

Northern Electric Company, Chico, Cal.—A contract has been awarded by this company for a new freight depot in Oroville. The structure will be a frame building, 40 ft. x 120 ft. The cost is estimated to be about $8,000. S. T. Cobb, the local contractor, will have charge of the work.

Tidewater & Southern Railroad, Stockton, Cal.—This company is receiving specifications for the construction of a new depot at Escalon. The structure will include a passenger waiting room, freight shed and platform. There will be ½ mile of siding at Escalon.

Illinois Traction System, Peoria, Ill.—This company is drawing plans for the new terminal building to be erected at Ninth Street and Adams Street in Springfield. The structure will cost about $25,000.

POWER HOUSES AND SUBSTATIONS

Birmingham-Tuscaloosa Railroad & Utilities Corporation, Birmingham, Ala.—This company has placed a contract with the General Electric Company for the equipment for its new power plant in Tuscaloosa. [E. R. J., March 29, '13.]

British Columbia Electric Railway, Vancouver, B. C.—This company is constructing a receiving station which will regulate the distribution of current to the company's territory on the southern mainland of British Columbia. The site for the building is on the boundary line of the city of Vancouver, where the company has a large tract of land. The total expenditure which will be made on the property is estimated at $250,000. The details of this and other proposed power improvements of the company were referred to in the ELECTRIC RAILWAY JOURNAL of April 5, 1913, page 652.

Albany (Ga.) Transit Company.—This company plans to build a new substation on Flint Street and Front Street in Albany. The structure will be 15 ft. x 20 ft.

Shreveport (La.) Traction Company.—This company will add to its station equipment a 1000-kw generator and switchboard. The General Electric Company will furnish and install the apparatus.

Worcester (Mass.) Consolidated Street Railway.—This company will install in its power house at Millbury a 5000-kw Curtis turbo-generator with 75-kw turbo-exciter, two 330-kva transformers and switchboard. This order has been placed with the General Electric Company.

Benton Harbor & St. Joe Railway & Light Company, Benton Harbor, Mich.—This company has placed an order with the General Electric Company for three 300-kw, 15,000-volt transformers.

Meridian Light & Railway Company, Meridian, Miss.—Among the improvements planned by this company will be the installation of a new 2000-kw turbo-generator at its Meridian power house.

Ohio Valley Electric Railway, Ironton, Ohio.—This company will install four 200-kw, 11,000-9500-volt substation transformers. The apparatus has been ordered from the General Electric Company.

Philadelphia & Western Railway, Upper Darby, Pa.—This company will install in the Beechwood power house a 500-kw rotary converter and 500-kw air-blast transformer and switchboard. The order for the apparatus has been placed with the General Electric Company.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—This company will install a 300-kw motor generator set and switchboard to be furnished by the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Saskatoon (Sask.) Electric Railway is reported to be considering the purchase of six cars.

Detroit (Mich.) United Railway, it is reported, will purchase a number of trail cars for use on its city lines.

Asheville & East Tennessee Railroad, Asheville, N. C., has purchased one double-truck car from the Southern Car Company.

Washington Railway & Electric Company, Washington, D. C., has ordered five double-truck cars from the Southern Car Company.

Phoenix (Ariz.) Railway has ordered from the American Car Company four 38-ft. 8-in. California type cars mounted on Brill 27-GE-1 trucks.

Norfolk (Va.) Southern Railroad has ordered five double-truck cars from the Southern Car Company. They will be equipped with Brill 27-MCB-2 trucks.

Boston (Mass.) Elevated Railway has ordered thirty cars from the Pressed Steel Car Company and twenty-five cars from the American Car & Foundry Company.

Southern Pacific Company, San Francisco, Cal., has applied to the Railroad Commission of California for permission to issue car trust certificates, the proceeds of which are to be used to purchase additional equipment including ninety passenger motor cars.

Meridian Light & Railway Company, Meridian, Miss., has ordered two single-truck cars from the Southern Car Company. They will have steel underframes with wooden posts. The company is now building in its own shops four single-truck cars which will have semi-steel underframes and wooden posts.

Philadelphia (Pa.) Rapid Transit Company, noted in the ELECTRIC RAILWAY JOURNAL of April 5, 1913, as having ordered 600 additional near-side cars, has ordered through the Near-Side Car Company from The J. G. Brill Company 550 34-ft. 1⅜-in. semi-convertible near-side car bodies mounted on Brill 39-E trucks.

Belt Line Railway, New York, N. Y., has ordered from The J. G. Brill Company forty 18-ft. storage battery cars. They will be equipped with the Electric Storage Battery Company's exide batteries, General Electric motors and Brill special trucks. The cars are similar to those now being operated by the Third Avenue Railway, New York, which were described previously in the ELECTRIC RAILWAY JOURNAL.

Worcester (Mass.) Consolidated Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of March 22, 1913, as considering the purchase of twenty-one cars, has ordered fifteen 28-ft. closed city cars from the Osgood-Bradley Car Company and six 35-ft. semi-convertible interurban cars from the Wason Manufacturing Company. The city cars are equipped with two General Electric 87-A motors and Standard 0-36 trucks. The interurban cars are equipped with four Westinghouse 305-A-2 motors and with H.L.F. control and Standard C-50-P trucks.

Northern Texas Traction Company, Fort Worth, Tex., reported in the ELECTRIC RAILWAY JOURNAL of Feb. 15, 1913, as having ordered ten double-truck double-end closed cars from the St. Louis Car Company, has included the following details in the specifications for this equipment:

Seating capacity	40
Length of body	26 ft. 6 in.
Length over buffers	39 ft. 0 in.
Width over sheathing	8 ft. 4 in.
Width over all	8 ft. 7 in.
Body	composite
Interior trim	mahogany
Roof	arch
Underframe	steel
Car trimmings	bronze
Curtain fixtures	Natl.L.W.Co.
Curtain material	Pantasote
Destination signs	Hunter
Gongs	Wall
Hand brakes	Peacock
Heaters	Consolidated
Headlights	C-H
Motors	outside-hung
Registers	International
Sash fixtures	Edwards
Seats	H. & W.
Seating material	wood slats
Step treads	Mason
Ventilators,	Stone & Webster vacuum
Wheelguards	H-B

TRADE NOTES

Watson-Stillman Company, New York, N. Y., has moved its Chicago office from 449 The Rookery to the McCormick Building, Chicago.

B. J. Carney & Company, Grinnell, Ohio, have just shipped fifteen cars of cedar poles to Omaha, Neb., to replace the poles destroyed by the tornado in that territory.

Allis-Chalmers Company's properties in Chicago, Ill., were sold at public auction on April 8 for $1,000,000 to J. H. McClement, J. W. Wallace and Francis S. Bang, representing the reorganization committee.

C. F. Goodrich Switch Company, Chicago, Ill., has been incorporated with a capital stock of $2,500 to manufacture and deal in railway equipment and machinery. The incorporators are C. F. Goodrich, Paul Schroeder and Joel Baker.

William Wharton, Jr., & Company, Inc., Philadelphia, Pa., announce that George R. Lyman, who has been connected with the company for several years, has been made sales agent at Chicago, with headquarters in the Fort Dearborn Building.

Metal Treating & Equipment Company, Inc., New York, N. Y., has been incorporated with a capital stock of $100,000 to exploit its patented processes and solutions for electro-galvanizing in the form both of installing job galvanizing plants and installing special plants for its customers.

Smiley Company, Edmonton, Alta., has just closed for the account of the United States Steel Products Company an order for 3000 tons of rails and $100,000 worth of special track work. J. B. Smiley, president of this company, was connected for a number of years with the Pennsylvania Steel Company in New York.

Eastern Car Company, Ltd., New Glasgow, N. S., is completing its plant at New Glasgow. The main building, which is 1100 ft. long, of four spans, each 90 ft. wide, is getting under roof, and much of the machinery is on the ground. It is expected that the plant will be in full operation within sixty days. H. B. Douglas, formerly manager of the Standard Steel Car Company, at Hammond, Ind., has accepted a position with the Eastern Car Company, Ltd., as manager.

General Vehicle Company, Long Island City, N. Y., has received an order from the New York (N. Y.) Railways for electric commercial vehicles as follows: One 1000-lb. wagon with express-type body, two 1000-lb. wagons with panel bodies, one 2000-lb. panel money wagon, fourteen 7000-lb. trucks with steel dumping bodies and hand-operated dumping devices, four 3½-ton trucks with platform and stake bodies, one 5-ton truck with platform and stake body and one 5-ton special truck. The 1000-lb. wagons will be used for special parcel delivery, while the money wagon ordered is a type already in use by express companies and banks. The fourteen 7000-lb. dumping trucks are to be furnished with the most modern equipment and will be the highest type of truck for the purposes for which they are designed. The 5-ton trucks will be used for cable work and the 3½-ton trucks will be used for general hauling.

Day & Zimmerman, Philadelphia, Pa., engineers, have moved their Philadelphia office from 608 Chestnut Street to 611-13 Chestnut Street. On April 5, to celebrate this move, the firm held a reception in its new offices, which occupy all but the first floor of the four-story building at 611-613 Chestnut Street. This is the third office in Philadelphia which the firm has occupied since 1902, the first being in the Drexel Building. Originally the business was confined largely to the rearrangement of equipment and industrial plants and the application of motors to machine tools. Eventually the firm developed the business of power plant work of all kinds for public service properties, and this led to the design and construction of transmission lines and finally the management of public utility properties. Among the latter, the firm operates the Lewistown & Reedsville Electric Railroad and the Citizens' Traction Company, Oil City, both in Pennsylvania.

Electrose Manufacturing Company, Brooklyn, N. Y., advises that it has received a reward of priority by the Court of Appeals of the District of Columbia in the Patent Office interference case upon the company's patent on suspension insulators. The interference was between Mr. Steinberger, president of the Electrose Manufacturing Company, and E. M. Hewlett, of the General Electric Company, and was first decided in favor of Mr. Steinberger last December by the Commissioner of Patents. An appeal from this decision was entered by Mr. Hewlett but was affirmed April 7 in the court already mentioned. The first claim of the patent sustained, No. 904,370, is as follows: "A disk strain insulator, comprising suspension members, a mass of insulating material partially enveloping the same, said mass being provided centrally with a disk integral therewith and lying substantially in the general equatorial plane of the said mass, and further provided with flanges extending in opposite directions from said equatorial plane."

Western Electric Company, New York, N. Y., demonstrated its ability to answer most unusual demands for apparatus during the last two weeks when orders began to come in to repair the damage caused by the recent tornado in Omaha and the flood in the Central States. After the Omaha disaster the company was notified that 8000 poles, 25,000 cross-arms, 100,000 pins and 32,000 ft. of telephone cable were immediately needed in that city and the entire order was filled and the apparatus was shipped the following day from the different yards and storerooms of the company. Following the floods in Indiana and Ohio other calls came for emergency line materials, and the stock at the company's storehouses at Cleveland, Pittsburgh, Indianapolis, Cincinnati, Boston, New York and other cities was immediately drawn upon for aid, and telegraphic orders were issued to the company's sources of supply for more than 500,000 lb. of copper wire and from 5,000,000 ft. to 10,000,000 ft. of rubber-covered wire and distributing wire. All of this emergency material was sent to the stricken districts by express, and upon one shipment the express charges aggregated over $6,000.

Esterline Company, Lafayette, Ind., was able to predict the overflow of its manufacturing plant in the recent flood in time to remove many thousands of dollars' worth of valuable material. The Esterline plant at Lafayette is located in a broad lowland, protected on one side by a high hill and on three other sides by levees. At 7 a. m. on Tuesday, March 25, the engineers of the company established a gage and took hourly readings of the rise of the water. These readings were plotted in the form of a curve in which the height of the levee was shown by ordinates and the hours were shown by the abscissas. By extending the curve the engineers determined about the time at which the levee would overflow and before that time the company removed about $100,000 worth of merchandise and tools, all of its records, office furniture and fixtures. The belts were taken from the machines and the latter cleaned up and painted with heavy grease. The finished goods removed are sufficient to take care of customers for at least three weeks. After the flood had subsided a large force removed and cleaned the machinery and tools, which were shipped to Indianapolis, Ind., where the company intends to commence operation of its new plant April 15. The total damage sustained will not exceed $10,000 and is limited practically to the cost of removing and cleaning up the apparatus and machinery which could not be moved before the flood. Shortly prior to the flood the company secured a new three-factory building on South Street in Indianapolis, and now that the flood has subsided both factories, that at Indianapolis and that at Lafayette, will be used for the manufacture of the company's "Golden Glow" electric lamps and other material manufactured by it.

ADVERTISING LITERATURE

Barrett Manufacturing Company, New York, N. Y., has issued two circulars which contain directions for inspecting and full specifications for use of Barrett specification roofs over concrete and board sheathing.

Kennicott Company, Chicago Heights, Ill., has issued Bulletin No. 38, which describes the principle of the operation of the Kennicott water weigher. The purpose of this device is set forth in a booklet entitled "Value of the Kennicott Water Weigher in the Power Plant." The company recently had awarded to it the John Scott legacy medal on this measuring device.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, APRIL 19, 1913 No. 16

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

JAMES H. McGRAW, President. C. E. WHITTLESEY, Secretary and Treas.

239 West 39th Street, New York.

CHICAGO OFFICE............................1570 Old Colony Building
PHILADELPHIA OFFICE.......................Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8000 *copies are printed.*

ELEVATED TERMINALS FOR INTERURBAN LINES

One of the chief obstacles to rapid transit service on interurban railways is the delays encountered in the streets of the terminal cities, and in most cities these delays are bound to increase in the future rather than decrease. Relief from a situation of this kind is being sought in Los Angeles by the Pacific Electric Railway, which is asking permission to construct an elevated road from its present passenger station past the more congested streets. If obtained, most of the interurban cars would use this elevated structure in reaching the downtown terminal. The construction of elevated roads is not as popular now with railway companies as it once was, owing to the high assessments for damages to abutting property, because of the noise and obstruction of light, and they are looked upon with disfavor also by some municipalities because of their supposed unsightly appearance. Both of these arguments against their construction are undoubtedly correct when applied to the older type of elevated roads with which most people are familiar because of its existence in New York and Chicago. The same arguments do not apply, however, to the elevated railways built during the last ten years, like those in Paris and Berlin, where an effort has been made to treat the structure in an artistic way and to introduce special means for deadening the noise. In consequence roads of this kind have been installed in some of the best residential sections of the two European capitals mentioned. Even at best, however, elevated railways are expensive, and it is safe to say that their cost is prohibitive for all interurban roads except those of large traffic, and that it would not be practicable to build them for any great distance except in the very largest cities. Nevertheless, they can be constructed for about one-fifth the cost of a subway, and they do offer an alternative for surface traction where a subway would be entirely out of the question.

FINANCING UNEXPECTED LOSSES

The terrible floods from which several of the most prosperous states in this country are now just emerging furnish another example of the hazards to which public utility enterprises, as investments, are subjected. It is a common presumption on the part of many persons, when the affairs of a public utility are running smoothly, that nothing serious of a financial character can occur to affect its prosperity. Its service, they argue, must be patronized by the people who live in that community, and its profits are so reasonably certain that the companies should be limited to a bare margin above that required to earn the legal rate of interest upon the investment in them. Then comes some such catastrophe as the San Francisco earthquake, the Baltimore fire or the Ohio and Indiana floods, wrecking property, destroying the accumulated investment of years and inflicting losses directly and through loss of business which it will take the profits of many years to repay. We have no doubt that if some of our regulating authorities had had presented to their attention during the middle of last month the public utilities in what is now the devastated district they would have pooh-poohed the idea that any serious disaster could come to them through natural causes. Their business might fairly be assumed to be as secure as government bonds, and their rates should be regulated accordingly. It is true that disasters of this kind cannot be predicted; that is to say, their exact nature and the time of their occurrence cannot be foreseen. But while fires, earthquakes and floods fortunately are not common, they do happen, and there are sufficient instances of their occurrence to render them, like strikes and other contingencies which might be mentioned, a real hazard in electric railway operation and one which must be taken into consideration when judgment is passed upon what constitutes a "reasonable return" for a public utility.

THE CAUSES OF THE RECENT FLOODS

Now that the work of repairing the damage from the recent floods in Ohio and Indiana is well under way, it is possible to survey the conditions leading up to them and to draw conclusions regarding the possible causes. It seems that, regardless of early reports of bursting reservoirs, the floods were produced primarily by an extraordinary rainfall, which in the State of Ohio exceeded one-third of the entire average annual precipitation. The storm, strangely enough, appeared to concentrate its effect between Bellefontaine and Marion, Ohio, extending to the east and west surprisingly close to the line of the watershed of the State from which the rivers flow north into Lake Erie and south into the Ohio River. According to a rainfall map published in the current issue of the *Engineering Record,* the precipitation in this region reached the unprecedented total of 11 in. during the four days between March 23 and

March 27, so that the rivers running to every portion of the State were flooded at their very sources. Judging from the most recent reports, it is safe to say that practically no dams failed with serious results. Several minor failures occurred, but these generally came after the period of highest waters in the rivers leading from them. Several of the great reservoirs in Ohio were, however, filled beyond their spillway capacities, and their banks were overtopped by waves, a serious condition if it exists for a sufficiently long period. In some cases the embankments of earth were washed out for various lengths, and a considerable amount of water was discharged on to the surrounding country, although these overflows were in no case a primary cause of the disaster. A suggestion has been made that there should be some supervision of the level at which reservoirs are held during the periods when heavy rains may be expected, and it is said that the large storage reservoir in the Scioto River above Columbus, Ohio, aided materially in lessening the flood at that city. In fact, it is pointed out that if the large reservoirs of central Ohio had been drawn down previous to the rains, each one of them would have stored practically the entire run-off from its drainage area.

INDIRECT LIGHTING ON LIMITED TRAINS

With the steady advances which illuminating engineering has been making toward the complete elimination of glare, it was to be expected that the indirect system of lighting would sooner or later receive a trial in railway service of the highest class. This is now the case, as the system has been placed in operation on the five-hour "Merchants' Limited" trains of the New Haven company between New York and Boston and on some of the Santa Fé trains out of Chicago, but has been confined to parlor, observation or dining cars. The fixtures are of the inverted opaque type, each carrying either one 100-watt tungsten lamp or three 50-watt lamps immediately above a porcelain reflecting bowl throwing the light upon the monitor ceiling, from which it is reflected and diffused throughout the car. The intensity of illumination sought is about 4½ ft.-candles on a working plane 33 in. above the floor. The expenditure of the same energy in 25-watt or 40-watt lamps with direct, diffused lighting would unquestionably flood the car with illumination that would do away entirely with the soft "twilight effect" now observed, but it is equally certain that glare would exist unless inefficient diffusing shades or globes were used.

Whether there are situations in electric railway work to justify this luxurious system of lighting is a question, but the matter is worth consideration. Certainly the cost for illumination per candle-power-hour should be less on electric roads, with their system of direct supply, than on the steam roads where an axle lighting generator is used. Whether the opaque type of fixture will meet the ultimate conditions remains to be seen. In most installations of indirect lighting it is a common experience to encounter the criticisms of the user against the absence of a visible light source, and in some classes of restaurant work a combination system is being used in which a portion of the fixture is translucent. It is also a question whether 150 watts per fixture is not better practice than the use of 100 watts, judging from the observation of passengers on these trains, even though newspaper print can easily be read with the indirect reflected light from the 100-watt equipments. The tungsten lamp is certainly a factor to be reckoned with in the most advanced car lighting of the present time, and its adaptability to ornamental service with diffusing and reflecting apparatus is almost as advantageous as its high intrinsic efficiency.

BRIDGE AND CULVERT INSPECTION

Largely upon the degree of care with which bridges and culverts are maintained depends the safety of operation as well as the continuity of service, and the quality of maintenance, in turn, is dependent almost wholly upon rigid periodical inspections. The value of such inspections, however, must necessarily be based upon the experience of the inspector with methods of maintenance as well as upon his ability to forecast dangerous conditions far enough in advance to permit repairs to be made before disaster occurs. At least two accurate inspections are necessary each year, one in the fall to determine the maintenance schedule for the following summer and one in the spring to determine which structures need attention first.

Monthly inspections should also be made by the section foremen so that unforeseen conditions may be promptly discovered. A section foreman of average intelligence is competent to make such inspections, particularly if he has had some instruction from an experienced bridge inspector, but important structures showing conditions which may become serious at any time should be watched carefully by the most competent man available.

The inspection by the trained bridgeman should not end with a report of structures needing immediate attention or repairs during the following year. A complete record of the condition of each bridge and culvert should be made on the ground, and a copy of this should be forwarded to the department head for comparison with previous inspection reports. The purpose of this comparison is to determine the rapidity with which any defect advances, and it enables officials to arrive at conclusions which are not evident on the ground. Items which should be noted on inspection reports include the number and condition of cracked pipes in culverts, the depth of underscour around masonry and pipe ends, the depth of decay in piling and the settling or lateral movement of pile bents due to shifting fills or faulty penetration.

The inspector's duties on the semi-annual inspection, the one which will form a basis for the following year's work, must necessarily be more thorough than the one which is made only to locate dangerous conditions. The former should include determination of the depth of decay in each member. This may be found by picking away portions of the decayed timber with an ordinary shoemaker's awl or an ice pick. The inspection of bridge ties or deck timber may be done with a light-weight pointed bar, which permits the inspector to do his work much more easily. To ascertain exact conditions around masonry footings soundings are necessary. This is also true of pipe ends where there is scour either due to the pipe flowing full at the upstream end or on account of the existence of soft soil at the outlet.

Experience has shown that certain points on steel bridges show failures in the paint skin greatly in advance of the rest of the structure, namely, the upper horizontal surfaces such as the top flanges of stringers, floor beams and upper chords. By watching these points an experienced inspector may quickly draw conclusions as to the immediate necessity of painting steel structures. By attempting to swing the eye-bars laterally he is able to investigate the accuracy of adjustment in a truss and recommend taking up the slack or relieving overstrained members through the turnbuckles or by shims at the pins.

Prompt removal of drift is very important. Repeated floods, particularly at wooden trestles, will collect sufficient drift to dam the stream flow, which usually results in one of two things, destruction of the bridge or washed-out embankments at either end of the opening. Drift around wooden bridges during dry periods may easily be set ablaze by a match or cigar end thrown from a car, resulting in a destructive fire.

LOCOMOTIVE AND MOTOR CAR ACCELERATIONS ABROAD

In the several reports and discussions of the proposed electrification of the Berlin Stadtbahn no attention appears to have been given to the possible influence which a higher rate of acceleration may have on the present type of car and the method of loading and unloading it. As previously noted in these columns, it is the intention of the Prussian State Railways, which operates the Stadtbahn, to substitute electric locomotives for steam locomotives. This will permit the retention of the steam trail cars with practically no radical changes in body construction. These cars are of the swinging side-door type, and they have a narrow double-step running board which is not unlike that on the Narragansett type of open car used in this country.

In accordance with the usual European practice, the passengers open and close these doors themselves, although they are not supposed to do this while the train is in motion. One duty of the guard is to run along the platform to close all open doors on his way to the rear of the train. This leisurely procedure is possible because the rate of acceleration is only 0.38 m.p.h.p.s. The natural consequence is that the service of the Stadtbahn is very far from real rapid transit. It is proposed to increase the rate of acceleration to about 1 m.p.h.p.s. by employing one head and one rear electric locomotive per train. Even this rate is fully 0.5 m.p.h.p.s. less than that used on the Hamburg rapid transit system. It may be questioned, however, whether it will be possible with the old-time trailers to maintain safely the proposed acceleration of 1 m.p.h.p.s. It is true that the doors of the faster Hamburg cars are successfully manipulated by the passengers, but this is feasible because these doors are of the sliding type and the car floor is but a few inches higher than the station platforms and overlaps them.

Of course, the desire to electrify the Stadtbahn as cheaply as possible has resulted in the choice of electric locomotives rather than motor cars, but the ratio of traffic increase on this system makes it likely that motor cars will have to be chosen eventually in order to get the benefits of a still higher acceleration with greater convenience and safety than can be afforded by locomotive operation. In fact, the increasing density of travel on the rapid transit lines of cities like Berlin, London and Paris indicates the early coming of the day when the present type of European motor car will have to be altered so that it can be safely operated at the higher schedule speeds and accelerations that are already in use in this country.

CENTER-ENTRANCE CARS FOR BROOKLYN

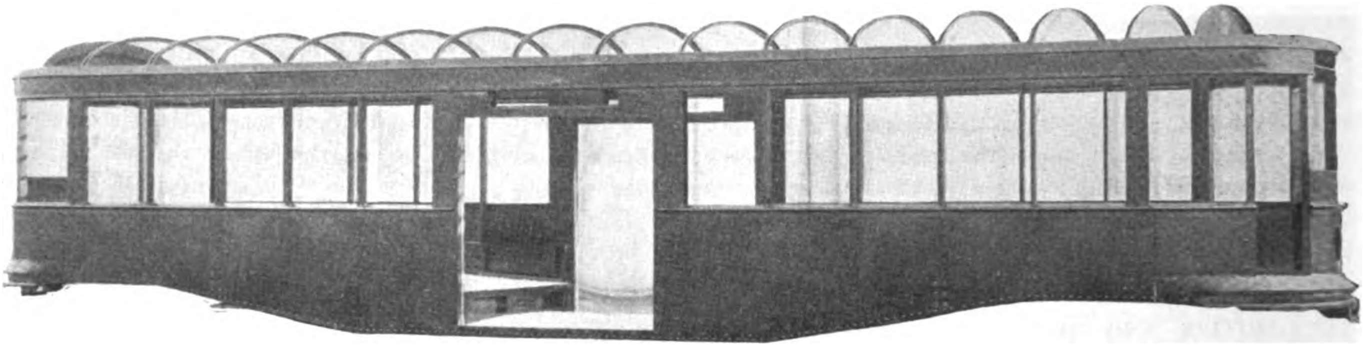
Early last year the Brooklyn Rapid Transit System designed and equipped a center-entrance, low-step car with the avowed object of making that type its future standard for new equipment if practical operation demonstrated its superiority to the drop-platform type. This trial car was the result of some two years' study by the management, first in making a comprehensive survey of center-entrance cars in general and, second, in preparing in detail a type which would be particularly suitable for the needs of Brooklyn traffic. As the design took form, experienced representatives of all departments concerned in car operation were invited to criticise the different features from their individual standpoints so that the completed car would incorporate what they considered best. From the day that the car was placed on the street in public service, an elaborate record was kept of its speed and passenger-handling ability, of the effectiveness of the devices for ventilation, for the folding of cabs and seats when the direction was changed, for interlocking the center doors and control, for fare collection and for other matters pertinent to satisfactory operation. That these elaborate preliminaries were amply justified is proved by the fact that the 100 cars now under way embody the same fundamental features as the pioneer design. The changes in the folding cabs and seating, however, present examples of improvement in fittings due to patient experimenting with all kinds of combinations of doors, sashes and seating. Again, the addition of grab-irons for reaching the roof illustrates how the emergencies of real operation disclose minor omissions.

A striking point in connection with the new cars, which are described at length in this issue, is that they were assembled, from the skeleton up, in the shops of the Brooklyn Rapid Transit System. The railway company felt that inasmuch as this rolling stock was so great a departure from standard cars, its own shops should be the place to work out every detail and install every part of the equipment. The car illustrated in the article was the one on which were developed the order and method of operations which are to be followed in the equipment of the remaining ninety-nine cars. On this car also were tested out minor variations in seating, in signs and the like. The cars now at the shops are to be turned out at the rate of one a day, although this work comes at the season when many cars must be prepared for summer service. Widespread interest has already been shown in this design, but only those who have followed the evolution of the car from its inception can appreciate the amount of conscientious effort that the Brooklyn Rapid Transit System has expended to produce a car that embodies so many features advantageous to both the public and the company.

Center-Entrance Cars for Brooklyn

Full Particulars Are Presented of the Construction and Equipment of 100 Center-Entrance Cars for the Brooklyn Rapid Transit Company—These Are Now Being Equipped in That Company's Shops

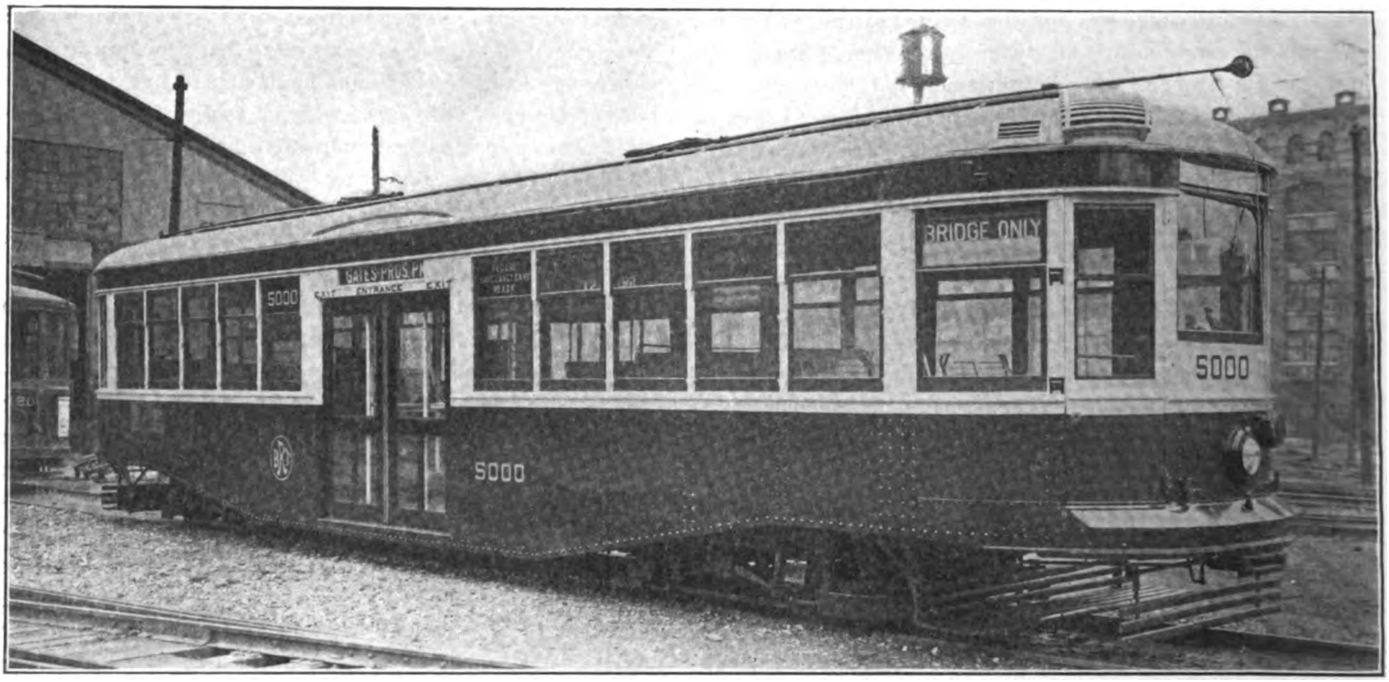
The Brooklyn Rapid Transit Company is now equipping at its Thirty-ninth Street shops 100 center-entrance cars. These cars, in general, are similar to the experimental car which was described in the ELECTRIC RAILWAY JOURNAL for March 30 and June 22, 1912. The cardinal features of design and construction have been changed very little, but important modifications were made in the motormen's cabs, in the seating near the cabs and center doors, in ventilation, etc. The following paragraphs and the accompanying illustrations present full particulars of the new cars.



Brooklyn Center-Entrance Car—Framing as Received at the Thirty-ninth Street Shops of the Brooklyn Rapid Transit Company

GENERAL DIMENSIONS AND FRAMING

This type may be described as a double-end, straight-sided body with low-step passenger entrance and two exits located at the center of the car and arranged for collection of fare as the passenger enters. The car floor at this point is 14 in. above the rails at the threshold with 2 in. of ramp to the center. Inside the car, from the center platform sub-floor or well is a 10-in. riser to the center aisle on each side, this aisle having a ramp of 6 in. in 8 ft. 6 in. to the bolsters, from which points the floor is level. The sash is arranged to raise or drop according to location. The ends of the body have swinging sashes and roller curtains to form the motorman's cab, which is folded back when not in use to allow the application of suitable seats.

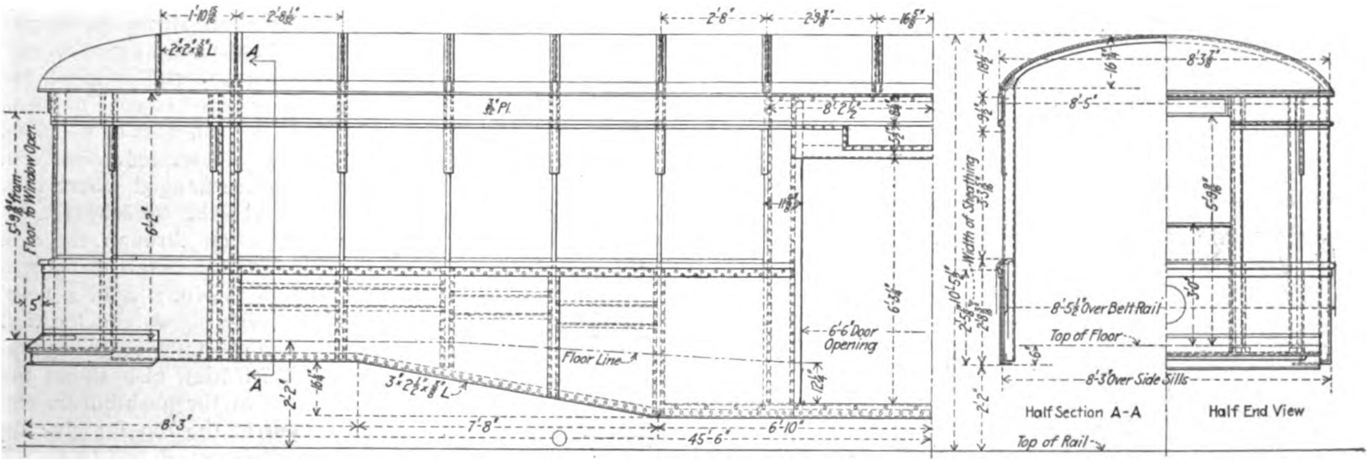


Brooklyn Center-Entrance Car—Side and End View of Car as Completed at the Thirty-ninth Street Shops of the Brooklyn Rapid Transit Company

The principal dimensions are as follows: length over all, 45 ft. 6 in.; length over the end sheathing, 44 ft. 8 in.; length of the motorman's cab, 3 ft.; center to center of bolsters, 24 ft. 8 in.; width over the side sheathing, 8 ft. 3 3/16 in.; width over the belt rail, 8 ft. 5½ in.; width over the drip rail, 8 ft. 5 in., and height from the bottom of the sill to the top of the trolley board, 10 ft. 2¼ in.

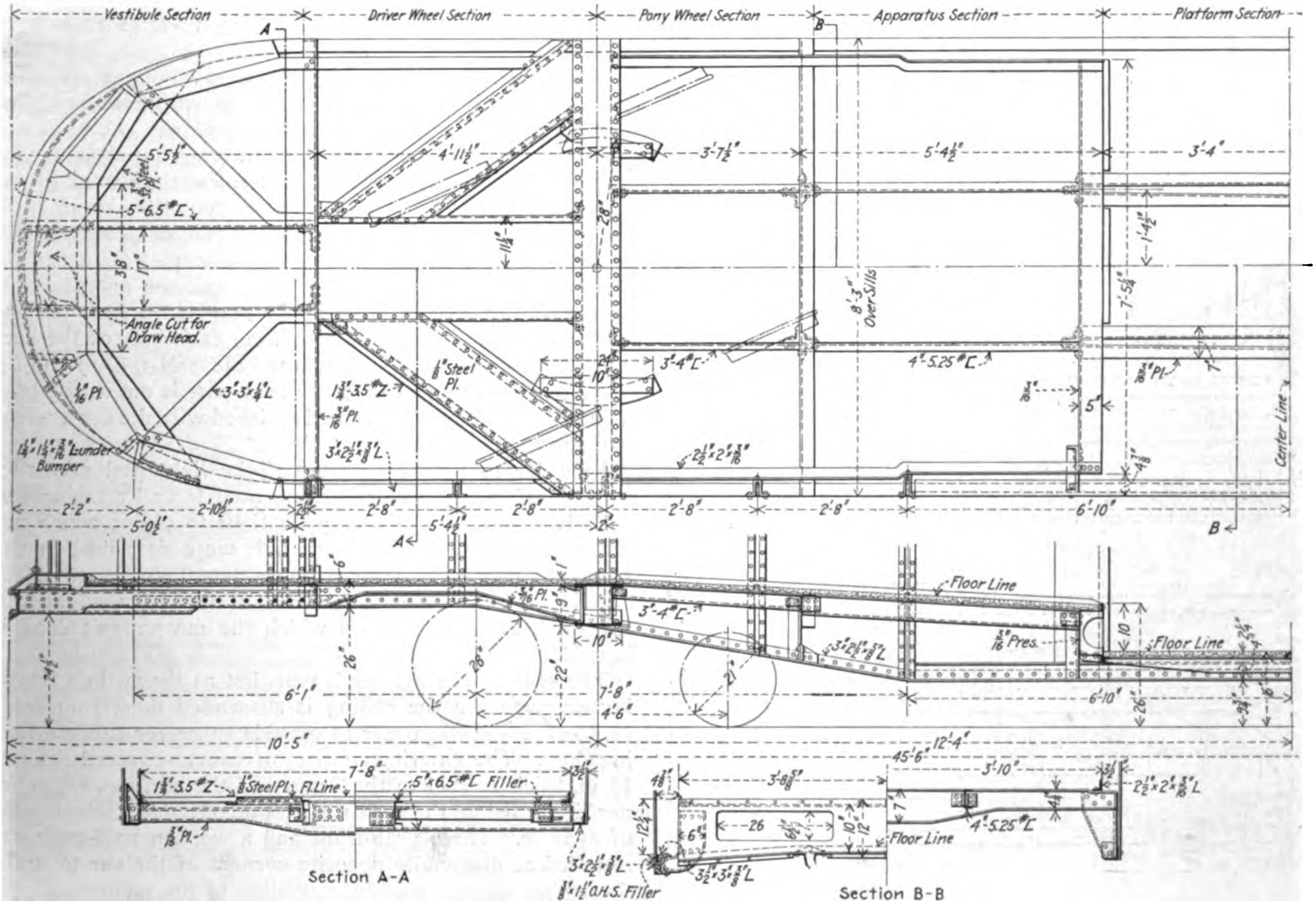
The car-body framing is of pressed steel, both welded and riveted. As received from The J. G. Brill Company for equipment at the Brooklyn Rapid Transit Company's shops, the framing illustrated in the accompanying half-tone weighed 8562 lb. This framing was designed with a factor of safety of five. Each side of the car forms a girder consisting of the side plates, belt rail, letterboard and side posts, all of which are riveted to each other, to the side sills and to the carlines. At the center of the car this side girder has a maximum depth of about 8 ft. The sides of the car below the window line and the letterboard sheathing are of 3/32-in. plate except at the ends, which are 1/16 in. thick.

The side sills are made up of 3-in. x 2½-in. x ⅜-in. angles which are reinforced at the center by 3½-in. x 3-in. x ⅜-in. angles. The side sills are rounded at the ends, where they are riveted to 4-in. 6½-lb. channel-iron bumpers, the whole forming a continuous line around the car. A 1¼-in. x 1¼-in. x 3/16-in. angle is installed under the bumper, and the latter is also reinforced with 3/32-in. anti-telescoping plates. The cross sills on opposite sides of the bolsters are channel-shaped pressings of 3/16-in. plate 6 in. deep. However, the center sills, which form the risers from the center platform to the main floor, are Z-shaped pressings of 3/16-in. steel 10 in. deep, the shape and depth of which have been utilized to receive four electric heaters.



Floor to Window Open
Floor Line
6'-6" Door Opening
Width of Sheathing
8'-5½" Over Belt Rail
Top of Floor
8'-3" Over Side Sills
Half Section A-A
Half End View
Top of Rail
8'-3"
7'-8"
45'-6"
6'-10"
A

Brooklyn Center-Entrance Car—Half Side Elevation and Half End Elevation



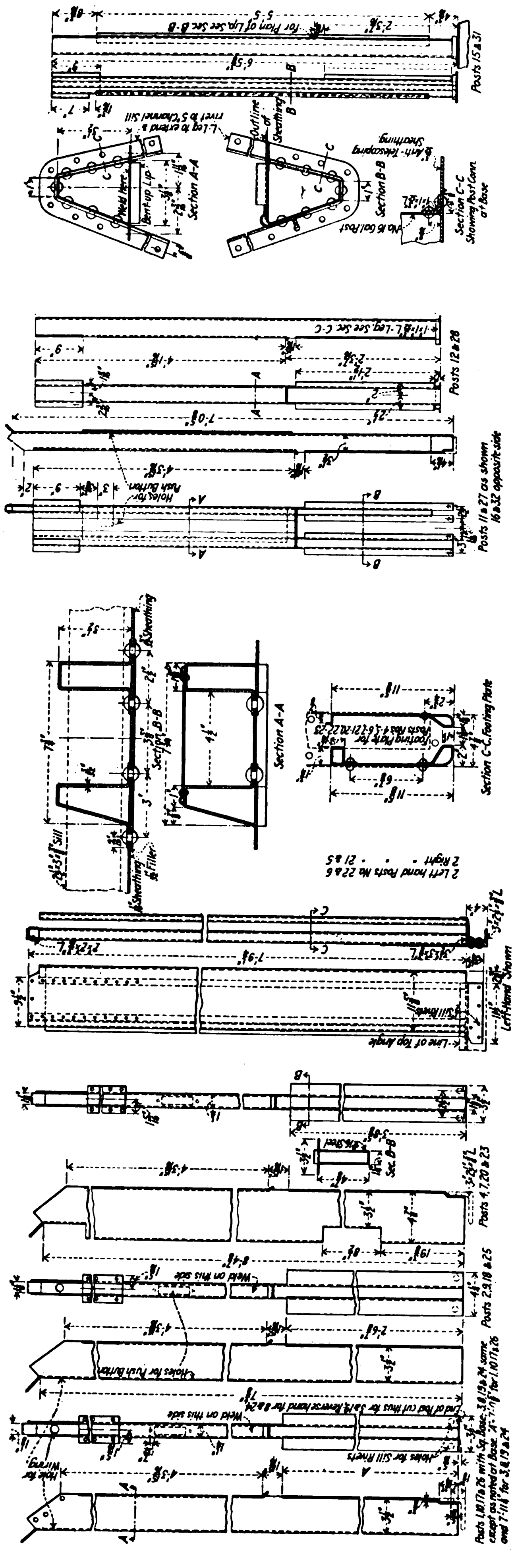
Vestibule Section
Driver Wheel Section
Pony Wheel Section
Apparatus Section
Platform Section
Angle Cut for Draw Head
Lunder Bumper
8'-3" Over Sills
Center Line
Floor Line
10'-5"
45'-6"
12'-4"
Section A-A
Section B-B
A
B

Brooklyn Center-Entrance Car—Half Bottom Framing, Cross-Sections of Framing, etc.

The bolsters are pressed-steel members, the outside dimensions being 9 in. deep x 10 in. wide with top and bottom cover plates ½ in. thick and ¼ in. web. The center line of each bolster is 12 ft. 4 in. from the center line of the car, thereby giving an overhang of 10 ft. 5 in., which so balances the car that very little tension exists at the center. This point received careful attention with the result that all danger of breaking down or sagging was eliminated.

The longitudinal floor members are 3-in., 4-in. and 5-in. channels, their size depending upon their location as shown on the accompanying plan. The floor framing at each end of the car is strengthened by two bent angles which are riveted to the longitudinal members. The driver wheel section is braced by four Z-section diagonals.

All transverse and longitudinal members are so con-


Brooklyn Center-Entrance Car—Connections of Posts to Sills and Carlines, Footing Plates, etc.

nected that the transverse members are 4 in. or more above the rails than the lowest level, namely, 9¾ in., of the longitudinal members. Consequently, if any ordinary obstruction is met, it will be fouled by those parts which would tend to slide over it in the direction of running. In this way the possibility of derailment and the strains caused by encountering obstructions are greatly reduced. The minimum clearance between suspended apparatus and the rails is 5¼ in.

The posts and carlines are U-shaped pressings, the former 1/16 in. thick except that the wider posts, like the carlines, are 3/32 in. thick. The posts of the original car were built up and the sash retainers were riveted to them. In the new cars the post is welded and sash runs of extruded brass are bolted thereto. The posts are welded solid from the belt rail to the letterboard and are flanged where they are riveted to the main panel and to the letterboard. A drawing on page 712 is a cross-section through the side post and flooring and shows particularly how the floor is supported at the sides of the car on 2½-in. x 2-in. x 3/16-in. angles. The drawing on this page shows the location of the different posts, together with details of their connection to the side sills. This illustration also shows the welding seam, the run and location of the push-button circuit and the way the posts are cut at the top for riveting to the U-shape carlines which are telescoped into them. A drawing on page 711 shows five styles of the extruded metal sash runs. These runs are usually 3/32 in. thick at and along the base, the extruded portions tapering to 1/16 in., as shown in style B. Their length varies from 2 ft. 1 in. to 4 ft. 7¾ in.

The attachment of the posts to the side sills varies somewhat according to the location. As shown in the key plan, the posts are divided into groups as follows: 22, 6, 21 and 5, constituting the posts at the center entrance where an angle is used to reinforce the side sill at the center of the car and where the top of the post is connected to an angle carried over the doorway; 11, 27, 16 and 32, posts between the motorman's door and the side sash; 15, 31, 12 and 28, posts between the motorman's door and the opposite side sash; 4, 27, 20 and 23, posts at the rear of the door pocket; 2, 9, 18 and 25, intermediate posts in each half of the car; 1, 10, 17 and 26, posts with square base, and 3, 8, 19 and 24, posts of similar type except that the post is cut at the base as noted. Footing plates are furnished with the center-door and door-pocket posts.

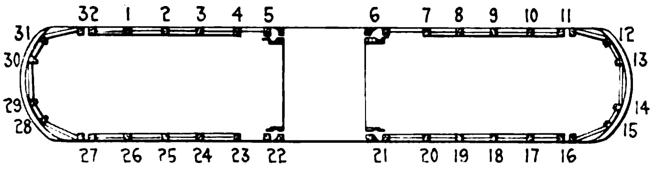
In order to take advantage of the light post construction, the Kling split bolt is being used for all attachments. This bolt and some of its applications to places which are not accessible to the ordinary bolt were described in the ELECTRIC RAILWAY JOURNAL, page 300, Feb. 15, 1913. A drawing on page 712 shows how it has been applied to the welded hollow post on which the motorman's door is hinged.

The roof is of single-arch type, but as shown in a drawing on page 714 the ceiling is suspended therefrom from bent oak frames in order to provide space for the ventilating duct. The exterior consists of canvas-covered agasote ⅜ in. thick riveted to the flanges of the carlines. The inner lining below the sash rail and advertising racks is also of agasote. Three grab-irons and a wooden roof rack are installed at diagonally opposite corners of the car to make the trolley fittings readily accessible to the motorman.

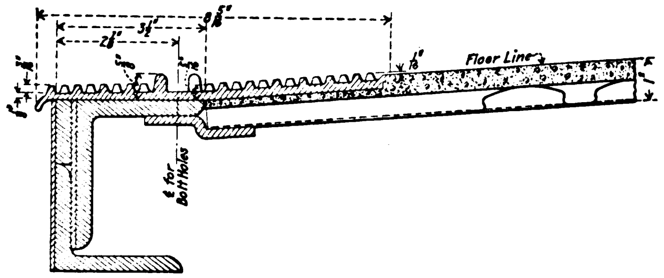
All flooring is of "Flexolith" cement supported on "Chanarch" metal, as shown in the accompanying cross-section, which was taken through the sill at the center door. This support was riveted and bolted to the car framing at the works of the car builder, but the cement was received at the shops of the railway company as a powder, mixed on the spot and applied to a uniform thickness of 1½ in.

SASHES AND DOORS

The sashes are of ¾-in. mahogany. To make the car popular for summer service, the sixteen side sashes raise and the eight end sashes drop; in addition, the four outside sashes at the door pockets drop and the four inside door-pocket sashes are hinged and arranged for screens in place of glass in the summer season. The sash lock, which operates on the inside of the sash run, is shown on page 713. This lock has a cam-like movement so that when the handle is pinched the catch is drawn out of the sash-run holes (located 4 in. apart) to permit the sash to be moved up and down. The release of the pinch handle causes the catch to lock the sash by dropping back into one of the holes of the sash run.



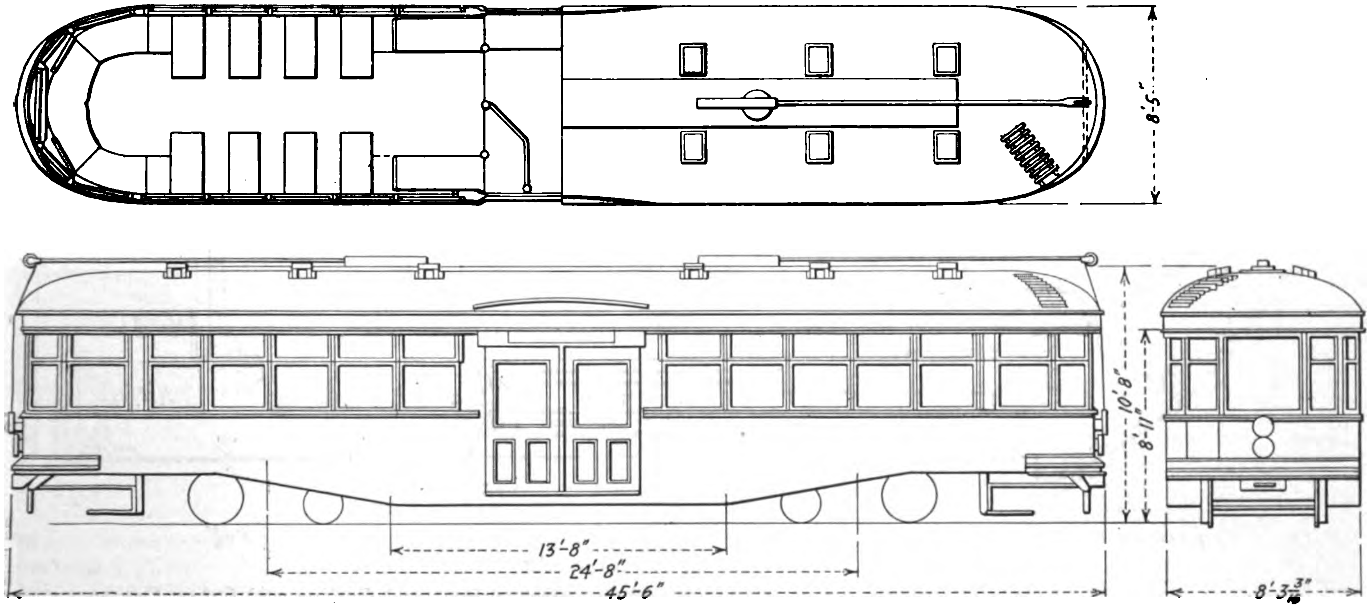
Brooklyn Center-Entrance Car—Key Plan of Posts



Brooklyn Center-Entrance Car—Cross-Section at Entrance

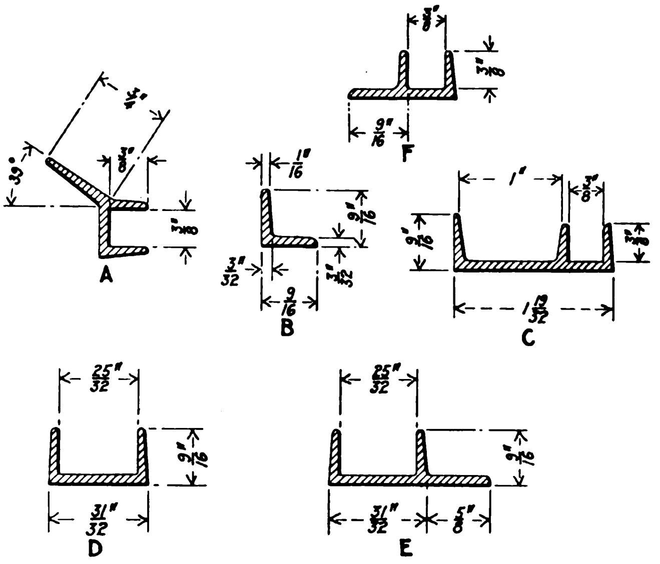
The great width, 39¼ in., of the motorman's center sash increases the angle of vision by eliminating posts. As illustrated on page 712, this sash is provided with the Minier window cleaner, which is screwed into and turns on the sash framing. The cleaner proper consists of an outside and an inside arm, each carrying a thin blade, which are revolved simultaneously across the entire window area.

The center doors give an opening 6 ft. 6 in. wide and 6 ft. 2 in. high. They are of twin type, constructed of sheet steel reinforced and welded, and slide into pockets formed by the hollow posts. The doors are pneumatically operated by the Consolidated Car Heating Company's apparatus and electrically controlled by means of push button and pedal from the conductor's pedestal, which is located in the center of the well.



Brooklyn Center-Entrance Car—Half Plans, Side Elevation, End Elevation, Seating and Main Dimensions

The center entrance and exits are divided by stanchions and railings to give a clear entrance of 32 11/16 in. in the center and 21⅜-in. exits on each side. The pivoted railing, which can be swung from one side of the car to the other, depending upon which set of doors is being operated, divides the incoming from the outgoing passengers. The lower panels of the side doors are of clear wired glass to permit unobstructed observation by the conductor while the doors are closed. Soft-rubber buffers are attached to the doors to avoid injury to passengers and damage to their clothing.

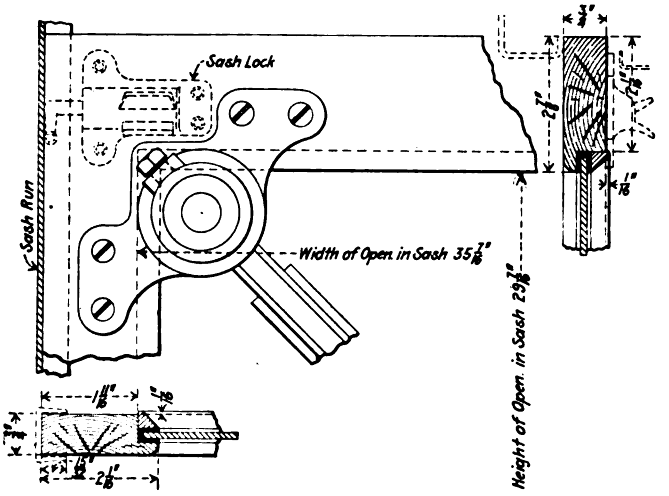


Brooklyn Center-Entrance Car—Specimens of Sash Runs of Extruded Metal

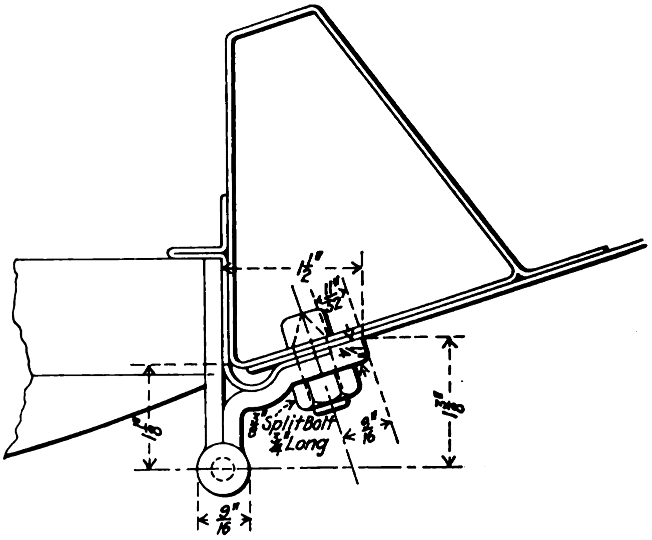
A locked swing door 21½ in. wide and 5 ft. 5 in. high is provided at each end of the car for the exclusive use of the motorman. This door is made of welded steel with one drop and one fixed sash.

SEATING

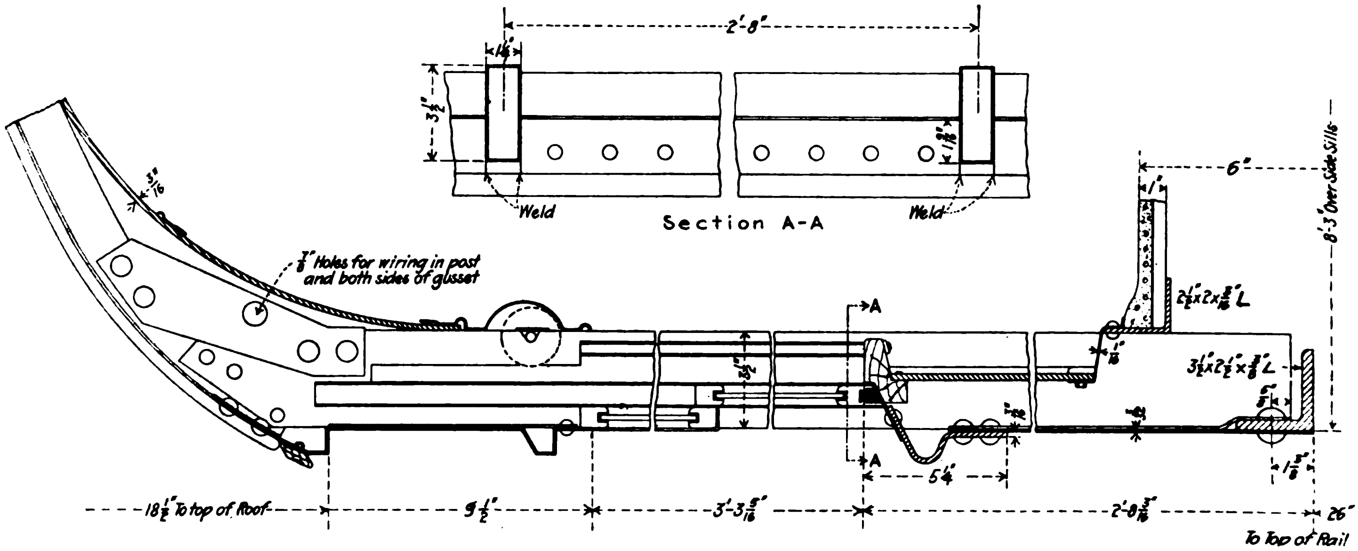
The car seats fifty-eight, which is equivalent to 671 lb. per passenger. The original seating plan called for sixteen cross seats of reversible type with a 26-in. aisle between, longitudinal seats at the center doors and curved seats at the ends. This general plan has been retained as giving maximum seating capacity without congestion at the center, but ingenious improvements have been made in those seats which are in or out of service, according to the direction of running. In the first car (see ELECTRIC RAILWAY JOURNAL, June 22, 1912, page 1070) the end seating was so arranged that the section directly behind the motorman was hinged upward at each end when the cab doors were swung out for service, and the outer ends of the seating near the cross seats were raised in like manner with the change in direction. The new end seat is a semi-circle seating eight passengers and made of four hinged segments, each quarter-circle consisting of a long segment near the motorman and a short segment which opens outward to a supporting piece on the adjacent cross seat. Before the motorman makes up the cab by bringing out the two swinging sashes, he turns over the ends of each half-circle of seating, thereby doubling its thickness and halving its length. The upwardly hinged seats were discarded to save time in changing from one end to the other. The curved end seats, of course, are finished on both sides. To avoid the possibility of tearing clothing, they are made with screws which are inserted transversely through the slats. The back of the curved seat is always hung behind the control apparatus. The view of No. 1 end on page 715 shows the curved seating arranged for passengers. At this end are located the switchboard, which is behind the bulkhead, the thermostat in front of the bulkhead and the cash fare register. The view of No. 2 end shows part of the seating removed when the cab is ready for use with the separator bar in position and the curtain partly drawn down. This view also shows the transfer register and the exhaust duct which leads to the inclosed fan behind the bulkhead.


Sash Lock
Sash Run
Width of Open. in Sash 35 7/8"
Height of Open. in Sash 29 7/16"
3/4"
2 7/8"
1/16"
1 11/16"
2 1/16"

Brooklyn Center-Entrance Car—Attachment of Cab Window Cleaner



Brooklyn Center-Entrance Car—Application of Split Bolt to a Hollow Post



Brooklyn Center-Entrance Car—Section of Side, Showing Connection of Post and Carline and Other Details

In the first car the seats opposite the center door were arranged to slide horizontally under the adjacent longitudinal seats on the higher floor level. This has been superseded by the arrangement shown in the drawing on page 713 and in the detail view taken at the center door. Each half of the seat is brought into place by swiveling it downward on a rod carried on the upper floor between the side of the car and an aisle stanchion. When not in use each half is kept vertical by a double-acting lock which fits into a retaining bar. The key is of the square-shank type used for the motorman's door. Both seat halves are alike except that one carries a folding leg which is automatically locked into place when the seat is up. The seat with the leg is dropped first. These seats and the pair of center doors not in service are interlocked both mechanically and electrically to prevent the improper opening of the door.

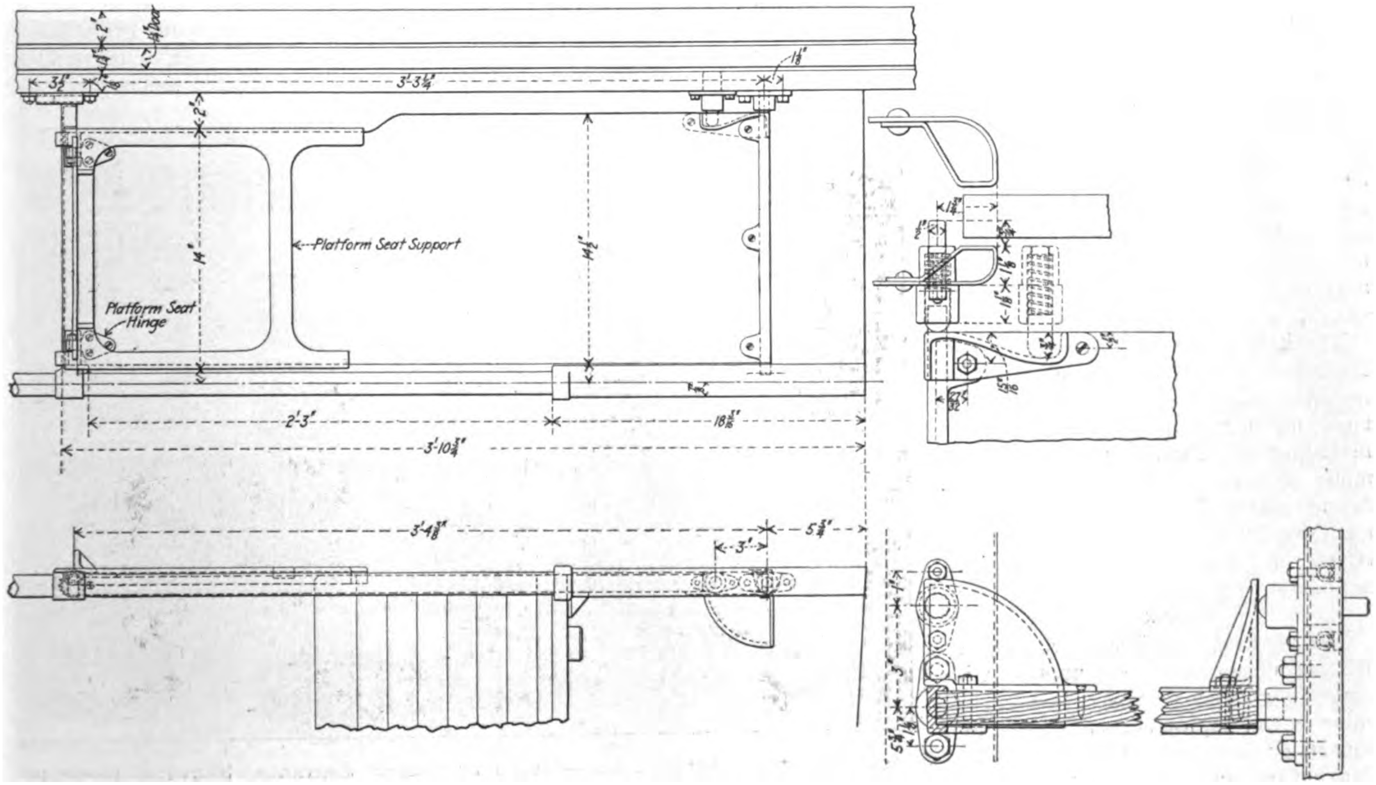
The cross seats are 34 in. wide. They have but one pedestal, the other end of each seat being carried by pressings between the posts. The arm rests are of mahogany. At each side on the upper level near the door is a longitudinal seat with space for three passengers.

MOTORMAN'S CAB

The motorman's cab presents a departure from the original design in that the folding doors have been replaced by a lighter, cheaper and faster combination, consisting of two swinging sashes, which are carried only to the height of the seat backs, and an intermediate curtain which is drawn down behind the motorman to screen him from the passengers. The cab is prepared for service by folding the curved seat, next swinging out the two sashes to an angle of about 45 deg. and then inserting the separator or tie bar, which normally is kept hinged in an upright position on one of the swinging sashes. These sashes are also provided with curtain grooves, the curtains being placed in moldings in the bulkhead above so that when the sashes are opened in position to form a cab the curtain grooves will be in the proper place to receive the curtain fixtures. The motorman's cab has a swinging bracket on which a seat may be placed, but at present it serves only as a support and junction piece for the curved seat when the latter is in use for passengers.

TRUCKS

Each car is mounted on two Brill 62-E-1 maximum traction trucks with 4-ft. 6-in. wheelbase, equipped with Carnegie 28-in. driver wheels and 21-in. pony wheels. The driver axles are of heat-treated carbon steel, with 3½-in. x 7 11/16-in. journals, and the pony axles of open-hearth hammered steel, with 3-in. x 7½-in. journals. These journals are somewhat smaller than the company's standard for drop-platform cars. All journal boxes are "Symington" semi-steel and the center plates are of the "Symington" ball-bearing type. The trucks vary from the builder's standard type chiefly in being arranged to take a 28-in. driver wheel and in locating the live lever so that it pulls from the bottom instead of from the top.

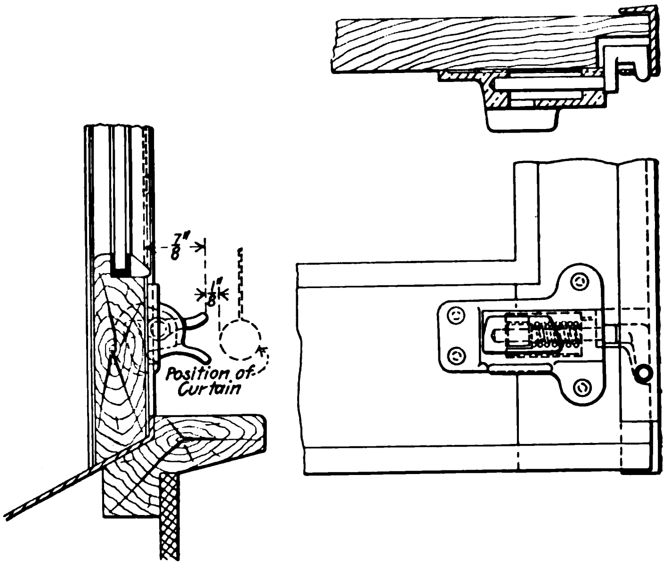


Brooklyn Center-Entrance Car—Details of Half-Seat Alongside Center Doors

MOTORS AND CONTROL

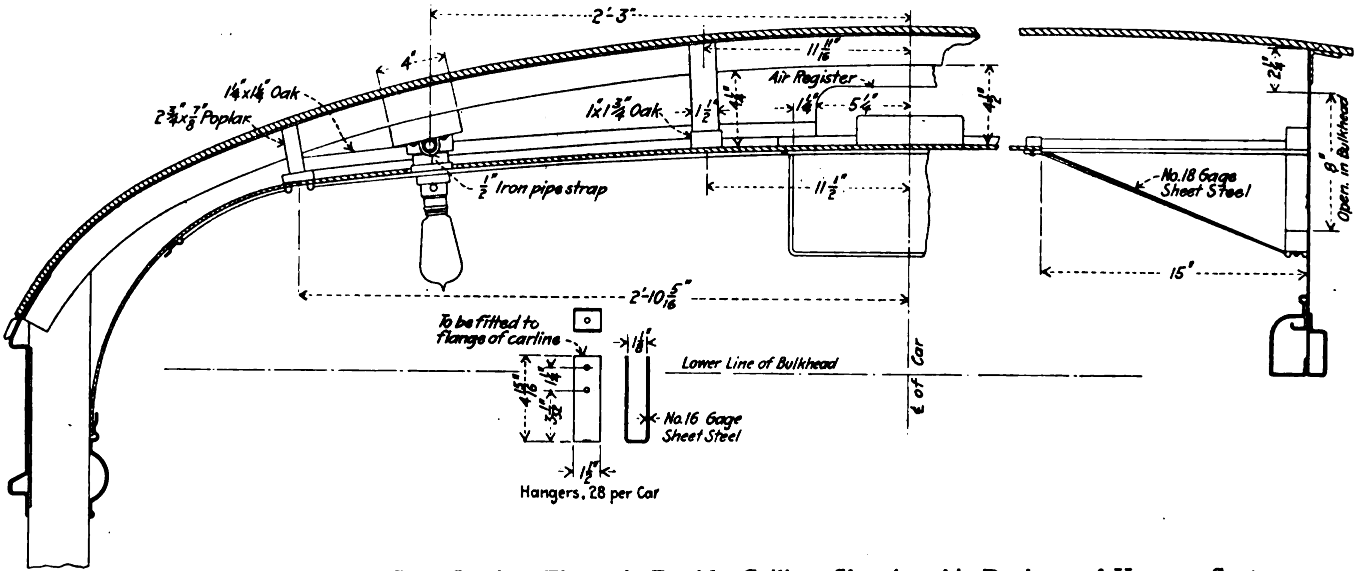
The traction equipment consists of two GE-234-A motors rated at 40 hp on 500 volts and 50 hp on 600 volts. These motors are wound for field control. On tapped field with seated load they are capable of giving a maximum speed of 25 m.p.h. with a gear ratio of 14:61 and a maximum speed of 21 m.p.h. on full field. The motors have a maximum vertical height of 2 ft. 1 in. and a maximum width of 4 ft. 7/16 in. Compared with older motors, these dimensions mean a saving of 2 in. clearance below the axle.

The controllers are of the C-96-A type with pilot valves operating a type SB-30-42-A-1 contactor set. A special feature of this switch group is that the overload relay cannot be reset unless the master controller drum is in the "off" position.



Brooklyn Center-Entrance Car—Sash Lock

Two relays are provided in connection with the door operation, namely, the signal relay, which is connected in the door signal circuit in such manner as to prevent a car from being started until the doors are closed, and the counter relay, which is connected with the control and motor circuit in such manner as to prevent the doors from being opened while the car is in motion. If for any reason the doors cannot be closed, a short-circuiting switch can be placed in circuit to operate the car with the doors open. A conductor's valve for cutting off the current and applying the air brakes in emergencies is provided in the fare pedestal. The usual deadman's controller handle is also incorporated. It is proposed to operate the cars singly, but provision has been made for possible multiple-unit operation.



Brooklyn Center-Entrance Car—Section Through Double Ceiling, Showing Air Register of Vacuum System

MISCELLANEOUS ELECTRICAL EQUIPMENT AND WIRING

All wires in this car were manufactured according to the standard Brooklyn Rapid Transit specification which calls for 30 per cent Para rubber compound. They are inclosed in "Galvanite" wire duct conduit piping, in conjunction with Crouse-Hinds condulets.

The two trolleys are brought down along the roof to No. 1 end through special brass-flanged castings which are insulated at the joints. The trolley circuit is carried through ¾-in. conduit to the steel switchbox in the cab. The switchboard is of two-panel slate construction, one panel carrying the power circuits and the other the auxiliary circuits. The two lightning arresters are taken off the main panel and carried perpendicularly to a point below the car floor. The two main fuses are located at one side under the motorman's cab at No. 1 end.

The illustrations of the underside of the car are of interest not only in showing the general layout of the equipment but also the attention given to installing the conduit piping with as many straight runs as possible. So far as practicable, all electrical equipment was hung at one side of the center entrance and the rest of the apparatus on the other side.

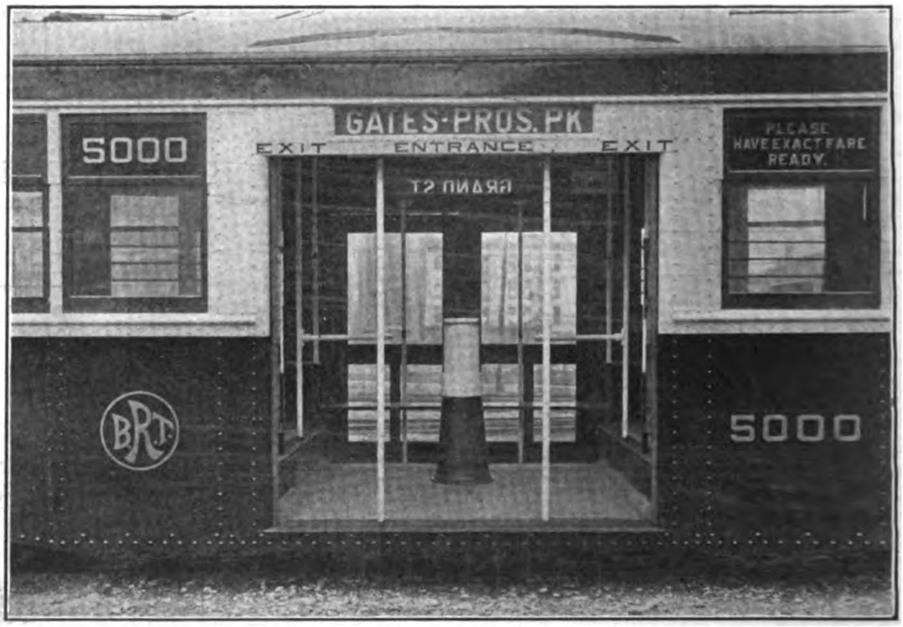
BRAKES

The air-brake equipment consists of Westinghouse D-1-L compressor with type G governor, type SY-2 brake valve with large emergency port and air sander incorporated, New York Air Brake Company's 8-in. x 12-in. cylinders, type H emergency valve and conductor's emergency valve; also "Wyoming" pneumatic sanders, with two sand boxes under end cross seats adjacent to truss-plank heaters and operated by means of the motorman's valve.

Instead of straight levers, two sheaves are provided at the boundary lines of the center-platform section to maintain the brake rigging at a higher level and to give additional room for other apparatus. Another interesting feature of the brake rigging is that, owing to the close margin of 9¾ in. between the underside of the platform and the paving, the cylinder levers had to be placed at an angle to permit the proper braking connections. The brake-shoes are of the B. R. T. standard type with American form G slack adjuster.

VENTILATION

The ventilation of the car is provided for by the Cooke system of mechanical ventilation, circulation being obtained by means of an exhaust fan driven by a ½-hp motor. An air duct from one motorman's cab bulkhead to the other extends under the roof inside of the car. This duct has a clear cross-section of approximately 150 sq in., with fourteen registers. The motor and fan with the exhaust duct leading to louvers in the bonnet are located under the bonnet at No. 2 end of the car. Eight fresh-air intakes are provided through the inside lining of the car near the floor line and through the heater backs, thus bringing the fresh air past the heaters before entering the car.



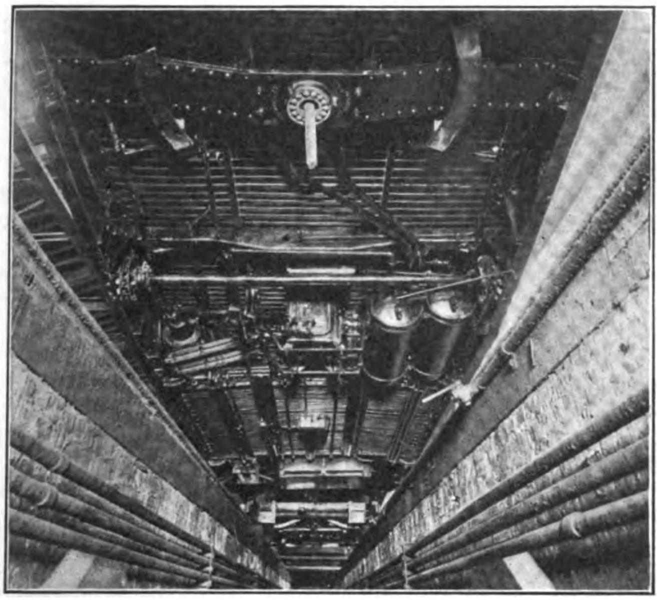
Brooklyn Center-Entrance Car—Detail at Center Entrance, Showing Dividing Rails and Stanchions, Conductor's Pedestal, Downwardly Swiveled Seats Alongside Closed Doors, Signs, etc.

HEATING

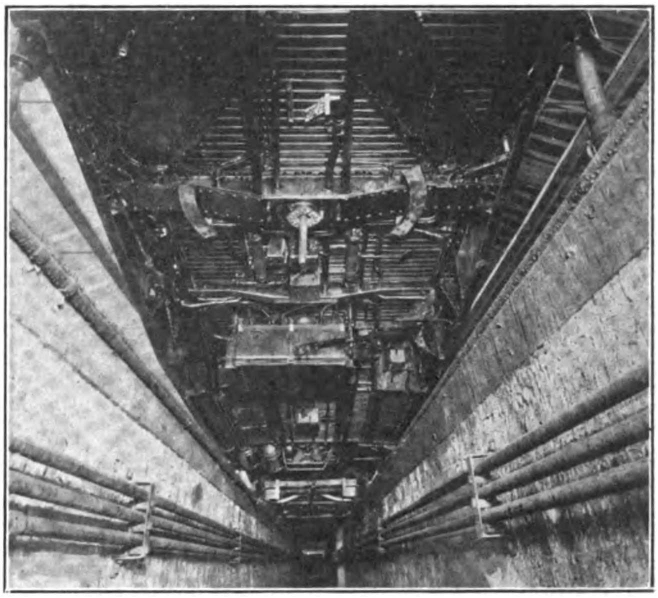
The heating is provided by eight Consolidated Car Heating Company's cross-seat heaters, eight truss-plank heaters and four panel heaters, all arranged for consuming 450 watts at 550 volts per heater with thermostatic control.

SIGNS AND SIGNALS

The car is brilliantly illuminated by five circuits of five clear-glass 23-watt, 115-volt tungsten-wire lamps distributed as follows: twenty lamps inside of the car, forming two rows of ten each, located 2 ft. 3 in. from the center line of the body; two lamps in each end sign box and one lamp in each Dayton headlight.



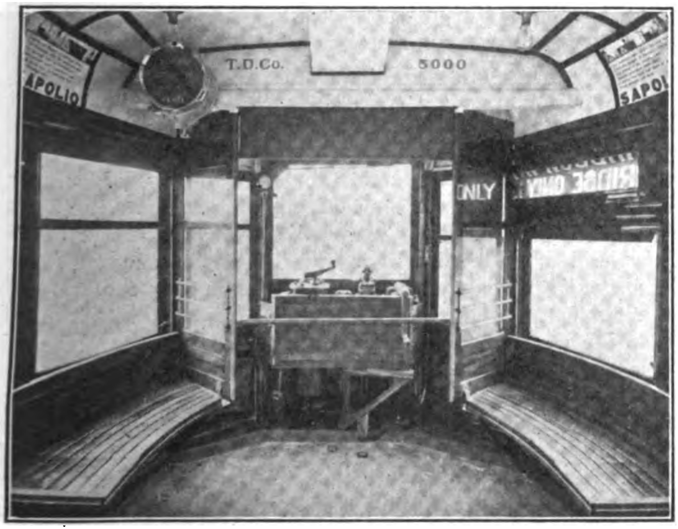
Brooklyn Center-Entrance Car—Underside, Air-Brake End



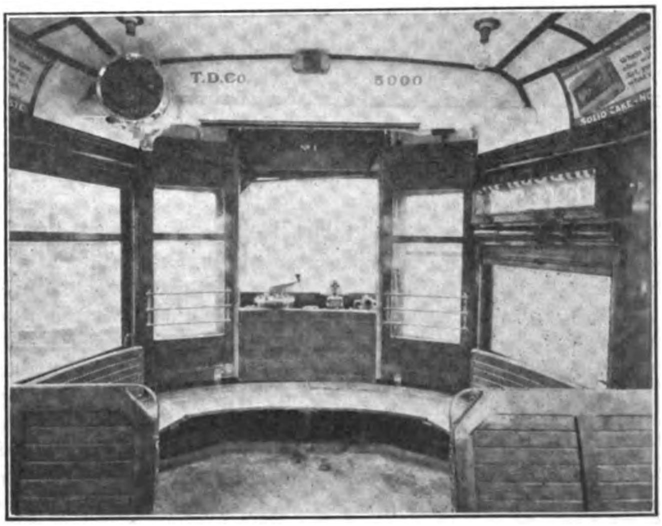
Brooklyn Center-Entrance Car—Underside, Electrical End

The destination and route of the car are indicated by the Electric Service Supplies Company's illuminated curtain signs. These signs are installed at each end of the car and at the sides of the doors to show the route and at right-hand diagonal corners to show the destination.

Twenty push buttons, operating the buzzer in the motorman's cab, are installed in the side posts for the convenience of passengers; push buttons are also at the conductor's pedestal, for independent bell signal to motorman. Electric signal lights in the motorman's cab show whether the doors are open or closed. The cash and transfer registers are also operated by electric push buttons from the conductor's pedestal. Hence the car is entirely free from both register rods and signal cords. All push-button circuits are operated from the line current through resistance.



Brooklyn Center-Entrance Car—Cab at No. 2 End Ready



Brooklyn Center-Entrance Car—Cab Out of Service

FARE, COLLECTION, WEIGHTS, ETC.

As in the trial car, fares and transfers will be collected as the passenger enters. The entrance railings lead the passengers to the conductor, who is stationed at his pedestal in the center of the well. The pedestal is a revolving device with a change table on the top, where fare is paid by the passenger.

The weight of this car, including drawbar fittings, etc., is 38,900 lb., compared with 39,550 lb. for the first car. It is expected that slight structural variation will produce a reduction of several hundred pounds more. The four vestibule sashes weigh only 94 lb., whereas the original cab-door layout weighed 480 lb.

The following is a partial schedule of the weights of different parts as determined at the Thirty-ninth Street shops of the company:

Frame as received, including 480-lb. "Chan-arch"	8562
Single truck without gear or electrical fittings	4371
One motor complete	2727
Seats	1638
Floor compound	1585
Control equipment complete with manufacturer's and B. R. T. panels	1370
Agasote roof, headlining, side panels, etc.	1231
Air-brake equipment as furnished and exclusive of piping	1147
Brake rigging	834
All glass, including signs	679
Trolley stands, poles, etc.	544
Doors without glass	438
Sashes without glass	330

Report on Street Railway System of Kansas City

An Investigation of the Valuation of the Property and Its Apportionment Between the Different Municipalities Served Has Been Made for Adoption in a New Franchise Together with Recommendations for Improvements—An Abstract of the Report Is Given

A report on the value of the properties of the Metropolitan Street Railway System of Kansas City, Mo., has been made by Bion J. Arnold to William C. Hook, judge of the United States Circuit Court, Kansas City.

Prof. Mortimer E. Cooley and Mr. Arnold were appointed on June 6, 1912, as commissioners to investigate and report to the court what in their opinion is a "fair and reasonable sum to represent the capital value of such properties for adoption in a contract for new franchises in the municipalities wherein the properties are operated, the various elements of such value and how it should be apportioned between the municipalities." As Professor Cooley was unable to act on account of illness, the order was amended on July 5, 1912, so as to make Mr. Arnold sole appraiser.

After these orders were entered, the receivers, Robert J. Dunham and Ford F. Harvey, requested that there be prepared in the same connection "such data as would serve to determine all the work that should be done to establish the present system in first-class physical condition, and to recommend such further work as may be necessary to permit the company to fulfil its moral obligations to the community in every sense, that is, to give the people of Kansas City a street car system commensurate with the city and its needs, taking into reasonable regard the conditions under which the company is now operating and must in the future operate."

In the general report Mr. Arnold says in part: "The Metropolitan system consists of the street railway properties of the Metropolitan Street Railway, including that which was formerly owned and conveyed to it by the Central Electric Railway Company and that of the Kansas City Elevated Railway Company, all using franchises received from the different municipalities through which they operate. Intimately connected therewith, though not in the hands of the receivers, is the Kansas City & Westport Belt Railway Company, the stock of which is, as is that of the Metropolitan company, owned by the Kansas City Railway & Light Company. The Metropolitan system, exclusive of the Westport company, contains 259.81 miles of single track, of which 182.28 miles are in Kansas City, Mo.; 5.26 miles in Independence, Mo.; 9.73 miles in Jackson County, Mo., outside of cities therein; 58.17 miles in Kansas City, Kan., and 4.37 miles in Rosedale, Kan. The Westport company has 16.87 miles of track in the present limits of Kansas City, Mo., and 4.23 in Jackson County outside of the city limits. In estimating the values of these properties, the conclusion reached is that the fair and reasonable sum to represent the capital value for adoption in any new contract with the municipalities wherein the properties are located is as follows: Metropolitan system, exclusive of the Westport company, $35,000,000; the fair and reasonable value of the property of the Westport company for the same purpose is $1,700,000; total, $36,700,00. These values thus found should, in the judgment of your commissioner, be apportioned as follows:

"Metropolitan system in Kansas City, Mo., $28,000,000; Independence, Mo., $350,000; Jackson County, Mo., $700,000; Kansas City, Kan., $5,600,000; Rosedale, Kan., $350,000; total, $35,000,000.

"Westport company, Kansas City, Mo., $1,200,000; Jackson County, Mo., $500,000; total, $1,700,000.

"An analysis shows that 81 per cent of the appraised value, 83 per cent of the investment value, 83.8 per cent of the gross revenue, 79 per cent of the car miles and 75.9 per cent of the track miles are located or originate in Missouri, and your commissioner believes that, taking all the facts into consideration and so long as the property is operated as an entity, the division between Missouri and Kansas on a basis of 83 per cent and 17 per cent respectively is fair and reasonable.

"The study of the various considerations affecting this apportionment has been further carried out so as to divide the value apportioned to Missouri between Kansas City, Independence City and Jackson County, and to divide the value apportioned to Kansas between Kansas City and Rosedale, as follows:

"Kansas City, Mo., 80 per cent; city of Independence, 1 per cent; Jackson County, 2 per cent; total Missouri, 83 per cent.

"Kansas City, Kan., 16 per cent; Rosedale, 1 per cent; total Kansas, 17 per cent.

"Since the value returned for the Westport company is practically that shown in the appraisal of that property, the apportionment of such value between Kansas City and Jackson County, Mo., is that shown by said appraisal.

"Many methods have been adopted by courts, experts and students of the problem in valuing street railway properties. Among these are the ascertainment of, first, the actual cash investment therein and the return actually had in the past thereon; second, taking, as was done in Chicago and Cleveland, the actual cost of reproduction less depreciation and adding thereto a fair and reasonable allowance for future earnings, which latter sum is intended to cover the intangible value or various other elements which go to make up the real value; third, the value based upon the deferred earnings upon the actual investment, and, fourth, the fair market value of the property. [The values determined by the various methods are summarized in Table I published herewith.—EDS.]

ACTUAL CASH INVESTMENT AND ACTUAL RETURN

"The actual cash investment in the properties of the Metropolitan system, exclusive of those of the Westport company, is $34,298,061. From this investment there have since the existence of the property been received over and above operating expenses sums equaling only 5.36 per cent annual interest thereon, out of which have been paid all interest charges and all moneys distributed to owners or stockholders as dividends or otherwise. A company must with actual cash investment meet the changing demands of the public for improved methods of service, with actual cash investment in much new property to take the place of property not yet worn out.

"If after meeting such charges and others of like nature the owners have drawn in returns considerably more than the ordinary rate of interest, there has, to the extent of that excess, been repayment largely, if not wholly, for the entire investment, including the losses thus sustained. If, however, the returns have not exceeded a reasonable interest rate, fairness demands that there be protection for the investment which was really made, provided the records show that the property has been efficiently managed. This is especially applicable where a company has spent large sums in the construction of municipal improvements and in extensions into new and comparatively unprofitable territory, which has later been built up to the advantage of the city and ultimately would be to the advantage of the railway company if it were allowed to continue to operate. That both these situations exist in the Kansas City territory is evidenced by the large amount of money spent by the company for bridges and viaducts and by the excessive track mileage now in operation as compared with other cities.

"The public has benefited by the changes necessitated on account of the supersession and abandonment of inadequate or obsolete property, and the company should have the opportunity, in view of the exceptionally low rate of return it has received to date, of earning these losses back out of the property, especially if the owners concede the right to the public to retire or amortize a large portion of this value from future earnings.

COST OF REPRODUCTION LESS DEPRECIATION WITH ALLOWANCE FOR INTANGIBLE VALUE

"The 'cost to reproduce new' value excludes promoters' profits or development expense and simply represents the investment that would be required to reproduce new to-day the physical property as it stands, no attention whatever being paid to any expenditures that may have been made in past years on account of the horse car lines, cable lines or any portions of the electric lines which may have been constructed and later worn out in service or abandoned.

"The present or depreciated value of the existing physical property has been arrived at by determining the depreciation which has occurred in the existing property between the time of its installation and the date of the appraisal.

"Taking everything into consideration, it would be a fair thing to assume that the rights of the Metropolitan system, as they now exist, exclusive of those of the Westport company, will in some form, in any event, continue until June 1, 1925, and the value of its earning capacity during that time, dependent upon that right alone and exclusive of anything on that account from the Westport company or other franchises extending beyond that date, should be ascertained.

VALUE ON BASIS OF DEFERRED EARNINGS UPON ACTUAL INVESTMENT

"Another method of ascertaining the fair value, approved by some experts and adopted in some instances in Wisconsin and by the French and Swiss governments in the acquisition of steam railways for national ownership, is as follows: Ascertain each year the actual investment in the property, deducting the value of superseded property in the year it was superseded, and estimate a fair return on this net investment. Deduct from such return the net income after paying operating expenses, including maintenance, renewals and taxes, charging to operation, however, the cost of superseded property in the year when superseded. Then compound each year the deficit or surplus, as the case may be, between the fair return and the said income. The result will show a sum representing the accrued loss estimated upon the basis of a return at a given reasonable rate or percentage. The total of the accrued loss together with the actual investment in existing property will then represent the fair value of the entire property. Or under a modification of this method a fair return may be figured upon the total investment without charging to operating expenses the cost of superseded property, this method retaining in capital account the investment in property which has been superseded.

"This method allows the investor, wholly regardless of bond and stock issues and liabilities outstanding, the actual amount invested with a fair interest return thereon, charging him, however, with every dollar earned from the property. Tested by this method and considering the purpose for which it is made, the value returned by your commissioner is found to be conservative.

FAIR MARKET VALUE

"It has been said that a reasonable fair market value is that sum at which a fair buyer would buy and a fair owner would sell, both being willing to deal at a fair price. So testing and considering the question in the light of one's experience in and judgment of like properties in the large communities of the country, and taking into consideration the above-mentioned elements as well as the entire situation and surrounding conditions, the fair and reasonable market value of the properties is, in the judgment of your commissioner, not less than the sums hereinabove given.

"The values of the property for the Metropolitan system exclusive of the Westport Belt Railway, as determined by the methods discussed above, are in substantial accord and have all been taken in consideration at the value returned for the Metropolitan system."

TABLE 1—SUMMARY OF VALUES OF METROPOLITAN SYSTEM, EXCLUSIVE OF THE WESTPORT BELT RAILWAY

(1) Actual cash investment in the property:		
Investment in the present property	$25,214,870.67	
Investment in superseded property	9,083,190.48	
Total investment	$34,298,061.15	
(2) (a) Value as determined from the present value of the physical property alone and the intangible value on the basis of a protected investment:		
Cost to reproduce physical property new	$27,327,549.00	
Less depreciation	5,792,514.77	
Present value of physical property alone	$21,535,034.23	
Intangible values	13,491,541.27	
Total value	$35,026,575.50	
(2) (b) Value as determined from the present value of the physical property and the intangible values on the basis of an unprotected investment:		
Cost to reproduce new	$28,643,733.02	
Less depreciation	5,958,015.19	
Present value of physical property	$22,685,717.83	
Net intangible value	12,951,284.82	
Total present value	$35,637,002.65	
(3) Investment in property determined on premise that company is entitled to fair return on capital actually invested:		
(a) Capital value obtained by adding to total investment the accrued deficit in operation below a fixed term, superseded property being retained in capitalization, using 6 per cent and 7 per cent as assumed fair rate of return:		
	6 Per Cent.	7 Per Cent.
Total investment	$34,298,061.15	$34,298,061.15
Accrued loss	1,742,251.54	9,903,865.90
Total capital value	$36,040,312.69	$44,201,927.05
(b) Capital value obtained by adding to net investment the accrued deficit in operation below a fixed return—the superseded property being charged to operation in the year in which it was removed, assuming 6 per cent and 7 per cent rates of return:		
	6 Per Cent.	7 Per Cent.
Total investment	$25,214,870.67	$25,214,870.67
Accrued loss	10,829,343.47	18,573,637.20
Total capital value	$36,044,214.14	$43,788,507.87

FAIR ORDINANCE PROVISIONS:

"(a) The contract should stipulate the agreed fair value of the property, which should be so determined as to protect the interests of those whose money is legitimately invested in the creation of the property, and in cases where the returns on the actual investment have not been excessive, as in the case of the Metropolitan system, should assure to the owners a fair return on such value.

"(b) The ordinance should provide for supervision by the city or State of capital expenditures in order either to rehabilitate portions of the property or to make such extensions as are necessary to give adequate service, such supervision to be made for the purpose of assuring investors that their investment is represented by money actually put into the property, thus tending to decrease the rate of return that will be demanded by investors, and at the same time for the purpose of securing the minimum capital investment, as well as the minimum rate of return, all of which serves to decrease the cost of transportation service.

"(c) The city or State should supervise the operation of the property to such an extent as may be necessary in order that the service shall be adequate and of as high a character as is consistent with the returns from operation.

"(d) The surplus from operation that remains after the payment of operating expenses, including taxes, maintenance and a proper reserve for depreciation and after the payment of fixed charges, consisting of the agreed minimum fair return on the capital invested, should be devoted to the following purposes:

"(1) Part to an amortization fund for the purpose of ultimately retiring any part of the capital investment that is not represented by physical property.

"(2) Part to the company as profit for efficient operation, unless it should be decided to limit the company to a fixed return upon its investment, which return should be somewhat higher than the minimum return referred to in paragraph (d).

"(3) Part to the city as its share in the net profits, if the city so elects in the ordinance, although for the best interests of the citizens it is questionable whether the city should retain any portion of the profits, the better policy being that any such surplus should be utilized in improving the service, extending the system or in establishing a pension or other fund for the benefit of employees of the company.

"(4) The reduction of fares after such time as the company has been able to decapitalize all that portion of its capitalization which is not represented by physical property, or after the decapitalization of the value of tangible property, should this be deemed advisable."

Table II shows the value of the Metropolitan system and the Kansas City & Westport Belt Railway on the basis of a protected investment.

TABLE II—VALUE OF METROPOLITAN SYSTEM AND THE KANSAS CITY & WESTPORT BELT RAILWAY ON BASIS OF A PROTECTED INVESTMENT

	Cost New.	Present Value.
Track	$5,686,568.15	$3,804,876.82
Grading	206,001.97	206,001.97
Bridges, trestles, culverts and viaducts	1,819,185.80	1,470,443.28
Paving	2,177,655.40	1,683,101.96
Electrical distribution system	2,274,622.96	1,902,886.58
Rolling stock	4,020,127.09	2,853,780.73
Power plant equipment	3,305,408.57	2,481,628.10
Shop equipment	127,561.20	78,344.58
Stores, roadway tools and miscellaneous equipment	428,257.90	418,501.71
Buildings	2,525,460.18	2,043,059.72
Furniture and fixtures	32,868.80	27,955.07
Real estate	2,081,409.04	2,081,409.04
Right-of-way	1,431,120.60	1,431,120.60
Property damages	73,363.60	73,363.60
Real estate dedicated to municipalities	236,584.37	236,584.37
	$26,426,195.63	$20,793,058.13
Legal expenses, carrying charges and incidentals, 5 per cent	1,321,309.77	1,321,309.77
Bond discount, 5 per cent	1,387,375.26	1,105,718.39
	$29,134,880.66	$23,220,086.29
By companies:		
Metropolitan Street Railway	$24,077,293.70	$19,028,798.47
Kansas City Elevated Railway	2,045,694.69	1,630,440.84
Central Electric Railway	1,204,560.61	875,794.92
	$27,327,549.00	$21,535,034.23
Kansas City & Westport Belt Railway	1,807,331.66	1,685,052.06
	$29,134,880.66	$23,220,086.29

"In detail the method of determining the future earning value is this: The operating statement of the company for the year ended May 31, 1912, gave the information as to the gross receipts and the operating expenses and showed that the gross income for the year was $6,346,782 while the operating expenses, including taxes, amounted to $3,998,548, or a total net income from operation of $2,348,234. The operating ratio as shown by this year's operation was 63 per cent, of which 17 per cent was charged by the company as maintenance. This operating expense, however, included a large amount of renewal expenditures, amounting to between 3 per cent and 4 per cent of the gross earnings. If the full provision is made to meet the depreciation, it is found that about 6.9 per cent of the gross earnings would have to be set aside annually for the purpose of renewals, that is, about 3½ per cent in addition to the 3 per cent or 4 per cent that was expended during the last year. This would result in an operating ratio of 66 2/3 per cent, which has been taken in determining the net from operation throughout the remaining period of the franchise. Ordinarily the fair operating ratio for street railway companies, including renewals, is about 70 per cent, but the Metropolitan company owns its own power plant, and in the operating expense the charge for power is figured at cost. In this method of estimating the future net earnings the entire capital is supported, which capital includes the cost of the power house. Since the gross receipts contain the receipts from the sale of power, a deduction of $128,947 was made from the total gross receipts, this amount representing the estimated profit to the Metropolitan company from the sale of power. This amount being deducted from gross receipts of $6,346,782 leaves the amount of $6,217,835 as the gross receipts from the operations of the transportation company, and this amount has been increased year by year at the rate of 4 per cent compounded throughout the remaining period of the franchises. The net receipts for the future have been taken as 33 1/3 per cent of the gross receipts, and the present value of the future net earnings from operation for the period ending May 31, 1925, have been determined. From the present value of the future net receipts there has been deducted the present value of the interest, figured at 5 per cent on the value of the physical property required to reproduce the gross receipts above referred to.

"In arriving at the increase in capitalization, the maximum ordinance requirements have been used, which, according to the contention of the cities, call for the construction of 8 miles of single track per annum. This will entail an expenditure of $750,000 per annum, based on a cost of $94,000 per mile of track, which is obtained by dividing the total value of the property, exclusive of property damages, real estate dedicated to the city and such items, by the total present mileage. The Metropolitan system is now overbuilt in the city of Kansas City, and the total expenditure for new property that will be necessary during the next fourteen years is practically $7,000,000. On the basis of the ordinance requirements, however, an expenditure of $9,750,000 will be necessary, and although this expenditure is greater than the situation warrants, this increase in capital has been used in determining the future earning value. The present value of all future interest payments on this capital has been determined, thus arriving at the total present value of the fixed charges, which in turn are to be deducted from the present value of the future earnings. The final result reveals that the present value of the future receipts amounts to $25,832,411, while the present value of the interest payments on the capital to be supported amounts to $12,340,870, resulting in a net earning value of $13,491,541, this value being figured in accordance with the Chicago method on a conservative basis at every point, that is, conservative as to the rate of increase of gross receipts, conservative as to the operating ratio, and conservative in that a much larger increase in investment is figured on than will be necessary in order to take care adequately of the increased business."

PRESENT AND FUTURE TRANSPORTATION REQUIREMENTS

Other sections of the report relate to present and future transportation requirements of the Kansas City district, saying in part:

"Table III shows a comparison between operating statistics for the Kansas City district and eleven other cities comparable in size with the Kansas Cities.

TABLE III—COMPARATIVE STATISTICS FOR KANSAS CITY DISTRICT AND THE AVERAGE FOR TWELVE CITIES

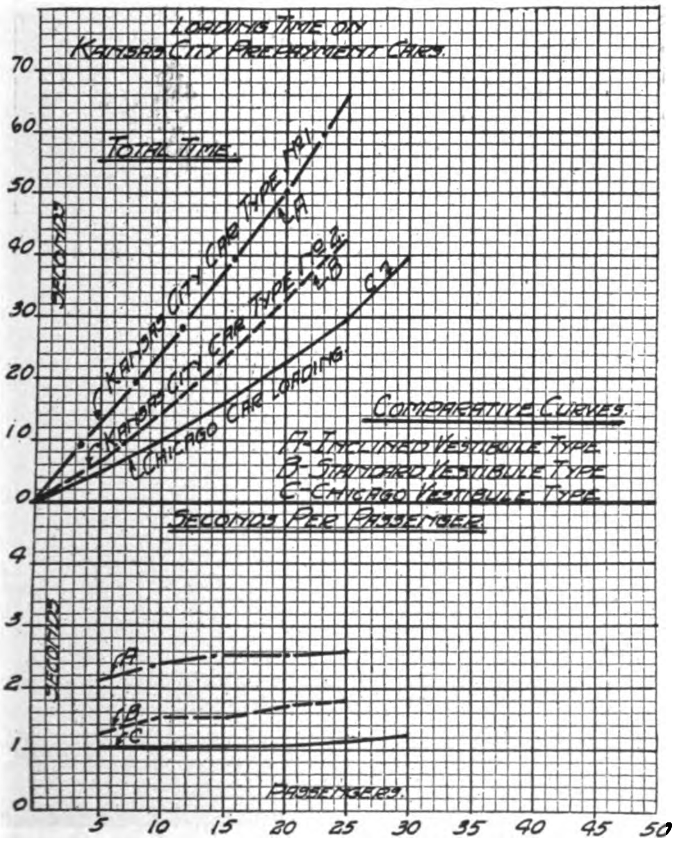
	Kansas City District.	Average for 12 Cities.
Car miles per mile of track	83,862	85,233
Revenue passengers per mile of track	420,747	496,247
Revenue passengers per car mile	5.02	5.82
Miles of track per 1000 inhabitants	0.794	0.572
Receipts per capita	$16.53	$13.26
Receipts per mile of track	$20,825.00	$23,177.00
Population per mile of track	1,260	1,780

"At the average rate of 1 mile of track for each 1748 of population, the Kansas City district would have but 212 miles, instead of the present 281 miles, which indicates an expansion in the track mileage of the Metropolitan system unwarranted by the population served.

"The first impressions of the transportation system of the Kansas City district are quite favorable, particularly so from the standpoint of one accustomed to the service given in the more congested centers of other cities. The cars move with a reasonable degree of speed in well-paved streets on tracks generally free from traffic interference. Passengers are carried a long distance for a single 5-cent fare. The headway on the various routes varies from a minimum of approximately 2 minutes to a maximum of 15 minutes. The average speed for all lines, including the slower speed now necessary through the central district of the town, averages 8.9 miles per hour. The character of the rolling stock is, in general, first-class. The physical property, in general, is in very good condition. It is found that only 31 miles of track should be entirely rebuilt and 13 miles should be furnished with a new substructure within the next two or three years.

"Of the total number of closed cars, approximately 3 per cent were found to be in the shops undergoing heavy repairs, while 2 per cent were found in the carhouses either undergoing light repairs or available for use at time of maximum service. This number of cars out of service is probably a minimum for good operating conditions, since in general with first-class maintenance it is necessary that not less than 2 per cent or 3 per cent of the cars normally available for service (that is, exclusive of those in the general shops) be held in the carhouses for minor repairs and such maintenance work as is necessary in the normal operation of the cars.

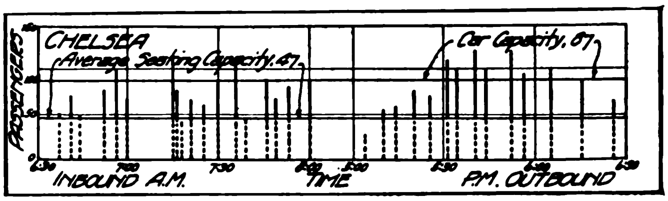
"Although a general view of the situation indicates that the traffic is reasonably well handled, in order to determine the sufficiency of the service furnished for the existing traffic it was necessary to study the situation somewhat in detail. Such investigations have been made, and such data have been collected as would serve to determine the character of the service at critical points on the system. The readings have been compiled in diagrammatic form and one of the records is published herewith.



Kansas City Traffic—Loading Time on Prepayment Cars

"By a study of the diagrams a very definite idea can be formed as to the traffic which exists on the various routes.

"Tables prepared, covering the entire rush-hour period of one and one-half hours and for a thirty-minute and a fifteen-minute traffic peak, show that, while the average percentage of standing passengers in the evening rush period from 5 p.m. to 6.30 p.m. is only 37 per cent, the average percentage of standing during the thirty-minute peak is 45.3 per cent and during the fifteen-minute peak is 49.2 per cent, this being for all lines.



Kansas City Traffic—Typical Passenger Count at Point of Maximum Load

"The passenger counts have all been made with the view of determining the character of service during the rush hours. For the rest of the day—that is, from 10 o'clock in the morning to 3 o'clock in the afternoon and from 6.30 to 10.30 in the evening—the passenger traffic was very much less than that existing in the peak hours, and it was found that too many cars were being operated on many of the lines for the revenue received.

"For the purpose of providing more adequately for the present passenger traffic in the Kansas City district a number of the present through lines should be re-routed and several general improvements are necessary. More cars should be placed in service at the time of the morning and evening rush-hour periods, more particularly during the evening rush hour, and to furnish satisfactory service to the business now being handled the company should place in service twenty-one additional cars.

"The majority of the cars of the Metropolitan company compare favorably with those of any other large transportation center in the country, being large, roomy, comfortable and well adapted for the hard usage to which they are subjected.

"There is, however, a fault in the design of the latest type of prepayment car operated by the Metropolitan company, in which the conductor is placed near the rear vestibule window on the left-hand side as the passenger enters. One of the most important features of the prepayment type of car is that which provides a large platform in order that a number of passengers may board the cars quickly and that the fares may be collected while the car is in motion. As a result of numerous observations shown in detail in the accompanying illustration, it is evident that as a means of facilitating loading in the congested districts this type of car is unsatisfactory and that to it can be charged a large amount of the prevailing car congestion due to the excessive time taken in loading.

"It will be noted that when five or more passengers board the car the average time per passenger required for boarding this type of car is 2.47 seconds, whereas the time for the same number of passengers boarding the ordinary vestibule type of car operated on the Metropolitan system is approximately 1.5 seconds. The average time per passenger boarding the Chicago-type prepayment car, which has a large rear platform, is shown by this illustration to be 1 second per passenger.

"A cause of slow car movements and irregularity of service has been found in the number of accidents which occur daily. Some of these are due to making a near-side stop with a car designed for a far-side stop, passengers frequently being in the wrong place and unnoticed by the conductor. Collisions with vehicles and injuries to persons boarding or alighting from cars, or while in cars, are quite numerous. The more recently constructed cars of the company are provided with rear platform doors which are closed while the car is in motion. This is probably the most effective remedy for the numerous boarding and alighting accidents, and as more cars of this character are placed in service there should be a proportionate reduction in the number of such occurrences. That the equipment is being used in a rough manner is indicated by the number of persons falling in cars. Automotoneers placed on the controllers would compel a more gradual application of power and thus lessen the jerking of the cars when starting.

TABLE IV—SUMMARY OF EXPENDITURES

IMMEDIATE

Rehabilitation:	
Track and paving, complete	$1,234,800.00
New substructure	213,500.00
Bridges	800,000.00
Electrical distribution system	95,000.00
Total	$2,343,300.00
100 cars, at $6,500 each	650,000.00
On account New Union Station—	
Track—3.2 miles, at $50,000	160,000.00
On account Twelfth Street and Twenty-third Street traffic ways—	
Twelfth Street, $200,000; Twenty-third Street, $250,000; track and line work, $180,000	630,000.00
Cross-town lines—	
Prospect Avenue-Chestnut Street, 2.2 miles; Thirty-ninth Street 4.4 miles; 6.6 miles, at $50,000	330,000.00
Necessary for re-routing—	
Woodland Avenue, Tenth and Missouri, 0.5 mile; Forty-third to Forty-seventh Street, 1 mile; Indiana Avenue, Twelfth to Eighteenth, 1.1 miles; 2.6 miles, at $50,000	130,000.00
	$4,243,300.00

FUTURE

Extensions—track, paving and line work, 27.3 miles	$1,365,000.00
Carhouses	450,000.00
Bridges	650,000.00
Shop addition	125,000.00
Cars—twenty per year for ten years—200	1,300,000.00
Power plant equipment	500,000.00
	$4,390,000.00
	4,243,300.00
Total	$8,633,300.00
Of the above amount it is estimated that only one-half of the rehabilitation expense on track and paving and one-third of the cost of rebuilding the elevated structure will be a capital account charge; therefore in determining the total additions to plant account during the remaining franchise period two-thirds of these amounts should be deducted	1,527,721.00
The increase in the capitalization during the next thirteen years should be	$7,105,579.00

"The universal transfer system now in effect on the Metropolitan system is very liberal in its provisions and is being subjected to great abuse, particularly in the downtown district. The trading of transfers has been frequently observed, and traveling in a loop on a single fare is possible in several different directions."

A number of changes in routing are recommended by the commissioner together with expenditures for rehabilitation, of which a summary is given in Table IV.

RECORD EFFICIENCY FOR WATER TURBINES

Ordinarily speaking, water turbines seldom show efficiencies exceeding 85 per cent, and at anything but the most advantageous gate opening 80 per cent is not an uncommon figure. Recent tests on four 6000-hp, single-runner Francis-type turbines of the Appalachian Power Company at New River, Va., have shown much higher results. The machines operate under the fairly good head of 49 ft. and at 116 r.p.m. They are large vertical-shaft turbines and therefore obtain some advantage in the matter of friction. The maximum efficiency rises to between 93 and 94 per cent and remains above 90 per cent from about 80 per cent load up to full load, after which it drops off rapidly. The rise in efficiency toward this maximum is extremely steady and the wheels pass 80 per cent efficiency at half load.

The results obtained seem to be attributable to very careful design and manufacture helped out by skill in placing the wheels. In arranging the draft tubes particular care was taken to avoid as far as possible the eddies which are known to have a serious effect on turbine efficiency. The importance of these minor details was shown in a slight but very plain difference observable in the tests of two similar turbines. The one that gave the lower efficiency discharged slightly to one side of the tailrace, producing some eddies, and these seem to be apparent to the extent of 1 or 2 per cent in the efficiencies obtained.

PREPAYMENT ZONE SYSTEM INAUGURATED AT LEICESTER

On March 19 the first installation of prepayment cars for a street railway with zone fares was made in England by the Leicester Corporation Tramways with ten double-deck cars furnished under license of the International P-A-Y-E Tramcar Company, Ltd., London. A description of the entrance and exit arrangements of these cars was published in the ELECTRIC RAILWAY JOURNAL for March 1.

The introduction of the prepayment service on the Narborough route of the Leicester lines was of particular interest because it is demonstrating that the prepayment system is applicable to any form of the zone fare system as well as to single-fare systems. On this route four fare zones are in use. The abuse of overriding, the European equivalent of missed fares in this country, is obviated by a novel ticket machine which permits the conductor to issue with great rapidity but absolute accuracy tickets of various colors or numbers corresponding to the zones named by the entering passengers. On leaving the car each passenger drops his ticket in a glass-covered box which is under the eye of the platform man. Overriding is therefore readily obviated because all tickets deposited within a given zone must be of the color or number which corresponds to that zone. Of the two accompanying illustrations, one shows the ticket machine in charge of the conductor and also (at the extreme right) the box in which departing passengers drop their tickets; the other view shows a passenger in the act of depositing a ticket.

PAY AS YOU ENTER CAR
44
HAVE YOUR PENNY READY
PAY AS YOU ENTER CAR
44
HAVE YOUR PENNY READY

Mayor Standing on Platform and Passenger Depositing Ticket on Leaving the Car

The inauguration of the prepayment service at Leicester was made quite a social occasion as the Mayor himself started the first car. After the trial trip, Alderman Flint, whose journey to America was largely responsible for the decision to use prepayment cars, entertained the representatives of the municipality and the licensing company.

Reports which have been received since the introduction of the service state that the cars are operating without a hitch. During Easter week they carried record crowds to the satisfaction of both the passengers and the tramways.

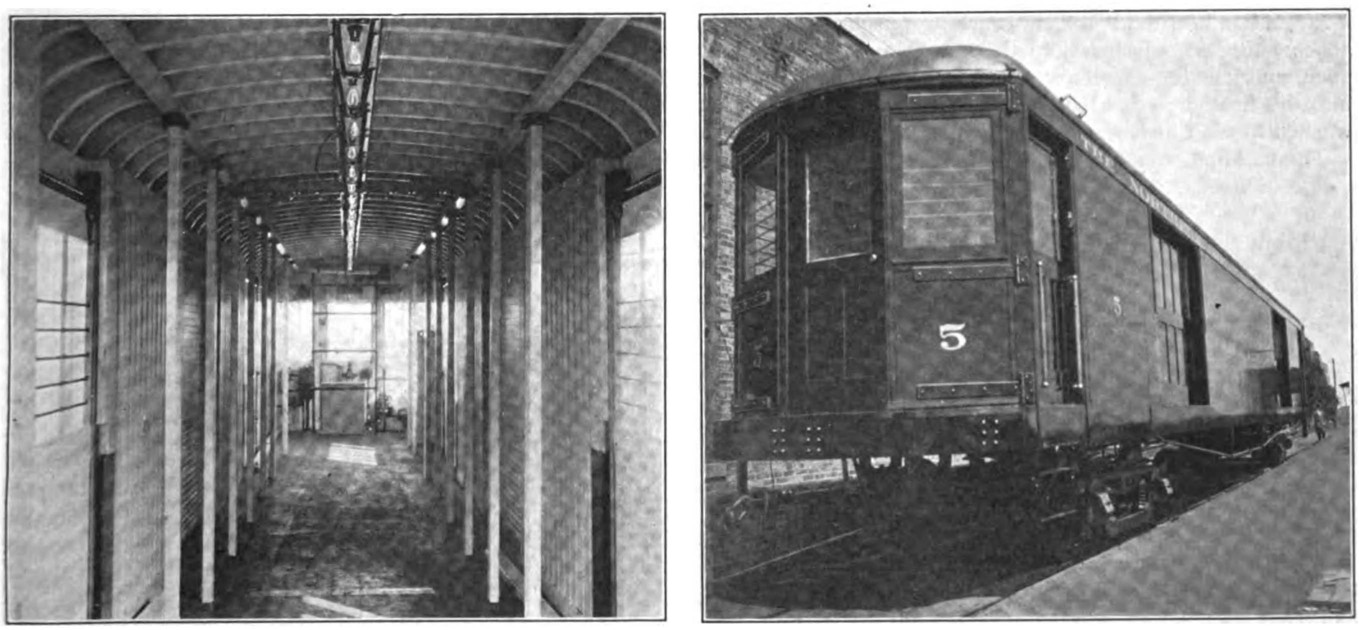
EXPRESS CAR FOR AUTOMOBILE SHIPMENTS

The Northern Ohio Traction & Light Company, Akron, Ohio, has recently placed in service a baggage and express car of unusual design. It is arranged to accommodate the heavy rubber and automobile shipments over this line from Akron, Ohio. Akron is the home of the rubber-tire industry, being the largest center of this kind in the world, and a considerable amount of this class of express business is handled by the traction company.

The design of this car includes an all-steel underframe and an arched roof body of wooden construction. The body is built for single-end operation and so that the rear end will open full width, thus permitting automobile bodies or other material to be loaded from the rear end from either an incline or an elevated platform. The full-width opening at one end of the car is obtained by designing the vestibule in three panels. A sash door forms the central panel, which is hinged to one of the side panels, and the latter in turn is hinged to the side of the car-body framing.

Three heavy strap and pin hinges extending practically the full width of each side panel permit of the usual vestibule construction, insuring rigidity when locked in the closed position and reducing the tendency to sag when open. There is also special provision made for adjustable posts, so that space may be arranged for different kinds of freight. Pockets in the roof and a bolt lock on each post base permit of the post being placed after a shipment has been loaded and thus serve as blocks to fix the shipment's position on the floor.

Car illumination is obtained from a series of lamps arranged down the center of the ceiling. They are covered with substantial metal guards to insure against breakage. Loading and unloading of small shipments is facilitated by two 7-ft. doors on each side of the car.

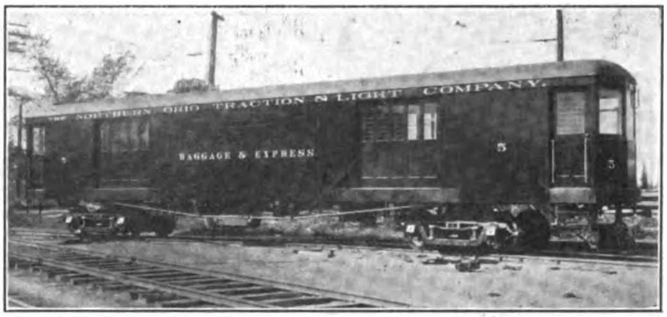


Express Car for Automobiles—Interior View, Showing Adjustable Posts, and Rear View, Showing Arrangement for Full-Width Opening

To provide comfort for the trainmen at low temperatures, a Peter Smith forced hot-air heater has been installed. The heat is carried over the entire length of the car body in metal ducts placed under the roof.

The electrical and air-brake equipments are the Westinghouse design. For propulsion four Westinghouse No. 304 commutating-pole, 90-hp railway motors are used. This type was selected for the heavy service incident to interurban freight and express operation. These motors are mounted on McGuire-Cummings No. 10-B. M. C. B. trucks, and the car was built by the McGuire-Cummings Manufacturing Company. Motor control is obtained through a Westinghouse type HL unit switch control equipment.

The car was constructed with a view to being used in heavy service, and the essential dimensions are as follows:



Express Car for Automobiles—Side View, Showing Wide Side Doors

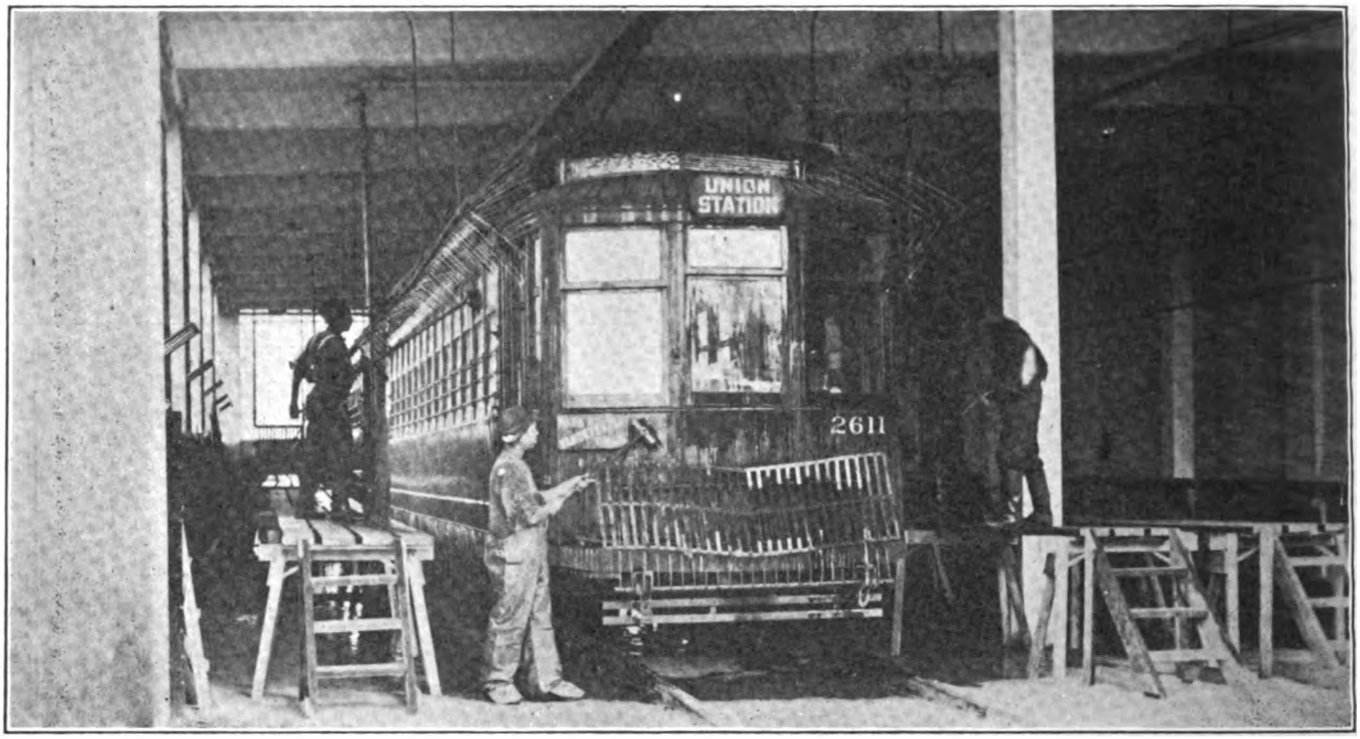
Length over all	60 ft. 0 in.
Length of body	58 ft. 4 in.
Width over all	8 ft. 8½ in.
Distance between center pins	37 ft. 0 in.
Diameter of wheels	35 in.
Length, wheel base	6 ft. 6 in.
Weight of car body only	30,000 lb.
Weight of two trucks	15,000 lb.
Weight of electrical equipment	17,200 lb.
Weight of air-brake equipment	2,200 lb.
Weight of miscellaneous equipment	500 lb.
Total weight of car completely equipped	64,900 lb.

A very complete set of operating equipment is mounted in the cab, including the master controller and air-brake equipment. The cab equipment is unique in that the cutout cocks for the air system are placed inside of the car instead of underneath as is usual. This makes it a very convenient arrangement for the motorman. The location of the sand box is such as to afford a seat for the motorman.

Fenders are painted in Portland, Ore., by being dipped in a tank, and to reduce the amount of paint which would have to be used to fill the tank, the tank is half filled with water before the paint is poured in. As the paint is nearer the top, the fender emerges covered with paint after it is dipped into the tank.

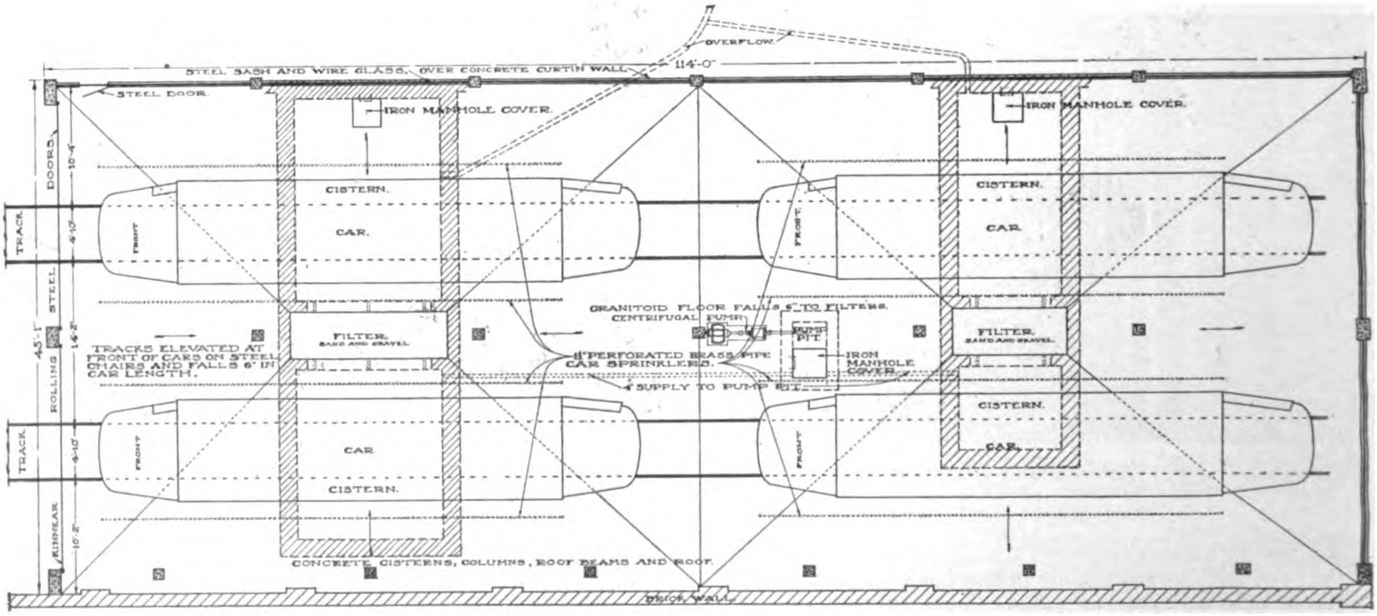
NEW CAR-WASHING PLANT AT ST. LOUIS

At the Park Avenue car yards of the United Railways Company at St. Louis a frame building formerly used for washing cars was destroyed by fire about a year ago. Since that time a fireproof, reinforced-concrete building, 114 ft. x 45 ft., has been built for car-washing purposes. There is no carhouse at this location, the cars being stored in the open, and it is therefore necessary to have a building which may be heated in cold weather so that the cars may be washed at all times of the year.


UNION STATION
2611

St. Louis Car-Washing Plant—Interior View of Building, Showing Plant in Operation

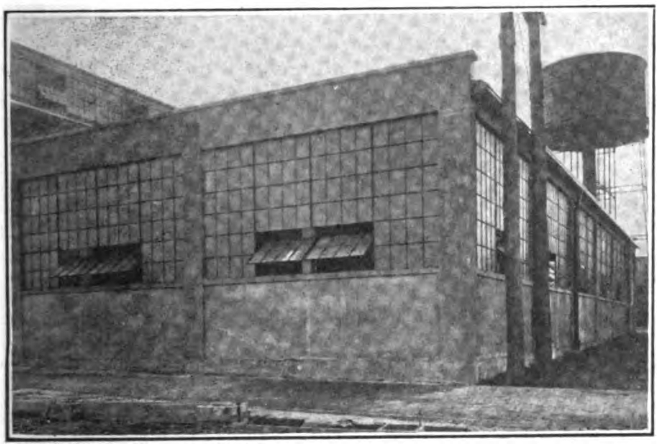
The building is entirely fireproof, one side resting against the brick wall of the neighboring building. The front is equipped with Kinnear rolling doors, and the other two sides are constructed of a concrete wall and steel sashes supplied with ¼-in. wire-glass. The roof and columns supporting the roof are of reinforced concrete. Underneath the building are two cisterns having an aggregate capacity of 45,000 gal. The down-spouts from the roof of the building and from one side of the neighboring building lead into these cisterns, so that after a rain the water has been completely flushed out and replaced by rainwater.

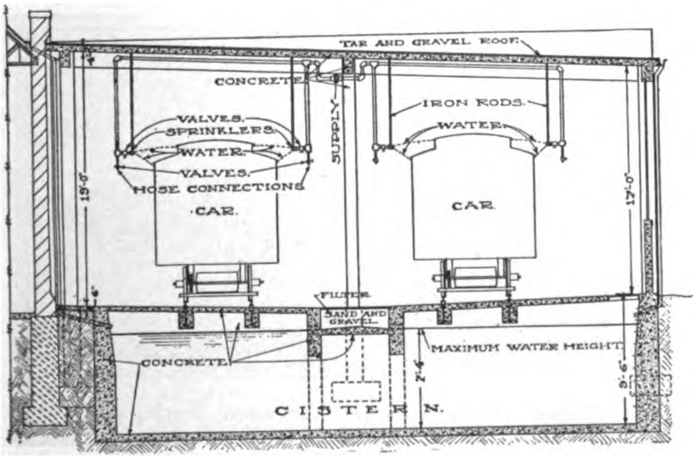

OVERFLOW
114'-0"
STEEL SASH AND WIRE GLASS, OVER CONCRETE CURTIN WALL
STEEL DOOR
IRON MANHOLE COVER
IRON MANHOLE COVER
CISTERN.
CAR.
CISTERN.
CAR
FRONT
FRONT
FRONT
FRONT
TRACK
TRACK
KINNEAR ROLLING STEEL DOORS
45'-1"
10'-4"
4'-10"
14'-2"
4'-10"
10'-2"
GRANITOID FLOOR FALLS 6" TO FILTERS.
CENTRIFUGAL PUMP
PUMP PIT
FILTER. SAND AND GRAVEL
FILTER. SAND AND GRAVEL
TRACKS ELEVATED AT FRONT OF CARS ON STEEL CHAIRS AND FALLS 6" IN CAR LENGTH.
1½" PERFORATED BRASS PIPE CAR SPRINKLERS.
IRON MANHOLE COVER
4" SUPPLY TO PUMP PIT
CAR
CISTERN.
CISTERN.
CAR.
CONCRETE CISTERNS, COLUMNS, ROOF BEAMS AND ROOF.
BRICK WALL

St. Louis Car-Washing Plant—Plan of Building, Showing Filters and Cisterns for Return Water

The capacity of the building is four cars. The tracks are elevated on one side and depressed on the other so that when a car is in proper washing position all the water on the floor of the car runs to one corner of the car, from which it may be drained. On each side of the car, at the roof level, there is a 1½-in. perforated brass pipe. The perforations in this pipe throw the water in two directions, in one direction against the ventilators in the monitor roof and in the other direction against the side of the car. The force of the water may be regulated by means of a valve on each perforated pipe. Permanent wooden platforms have been erected at the side of each car so that the car washer may regulate the force of the water and wash the side of the car by means of a brush without getting wet. A hose connection for each car is taken off the water system, the nozzle on the hose being supplied with a valve so that the flow of water may be regulated by the man manipulating the nozzle. This hose is introduced at one of the windows of the car and is used for washing the interior.

The city water pressure at this location is about 40 lb. per square inch, which is amply sufficient for this work. In order to economize in water a filtering arrangement has been introduced below the water level in the cisterns so that the water may be purified and used again. A 2½-in., two-stage centrifugal pump, driven by a 7½-hp motor, pumps the water from the cisterns back into the washing system. By means of valves either city hydrant water or water pumped from the cisterns may be used. The filters are about 18 in. in depth and are filled with fine gravel which has been screened through a ¼-in. screen. Every morning about 1 in. of the top of this filter is removed and thrown away, fresh gravel being put in its place. Once a week the entire contents of the filter are removed and replaced with fresh gravel. The rainwater from the roof is introduced below the water level in the cisterns so that the entering fresh water will float away into the sewer any scum on top of the water in the cistern. The two cisterns empty into a pump pit and are controlled by valves so that either cistern may be pumped out and cleaned whenever necessary without interfering with the use of the other cistern.

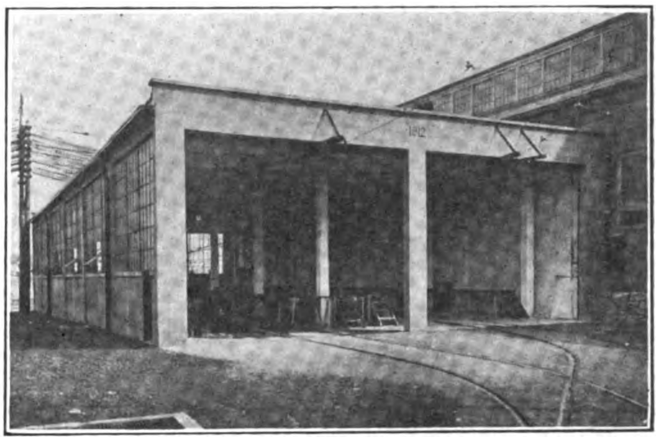

St. Louis Car-Washing Plant—Rear View of Building, Showing Elevated Tank



St. Louis Car-Washing Plant—Transverse Section, Showing Location of Sprinkler Pipes

The washing crew consists of five men. One man washes the outside of the car while four men wash the inside. The average time required for completely washing a car inside and outside, including time lost in car switching, is about twenty minutes per car.

The cost of the building, exclusive of track, piping, heating, lighting and cisterns, was $6,000, or about 6 cents per cubic foot of volume.


St. Louis Car-Washing Plant—Front View of Building, Showing Washing Platforms

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RE-HEARING OF THE PAINESVILLE TRANSMISSION CASE

In the issue of the Electric Railway Journal for June 8, 1912, an account appeared of an important hearing before the Ohio Public Service Commission. The case was brought before the commission by the Western Union Telegraph Company and involved a transmission line which had been recently installed by the Cleveland, Painesville & Eastern Railroad on its own right-of-way. This, however, adjoined the right-of-way of the Lake Shore Railroad, and the dispute was concerned with the character of construction and location of the transmission line, which were held to be such as to constitute a serious risk to the general public. The case aroused great interest as it opened up a large field of possible interference with the progress of transmission line construction. Leading experts were called as witnesses of both sides and the whole subject of transmission line engineering was thoroughly presented. The general aspects of this case were also discussed in a paper delivered by J. G. Swain before the Central Electric Railway Association and reported in the Electric Railway Journal for June 15, 1912.

On Feb. 11, 1913, the commission rendered a decision substantially in favor of the defendant by issuing an order imposing certain minor requirements. This order is numbered 155, and its provisions were to be carried into effect by March 1, which was done to the commission's satisfaction. The items of the order are substantially as follows: Certain wires were to be moved so that they cleared the Western Union wires by 6 ft.; high-voltage strain insulators were to be installed in certain guy wires (about sixty in number) in place of the low-voltage insulators originally used; a few push guys were to be put in; inspections are to be made every ten days instead of bi-weekly as heretofore, and the reports of these are to be subject to inspection by the commission.

The case is again brought to attention by the announcement of a re-hearing to be held in Columbus on May 6, the complainant alleging the finding of new evidence.

The Durban Municipal Tramway, Durban, South Africa, reports the gross income for the year ended July 31, 1912, as $593,986, of which $87,017 was net. The tramway carried 15,655,737 passengers during the year.

EFFECT OF THE FLOOD ON THE OHIO ELECTRIC RAILWAY

Conditions on the Ohio Electric Railway system are becoming normal again rapidly, except at points where track and bridges were damaged so seriously that time will be required to prepare them for regular operation. The difficulty with floods began to develop on the morning of Tuesday, March 25, on the most northerly lines of the system, and as the floods swept south other lines and property controlled by the company were affected on succeeding days. Communication between the different offices and the general offices in Cincinnati was cut off for a time but was restored as quickly as possible and the work necessary to permit resumption of operation was begun. The full extent of the damage done to the property of the company cannot be judged accurately at this time, but the principal points at which loss has been sustained are given in the following summary of conditions on the entire property. The system is divided into several districts and in all of these some difficulties causing suspension of operations have arisen.

Ohio Flood—Washed-Out Culvert on Ohio Electric Railway

THE SOUTHERN DISTRICT

The southern district is that served by the Cincinnati, Dayton & Toledo Traction Company, which is leased by the Ohio Electric Railway Company and comprises the interurban line between Cincinnati and Dayton, the branch line from Miamisburg to Germantown, the Hamilton city railway line and the Dayton city railway line. The greatest loss in this district, and in fact on the entire system, was between Dayton and Hamilton. About 50 per cent of the high-tension transmission line between these two points was destroyed.

Very little damage was done between Dayton and West Carrollton, but between the latter point and Miamisburg the track was washed very badly in a number of places. Thus a bridge across the Miami River on the Miamisburg-Germantown branch and about 50 per cent of the track between Miamisburg and Franklin were washed out. The greatest damage in this section, however, was at Chautauqua, where for a distance of about half a mile the tracks and roadbed, as well as poles and wires, were entirely washed away. Some of the rail is badly bent and twisted and cannot be used at all.

The substation at Franklin was damaged slightly by water, and there was about 2 ft. of water in the building. Between Franklin and Middletown there were a large number of washouts, but none of these was very serious. Very little damage was done to property at Middletown. South of Middletown, however, a new 1200-ft. bridge with concrete piers and abutments was completely wrecked. This bridge crossed the Miami River and was built two years ago of 90-ft. plate girders. The abutment of this bridge on the Middletown side remains, together with the first pier from that abutment, and also two piers about the middle of the river. The latter two piers, however, were damaged. The span of girders supported by the abutment and the first pier remain in place. The other piers were washed away. The approaches on both sides of the Middletown bridge were damaged badly. The tremendous force with which the water swept down on this bridge is shown by the fact that two bridges of the Cleveland, Cincinnati, Chicago & St. Louis Railroad just above this one, which were erected at about the same time but were of much heavier construction, were also wrecked completely.

The overway across the Cincinnati, Hamilton & Dayton Railway tracks on the line between Middletown and Trenton was also wrecked completely, but the bridge over Elk Creek, a short distance away, was not damaged. With the exception of one washout on the tracks between Trenton and West Hamilton the damage in this section was slight.

On B Street in West Hamilton for a distance of a mile, although the tracks were not damaged, the overhead construction was entirely destroyed. Practically every pole was cut off at the ground line and carried away. When the flood reached West Hamilton it came so suddenly and with such force that one car on the city line which was caught on B Street was wrecked by floating debris. The upper structure of the car body was battered to pieces and carried away. Although the force of the water was not strong enough to carry away the car motors and trucks, which remained on the track, numerous freight cars of the steam railroad company in this vicinity were swept away.

The county bridge at High Street connecting West Hamilton and East Hamilton was completely destroyed, and this cut the line of the company in two at that point.

A good deal of damage was done to some of the city lines in Hamilton, and there were a number of washouts between that city and the terminal of the interurban lines in Cincinnati.

THE WESTERN AND NORTHERN DISTRICTS

The western district comprises the interurban lines between Dayton, Ohio, and Richmond, Ind., and between Dayton, Ohio, and Union City, Ind. These lines were damaged very slightly, but their operation was discontinued until April 7 on account of the power situation. The lines receive current from the Lindenwald power station at Hamilton, Ohio, but were unable to get it because of the destruction of the high-tension transmission lines extending from Lindenwald to O'Neils, the first substation south of Dayton.

The northern district comprises the Lima city railway, light, power and heat plants, the interurban lines between Lima and Defiance, Lima and Toledo, Lima and Fort Wayne and Lima and Springfield.

Ohio Flood—Damaged Track Between Springfield and Dayton

On these lines the damage was very slight, though about 17 miles of track were under water, and one end of the bridge at West Liberty dropped a little, but has been raised since. Several of the lines discontinued operation for from four to five days, but all are open now and normal service has been resumed. No damage was sustained by the city railway and lighting systems of Lima.

THE CENTRAL DISTRICT

The central district comprises the interurban line from Dayton to Columbus, the branch line from Medway to New Carlisle and the Columbus-Orient interurban line.

The line between Columbus and Dayton suffered a good deal of damage immediately west of Columbus. The paving, foundations and tracks were washed out for a distance of about 800 ft., and as the city bridge across the Scioto River at Tom Street, Columbus, was also washed out, operation into that city was necessarily discontinued. A temporary bridge is being built at this point, which will permit the resumption of operation soon. No damage whatever was done to the new interurban station at Columbus and the damage between Columbus and Springfield and in the city of Springfield was small.

On the line between Springfield and Durbin about 1000 ft. of track were washed out. Between Durbin and Osborne, a distance of about 11 miles, stretches of track were washed out entirely, and so powerful was the force of the water that in some places it is scarcely possible to see where the roadbed was originally. Right-of-way fences and poles, as well as track and roadbed, have disappeared completely on sections of the line between these two points. Where part of the roadbed stood originally at one point on this section there is a pool of water about 2000 ft. long, which in some places is 16 ft. deep. None of the structures, or bridges on this section sustained any damage.

Between Durbin and Dayton the amount of damage was slight. The line has not yet been operated into Dayton because of the fact that Third Street, on which the tracks extend from Springfield Street to the terminal station, is covered with debris and wrecked houses. The wreckage of houses after drifting in the flood collected in this street and will make it impassable until the street is opened again for traffic. The first floor of the passenger station at Dayton was damaged, but no serious damage was done to the building itself. The freight house at Dayton was not damaged, but the contents were damaged. Very little damage was done to tracks and overhead work at Dayton.

The line between Columbus and Orient was not damaged, but cars can be operated only to the site of the Town Street city bridge crossing the river, because this bridge, as stated, was carried away by the flood.

The power plant at Medway was not damaged, as it happened fortunately that the force of the water carried away the dam raceway at that point and thus released the water, which otherwise would have flooded the power house. On account of the condition of the water operation was suspended for three or four days, but the electrical equipment did not get wet.

THE EASTERN DISTRICT

The eastern district comprises the interurban line from Columbus to Zanesville, the city line in Newark, the interurban line from Newark to Granville and the city lines and light and power plant in Zanesville.

The principal damage in this district was done in the city of Zanesville, where the loss was heavy. Lines of the city system were washed out for stretches of two or three blocks. The city bridge over the Muskingum River at Third Street, over which one line was operated, went out in the flood and that line therefore has not been operated since. The Southeastern Ohio Railway, Light & Power Company also lost its bridge over the Muskingum River at Zanesville.

The water in the power station at Zanesville reached a height of 15 ft., flooding the basement, boiler room and engine room. The water was up 12 in. on the switchboard gallery. This condition made it necessary to abandon lighting service at this point, but transmission lines were extended from the Hebron plant, and two portable substations were taken to Zanesville, so that current was obtained for the operation of some of the city lines. The Zanesville power plant escaped being wrecked when a girder of the Baltimore & Ohio Railroad bridge, which was dislodged by the water, just grazed the structure. The water entered the building with such force that it carried away all of the windows and sashes. The entire electrical equipment was under water for about three days, and when the water subsided it was necessary to clean out the mud, which had reached a depth of between 1 ft. and 2 ft. In order to dry out the equipment the company put furnaces all through the station, and in addition ran current through the generators at low voltage. Two employees of the Westinghouse Electric & Manufacturing Company, who had had experience in the drying out of equipment damaged by floods, assisted in the work. It was expected on April 11 that lighting service would be resumed in Zanesville in a day or two.

The city line in Newark, the Newark-Granville line and the Hebron plant escaped damage.

The water tore up the track in forty-two places between Newark and Zanesville but only for short stretches in each instance. In one place a rock dropped on the track from an adjoining hill, and this had to be removed with dynamite. On account of these conditions the interurban line could not be operated into Zanesville for several days.

Cars of the company were caught by the flood at various points and were damaged by the water. The principal damage of this nature was done at the carhouse of the company at Mound Street, Columbus, which was flooded. A number of interurban cars were damaged by the water at this carhouse. Three cars were caught in the flood at Miamisburg. About six cars were caught in the flood at Hamilton, two of which were interurban cars. Three cars were in McDowell Street, Columbus, and caught the full force of the flood at that point. Several motor freight cars loaded with freight, which were all ready to leave Dayton, were caught by the flood at that point and damaged.

The lines of the Cincinnati Traction Company and the Ohio Traction Company were but little affected by the flood. Accounts of the experiences of these companies were published in last week's issue.

FLOOD DAMAGE ON OTHER ROADS IN THE CENTRAL WEST

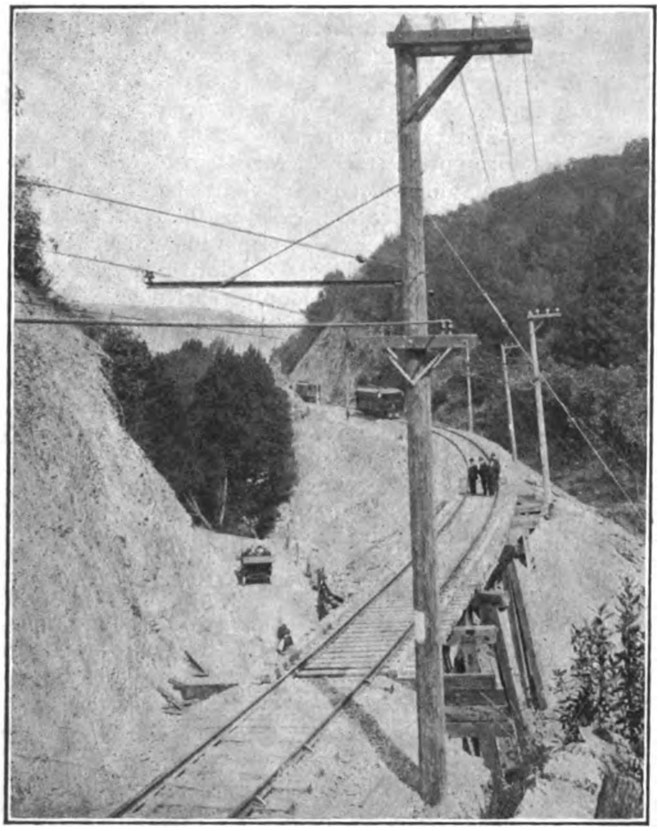
The Cincinnati & Columbus Traction Company had one span of a bridge across the Little Miami River washed away by the recent flood. This was part of a 460-ft. steel bridge at Milford, Ohio. The span which was destroyed was 160 ft. in length. One pier was undermined and toppled over. The bridge span was carried about 150 ft. down the river and was badly twisted and bent. Damage done to the track of this company by the water was inconsequential, although water covered about 5 or 6 miles of the track for one day. No water reached the power house, but when the bridge fell it carried down the overhead work, and on account of this situation operation was discontinued for two days on the western end of the line, although it was discontinued for only one day on the eastern end of the line. As two cars were left on the western end of the line, it was possible to begin operation and passengers crossed the Little Miami River by foot, using the county bridge for this purpose.

With the surface of the Wabash River 3 ft. above the level of the engine-room floor, satisfactory operation of the 12,000-kw generating station at Terre Haute owned by the Terre Haute, Indianapolis & Eastern Traction Company was maintained throughout practically the entire flood. A wall of sandbags was built around the building to deflect the current of the river, and a temporary brick wall was built across the building interior at each end. Centrifugal circulating pumps were used to remove the water which leaked into the basement.

The Oakland, Antioch & Eastern Railway, California

A New 1200-Volt Line Which Reaches San Francisco by Ferry—The Coast Range Is Pierced by a Tunnel 3458 Ft. Long

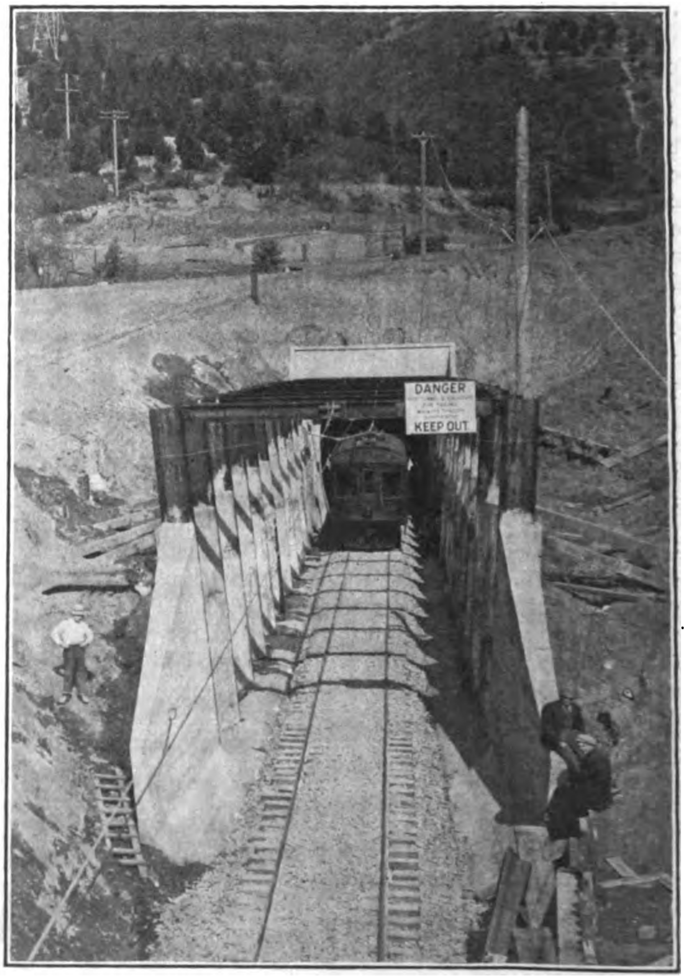
Interurban electric systems are fast supplanting the steam railway in the vicinity of San Francisco. Work will be begun in the near future on many such projects. Among these may be mentioned the Peninsula system between San Francisco and San José and the Key Route extension between Oakland and San José, each 50 miles in length; the Ocean Shore Railroad from San Francisco to Santa Cruz, covering a distance of 65 miles, now operated part way as a steam road at a negligible profit; the Fresno & Monterey Railroad, which will very materially shorten the distance from the center of the San Joaquin Valley to Tidewater; the Northern Electric Company's line from Sacramento to Vallejo, which, with the Suisun and Vacaville extensions, will be over 60 miles in length, and the Oakland, Antioch & Eastern Railway, now almost completed. On April 7 the last-named company expected to inaugurate regular train service between Oakland and Bay Point, Contra Costa County, a distance of 31 miles. This is merely preliminary to running by July 1 through trains between Oakland and Sacramento, 85 miles distant.



Oakland, Antioch & Eastern—1200-Volt Catenary

The route between these two cities is shown on the map on page 728. A traffic agreement has been made with the Key Route which provides for the use by the Oakland, Antioch & Eastern trains of the Key Route tracks upon the 2-mile Key Route pier, and Oakland, Antioch & Eastern passengers will be carried to and from San Francisco on the Key Route ferryboats. The regular Key Route fare between San Francisco and Oakland is 10 cents. An innovation is being made by the Oakland, Antioch & Eastern in adding the amount to the price of tickets from interior points to San Francisco instead of charging the same fare to either San Francisco or Oakland, as is customary on the Southern Pacific and Santa Fé lines from Sacramento and the interior valleys. The Oakland Chamber of Commerce greatly favors this charge.

From the main Oakland depot at Fortieth Street and Shafter Avenue, near the Key Route's Piedmont terminus, the Oakland, Antioch & Eastern line extends up Shafter Avenue and crosses the north arm of Lake Temescal. Thence it winds up Shepherd Canyon on a 3 per cent grade to the Redwood Peak Tunnel, which pierces the Coast Range for a distance of 3458 ft. Most of the tunnel is through solid rock, and all that is not is lined with reinforced concrete 24 in. in thickness on the sides and 18 in. in the arch, as shown on the accompanying section drawing. Located at the east portal is the largest of the five substations the equipment of which is described below. From the summit of the Coast Range the interurban passenger can obtain a view which is not often excelled even in California, noted for its magnificent scenery.

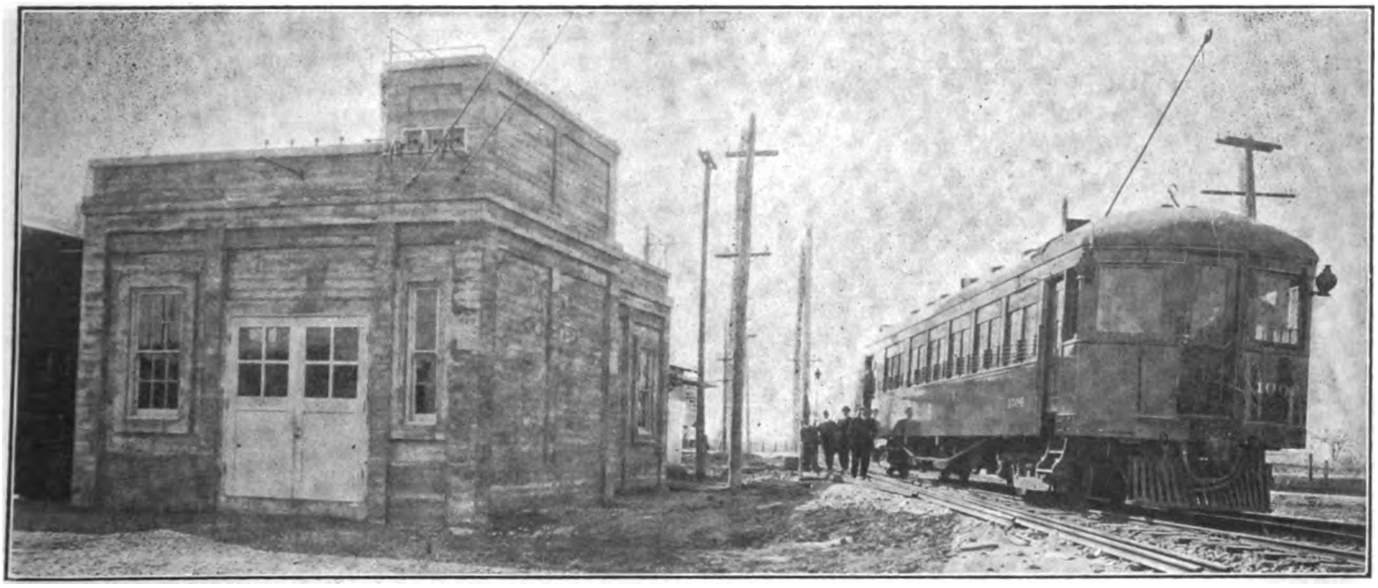


Oakland, Antioch & Eastern—Portal of 3458-Ft. Tunnel

From Bay Point across Suisun Bay to Chipp's Island the Oakland, Antioch & Eastern Railway proposes to build a bridge 10,000 ft. in length and 70 ft. high over the navigable portion of the stream. The estimated cost of this bridge is $1,500,000. Borings have been made to test the bearing capacity of the foundation beds, and work has begun on one of the piers. While this bridge is being constructed, a ferryboat will be used to transport trains across Suisun Bay. The boat is 185 ft. long, 57 ft. beam at deck, 38 ft. beam over frames and 590 gross tons. Its capacity will be six loaded passenger cars or eight freight cars. It will be operated by an eight-cylinder, 500-hp gas engine, driving a 6½-in. shaft, with a universal coupling at each end of the engine. This boat is noteworthy as it is one of the few gas-operated boats in the world used for car transportation. The ferry slips are 89 ft. long, 24 ft. wide and designed for three tracks. The two aprons are all steel, 65 tons each, operated by counterweights and water tanks.

Across Yolo Basin the road is carried on a trestle 13,900 ft. long. In the center of this trestle a drawbridge has been erected across Montezuma Slough. The timber trusses are of the Howe type. There is a clear opening of 109 ft., and the draw is operated from land by remote control, a 1200-volt, 15-hp motor supplying the power, which is transmitted by submarine cable. All of the roadbed between Chipp's Island in Suisun Bay and Sacramento has been completed. It is heavily ballasted and will be oiled to prevent dust. The laying of the rails is progressing rapidly. These rails will be of ferro-titanium alloy, 70 lb. per yard, A. S. C. E. standard.

Oakland, Antioch & Eastern—Typical Cut

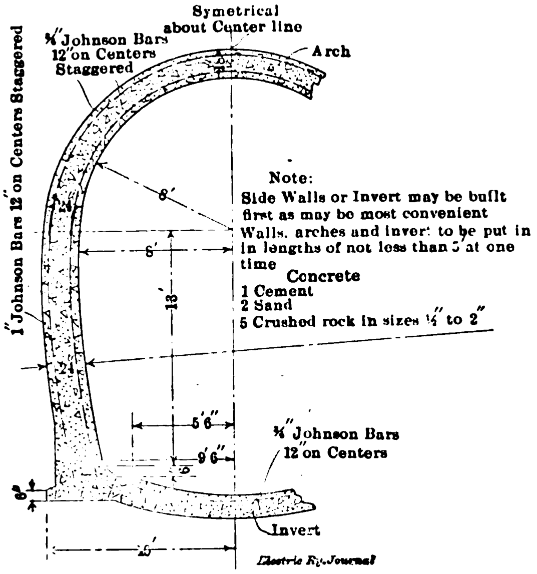

Oakland, Antioch & Eastern—Substation and Car

The Oakland, Antioch & Eastern will enter Sacramento by the M Street bridge, owned partly by that company, partly by the Northern Electric Railway and partly by the counties of Sacramento and Yolo. The passenger depot will be located at Third and I Streets, and the freight depot at Second and M Streets.

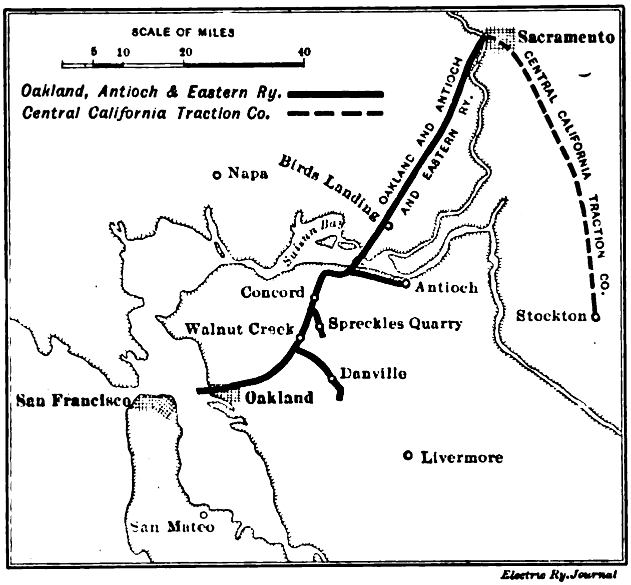
Between towns a speed of 60 m.p.h. will often be maintained. The road has been equipped with automatic block signals by the Union Switch & Signal Company.

Power will be supplied by the Great Western Power Company, whose main power house is on the Feather River, 18 miles north of Oroville. Five substations will be required for the service of the Oakland, Antioch & Eastern Railway. They are 17 miles apart and are located at the east portal of Redwood Peak tunnel, at Concord, Montezuma, Main Prairie and Glide's Levee respectively. The standard substation equipment will consist of one 750-kw Westinghouse motor-generator set and switchboard, one 1300-volt interpole d.c. generator rated at 514 r.p.m., one 1080-hp synchronous 11,000-volt, three-phase, 60-cycle motor, with one 18-kw, 125-volt d.c. exciter on shaft, one switchboard equipped with one synchronous motor panel, one d.c. general panel and three d.c. feeder panels. The substation at Redwood Peak, which will have to provide for the heaviest load, is equipped with two complete sets of this equipment, while the other four substations have but a single set. There will also be one portable substation of 350-kw capacity.

Overhead catenary construction is of the Westinghouse type, 1200-volt No. 000 trolley, 7/16 Siemens-Martin steel messenger, with a 600,000-circ. mil aluminum feeder. Until the completion of the bridge across Suisun Bay current will be transmitted from Bay Point beneath the surface by two submarine cables, 250,000 circ. mils, 3/32-in. Para rubber taped, wound with 1/16-in. varnished cloth and inclosed in ⅛-in. plain lead sheath, with No. B. W. G. galvanized armor, and a jute and lime finish over all. Two telephone cables will be laid beside the power cable. Each will consist of two pairs of No. 16 B. & S. G strand, insulated with three wraps of dry paper, 3/32-in. lead sheath and No. 10 B. W. G. galvanized armor.


Symetrical about Center line
¾" Johnson Bars 12" on Centers Staggered
Arch
1" Johnson Bars 12" on Centers Staggered
8'
8'
13'
24"
5' 6"
9' 6"
8"
¾" Johnson Bars 12" on Centers
Invert
Note:
Side Walls or Invert may be built first as may be most convenient
Walls, arches and invert to be put in in lengths of not less than 3' at one time
Concrete
1 Cement
2 Sand
5 Crushed rock in sizes ¼" to 2"
Electric Ry. Journal

Oakland, Antioch & Eastern—Concrete Tunnel Section


SCALE OF MILES
5
10
20
40
Oakland, Antioch & Eastern Ry.
Central California Traction Co.
Sacramento
OAKLANC AND ANTIOCH AND EASTERN RY.
CENTRAL CALIFORNIA TRACTION CO.
Napa
Birds Landing
Suisun Bay
Concord
Antioch
Walnut Creek
Spreckles Quarry
Stockton
Danville
San Francisco
Oakland
Livermore
San Mateo
Electric Ry. Journal

Oakland, Antioch & Eastern—Map

The company will operate fourteen standard cars and two parlor cars. The former are 56 ft. in length over all, 10 ft. wide, and are divided into express, mixed passenger and smoking compartments. There is seating capacity for fifty persons. The cars are provided with electric fans for summer and electric heaters for winter. Electric lights will overhang every seat. The parlor cars, which are to be attached to the express trains, will seat sixty passengers and will be provided with a well-appointed buffet. All cars are equipped with four 140-hp, 600-1200-volt d.c. interpole railway motors, with Westinghouse HL control and two dynamotor compressors. The trucks are C-Lo-P standard, "trunk-line" type.

The heavy freight traffic will be handled by two Baldwin-Westinghouse 50-ton electric locomotives. Each is equipped with four 160-hp, 600-1200-volt d.c. interpole motors, HL control, and two dynamotor compressors. As the freight traffic develops additional locomotives will be added.

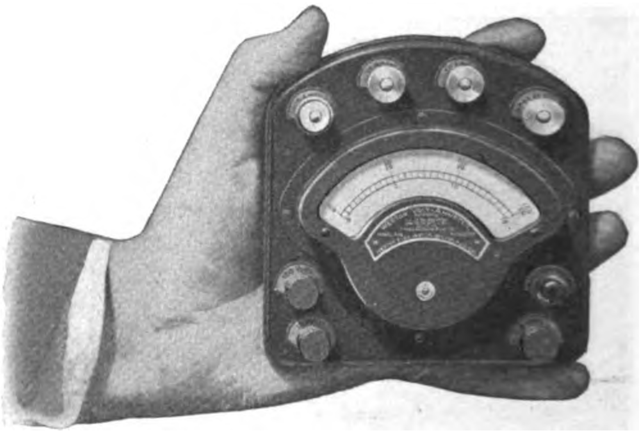
The Central California Traction Company operates an electric line between Stockton and Sacramento. A traffic agreement exists between the Central California Traction Company and the Santa Fé Railroad. It is reported that the Oakland, Antioch & Eastern Railway intends to establish a connection with the Central California Traction Company by building an extension from Antioch to Stockton. This fact, as well as the close relations existing between the road and the Key Route, as also between the Santa Fé and Key Route, is responsible for a general impression that the Oakland, Antioch & Eastern is controlled by the Santa Fé Railroad. The officials of the Oakland, Antioch & Eastern are S. Napthaly, president; W. Arnstein, secretary, and H. Mitchell, general manager. The directors are Henry T. Scott, I. W. Hellman, H. C. Breeden, B. Corbet and A. W. Maltbie. J. G. White & Company, New York, were the engineers and in charge of construction.

Residents of the fertile valleys between the Coast Range and Sacramento regard the new road as the forerunner of a new era of prosperity.

PORTABLE ELECTRICAL INSTRUMENTS

The Weston Electrical Instrument Company, of Newark, N. J., has recently developed and placed upon the market a complete line of miniature direct-current instruments of the Weston permanent-magnet movable-coil type for the measurement of current and voltage. They are made in both portable and switchboard forms and are very compact, the portable type having outside dimensions of 4.4 in. by 4.6 in. The instruments weigh less than 1 lb. each and may easily be carried in the pocket.

The accompanying illustration is one-half the actual size of the triple-range portable volt-ammeter, model 280. By means of this instrument any current from 1/20 amp to 30 amp and any voltage from 1/50 volt to 150 volts can be measured. Railway signal engineers and all those who must carry instruments from place to place for general testing and inspection work will appreciate the compact form and light weight of this type, and, furthermore, the combination volt-ammeter with multiple ranges reduces the number of instruments required to be carried. These instruments are especially useful in telegraph and telephone



Portable Volt-Ammeter

testing, and in general for all work where small d.c. currents and comparatively low potentials are used.

A switchboard form of meter having the same general characteristics as the portable form just described is also manufactured. These are provided with a pear-shaped pointer tip to enable readings to be made at a distance. They are all single-range, but are made in ranges increasing by small steps from 50 milliamp to 30 amp in the case of ammeters; and from 50 millivolts to 150 volts in voltmeters. This form of instrument is useful for all purposes where size and weight are important factors, and also where the cost of installation must be kept low.

Another type is the switchboard volt-ammeter, which is designed especially for use on storage battery charging outfits where it is desired or is necessary to use a single instrument to indicate both volts and amperes. For instance, the meter normally indicates the charging or discharging current, but by pressing the contact button the voltage of the cell or battery may be read on the same scale.

Another instrument included in the line is a battery-testing voltmeter, which is provided with a steel point at one of the terminals to facilitate making contact to one of the plates or terminals of the cell to be tested. The other terminal consists of a flexible lead also provided with a point. Knife-edged pointers are provided and the scale has the zero in the center, so that the voltage may be read regardless of the polarity.

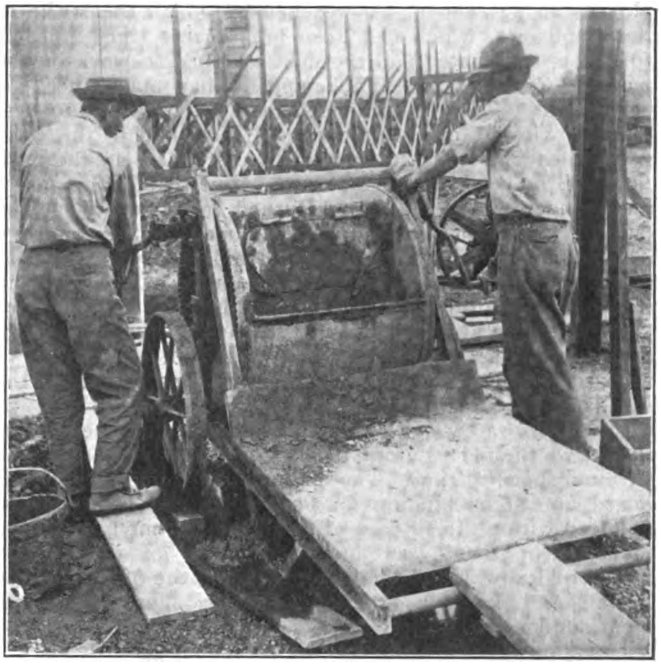
REPLACING OVERTURNED TRACK

The accompanying illustration shows graphically not only the havoc caused to railway property in the Central States during the recent flood but also the methods employed to replace a section of overturned track. Although part of the main line of the Louisville & Nashville Railroad (steam), the view is typical of electric railway conditions in the devastated country. The section overturned was about 1½ miles in length near Maunie, Ill., and the method of replacement was to sink guy anchors at intervals of about 50 ft. and at an angle of about 45 deg. and then to haul the track back into position by block and falls attached to a chain on the end of the guy anchor. Twelve 12-in. Matthews guy anchors were furnished for this purpose by the manufacturers on a hurry order, and at the point of use these anchors were screwed down until the eyes were under the water from 18 in. to 30 in. After a section of track had been rolled back upon the right-of-way by these means, as shown in the view, the anchors were unscrewed, taken ahead, screwed down again, and another section of track was replaced. In this way 1500 ft. of track was put back in position in a day.

Replacing Railroad Tracks Overturned by the Flood

HAND-OPERATED CONCRETE MIXER.

A mixer for handling concrete in small quantities such as would be required for pavement repairs, sidewalks, culverts or light foundations has been placed on the market by the T. L. Smith Company, Milwaukee, Wis. The machine is operated by hand, and as it is extremely light and compact it may be moved easily from place to place in accordance with the requirements imposed by a series of small and widely separated jobs. The capacity is 2½ cu. ft. to the batch.



Hand-Operated Concrete Mixer, Showing Loading Platform and Charging Door

Essentially the mixer consists of a drum and a feeding platform mounted on a two-wheel truck made up of structural steel shapes. The drum is made of No. 14 gage steel with cast heads. It is 3 ft. in diameter and 2 ft. 8 in. in length and has a charging door 2 ft. 4 in. long by 10 in. wide. All moving parts have been eliminated from the interior, as well as corners which might collect concrete during the mixing process.

The drum is fixed upon a 1½-in. steel shaft which revolves in interchangeable babbitted bearings. It is driven by means of two internal gears cast integral with the heads at each end of the drum, and these gears mesh with pinions mounted on two short hand-crank shafts, which are located at either end of the machine. The feeding platform is 3 ft. 7 in. wide and 3 ft. in length and is made of 1½-in. planks resting on 3-in. channels. The whole mixer is mounted on 30-in. wheels which have 3-in. treads. The weight complete is 1000 lb. and the over-all dimensions are: height, 4 ft. 5 in.; width, 4 ft. 2½ in., and length, 7 ft. 6 in.

The manufacturers state that three slow turns of the drum will mix the concrete aggregate as thoroughly as it can be mixed in a large power mixer. The force required to do the work is, however, much smaller than would be needed in case the mixing was done by hand. It is reported that from 30 cu. yd. to 35 cu. yd. of first-class concrete can easily be turned out with the machine in ten hours.

Representatives of the British government Board of Trade recently inspected the new trackless trolley system operated by the Stockport Corporation, Stockport, England. The cars are in use upon a route 1¾ miles in length, the fare for the distance being 2 cents.

News of Electric Railways

Terms of Settlement of Buffalo Strike

As a result of a conference held in the office of Mayor Fuhrmann of Buffalo on April 11, 1913, between the officers of the International Railway and representatives of the employees an agreement was reached by which the strike of the employees, which had been in progress since April 6, 1913, was terminated and the men returned to work on the morning of April 12. The company has maintained the principle for which it contended, namely, the right to deal directly with its own employees as such, and in the company's dealings with the men in the future, as in the past, they will be received as employees. The text of the agreement under which the men returned to work was signed only by President Connette and employees of the company. The demand for higher wages and modified working conditions was to be taken up by a committee of the men and the company within five days from April 11. All questions upon which an agreement is not reached by this joint committee from the company and the men will be referred to a board of arbitration of three members, one chosen by the men, one by the company and the third by these two. If the two arbitrators fail to agree upon the third member of the board, the place automatically goes to Mayor Fuhrmann within a specified time. The findings of the majority of this board are to be binding on both sides and must be announced within fifteen days after all the testimony has been taken. The employees and the officers of the Buffalo Southern Railway and the employees and the officers of the Buffalo & Lake Erie Traction Company signed an agreement similar to that between the International Railway and its employees. The full text of the agreement which has been entered into between the International Railway and its employees follows:

"It is hereby agreed as a basis of settlement:

"First—All employees who were in the employment on Saturday, April 5, 1913, to be returned to the service in the positions and with the seniority held by them at that time, with a leeway of forty-eight hours for such employees as may not be within calling or notifying distance to return and take their positions.

"Second—When the employees have returned to work, and within five days after having signed this agreement, the company is to take up with a committee of the employees all complaints, grievances and the working conditions for the future. Included in these complaints shall be the cases of the men discharged within thirty days prior to April 5, 1913. If they cannot reach a satisfactory agreement through these conferences, all questions in dispute between them shall be submitted to a board of arbitration. Either party upon being notified in writing by the other party that arbitration is desired shall name its arbitrator within forty-eight hours after having received such written notice.

"Third—The board of arbitration is to be composed of three persons, the employees to select whomsoever they desire as their arbitrator, the company to select whom it desires. These two arbitrators thus selected shall select within five days from the date of their appointment the third arbitrator. In case of failure to select a third arbitrator within five days as specified, the Mayor of Buffalo shall become the third arbitrator. Within three days after the appointment of the third arbitrator, the board of arbitrators shall meet and continue in session until all disputes have been heard and decided.

"At the hearing before the board of arbitration either side may be represented by any one whom it desires, and after all evidence and arguments have been heard by the board of arbitration it shall within fifteen days formulate its award in writing and submit the same to both parties. The findings of the majority of the board of arbitration shall be final and binding on both parties.

"The expenses of the board of arbitration shall be borne as follows: Each party shall pay the arbitrator of its selection, and they shall jointly pay the expenses of the third arbitrator and such other expenses as may be incurred in the negotiations."

Mayor Whitlock Reviews Franchise Negotiations

Mayor Brand Whitlock of Toledo, Ohio, in a communication to the North End Improvement Association of that city, has summarized the street railway situation in Toledo in part as follows:

"The Toledo Railways & Light Company is operating a part of its system by sufferance of the city and the rest under franchises expiring at various times in 1914, 1915 and 1916. Two years ago, when the first of the company's franchises were about to expire, negotiations for a settlement of the whole problem were opened at the company's request and carried on for months, but these were interrupted because the company's representatives were unwilling to go on with them during the various efforts at reorganization.

"Inasmuch as transportation is the very life of a city, the municipal authorities were loath to prohibit the operation of cars, and therefore the city solicitor proposed and drafted an ordinance providing that the company could operate its lines in those streets where the rights had expired only on condition that it reduce the fare on all lines, and as a result a tentative and informal arrangement was made by which 3-cent fares are charged during the morning and evening hours, and at other times tickets are sold at the rate of six for a quarter, with universal transfers.

"At the time this arrangement was made it was provided, too, that certified accountants should examine the records of the company to ascertain the effect on its receipts of the reduction in fares. The accountants have examined a period covering nine months of operation under this reduced fare and are now examining the remaining three months, so that the entire year may be brought under notice and the results under all sorts of conditions studied. The reports of the accountants thus far show a considerable stimulation of traffic as a result of low fares, and tend at least to confirm the opinion so often expressed that with a proper routing of the cars and with a proper valuation 3-cent fares would be practicable.

"The municipal authorities have always been willing to have the company's properties evaluated and then to lay before the people the question of whether or not they desire to have submitted at referendum for their approval a franchise based on a rate of fare sufficient to enable the company to pay its interest charges, its taxes and operating expenses and a reasonable return on its actual investment.

"In the meantime the Council has appointed a committee charged with the duty of investigating the subject of municipal ownership with reference to Toledo at this time. Under all the circumstances it would be well, therefore, to await the report of this committee before final action of any sort is taken. When that report is made it may be entirely possible to submit to the people at the same election, in the form of alternative propositions, the question of municipal ownership and operation of the railroad and an ordinance granting the company a franchise.

"I think that when the franchises have expired the company will find the people determined to adopt municipal ownership as the only solution of the problem. I am sure that this will be the ultimate solution, come when it may, though, of course, I do not know when that will be. It is for the people themselves to say."

Employees' Stores in Milwaukee

As a result of the inquiry which it has been conducting among its employees into the cost of living with the idea of securing information and data from which to evolve a plan of benefit to the men, The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has decided to establish stores at five of its carhouses where farm produce cultivated on about 700 acres of land along the company's lines will be sold to the employees. Later groceries, canned goods, shoes and other necessities may be sold. This plan of the company was referred to briefly in the ELECTRIC

Railway Journal of Oct. 26, 1912, page 921. R. B. Stearns, vice-president of the company, explains the purpose of the company as follows:

"It is not our intention to go into competition with the stores of the city. We believe our duty to the employees of the company is to provide means for them to obtain produce for their families at a great reduction in cost. Nothing will be sold to outsiders. We have prepared statistics which show that 708 acres of land will be necessary to raise potatoes, cabbages, onions and other vegetables needed for the tables of the families of the men in all branches of work with the company. Only such vegetables will be grown as can be stored easily after harvest in the fall. These will be shipped from the farms along the right-of-way to the carhouses where the stores will be established. Then those men with identification cards can obtain whatever they want. We do not contemplate going into the slaughtering business. The meat will be bought in large quantities and sold at cost.

"The necessity for such an enterprise for the benefit of our employees has been shown in our investigation. There is a material difference between the cost of production and the cost price to the consumer. Some one gets this money, as I told the representatives of the grocers and butchers when they visited me to protest against this venture.

"One reason for the high cost of produce is that the farmer ships his produce to the Chicago wholesaler, who ships to the Wisconsin wholesaler, who in turn sells to the Wisconsin retailer. Every one gets his profit. The retailer has to provide delivery wagons, which add to the cost of the merchandise or produce, and by the time the consumer comes to pay the bill there is a wide margin between the production cost and the consumer's bill.

"The retailers are also forced to protect themselves against the persons who obtain goods on credit and then do not pay. Perhaps 10 per cent of their customers do not pay regularly or at all. This must be taken out of the pockets of those that do pay. In our stores everything will be sold for cash. There will be no delivery. Everything will be sold for cost of production."

Request for Increase in Ordinance Allowances in Cleveland

J. J. Stanley, president of the Cleveland (Ohio) Railway, requested at the meeting of the Cleveland Council on April 14, 1913, that the ordinance allowances for maintenance and operation be increased to 7 cents and 12½ cents per car mile respectively. This request was transmitted to the legislative body by Street Railway Commissioner Witt, who also presented two letters containing a history of the negotiations with the company on this point. Mr. Witt stated that he had proposed to ask Council to increase the operating allowance to 12 cents per car mile for one year beginning May 1, 1913, if the company would consent to use accumulations in the accident fund to reduce the deficits that have accrued and to stay within the limit of 12 cents or any other limit hereafter set. This the company refused to do, as it is obviously impossible to foresee just what will be necessary in the future. Mr. Witt stated that under its franchise the company ought not to spend more than the ordinance allows and that he and other city officials had had several conferences with the officers of the company regarding this matter. The company officials state that they have been unable to give the service demanded without making deficits in these funds.

On Mr. Witt's assertion that the interest fund now amounts to more than $700,000, Councilman Haserodt, chairman of the street railway committee, presented a resolution that the fare be reduced to the rate in the Tayler ordinance known as G, which would mean 2½ cents, with 1 cent for a transfer, not to be refunded. In reckoning the interest fund Mr. Witt has included the accident and some other funds maintained by the company. Both of these measures were referred to the street railway committee.

Officers of the company contend that the interest fund, if computed as it should be, is close to the $300,000 mark, where the fare would be automatically increased, instead of reduced.

The employees of the company at a meeting on April 12 formulated a demand for an increase of wages from 27 cents and 30 cents an hour to 37 cents flat an hour, a nine-hour day, with eight hours' work on the night runs, abolition of tripper runs, additional time off for sleep for extra crews and pay for the ten minutes the men are required to be at the carhouse before they take out their cars. Charles E. Koontz, representing the union, states that the men are not concerned with the differences between the company and the city and that if their demands are not granted the men will ask for arbitration. Mr. Stanley is said to have informed the men some time ago that the company could not increase wages. The employees who objected that the city might accuse the company and the men of working together to secure larger ordinance allowances were overruled.

In working out plans by the charter commission, Mayor Baker presented a draft of sections relating to public utilities in which the price for purchase by the city was to be fixed at the cost of reproduction plus 10 per cent. In addition, he suggested that in case a fifty-year franchise is granted the reduction in price each year should be such that at the end of fifty years the railway would automatically become the property of the city. This plan was opposed by some of the members, who said that it would amount to a tax on gross receipts, an idea that is not favored at this time.

The Mayor threatens immediate purchase of the property of the Cleveland Railway if the city loses in the arbitration of the demand for an increase in allowances for maintenance and operation.

Mr. Stanley has made a counter proposition to the motormen and conductors, proposing the open shop.

Detroit's Municipal Ownership Amendments Carried

The charter amendment providing for municipal ownership of street railways was approved by the electors of Detroit, Mich., on April 7. The proposed increase in the bonding limit of the city and the amendment to place city employees under civil service were also approved. All three apply to the street railway situation. In an interview Mayor Marx said:

"I have been asked what will be the first step we shall take in preparation for municipal ownership and operation of the street railway system. In reply, I wish to say that within the next few weeks I shall appoint a street railway commission, and the people of Detroit may rest assured that the men to whom this great responsibility will be delegated will be those in whom they will have full confidence."

On the day following the election Mayor Marx announced that William H. Maybury, William T. Dust and Joseph Stringham will be appointed street railway commissioners as soon as the Verdier home rule act is sustained by the courts. Upon this commission will rest the responsibility of spending the $10,000,000 which the voters have made available as the initial expense toward the purchase of the street railway property for municipal operation. It is said that $100,000 will be put into the hands of the commission at once to be expended in valuations and other work that must precede the actual purchase of property. William H. Maybury was formerly commissioner of public works of the city. Mr. Stringham is an engineer. Mr. Dust has had long experience in municipal affairs and has been a close student of transportation. A secretary will be appointed to this commission.

A very important point in the injunction case brought in the Wayne County Circuit Court has not been decided, although the court allowed the vote to be taken on the charter amendments and the bond issue. This relates to the appointment of the street railway commission. In this case the plaintiffs, George H. Barbour, Fred T. Moran and Charles A. Ducharme, asked that the city be restrained from issuing bonds for the purchase of the railway property. The court merely allowed the city to proceed with the vote on the charter amendments, but did not rule on the other points.

Corporation Counsel Lawson and Attorney Alfred Lucking, who have returned to Detroit from Washington, announced that steps had been taken before the United States Supreme Court to bring about an early hearing of the Fort

Street case. They made three motions before the Court, as follows:

First—To dismiss the writ of error and appeal in this cause for the reason that no federal question is involved in the case which would authorize or justify an appeal to this court from the Supreme Court of the State of Michigan.

Second—In case the foregoing motion be denied, city of Detroit moves to affirm the judgment of the Supreme Court of Michigan for the reasons that it is manifest that the appeal is taken for delay only and the questions involved are so frivolous as to need no further argument.

Third—In case both the foregoing motions should be denied motion is made to advance the cause.

The attorneys for the company are to have three weeks in which to file a brief in the case, according to Mr. Lawson.

The provisions of the municipal ownership amendment were summarized in the ELECTRIC RAILWAY JOURNAL of March 22, 1913, page 557. The section covering the rate of fare was given in full as was also the question upon which the voters were asked to express their opinion.

Chicago Elevated Railways Wage Decision

On May 31, 1912, the working agreement between the employees and the five elevated railways of Chicago expired. Some weeks prior to the expiration of the old contract negotiations were commenced for a new contract. As a satisfactory agreement could not be reached resort was had to arbitration as provided in the old contract. Wallace Heckman was selected as arbitrator to represent the elevated companies and Jacob C. Lebosky was selected as arbitrator to represent the men. The effort made by these arbitrators to adjust the points of difference without selecting a third man has resulted in their reaching a satisfactory agreement. Mr. Heckman and Mr. Lebosky have worked continuously since September, 1912. The conditions existing heretofore on the different roads made a solution especially difficult.

The decision of the arbiters was read at a conference of the representatives of the companies and the employees on April 12. The companies were represented at this conference by President Britton I. Budd; E. C. Noe, general manager, and G. P. Seely, assistant general manager. Franklin B. Hussey acted as attorney for the companies. The employees were represented by John McIntosh, Edward McMorrow and a committee of five representing the five roads involved. The old agreement stands except for slight changes in the wages and the hours of some of the employees. The new and the old rates of pay for the employees of the transportation department of the companies follow:

NEW RATES

	Rate per Hour, Cents
Regular motormen:	
First year	30½
After first year	34
Extra motormen:	
First year	28
Second year	28½
Third year	29½
Regular conductors:	
First year	25½
After first year	27
Extra conductors	24
Regular guards	24
Extra guards:	
First year	21
Second year	22
Third year	23
After three years	24

OLD RATES.

Regular motormen:		
First year	28	
After first year	32	
Extra motormen	25	to 28
Regular conductors	24	to 25
Extra conductors	22½	to 23½
Regular guards	22	to 23
Extra guards	19	to 22½

Ticket agents were granted an increase of from 8 cents to 25 cents per day. The wages of shopmen were increased from 1 cent to 1½ cents per hour, and their hours were reduced to nine per day. Power house employees were granted an increase of from 1 cent to 1½ cents per hour, and the hours of work of the latter class of employees were reduced to ten per day.

Proper Capitalization of Flood Damage Favored in Ohio

O. H. Hughes, of the Public Service Commission of Ohio, says that the following statement attributed to him by some of the daily papers with regard to the attitude of the commission with respect to the capitalization of the improvements to the public utilities necessitated by the flood damage is in substance correct, although he has not in mind any well-defined plans looking to the solution of the problem in detail:

"We want to help the public utilities of Ohio. They are engaged in a public duty, and those companies that have sustained great damage through the floods should be permitted to issue securities to cover the damage, instead of being compelled to make their replacements out of surplus and future earnings. If the laws of the State are not sufficiently broad now to give the commission authority, the Legislature now in session ought to give the proper authority. At the same time, in view of the blow which many of these properties have also received in the loss of present and future earnings, the commission ought also to have the right to adjust rates to help make up losses. This would have to be very carefully handled, however, and entertained only in especially severe cases.

"I am in favor of a sane policy at all times—a live and let live policy, as it were, with equity and justice as the true guide. The reconstruction problem confronting the properties in Ohio at this time is very complex and should be solved in the light of reason."

Governor Cox of Ohio was also quoted as follows by some of the daily papers:

"Our policy should be one of sympathetic construction. Companies serving the public should be permitted to capitalize the replacements which they are forced to make through flood damages and spread the payments through a term of years. Some plan can be worked out that will cause the minimum of hardship."

Organization of New York Municipal Railway Corporation

The New York Municipal Railway Corporation formed by the Brooklyn Rapid Transit interests to facilitate participation in the proposed dual system of rapid transit, has organized as follows: A. N. Brady, chairman of board; T. S. Williams, president; C. D. Meneely, vice-president, secretary-treasurer and member of board; J. Horace Harding, vice-president; W. S. Menden, chief engineer; C. E. Roehl, electrical engineer; W. G. Gove, engineer of car equipment; J. J. Dempsey, transportation engineer; Lincoln Van Cott, purchasing agent; G. D. Yeomans, general counsel; Howard Abel, comptroller; J. H. Bennington, in charge of real estate purchase and sales. The chief engineer will supervise and direct all construction and equipment, including plans and specifications therefor. The chief engineer, purchasing agent, general counsel, comptroller and real estate manager will report to President Williams. The electrical engineer, transportation engineer and engineer of car equipment will report to the chief engineer. H. A. Bullock as secretary is in charge of obtaining the consents of abutting property owners, releases of property owners, etc. The directors of the company are: A. N. Brady, W. G. Oakman, J. H. Harding, J. N. Wallace, T. S. Williams, Charles A. Boody, James C. Brady, A. K. Wood, Clinton D. Burdick, George W. Davison, N. F. Brady, Bernard Gallagher and C. D. Meneely.

Rapid Transit Progress in New York

Plans for the connection of the existing subway with the new subway in Lexington Avenue have been changed by the Public Service Commission for the First District of New York so that the junction will be made south of Fortieth Street instead of near Forty-second Street as originally contemplated. The first plan involved the passage of the new subway under private property on both sides of Forty-second Street, and it developed that the obtaining of easements would be very expensive. On this account the Board of Estimate and Apportionment refused to approve the first plan. The Public Service Commission then adopted a plan for a connection through Fortieth Street. According to this plan the route just touches private property where it cuts the corners of blocks at Park Avenue and Fortieth Street and Lexington Avenue and Fortieth Street. The Board of Estimate and Apportionment has not yet acted upon this plan.

The Interborough Rapid Transit Company has submitted to the Public Service Commission for the First District a bond in the sum of $1,000,000 for equipment, maintenance and operation under the dual system contract recently signed.

The New York Municipal Railway Corporation (Brooklyn Rapid Transit), having already filed its bond for $1,000,000, has also made a deposit of $1,000,000 with the comptroller of the city, thus completing the security required under its part of the contract for new subways. This deposit is to secure the company's contribution toward construction and its purchase of equipment, in accordance with the provisions of the dual system contracts. The contract permits the deposit of either cash or approved securities, and in this case the company loaned to the city, through the comptroller's office, $1,000,000 in cash to be used in anticipation of the issue of corporate stock for water supply purposes. The city gave the company a note for the amount maturing May 15 next and bearing interest at 4¼ per cent per annum. This note the company offered and the Public Service Commission approved as its deposit under the security provisions of the dual system contracts. When the note matures it is understood the company will purchase $1,000,000 in city bonds and substitute the bonds for the note as its deposit.

Electrification of Canadian Northern Pacific Railway Feeders

The Canadian Northern Pacific Railway has decided to electrify its branch lines from Kamloops to Vernon, B. C., and according to R. A. Barton, the engineer in charge of the preliminary development of the Couteau Power Company near Ducks, B. C., just north of Kamloops, the Canadian Northern Pacific Railway has acquired the charter and rights of the Couteau Power Company, which contemplated spending $2,000,000 in development work. The line from Kamloops to Vernon, Lumley and Kelowna, in British Columbia, will be 132 miles long and is under construction as a branch line to the Canadian Northern Pacific Railway or the Canadian Northern Railway. The Canadian Northern Railway is linking up a transcontinental line across Canada. At present the lines are operated separately, the Canadian Northern Quebec Railway in the Province of Quebec, the Canadian Northern Ontario Railway in Ontario, the Canadian Northern Railway and the Canadian Northern Alberta Railway in the prairie provinces, and the Canadian Northern Pacific Railway in British Columbia. During 1912 track was laid on the Canadian Northern Pacific Railway from Sumas to Hope, 41.64 miles, making the total track laid on the line 78.25 miles. The line from Hope to Yellowhead Pass, 421.82 miles, is under construction.

Increase of Wages at Philadelphia

Co-operative Bulletin No. 10 of the Philadelphia (Pa.) Rapid Transit Company, just issued, states that the accumulations in the 22 per cent fund now permit an increase of the wages of motormen and conductors, effective May 1, as follows: New men, 23 cents; after one year's service, 24 cents; after two years' service, 25 cents; after three years' service, 26 cents; after four years' service, 27 cents; after five years' service, 28 cents. The present scale of wages which was effective Jan. 1, 1913, is as follows: New men, 22½ cents; after one year's service, 23½ cents; after two years' service, 24 cents; after three years' service, 25 cents; after four years' service, 26 cents; after five years' service, 27 cents. The company pays for a minimum of nine hours on all regular runs and has approximately 7000 motormen and conductors in its service. The bulletin mentioned, which is issued to all trainmen, after making this announcement, discusses the improvements made by the present management in the status of the men under the heading "co-operation versus conflict" and shows that the wages have increased much more during the period of peace under the Stotesbury régime than because of the strikes during 1909 and 1910.

Adverse Reports by City Engineer Regarding Extension of San Francisco Municipal Line

A report on the cost of municipal railway lines which have been proposed for immediate construction in order to provide adequate transportation facilities for the Panama-Pacific International Exposition has been filed by City Engineer O'Shaughnessy of San Francisco, Cal., with the Board of Public Works and has been transmitted with the board's approval to the Board of Supervisors, which has referred it to the public utilities committee. The city engineer says:

"From the estimates it is apparent that the cost of construction and equipment of street railways to provide adequate transportation for the large number of persons who will desire to attend the exposition during the few days of maximum attendance, without the co-operation of the United Railroads, will far exceed any possible profit to be derived from the operation of such street railways, and that after the close of the exposition the city will be left with a large amount of equipment on hand for which no profitable use can be found for a number of years afterward."

After figuring the probable average attendance, the number of workmen and other factors of exposition travel, the city engineer says:

"This makes the total income to be derived from the transportation of passengers to and from the exposition, for the year preceding the exposition, $300,000; for the 288 days during which the exposition will be open, $864,000, and for the year following the exposition, $75,000, a total of $1,239,000. The operating expenses will average two-thirds of the gross income, leaving one-third, or $413,000, as the gross profit to be derived from the estimated traffic."

Mr. O'Shaughnessy gives the cost for three different methods of operation, the first for ordinary transportation conditions, such as will exist after the close of the exposition; the second to provide for the extraordinary conditions which will prevail during the exposition period, and the third for joint operation on the proposed lines by the municipality and the United Railroads. The estimates under the third method include the cost of connections with the United Railroads.

Little Damage to Erie Railroad Electric Division.—The Rochester electric division of the Erie Railroad Company, Rochester, N. Y., reports that its electric service was suspended three days during the recent flood, with 90 per cent of the route affected. There was no interruption to the supply of power. The damage to the property was trifling.

Meeting to Consider Additions to Standard System of Accounts.—The committee on a standard classification of accounts of the American Electric Railway Accountants' Association will meet representatives of the Interstate Commerce Commission at the Hotel Marlborough-Blenheim, Atlantic City, N. J., during the week beginning April 21, 1913, to consider the proposed additions to the standard system of accounts.

Another San Francisco Report.—B. J. Arnold has just submitted another exhaustive report to the Mayor and Board of Supervisors on the street railway conditions in San Francisco. He makes many recommendations for changes and improvements to take care of the immediate future, and outlines other improvements and extensions which he says will be necessary within the next twenty years. He urges prompt action by the city upon the transit situation and says that the present uncertain condition is being capitalized by surrounding communities to the detriment of the city.

Relief for Congestion in Los Angeles.—It is announced that the Pacific Electric Railway, Los Angeles, Cal., is prepared to proceed with the construction of its proposed elevated railway. The plans involve the construction of an elevated line from the rear of the company's depot at Sixth and Main Streets, Los Angeles, over which will be routed the cars of the Southern division and those running to Pasadena, the San Gabriel Valley and the various other lines of the Eastern division. Practically all of the interurban cars will be removed from downtown Main Street. The section of the road which it is proposed to build at this time will be constructed over private right-of-way.

Charter Conference in Los Angeles.—Immediately after the adverse vote on the Los Angeles charter on Dec. 3, 1912, the People's Charter Conference was organized with a view to getting amendments before the people in time for approval by the Legislature. The conference has reported eight separate amendments which purport to give the city increased power in the purchase and regulation of public utilities and the power of excess condemnation, when it shall be provided for by state law. Each of the nine members of the Council would be designated a committee of one to look after a division of the city's affairs. One amendment provides for a form of proportional representation in the Council.

Chicago Partnership Receipts from Surface Railway Operation.—By the terms of the ordinances under which the Chicago street railways are operating, the city is entitled to 55 per cent of the "net divisible receipts." The amounts which have just been paid to the city under this arrangement for the year ended Jan. 31, 1913, were $1,413,404 from the Chicago Railways and $1,116,588 from the Chicago City Railway, making total receipts $2,529,992 for the year. For the six years these ordinances have been in operation the payments have amounted to $10,326,391. The amount turned over by the Chicago Railways for the year 1912-13 was 7.2 per cent more than for the preceding year, while the increase in the payment from the Chicago City Railway was 6.5 per cent. Under the law the city must use the money received from this source to create a fund to purchase the properties or build subways.

Subway Question Before Council of Providence.—At a recent meeting of the committee on subways of the City Council of Providence, R. I., D. F. Sherman, vice-president of the Rhode Island Company, told the committee that the only way the company could improve its service in Providence materially was to operate in the congested district in a subway or on an elevated railway. The former was to be preferred. The opinion expressed by the committee was that if a subway system was built by the city for lease to the Rhode Island Company the company should pay the interest on the bonds issued to cover the expense of construction and in addition a sum yearly such as would retire the principal in from forty to sixty years. Mr. Sherman said that the Rhode Island Company would submit a proposal to the city if the committee would draw up accurate estimates of the cost of construction of the proposed subway.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CONNECTICUT

The House has rejected the bill to regulate fares on electric railways so that a person should pay 3 cents on entering a car and 2 cents more when provided with a seat.

ILLINOIS

The public utilities bill, sponsored by Governor Dunne, contains the following salient provisions:

1. A commission of five members, the salary of each commissioner to be $10,000 a year.
2. Abolition of the present State Railroad and Warehouse Commission.
3. Provisions for appeals to the Circuit Courts and then the Supreme Court from all rulings of both the state commission and the local municipal commission.
4. The law to become operative in all cities of the State under 25,000 population upon its going into effect, it to be left optional with the cities of more than 25,000 population as to whether they will avail themselves of the enabling legislation and establish a local commission for the regulation of all utilities.
5. Provision whereby cities of more than 25,000 population which have adopted the commission method of dealing with the utilities may surrender their rights and come under the state commission control.
6. Cities of more than 25,000 population, operating under a local commission, to have jurisdiction only over the local utilities within the municipal limits.
7. The regulation of the issuance of all stocks, bonds and securities of all corporations, local utilities or otherwise, to be controlled by the state commission.
8. The act not to apply to municipally owned utilities in any city, such as water works, gas and electric plants.
9. The powers of the commission to be made plenary and applicable to all public service corporations of every kind and character in Illinois.
10. The commission to be authorized to regulate the service of all public service corporations, with particular respect to schedules, quality of service and rates charged.

The utilities bill was introduced in both branches on April 16.

Despite the fact that Judge James A. Creighton of the Sangamon County Circuit Court at Springfield, Ill., has decided that the Illinois Railroad & Warehouse Commission has a right to carry out its order directing the Alton, Granite City & East St. Louis Railway to install toilets on its interurban cars between Alton and East St. Louis, the bill introduced into the Legislature by Senator Edmond Beall, Alton, providing for these conveniences on all interurban cars will be urged for passage. Senator Denvir's bill limiting the hours of employment of street railway motormen and conductors to ten hours which must be within twelve consecutive hours has been reported favorably out of the labor committee of the Senate.

IOWA

The House has voted against the amended public utilities bill and there is little or no prospect of a measure of this kind passing at the present session.

MASSACHUSETTS

The committee on street railways has sent in adverse reports upon the bills providing for state ownership of all street railways and upon the bill requiring companies to charge not more than half fare for pupils of any institutions of learning in traveling between their homes and school. The committee has reported a bill requiring all cars operated in the State on street railways to be equipped with an emergency lifting jack of a type to be approved by the Railroad Commission, with a maximum penalty of $100 per violation. Chairman McLeod of the Railroad Commission appeared before the committee on street railways recently in executive session to consider the bill authorizing the New York, New Haven & Hartford Railroad to own and develop electric railways in western Massachusetts. During the conference Mr. McLeod pointed out that the contemplated extensions of the existing systems fall within the scope of heavy railroad construction and contended that as such they should be made as a part of the railroad company's system. The committee has before it at present five bills relating to street railway investments, in which it is proposed to attach as amendments substantially the stock and bonding features of the Washburn bill under the changes proposed by the savings bank interests of the State. One bill places the Railroad Commission in jurisdiction over investments of street railways in certain cases. Interest centered during the week upon the final arguments before the committee on street railways on the so-called nine-hours-in-eleven bills regulating the working conditions of motormen and conductors. A résumé of the later testimony and arguments was published last week.

A bill establishing a public service commission of five members, having control of railroad, street railway, telegraph and telephone lines of the State, was approved on April 16, 1913, by the House committee on ways and means, and was sent to the House for a first reading. The bill abolishes the present Railroad Commission.

MINNESOTA

By a vote of seventy-eight to thirty the House has rejected the bill providing for state regulation of public utilities.

NEW YORK

The Senate on April 15, 1913, defeated by a vote of twenty-two to twenty-four the bill to transfer the jurisdiction over the telephone and telegraph companies from the Public Service Commission of the Second District to the Public Service Commission of the First District.

Three bills have been drawn to give the Public Service Commissions powers similar to those exercised by the Interstate Commerce Commission in regard to rates. It is also proposed to facilitate litigation which involves decisions made by the commissions. The bills are also designed to bring baggage and transfer companies under the jurisdiction of the public service commissions by making them common carriers.

Governor Sulzer has signed the Levy bill relating to the manipulation of the prices of securities.

OHIO

The Bigelow bill, revoking the franchises of electric railway companies made for more than twenty-five years was passed by the House on April 10, 1913. Representative Bigelow, immediately after its passage by the House, had the bill sent to the Senate, where it was referred after second reading to the committee on municipal affairs. The bill would set a precedent by revoking contracts that have been considered inviolate.

The House has passed the Volmer bill requiring that motormen and conductors shall have at least eight hours to rest after fifteen consecutive hours of employment. The Kilrain bill, requiring seats for motormen and conductors on prepayment cars, has been acted upon favorably by the House. Screens for the protection of motormen will be required if the Moore bill, which has already passed the House, becomes a law. Representative Wise, of Stark County, has secured the passage by the House of the bill to give county commissioners the right to annul indeterminate franchises of electric railways. The Plumb bill, giving the Columbus, Urbana & Western Railway right-of-way across the grounds of the girls' industrial school near Delaware, has been passed by the House.

The Mills bill, which will allow the sale of bonds in small amounts for the purchase of street railways and exempt bonds for city-owned street railways from the provisions governing the debt limit of cities, has been passed by the House.

TEXAS

The Thirty-third Legislature, which adjourned April 1, to meet again in special session July 21, considered a total of 1467 bills and resolutions. Of this number 197 general bills and resolutions finally passed both branches of the House and have been acted upon favorably by the Governor. In all 1397 bills were introduced. Of this number the Senate fathered 494 and the House 903. In the Senate twenty-four joint resolutions were offered and in the House forty-three. Bills and resolutions offered this session exceed those of the Thirty-second Legislature by 443. During the session of the last Legislature a total of 1024 bills and resolutions were presented for consideration. There were ninety-five bills passed by the Senate, all of which have either received consideration at the hands of Governor Colquitt or will soon be at his disposal, while 102 bills passed the lower branch of the House. The records show that during the session 114 bills were killed or died on the calendar, while twenty-three amendments to the constitution met the same fate. A joint resolution calling for a constitutional convention was also killed.

WISCONSIN.

The Senate has passed the Linley bill providing that municipalities may at any time purchase street railways. The present law specified that such a purchase must be made within three years of the expiration of the franchise held by the company. Much interest is being manifested in the effect of the bill which has been passed authorizing the Railroad Commission to order the joint use of tracks by street railways, interurban railways and steam railroads.

PROGRAM OF ASSOCIATION MEETING

New England Street Railway Club

The regular monthly meeting of the New England Street Railway Club will be held on April 23, 1913, at 6.30 p. m. in the new mahogany room at the New American House, Boston, Mass. During the dinner the Clio quartet will play and Miss Irene Champney, Miss Emily Wilson and Chick Fox will entertain. The speaker of the evening will be Harry P. Cassidy. Mr. Cassidy, it is announced, will depart considerably from street railway topics.

Financial and Corporate

Stock and Money Market

April 16, 1913.

There was a sharp contraction in the selling of securities on the New York Stock Exchange to-day. Nearly all the active issues showed some amount of loss, although the declines were not extensive enough to be regarded with much importance. Railway and other bonds were irregular. Rates in the money market to-day were: Call, 2½ @ 3 per cent; thirty days, 3¾ @ 4 per cent; sixty days, 4 @ 4¼ per cent; ninety days and four to six months, 4½ @ 4¾ per cent.

The Philadelphia market to-day was broad but inactive, except for a few issues. The demand for bonds continued good.

Trading in Chicago to-day was narrow and the volume of transactions very small. The bond transactions were confined to a few issues.

In the Boston market Boston Elevated Railway was again a feature. It closed at 98, up 3, with that bid and 98¾ asked. Otherwise the market was dull and somewhat irregular.

The market for stocks in Baltimore to-day was extremely narrow and dull. The demand for bonds was good.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 9	April 16
American Brake Shoe & Foundry (common)	93¼	92
American Brake Shoe & Foundry (preferred)	132½	131
American Cities Company (common)	38¾	40
American Cities Company (preferred)	70	70¼
American Light & Traction Company (common)	400	380
American Light & Traction Company (preferred)	107	105
American Railways Company	38½	38¾
Aurora, Elgin & Chicago Railroad (common)	42½	42
Aurora, Elgin & Chicago Railroad (preferred)	85	85½
Boston Elevated Railway	105½	98
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	a66	a66
Boston & Worcester Electric Companies (common)	7½	a8
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	91¼	90¼
Capital Traction Company, Washington	122½	123¼
Chicago City Railways	*150	150
Chicago Elevated Railways (common	*26	29
Chicago Elevated Railways (preferred)	*88	88
Chicago Railways, ptcptg., ctf. 1	*85	90
Chicago Railways, ptcptg., ctf. 2	*21½	22
Chicago Railways, ptcptg., ctf. 3	*6½	7
Chicago Railways, ptcptg., ctf. 4	*3½	3½
Cincinnati Street Railway	111	111
Cleveland, Southwestern & Columbus Ry. (common)	5½	5½
Cleveland, Southwestern & Columbus Ry. (preferred)	30	30
Cleveland Railway	104¾	103
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	69½
Columbus Railway (preferred)	82½	82½
Denver & Northwestern Railway	*108	*108
Detroit United Railway	a80	80
General Electric Company	141	139⅞
Georgia Railway & Electric Company (common)	118¾	118
Georgia Railway & Electric Company (preferred)	84½	83¼
Interborough Metropolitan Company (common)	17⅞	17
Interborough Metropolitan Company (preferred)	59⅞	58
International Traction Company (common)	*35	*35
International Traction Company (preferred)	95	*95
Kansas City Railway & Light Company (common)	*15	15
Kansas City Railway & Light Company (preferred)	*30	*30
Lake Shore Electric Railway (common)	*6½	*6½
Lake Shore Electric Railway (1st preferred)	*91	*91
Lake Shore Electric Railway (2d preferred)	*25½	*25½
Manhattan Railway	129	128¼
Massachusetts Electric Companies (common)	18	17½
Massachusetts Electric Companies (preferred)	77	76
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*25¼	*25¼
North American Company	79	76
Northern Ohio Light & Traction Company (common)	75	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	44¼	44
Philadelphia Company, Pittsburgh (preferred)	40	40
Philadelphia Rapid Transit Company	25¼	25¼
Portland Railway, Light & Power Company	67	*67
Public Service Corporation	115	115
Third Avenue Railway, New York	38	36
Toledo Railways & Light Company	12½	a12½
Twin City Rapid Transit Co., Minneapolis (common)	105⅛	105
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	27⅝	25
United Rys. Inv. Company (common)	28¼	27½
United Rys. Inv. Company (preferred)	51	49
Virginia Railway & Power Company (common)	52	52
Virginia Railway & Power Company (preferred)	92	93
Washington Ry. & Electric Company (common)	92	91½
Washington Ry. & Electric Company (preferred)	90⅜	91⅜
West End Street Railway, Boston (common)	77	75½
West End Street Railway, Boston (preferred)	*96	95
Westinghouse Elec. & Mfg. Company	65⅛	63⅛
Westinghouse Elec. & Mfg. Company (1st preferred)	116⅜	116

*Last sale. aAsked.

ANNUAL REPORTS

Hudson & Manhattan Railroad

The president and board of directors of the Hudson & Manhattan Railroad have submitted the report of the operation of the company for the year ended Dec. 31, 1912. At the last annual meeting of the stockholders the fiscal year of the company was changed to end on Dec. 31, instead of March 31. Therefore the statement of income which follows includes the results of January, February and March, 1912, which have already been given in the preceding annual report.

Year Ended Dec. 31.	1912	1911
Gross revenue, all sources	$5,334,660	$4,639,464
Operating expenses and taxes	2,240,255	2,042,804
Gross income applicable to fixed charges	$3,094,404	$2,596,659
Interest on total interest-bearing bonds outstanding	$2,943,196	$2,944,552
Less interest chargeable to construction	64,114	640,627
Balance, being interest on capital employed in operation and chargeable against income	$2,879,081	$2,303,924
Other charges	289,855	283,864
Total deductions from income	$3,168,936	$2,587,789
Net income	*$74,532	$8,869
Percentage of railroad operating expenses vs. railroad revenue	36.04	38.99
Number of revenue car miles operated	7,950,413	7,150,826
Total railroad revenue per car mile, cents	45.66	42.58
Railroad operating expenses per car mile, cents	16.45	16.60
Net railroad revenue per car mile, cents	29.21	25.98

*Deficit.

Wilbur C. Fisk, the president of the company, says in part:

"The physical condition of your property is excellent. No effort has been spared to keep the property perfectly maintained in all departments.

"On April 14, 1912, temporary station facilities at Summit Avenue, Jersey City, were opened to the public. The completed structure was opened for public use during February, 1913. The Public Service Corporation of New Jersey has installed adequate terminal facilities adjacent to the Summit Avenue station and operates a large number of surface cars to that point, thus affording the people of that section of Jersey City convenient and frequent service to New York in connection with the Hudson tubes. The traffic at this station has doubled since it was first opened.

"During the year an additional platform was installed at the Erie station, with a stairway to the main passageway leading to the Erie Railroad's Jersey City terminal. This increased facility has greatly relieved the congestion of traffic at this point. The new platform, being on the east side, is used exclusively for northbound passengers, leaving the older platform for the use of southbound traffic.

"The block of real estate in Jersey City bounded by Henderson, Provost, Thirteenth and Fourteenth Streets, which was formerly occupied as the company's general storeyard, was sold in August at a price considerably in advance of its cost. The proceeds of this sale have been deposited with the Guaranty Trust Company, trustee of the New York & Jersey 5 per cent first mortgage.

"In May, 1912, the company took over the additions to the Hudson Terminal Buildings, and both the original buildings and the additions are fully rented at advantageous rates to a high class of tenants.

"Since the close of the fiscal year the directors of your company have approved a plan formulated by Kuhn, Loeb & Company, New York; Robert Fleming & Company, London, and Harvey Fisk & Sons, New York, for the readjustment of the debt of the company. The various security holders have already been advised of the details of the proposed plan, and their almost unanimous consent thereto has been most gratifying. It is expected that its successful consummation can be announced in the near future.

"As of March 31, 1912, there had been accumulated a reserve for the amortization of capital in the amount of $512,794. During ten months since that date no further accruals have been made as, in the judgment of the directors of your company, the amount already reserved was sufficient for all reasonable current requirements and it was, therefore, justifiable temporarily to discontinue further accretions to the reserve account. During the said period of ten months to Feb. 1, 1913, all expenditures for maintenance, renewals and repairs have been made out of current income and the amortization reserve has not been in any way depleted. Beginning with the accounts of February, 1913, it is proposed to inaugurate a new amortization plan, which will be sufficient to provide for the replacement of the various units of property at the ends of their estimated lives.

"The appointment of William G. McAdoo as Secretary of the Treasury of the United States necessitated his resignation as a director and president of this company. At a meeting of the board of directors on March 6 Mr. McAdoo's resignation was accepted with great regret, and Wilbur C. Fisk, formerly vice-president and general manager, was elected to the presidency of the company."

Traffic statistics for years ended Dec. 31, 1912 and 1911, follow:

	1912	1911
Average miles of road operated	7.91	7.4
Number of revenue car miles operated	7,950,413	7,150,826
Passenger revenue	$3,404,519	$2,846,945
Miscellaneous railroad revenue	225,541	197,810
Gross railroad operating revenue	$3,630,061	$3,044,755
Operating expenses (excluding taxes)	1,308,104	1,187,124
Net railroad operating revenue	$2,321,956	$1,857,631
Passenger traffic:		
Number of passengers carried	58,079,194	56,717,809
Number of passengers carried per mile of road	7,342,502	7,664,568
Number of passengers per revenue car mile	7.31	7.93
Revenues and operating expenses:		
Passenger revenue per mile of road	$430,407	$384,722
Gross railroad operating revenue per mile of road	458,920	411,453
Operating expenses (excluding taxes) per mile of road	165,373	160,422
Net railroad operating revenue per mile of road	293,546	251,031
Passenger revenue per revenue car mile	$0.4282	$0.3981
Gross railroad operating revenue per revenue car mile	0.4566	0.4258
Operating expenses (excluding taxes) per revenue car mile	0.1645	0.1660
Net railroad operating revenue per revenue car mile	0.2921	0.2598
Passenger revenue per passenger	$0.0586	$0.0502
Gross railroad operating revenue per passenger	0.0625	0.0537
Operating expenses (excluding taxes) per passenger	0.0225	0.0209
Net railroad operating revenue per passenger	0.0400	0.0328

Federal Light & Traction Company

The consolidated statement of profit and loss of the Federal Light & Traction Company, New York, N. Y., and its controlled companies, exclusive of the Deming Ice & Electric Company, for the year ended Dec. 31, 1912, follows:

Gross earnings of controlled companies	$1,722,647
Operating expenses of controlled companies (including taxes)	1,008,035
Net earnings of controlled companies	$714,612
Federal Light & Traction Company net income	22,446
Total net income (all companies)	$737,058
Total interest on outstanding bonds, notes and floating debt	374,540
Balance after interest	$362,518
Dividend on $2,500,000 6 per cent preferred stock of Federal Light & Traction Company	150,000
Surplus, after interest and preferred dividend payments	$212,517

The earnings of the controlled companies, after the elimination of inter-company earnings and making provision for reserve funds, for the years ended Dec. 31, 1909, 1910, 1911 and 1912, follow:

	Gross Earnings	Operating Expenses and Taxes	Net Earnings
1909	$1,217,434	$764,554	$452,830
1910	1,352,449	768,659	583,790
1911	1,496,177	887,094	609,082
1912	1,722,647	1,008,035	714,612

C. C. Chappelle, vice-president and general manager of the company, says in part:

"The gross earnings of the Federal Light & Traction Company's several controlled companies for the fiscal year ended Dec. 31, 1912, were $1,722,647, a gain of 15.1 per cent over 1911, and the net earnings were $714,612, a gain of 17.3 per cent over 1911.

"During the fiscal year ended Dec. 31, 1912, there was spent for additions, extensions, betterments and acquisitions to the properties of your several controlled companies the sum of $1,200,000, from which expenditure your company should receive substantial benefit in increased net earnings.

"Since the close of the fiscal year ended Dec. 31, 1912, your company has acquired the control of the Central Arkansas Railway & Light Corporation, which company, through its subsidiary companies, owns and operates the street railways, gas, water, electric lighting and power business in Hot Springs, Ark., and vicinity.

"The entire outstanding common stock of the Central Arkansas Railway & Light Corporation is owned or controlled by your company. The operations of the properties of the Central Arkansas Railway & Light Corporation were taken over by your company March 1, 1913, but the earnings from the several Hot Springs subsidiary companies accrue to your company from Jan. 1, 1913.

"The Central Arkansas Railway & Light Corporation gross earnings for 1913 should be in excess of $500,000, and the net earnings from operation not less than $240,000, the surplus thereof, after the fixed charges on outstanding bonds and dividends on preferred stock of said corporation, accruing to your company.

"Since the close of the fiscal year ended Dec. 31, 1912, the property of the Montrose Electric Light & Power Company, one of your controlled companies, has been sold.

"In conclusion, the communities served by your controlled companies are growing in population and general prosperity, and the year 1913 should show gratifying returns for your company."

Liverpool Corporation Tramways

The annual report of the Liverpool (England) Corporation Tramways for the calendar year of 1912 has just been issued. The revenue and expenditure account follows: Total revenue, £668,220; operating costs (including rental of leased lines), £425,018; gross profit, £243,202. The gross profit has been apportioned as follows: Interest, £50,096; sinking fund and repayment of loans, £59,248; reserve, renewal and depreciation account, £66,929; contribution in aid of the general rate, £66,929. The net profit for the year amounted to £133,857, an increase of £19,125 over 1911.

The number of passengers carried and miles run during 1912 and 1911 follow:

	1912	1911	Increase	Per Cent Increase
Passengers	134,249,967	128,625,374	5,624,593	4.4
Mileage	12,590,408	12,399,469	190,939	5.0

The average earnings per car mile for the year 1911 amounted to 12.03d., as against 11.64d. for 1911, an increase of 0.39d. The traffic receipts and car mile earnings, together with the passengers carried, are the highest recorded in connection with the Liverpool Tramways.

The report refers to the two new sample cars put in service last year. Both were double-deck cars and were described in the ELECTRIC RAILWAY JOURNAL for July 6, 1912. One of them, a single-truck car, has proved very satisfactory and six more have been ordered. The double-truck car has also shown its superiority over the ordinary type of double-truck cars, but double-truck cars are not considered suitable for general service in Liverpool.

During the year the wages of the drivers, conductors and other employees were raised ¼d. per hour. The rolling stock has been increased by the addition of fourteen cars. The following statement shows the division of passengers over various stages:

Value of Tickets.	Number Sold	Percentage of Total
1d.	118,342,962	88.151
2d.	14,407,459	10.732
3d.	1,207,943	0.900
4d.	167,025	0.124
5d.	2,008	0.002
6d.	122,590	0.091
	134,249,967	

The increase in the number of penny section tickets sold amounted to 39,688, valued at £165 7s. 4d., or 5.4 per cent. The company has now 587 cars. The ordinary day's service consists of 445 cars. There are 2166 employees, compared with 2295 in 1911.

The report contained a number of traffic curves, including one showing the passengers carried per hour and the licensed capacity of the cars per hour.

New Orleans Railway & Light Company

The income account of the New Orleans Railway & Light Company, New Orleans, La., for the year ended Dec. 31, 1912, compares with the income account of the previous year as follows:

	1912	1911
Operating revenues	$6,628,147	$6,335,462
Operating expenses	3,420,356	3,419,648
Net operating revenue	$3,207,791	$2,915,813
Revenue outside operations	10,463	14,453
Total net revenue	$3,218,255	$2,930,267
Revenue deductions:		
Taxes	$560,980	$535,339
Uncollectible consumers' accounts	5,010	5,190
Total revenue deductions	$565,990	$540,530
Net operating income	$2,652,264	$2,389,736
Miscellaneous income	14,324	12,918
Gross corporate income	$2,666,588	$2,402,654
Income deductions:		
Interest:		
On funded debt of N. O. Ry. & Lt. Co.	$967,696	$944,380
On funded debt of affiliated companies	299,372	315,414
On consumers' and employees' deposits	10,863	10,726
On other unfunded debt	33,185	1,888
Rent for lease of other street railroad:		
Interest on funded debt of lessor company	302,903	304,578
Dividends on stocks, lessor company—held by others	4,130	4,130
Other rental obligations	6,791	6,898
Amortization of funded debt, discount and expense	39,971	37,882
Other income deductions	2,680	1,998
Total income deductions	$1,667,596	$1,627,898
Net corporate income	$998,992	$774,756
Dividend deductions:		
On stocks of affiliated companies—held by others:		
Cumulative dividends on preferred stocks	$600	$600
Declared on common stocks	3,360	2,460
Total dividend deductions	$3,960	$3,060
Surplus from operations for period	$995,032	$771,696

Delaware & Hudson Company

The following reference to the electric railways controlled by that company is contained in the report of L. F. Loree, president, to the stockholders of the Delaware & Hudson Company for the year ended Dec. 31, 1912:

"Increases in net operating revenues were as follows: United Traction Company, $18,721; Hudson Valley Railway, $11,713; Schenectady Railway, $35,321. The net operating revenues of the Troy & New England Railway and the Plattsburgh Traction Company decreased $2,578 and $2,598 respectively.

"Dividends of 4 per cent for the year 1912 were declared on the capital stock of the United Traction Company, 6 per cent on that of the Schenectady Railway, 3 per cent on that of the Troy & New England Railway, and 5 per cent on that of the Plattsburgh Traction Company.

"The United Traction Company has completed the work inaugurated in 1911 of placing feeder wires underground. A high-tension transmission line from the Mechanicsville power plant to North Albany, a distance of 17¼ miles, has been constructed, affording the company direct transmission of current from the Mechanicsville power plant to its various transformer stations at Albany and Troy, N. Y. The tracks have been extended on Ten Broeck Street, Albany, N. Y., Mill Street and Pawling Avenue, Troy, N. Y., for a distance of 6054 ft., 1450 ft. and 2692 ft. respectively. During the year seventeen 16-ft. cars were lengthened to 21 ft., increasing the seating capacity from twenty-two to twenty-eight passengers, or 27.3 per cent, and three 18-ft. cars were rebuilt and lengthened to 21 ft., increasing the seating capacity from twenty-four to twenty-eight passengers, or 16.7 per cent.

"The Hudson Valley Railway has purchased three new passenger cars for use in interurban service between Albany and Warrensburg, N. Y., each with a seating capacity of fifty-two passengers, and has completed the work of paving Broad Street, Schuylerville, N. Y. The work of paving Lawrence Street, Glens Falls, N. Y., with asphaltic concrete pavement will be completed early in 1913."

Havana Electric Railway, Light & Power Company, Havana, Cuba.—The Havana Electric Railway, Light & Power Company has declared a semi-annual dividend of $2.75 a share on its common stock. This is an increase of 50 cents a share over the previous disbursement. The regular semi-annual dividend of $3 a share also has been declared on the preferred stock. Both dividends are payable on May 15. A special meeting of the stockholders of the Havana Electric Railway, Light & Power Company has been called for May 15 at Jersey City to vote on the proposed merger with the Havana Electric Railway.

Interborough Rapid Transit Company, New York, N. Y.—J. P. Morgan & Company have issued a call on the syndicate members for 12½ per cent of the $170,000,000 of Interborough Rapid Transit Company new first mortgage 5 per cent bonds. This amounts to $21,250,000. The funds will be used to pay off the $15,000,000 notes of the Interborough Rapid Transit Company which mature on May 1, 1913, and for other corporate purposes. The $300,000,000 mortgage of the Interborough Rapid Transit Company to the Guaranty Trust Company, New York, N. Y., has been filed for record with the register of New York County.

Interstate Public Service Company, Indianapolis, Ind.—The Interstate Public Service Company, the holding company of the Insull interests in Indiana, has increased its stock from $3,000,000 to $8,000,000 as the initial step in the plan to consolidate properties in Indiana which it controls for the purpose of handling the business more efficiently. Mr. Insull is reported to have said: "Although an increase has apparently been made in the stock, as a matter of fact the result will be a decrease in securities, for when the exchange of securities of the various interests takes place there will be a smaller amount than is shown at the present time." Chester P. Wilson, vice-president of the Interstate Public Service Company, has announced the purchase of the properties of the Central Indiana Lighting Company, which controls the Columbus Street Railway & Light Company.

Interstate Railways, Philadelphia, Pa.—John A. Rigg, president of the Interstate Railways, in a letter addressed recently to the holders of the preferred stock of the company, says: "The Interstate Railways was incorporated in New Jersey on Dec. 4, 1902, and issued $2,291,050 of capital stock for money, full paid at par. It then acquired all the capital stock of the United Power & Transportation Company and paid for the same by an issue of $10,776,600 of 4 per cent collateral bonds, agreeing to make advances to the United Power & Transportation Company and its underlying companies to provide for their fixed charges, betterments, operating expenses and taxes. The underlying companies earned their charges, and the Interstate Railways applied its capital to the betterment of these properties. Then came the depression of 1907-'08-'09, and the company defaulted in the interest on its bonds and in the advances it had agreed to make. In this extremity, other plans having failed, the system of leases was adopted and $1,000,000 of preferred stock was authorized and issued in exchange for coupons of 1910 and 1911 or offered for subscription. The preferred stock was over-subscribed and issued, and the dividend of 6 per cent has been earned and promptly paid. Under the leases a fixed income to meet charges is assured, and the gradually increasing rentals would soon provide an income for the common stock were it not for the stipulation that the principal of the preferred stock must be paid before any dividend can be declared upon the common stock. However wise that precaution may have been at the outset, there is a present general sentiment among the preferred stockholders that the payment of a dividend earned upon the common stock would strengthen both the preferred stock and the bonds and would make a ready market for the 6 per cent preferred stock at par, so that if a holder desired to convert his stock into money he could do so more readily by a sale in the market than by waiting for gradual payments by instalments. The purpose of this communication, which, though unofficial, is issued with the approval of the board, is to get the sense of the holders of preferred stock as to the advisability of a new issue without the instalment payment clause in exchange for the present certificates, the effect of which would be to make the preferred stock permanent."

Lehigh Valley Transit Company, Allentown, Pa.—The directors of the Lehigh Valley Transit Company have authorized the officers of the company to enter into a contract with Edward B. Smith & Company, Philadelphia, Pa., representing the stockholders of the Easton Consolidated Electric Company, for the purchase of the holdings of the stockholders of the Easton Consolidated Electric Company who have agreed to accept the proposition of purchase, the number of shares aggregating 23,000. The shareholders who have not yet accepted the proposition will have until May 1 in which to accept. After that date the Lehigh Valley Transit Company will not be bound under the contract to purchase any of the minority shares. The terms of the purchase were published in the ELECTRIC RAILWAY JOURNAL of April 12, 1913, page 696. The Easton Consolidated Electric Company was chartered in New Jersey in 1899 to control the Easton Transit Company, the Easton, Palmer & Bethlehem Street Railway, the Phillipsburg Horse Car Railroad, the Edison Electric Illuminating Company of Easton, the Northampton Central Street Railway and the Easton & South Bethlehem Transit Company.

Mexico, Santa Fé & Perry Traction Company, Mexico, Mo.—Judge Barnett in the Circuit Court at Montgomery City, Mo., has granted an order of sale to the plaintiffs in the case of J. D. Bates against the Mexico, Santa Fé & Perry Traction Company to foreclose under the bond issue. The date of the sale and the terms remain to be fixed by the court.

New York, Westchester & Boston Railway, New York, N. Y.—The Public Service Commission of the Second District of New York has authorized the New York, Westchester & Boston Railway to issue its first mortgage bonds to the par value of $6,044,000, the bonds authorized to the amount par value of $1,290,000 to be sold at not less than par and the balance to be sold at not less than 92. The proceeds of the sale of the bonds are to be used for right-of-way, station and other construction purposes, for the construction of the main line from New Rochelle to the terminus in Port Chester, for the construction of double track from the present end of its main line at Larchmont Junction, New Rochelle, to the proposed terminus in Port Chester, to complete the construction of the White Plains branch, and to pay and cancel outstanding notes held by the New York, New Haven & Hartford Railroad for money loaned for capital purposes.

People's Traction Company, Galesburg, Ill.—Charles S. Harris, secretary and treasurer of the People's Traction Company, is reported to have purchased the holdings of President A. P. Higgins of the company, giving Mr. Harris control of 1282 shares of stock out of 1500 shares.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—The Petaluma & Santa Rosa Railway has received authority from the Railroad Commission to pledge $80,000 of its first mortgage 5 per cent bonds as collateral for a note for $64,000. It is proposed to use the proceeds of the note to pay for the construction of 5½ miles of electric railway from the main line of the company from Liberty Station to Two Rock.

Toledo & Chicago Interurban Railway, Kendallville, Ind.—The property of the Toledo & Chicago Interurban Railway was sold at receiver's sale at Fort Wayne, Ind., on April 14, 1913, at the upset price of $550,000 to George R. Sheldon, New York, N. Y., representing the holders of the bonds. On April 13, 1913, the Fort Wayne & Northwestern Railroad was incorporated in Indiana with a capital stock of $1,950,000, consisting of $650,000 of preferred stock and $1,300,000 of common stock, presumably as the successor to the Toledo & Chicago Interurban Railway.

Toledo Railways & Light Company, Toledo, Ohio.—At the meeting of the representatives of the two factions in the Toledo Railways & Light Company reorganization held in the offices of Attorney Rathbun Fuller at Toledo on the afternoon of April 14, 1913, a temporary board of directors was chosen as follows: F. R. Coates, Rathbun Fuller, Thomas H. Tracy, John H. Taylor and R. D. Logan, Toledo; Charles A. Frueauff, F. J. Derge, Milan R. Bump, George Williams and Frank W. Frueauff, New York; Cyrus L. Coup and George L. Heater, Toledo; William F. Hoffman, Columbus, Ohio, and C. F. Chapman, Jr., George D.

Welles, Frank W. Caughlin, Harry W. Isenberg, Frank E. Miller, Robert Newbegin, Eugene H. Winkworth and Newton A. Tracy, all with the law firm of King, Tracy, Chapman & Welles, Toledo. While this board is temporary permanent members are to be elected at a meeting called for April 21. Officers were chosen as follows: Frank R. Coates, president; Rathbun Fuller, vice-president; M. R. Bump, secretary; S. D. Carr, treasurer. It is said that out of a total of 139,000 shares of stock 120,000 shares were represented at the meeting on April 14. The number of members of the board has been increased from nine to twenty-one. By order of Judge J. M. Killits of the Federal Court the officers and directors chosen by the Doherty interests took possession on April 16, 1913. The petition was filed by the Toledo Traction, Light & Power Company and alleged that the Smith faction was wrongfully in possession of the porperty. The injunction is temporary and is to be in effect until further orders are issued by the court.

Dividends Declared

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, preferred; 2¾ per cent, common.

Jacksonville (Fla.) Traction Company, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Lehigh Valley Transit Company, Allentown, Pa., 50 cents, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

Mexico (Mex.) Tramways, quarterly, 1¾ per cent.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Public Service Investment Company, Boston, Mass., quarterly, 1½ per cent, preferred.

United Railways & Electric Company, Baltimore, Md., $1, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.							
1 m.	Feb.	'13	$88,878	*$55,505	$32,373	$23,740	$9,633
1 "	"	'12	76,657	*46.275	30.382	21.279	9,103
12 "	"	'13	1,091,523	*654,994	436,529	271,621	164,908
12 "	"	'12	958,335	*565,857	392,478	243,836	148,642
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO							
1 m.	Feb.	'13	$24,548	*$15,909	$8,638	$10,227	†$1,589
1 "	"	'12	22,819	*15,991	6,828	9,944	†3,115
2 "	"	'13	52,643	*32,590	20,052	20,699	†646
2 "	"	'12	46,720	*32,949	13,771	19,959	†6,188
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, SAGINAW, MICH.							
1 m.	Feb.	'13	$549,665	*$295.088	$254,577	$142,327	$112,250
1 "	"	'12	488.859	*285.386	203,473	108,241	95,232
12 "	"	'13	6,532,924	*3,762,961	2,769,963	1,558,501	1,211,462
12 "	"	'12	5,647,600	*3,257,651	2,389,949	1,300,400	1,089,549
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE							
1 m.	Feb.	'13	$172,587	*$101,605	$70,982	$56,733	$14,249
1 "	"	'12	149,711	*84,445	65,266	48.158	17,108
12 "	"	'13	2,151,405	*1,217,361	934,044	653,082	280,962
12 "	"	'12	2,014,013	*1,274,757	739,256	557,929	181,327
DETROIT (MICH.) UNITED RAILWAY							
1 m.	Feb.	'13	$920,166	*$623,519	$296,646	$178,603	$108,043
1 "	"	'12	790,203	*525,137	265,064	175,155	89,909
2 "	"	'13	1,925,512	*1,301,295	624,216	357,103	267,112
2 "	"	'12	1,598,015	*1,070,962	559,460	359,758	199,701
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.							
1 m.	Feb.	'13	$200,100	*$117,832	$82,268	$49,781	$32,487
1 "	"	'12	185,809	*106,026	79,783	47,595	32,188
12 "	"	'13	2,488,921	*1,379,919	1,109,002	580,958	528,044
12 "	"	'12	2,298,587	*1,281,979	1,016,608	552,735	463,873
GRAND RAPIDS (MICH.) RAILWAY							
1 m.	Feb.	'13	$93,049	*$56,047	$37,002	$14,821	$22,181
1 "	"	'12	91,627	*53,999	37,628	14,727	22,901
12 "	"	'13	1,241,548	*706,972	534,576	175,265	359,311
12 "	"	'12	1,184,564	*669,214	515,350	178,682	336,668
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO							
1 m.	Feb.	'13	$88,679	*$59.798	$28,881	$34,937	†$6,055
1 "	"	'12	82,117	*56,392	25,724	34,833	†9,108
2 "	"	'13	189,052	*124,775	64,277	69,875	†5,597
2 "	"	'12	169,270	*111,842	57,420	69,424	†12,004

*Includes taxes. †Deficit.

Traffic and Transportation

Report of Milwaukee Benefit Association

The first annual report of the Employees' Mutual Benefit Association of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., and associated companies, for the year ended Feb. 28, 1913, has been issued in pamphlet form. The report, showing in detail the results and activities of the association, presents many facts of interest and importance. The total income amounted to $25,254, as follows: Monthly dues—members, $9,576; monthly dues—company contributions, $9,576; company contributions for expenses, $5,904; miscellaneous income, $197. The total expense amounted to $17,562, as follows: Sick benefits, $7,819; death benefits, $1,200; association physician's fees, $2,317; directors' fees and expenses attending meetings, $291; drugs, medical and surgical supplies, $18; miscellaneous expenses, $10; company contributions (services of officials, office expenses, stationery and printing, postage, etc.), $5,904.

The cash on hand at the close of business on Feb. 28, 1913, was $12,527, of which $1,527 is on current deposit at the Wisconsin National Bank and $11,000 is invested in time deposit certificates of the Wisconsin National Bank, drawing interest at the rate of 3 per cent per annum. Sick benefits were allowed to 363 members, covering 430 cases of disability caused by sixty-three different kinds of sicknesses. and fourteen cases of disability caused by injuries received when off duty. The amount of these sick benefits allowed to those 363 members was $7,819. The amount paid into the association by these 363 members was $2,181. The 363 members to whom sick benefits were paid represent thirty-three different occupations. Of the 363 members 161 were motormen, 143 were conductors and fifty-nine were engaged in thirty-one other occupations. There were four death benefits amounting to $1,200 allowed to beneficiaries.

In furnishing medical attendance to the members the medical staff made 1764 visits to the homes of the members and prescribed 1433 treatments at their offices, making a total of both of 3197. The value of the medical services thus rendered, based on an average of $1 per treatment, was $3,197.

This total of 3197 includes only treatments given by four of the association's physicians—three located in Milwaukee, one in Watertown. Treatments given by the other four association physicians, located in West Allis, Waukesha, Racine and Kenosha, and treatments given by the medical director in hospitals, at the homes of members or at his office are not included. The data of the treatments given by the four association physicians previously referred to and the medical director are not available, but if added to the 3197 treatments recorded would increase the number of treatments to not less than 4000 and the value of the medical services rendered to not less than $4,250.

The medical director performed thirty-seven surgical operations, fourteen of which were major operations, and twenty-three minor operations. The value of these surgical operations was not less than $1,750.

The number of members admitted initially, pursuant to plan outlined in the announcement dated Jan. 1, 1912, prior to April 1, 1912, was 1654; 524 members were admitted during the period beginning April 1, 1912, and ending Feb. 28, 1913. Five hundred and forty-two members were out of the service of the companies between March 1, 1912, and Feb. 28, 1913. Fourteen members were dropped from the membership roll, nine being under age and five withdrawing their membership. Five members died. There were 1612 members in the association at the close of Feb. 28, 1913.

Safety League in Rockford.—S. R. Smith, claim agent of the Rockford & Interurban Railway and Rockford City Traction Company, Rockford, Ill., has taken steps to form a safety league in Rockford. Booklets and badges have been distributed among the school children of the city by the company.

Accident in Baltimore.—One person was killed and more than twenty were injured recently when a car of the United Railways & Electric Company, Baltimore, Md., was derailed on the bridge which connects Baltimore City with

Anne Arundel County. The car left the bridge and plunged into the Patapsco River.

Change of Schedule of Market Street Elevated, Philadelphia.—The work of relaying track on the Market Street elevated line of the Philadelphia (Pa.) Rapid Transit Company was commenced on the night of April 8. While this work is under way all trains, after 1 a. m., will be run on a twenty-minute headway, except on Saturday nights, when the regular ten-minute headway will be maintained.

Increase in Wages in Jamestown.—The Jamestown (N. Y.) Street Railway has announced an increase in wages and an improvement in the working hours of its men to take effect on May 1, 1913. The new schedule of wages is a sliding one. It gives first-year men 19 cents an hour and increases until at the end of the tenth year the men receive 25 cents an hour, a rate of increase of about 1½ cents an hour.

Rhode Island Company Agrees to Reinstate Men.—As a result of a conference held recently between A. E. Potter, general manager of the Rhode Island Company, Providence, R. I., and a committee of the employees Mr. Potter has agreed to reinstate all of the men discharged some time ago except two. Action has been deferred, however, on the question of paying the men during the time that they were idle. Mr. Potter promised to let the men know his decision in regard to this matter within a few days.

Extension of Accident Prevention Campaign by A., E. & C. Railroad.—The accident prevention campaign begun in the schools of Aurora, Ill., by H. B. Adams, of the Aurora, Elgin & Chicago Railroad, will be extended by request to the schools of Elgin. Mr. Adams has addressed more than 6000 pupils in public, parochial and business schools. In the first three weeks of the campaign there was not an accident in Aurora. The city of Aurora will ask the Aurora, Elgin & Chicago Railroad to hang signs from guy wires so that drivers of vehicles may know they are approaching a street upon which there is a car track.

Trolley Trip from Michigan to St. Louis.—Officials of the Michigan United Traction Company, Lansing, Mich., planned to take a trip on the private car "Michigan" to Indianapolis via Detroit, Toledo, Lima, Fort Wayne, Bluffton and Anderson. They expected to leave on April 16. At Indianapolis they intended to take the Big Four Railroad to Peoria and then, through the courtesy of the Illinois Traction System, leave on a private car on April 18 for St. Louis. The fact that the through trip may be made by electric car from Michigan to Indianapolis indicates that the conditions caused by the floods are becoming a matter of the past.

Lectures to Employees on Technical Subjects.—Technical features of interest to car crews and others are being embodied in the educational work of the employees of the Louisville & Northern Railway & Lighting Company, New Albany, Ind., who meet regularly in the general offices of the company at what are called "boosters' meetings." William Buckman, of the electrical staff of the company, is on the program of the club for a series of lectures upon the wiring and electrical equipment of cars. His talks are illustrated with blue-prints drawn to a large scale and illustrating the points touched upon, while the audiences are composed largely of car men and road employees.

General Statement of Policy by California Commission in Regard to Rates.—In a decision handed down by the Railroad Commission of California on April 8, 1913, in passing upon the application of the owners of a water company in San Diego County to increase rates the commission summarized its position in this regard as follows: "All contracts made by a public utility will not stand when this commission has fixed rates, but this commission may adopt the rates fixed by contract if made under fair conditions, as far as it may do so without bringing about discrimination, and it specifically instructs utilities that they are not to repudiate their contracts until the matter has been presented to this commission."

Fare Complaint Dismissed in New Jersey.—The Board of Utility Commissioners of New Jersey has dismissed the complaint under which an order was sought to compel the Public Service Railway to grant a 5-cent fare from any point in Newark to any point in Union Township, Bergen County, or vice versa. The present fare between Newark and points in Union Township, Rutherford and East Rutherford is 10 cents. The board made an order last October dismissing a similar complaint by the Mayor of Arlington, the order establishing a fare zone at Belleville Turnpike on the line between Newark and Hackensack. Union Township lies outside of this fare zone, and as conditions have not changed materially since the decision of October, the board dismissed the new petition for the reasons stated in its earlier decision.

Accident Prevention Campaign in York.—The York (Pa.) Railways is inaugurating an educational campaign for the prevention of accidents on the public highways of the city and has enlisted the co-operation of the officials of the public schools of York. Five thousand blotters are being distributed among the pupils in all the graded schools in the city and the teachers are instructing the children to exercise care in walking or playing upon the streets. The blotters describe the danger to youths playing in or along the car tracks, stealing rides on street cars, riding on steps of cars, putting their heads out of car windows, and getting off the cars before they are brought to a stop. The children are being urged to take the blotters home. The teachers in emphasizing the dangers of the streets are teaching the children a series of don'ts at the request of the company.

Apprehending Pickpockets on New York Railways.—In the item published in the ELECTRIC RAILWAY JOURNAL of April 12, 1913, page 698, referring to the apprehension and conviction of criminals by secret service men in the employ of the Interborough Rapid Transit Company, the total number of arrests of pickpockets between July 1, 1911, and March 17, 1912, was thirty-four, as stated in the previous item, but the number sentenced to prison was twenty-six instead of thirty-six. The Grand Jury failed to indict in four cases and four were acquitted. As stated previously, the number of pickpockets arrested on property of the company by the company's detectives from March, 1912, up to and including April 4, 1913, was twenty-three. Seventeen convictions have resulted from the last-mentioned arrests, there have been three discharges and three persons are under bail awaiting proceedings.

Fare Adjustment on Long Island Railroad.—The Public Service Commission for the First District, on the opinion of Commissioner George V. S. Williams, has dismissed the proceeding against the Long Island Railroad for alleged discrimination in charging 10 cents on express trains and 5 cents on local trains for passenger transportation between Flatbush Avenue and East New York. Before dismissing it, however, the commission induced the company to agree to a reduction of fare on the express trains to 5 cents provided patrons would purchase twenty tickets at a time for $1. These tickets will soon be placed on sale and will be honored on express trains. The commission believes this change will obviate the principal cause of complaint, which was that the local trains at a 5-cent fare were badly crowded during the rush hours while express trains, upon which the 10-cent rate was charged, frequently operated with vacant seats. It is expected that the new arrangement will tend to equalize the traffic and reduce crowding.

Service Recommendations for Cambridge.—The Massachusetts Railroad Commission has issued a number of recommendations bearing upon the service of the Boston (Mass.) Elevated Railway on its surface lines in Cambridge, including the establishment of transfer facilities in the Inman Square district, the operation of additional cars, the shortening of certain routes and the establishment of express service in the morning rush hours inbound and in the evening rush hours outbound between Harvard Square and North Cambridge. Increased service over the crosstown line between Harvard Square and Dudley Street, in the Roxbury district of Boston, is to be provided during certain hours. Additional rush-hour service is recommended in the Huron Avenue district at morning and night and a trial shuttle service on a five-minute headway is to be undertaken between Harvard and Central Squares at certain periods when the local traffic on the surface immediately above the Cambridge subway line is heavy. It is recommended that the inbound express service shall be carried on without stopping to take on passengers going toward the business district in the morning rush hours inside the terminal limits of the express zone, with reversed conditions in the evening.

Personal Mention

Mr. L. B. Wickersham has been appointed chief electrical engineer of the Oregon Electric Railway and the United Railways, with headquarters at Portland, Ore.

Mr. A. M. Lupfer has been appointed chief engineer of the Oregon Electric Railway and the United Railways, with headquarters at Portland, Ore., vice Mr. L. B. Wickersham, assigned to other duties.

Mr. R. H. Crozier has been appointed assistant general passenger agent of the Spokane, Portland & Seattle Railway, Oregon Electric Railway, Oregon Trunk Railway and United Railways, with headquarters at Portland, Ore.

Mr. H. F. Johnson, who has been assistant engineer of maintenance of way of the New York State Railways, Rochester Lines, has been appointed engineer of maintenance of way of the Utica & Mohawk Valley Railway, Utica, N. Y., to succeed Mr. M. J. French, resigned.

Mr. P. J. Wood, formerly master mechanic of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, has accepted the position of general master mechanic of the Northern Ohio Traction & Light Company, with headquarters at Akron, Ohio. He will have supervision over the rolling stock of the Canton and Akron divisions.

Mr. S. W. Greenland has been appointed general manager of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., a place made vacant some time ago when Mr. Robert W. Watson severed his connections with the company. Mr. Greenland, while virtually general manager, has had the title of assistant general manager. In addition to being general manager, Mr. Greenland has charge of the purchasing department.

Mr. E. C. Deal, who has been general manager of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., since April 1, 1911, has been elected a vice-president of the company. Mr. Deal is a native of Atlanta and gained his early experience with the Georgia Electric Light Company, now the Georgia Railway & Power Company. He was connected with properties in Baltimore, Seattle, Brockton and Terre Haute controlled by Stone & Webster, and was also chief engineer of the Gas & Electric Company of Bergen County, in New Jersey. Previous to becoming connected with the Augusta-Aiken Railway & Electric Corporation Mr. Deal was manager of the North Carolina Public Service Company, Greensboro, N. C.

Mr. Rex Dunbar Frazier, formerly editor of the *Tangent Magazine,* which is published at Houston, in the interest of the Stone & Webster companies, has been appointed assistant general passenger agent of the Galveston-Houston Electric Railway. Before he became connected with the *Tangent Magazine* some eighteen months ago Mr. Frazier was connected with the editorial staff of the Houston *Post* for more than two years. Previous to that he was engaged in newspaper work in Peoria, Ill. Mr. Frazier has been a frequent contributor to the newspapers and magazines and is the author of a fourteen-page article, "The United States Army in Texas," profusely illustrated, which is published in the issue of the Stone & Webster *Public Service Journal* for April, 1913.

Mr. Charles A. Brooks has been appointed local manager of the Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., the management of which has been taken over by the J. G. White Management Corporation. New York, N. Y. Mr. Brooks has been engaged in electric railway work about ten years. He had two years of practical shop work, both mechanical and electrical, and then acted for a year as assistant superintendent of equipment of an electric railway in Ohio. For two years he was chief clerk to the superintendent of equipment of the Third Avenue Railway, New York. He was also assistant general manager of the South Shore Traction Company, New York. In September, 1910, he entered the supply business but later joined the railway forces of J. G. White & Company.

Mr. George F. Faber has been appointed general superintendent of the Atlantic City & Shore Railroad, Atlantic City, N. J., to succeed Mr. J. N. Akarman, who, as noted elsewhere in this column, has resigned from the company on account of ill health. Mr. Faber began his railroad career with the Pennsylvania Railroad as a clerk in the superintendent's office, where he served from 1890 to 1892. He next became connected with the accounting department of the East Cleveland Railroad. From 1894 to 1901 he was associated with the Warner & Swasey Company, Cleveland, Ohio, but resigned from this company to re-enter the electric railway field with the so-called Appleyard lines in Ohio. Mr. Faber next accepted the position of superintendent of the Elgin-Belvidere Electric Railway, then under construction. He subsequently became general superintendent of the Western Ohio Railway, Lima, Ohio. Early in 1909 he accepted the position of traffic manager of the Chicago, Lake Shore & South Bend Railway, and in August, 1910, was appointed superintendent of transportation of the Michigan United Railway, now the Michigan United Traction Company.

Mr. Mansfield J. French has resigned as engineer of maintenance of way of the New York State Railways, Utica Lines and Oneida Line, to engage in railway and structural engineering with headquarters at Syracuse. Mr. French first engaged in engineering work under Mr. C. Loomis Allen, who was then engineer in charge of reconstruction of the lines that were consolidated to form the Syracuse Rapid Transit Railway System. On Jan. 1, 1900, Mr. French became engineer of maintenance of way of the company. In September, 1901, he began work with the Oneida Railway and was in charge of surveys and track and overhead construction until July, 1903. After nine months as assistant to Mr. Charles H. Clark, engineer of maintenance of way of the Cleveland (Ohio) Electric Railway, Mr. French in 1904 became roadmaster of the Syracuse Rapid Transit Railway. In 1905 he was appointed engineer of maintenance of way of the Utica & Mohawk Valley Railway and in addition was appointed in 1907 to the same position with the Oneida Railway, retaining these positions under the consolidation of the properties as the New York State Railways, Utica Lines and Oneida Line.

J. M. Joel

Mr. J. M. Joel on April 2, 1913, was appointed by the executive committee of the New York State Railways as auditor of all lines controlled by that company with offices in Utica, N. Y., ranking next in position to the general auditor. Mr. Joel entered the service of the Syracuse (N. Y.) Consolidated Street Railway on Nov. 20, 1890, as clerk and after serving successively as voucher clerk, bookkeeper, and chief clerk was, in the latter part of 1903, made auditor of the Syracuse Rapid Transit Railway, which succeeded the Syracuse Consolidated Street Railway. In January, 1907, he was appointed auditor of the Syracuse Rapid Transit Railway, the Utica & Mohawk Valley Railway and the Oneida Railway, shortly after the acquisition of these properties by the Vanderbilt-Andrews interests. Mr. Joel is a member of the American Electric Railway Accountants' Association and is on the joint committee on engineering accounting of that association and the American Electric Railway Engineering Association.

Mr. J. N. Akarman has resigned as general superintendent of the Atlantic City & Shore Railroad, Atlantic City, N. J., on account of ill health. Mr. Akarman was born in Brooklyn on March 4, 1854, and began his railroad career in 1873 with the South Boston Railroad. In 1877 he became connected with the Middlesex Railroad. Subsequently he became superintendent of the Charles River Street Railway, Boston. Four years later, when this company was consolidated with the Cambridge Railroad, Mr. Akarman was appointed general superintendent of the Worcester (Mass.) Consolidated Street Railway. Later he negotiated the sale of the electric railways in Newark and Elizabeth, N. J., and in Worcester. He then became connected with the Elizabeth, Plainfield & Central Jersey Railway, and when the property of that company was sold to the Public Service Corporation he entered the employ of the latter, acting in turn as traffic superintendent, general passenger agent and general superintendent of the South Jersey division. Mr. Akarman was appointed general superintendent of the Atlantic City & Shore Railroad four years ago to succeed the late S. S. Neff.

D. Daly

Mr. David Daly, whose appointment as manager of the Galveston-Houston Electric Railway, Galveston, Tex., in addition to being manager of the Houston Electric Company, was noted briefly in the ELECTRIC RAILWAY JOURNAL of April 12, 1913, was born in Boston, Mass., on Oct. 16, 1878. He was educated in the public schools of that city and afterward entered Harvard. When he was twenty-two years old he entered the employ of the Stone & Webster Engineering Corporation. After serving with the company in Boston in various capacities he was sent by Stone & Webster to Ponce, P. R., as local manager there of the Ponce Railway & Light Company. Mr. Daly returned to the United States in May, 1905, and in August of that year he was appointed by Stone & Webster to manage the Houston Electric Company. Mr. Daly succeeds with the Galveston-Houston Electric Railway Mr. L. C. Bradley, who, as previously announced in the ELECTRIC RAILWAY JOURNAL, has assumed the duties of assistant district manager for Stone & Webster in Texas.

F. W. Hild

Mr. Frederic W. Hild, who was elected president of the Pacific Coast Electric Railway Association, which was organized at San Francisco, Cal., on April 1, 1913, has been general manager of the Portland Railway, Light & Power Company, Portland, Ore., since March 15, 1911. This company operates 286 miles of electric railway and does a general lighting and power business. Mr. Hild is in charge of the railway, light and power operating departments of the company. He was formerly assistant general manager and chief engineer of the Havana (Cuba) Electric Railway. He was graduated as an electrical and civil engineer from Union College at Schenectady, N. Y., in the class of 1898, and was for a time connected with the General Electric Company. While in the employ of this company Mr. Hild assisted in the important rehabilitation work carried out by the Twin City Rapid Transit Company, the Kansas City Railway & Light Company and the Chicago Edison Company. Mr. Hild was one of the originators of the idea of organizing an association to represent the electric railways on the Pacific Coast, and the call for the meeting at San Francisco at which the association was organized was issued over his signature.

Mr. Harlow C. Clark has just been appointed by the American Electric Railway Association editor of *Aera* and will conduct a publicity campaign through that paper and in other ways with the co-operation of the individual and company members of the association. He will enter upon his task with some unusual qualifications. He is not only a trained newspaper writer, but has served as an executive officer of a municipality and of a large commercial organization, so that he brings to the consideration of the problems with which he will deal a viewpoint which must be of value in determining the kind of publicity needed to correct existing misunderstandings. After serving in various capacities in the employ of the New York Central & Hudson River Railroad, Mr. Clark began his newspaper career in Syracuse, N. Y. He was political reporter, city and Sunday editor of the Syracuse *Herald* and left the newspaper business to become secretary to Mayor Alan C. Fobes in 1903. Two years later he became secretary of the Syracuse Chamber of Commerce, an organization of more than 1200 members. During his incumbency many important civic movements were inaugurated. In 1907 Mayor Fobes made him Commissioner of Public Safety, in which office he had charge of the police, fire, health, building and lighting bureaus of the city. At the expiration of his term he returned to the Chamber of Commerce as secretary. For the last year he has been one of the editors of the Syracuse *Journal*. Mr. Clark has written much on civic and corporation matters and has been during the greater part of his life in active touch with affairs of this character.

Mr. D. L. Turner has been promoted to be deputy engineer of subway construction for the Public Service Commission for the First District of New York. Mr. Turner was graduated from the Rensselaer Polytechnic Institute at Troy in 1891, with the degree of civil engineer. After teaching at the institute for a year he engaged in railroad location and construction work and in architectural engineering. From 1893 to 1901 he was instructor in surveying, railroading and hydraulics in the faculty of Harvard University, having charge of these departments and conducting courses in topographical, railroad, hydraulic, water-power, canal, river and irrigation engineering. He also inaugurated the Harvard engineering summer camp and established and conducted the present camp located at Squam Lake, N. H. During this same period he engaged in general engineering and consulting practice. From 1901 to 1907 he was attached to the engineering staff of the Rapid Transit Commission of New York City, first as assistant engineer and finally as a division engineer on the executive staff of the chief engineer. From 1907 to date he has been attached to the engineering staff of the Public Service Commission for the First District as chief of the bureau of transit inspection and as engineer of the seventh division. In the former position he originated and formulated the methods of supervising the operations of the various street railways coming under the commission's jurisdiction. In the latter position he was to have direct charge of subway construction work aggregating about $30,000,000 in value. He has, therefore, been connected with the present transit development of the city almost from its inception and has had to do with the problem in all of its phases, both from the construction and the transportation standpoints. Mr. Turner is a member of the American Society of Civil Engineers, the Boston Society of Civil Engineers and the Municipal Engineers of New York City.

OBITUARY

I. Parker Lawton, secretary of the Safety Car Heating & Lighting Company, New York, N. Y., is dead. Mr. Lawton was born in Rome, N. Y., forty-five years ago.

Albert E. Holmes, superintendent of the Fall River division of the Bay State Street Railway, Boston, Mass., is dead. Mr. Holmes was a native of Taunton, Mass., and was about fifty-one years of age. He attended the public schools in Taunton and Fall River and secured a position as conductor on what was the Globe Street Railway, Fall River. In June, 1901, he was appointed superintendent of the Fall River lines of the Bay State Street Railway to succeed Mr. William S. Tucker, resigned.

Joseph T. Orme, president of the Georgia Railway & Electric Company, Atlanta, Ga., and a director of that company, the property of which is leased to the Georgia Railway & Power Company, is dead. Mr. Orme succeeded Mr. P. S. Arkwright as president of the Georgia Railway & Electric Company when Mr. Arkwright was elected president of the Georgia Railway & Power Company. Mr. Orme was born in Atlanta in 1861 and was vice-president of the Lowry National Bank, Atlanta, with which he had been connected for more than thirty years. In addition he was treasurer of the Chamber of Commerce at Atlanta and a director of a number of other enterprises, among them the American Cast Iron Pipe Company, Birmingham, Ala., and the Georgia & Florida Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Pine Bluff & Sulphur Springs Interurban Railway, Pine Bluff, Ark.—Incorporated in Arkansas to build an 8-mile electric railway between Pine Bluff and Sulphur Springs. Capital stock, $100,000. Officers: A. G. Russell, president; H. Hanf, vice-president and treasurer, and John H. Tucker, Jr., secretary. [E. R. J., Nov. 2, '12.]

***Fort Wayne & Northwestern Railroad, Fort Wayne, Ind.**—Incorporated in Indiana presumably as the successor to the Toledo & Chicago Interurban Railway. The line will extend through Fort Wayne, Garrett, Auburn, Waterloo, Avilla and Kendallville, and from Waterloo eastward through Butler to the Ohio State line, and westward from Kendallville through Brimfield, Wawaka, Logonier, Millersburg and Goshen. Capital stock, $1,950,000; preferred stock, $650,000; common stock, $1,300,000.

St. Paul Southern Electric Railway, St. Paul, Minn.—This company, which is constructing an electric railway between St. Paul and Hastings, Minn., has been incorporated in Delaware. Grading has been completed and the bridges are being built. Capital stock, $5,000,000. Philip Heinz, Rochester, president. [E. R. J., Oct. 12, '13.]

***Norman Interurban Railway, Oklahoma City, Okla.**—Incorporated in Oklahoma with a capital stock of $150,000. Incorporators: George W. Knox, general manager Oklahoma Railway; Guy B. Treat, J. J. Johnson, W. J. House and Charles Hoopes, Oklahoma City.

***Bryan & Central Texas Interurban Railroad, Bryan, Tex.**—Application for a charter will be made by this company to take over the Bryan-College Interurban Railway and build extensions to the Brazos section and other points. Capital stock, $85,000. Officers: W. E. Saunders, president; A. W. Wilkerson, first vice-president; O. E. Gammill, second vice-president and general manager; L. L. McInnis, treasurer; L. M. Hewit, secretary and traffic manager; Doremus, Butler & Henderson, general attorneys.

***Willapa Bay & Eastern Railway, Seattle, Wash.**—Application for a charter has been made by this company to build an interurban line from Lincoln Creek station just south of Rochester to a point near South Bend, from where it is proposed to build along the North River. Capital stock, $2,000,000. Incorporators: W. H. Bogle, F. T. Merritt and C. P. Bissitt.

FRANCHISES

Pine Bluff, Ark.—The Pine Bluff & Sulphur Spring Interurban Railway, Pine Bluff, the incorporation of which is noted elsewhere in this issue, has asked the Council for a fifty-year franchise in Pine Bluff. This 8-mile line will connect Pine Bluff and Sulphur Springs. [E. R. J., Nov. 2, '12.]

Texarkana, Ark.—Rollin W. Rodgers and associates have received a franchise from the Council in Texarkana. This is part of a plan to build an electric railway between Texarkana and Clarksville. [E. R. J., Aug. 31, '13.]

Glendale, Cal.—The Pacific Electric Railway has asked the Council for a fifty-year franchise over several streets in Glendale. The company has received a fifty-year franchise in Orange County.

Pittsburg, Cal.—The Oakland, Antioch & Eastern Railway has asked the Council for a franchise in Pittsburg.

Redding, Cal.—Albert C. Agnew, Redding, has received franchises to build an electric railway and power line in Redding and on the highways of Shasta County. [E. R. J., March 15, '13.]

Sacramento, Cal.—The Northern Electric Company will ask the Council for a franchise for a change of its route within Sacramento.

Sacramento, Cal.—The Pacific Gas & Electric Company will ask the Council for a transfer of its franchise granted for a line on Twelfth Street to Fifteenth Street in Sacramento.

Canon City, Col.—Frederick B. Smith, New York, N. Y., has received from the City Council an extension of time to May 1 in which to begin the construction of an electric railway from Canon City to the top of Royal Gorge. [E. R. J., Jan. 11, '13.]

Denver, Col.—The Denver City Tramway has received a franchise from the Council and County Commissioners to extend its lines in the city of Denver and Denver County.

Ansonia, Conn.—The Connecticut Company has received a franchise from the Council to double-track its east side lines in Ansonia.

Champaign, Ill.—The Urbana & Champaign Railway, Gas & Electric Company, a subsidiary company of the Illinois Traction Company, has received a twenty-nine-year franchise from the Council to build a line about its proposed new station at University Avenue and Market Street in Champaign.

Collinsville, Ill.—The Springfield & Central Illinois Traction Company has received a franchise from the Council in Collinsville. This line will connect St. Louis, Terre Haute, Springfield and Duquoin. Isaac Smith, 1042 Pierce Building, St. Louis, president. [E. R. J., March 29, '13.]

Dubuque, Ia.—The Union Electric Company has received a twenty-five-year franchise from the Council to extend its lines in Dubuque.

Oskaloosa, Ia.—The City Council has granted a twenty-five-year franchise to the Oskaloosa Light & Traction Company, which was recently purchased by the Illinois Traction Company. The franchise will have to be ratified by the voters of the city.

Iola, Kan.—The Union Traction Company has asked the Council for a new franchise in Iola.

Abbeville, La.—The Louisiana Traction & Power Company, Lafayette, has received a franchise in Abbeville. This line will connect Lafayette, Morgan City, Alexandria and Abbeville. J. A. Landry, Lake Charles, president. [E. R. J., Feb. 8, '13.]

Slidell, La.—The Interurban Railways Company has received a franchise from the Council in Slidell. This company will soon ask for a charter to build a gasoline railway to connect New Orleans, Slidell, Oaklawn, Liberty and Covington. Among those interested are Joseph Blythe, N. J. Clesi and T. Semmes Ranlett. [E. R. J., March 29, '13.]

Baltimore, Md.—The United Railways & Electric Company, Baltimore, has asked the Council for a franchise to extend its Monument Street line to Orangeville.

East Gardner, Mass.—The Massachusetts Northern Railways, Greenfield, has received a franchise from the Council in East Gardner.

Highland Park, Mich.—The Detroit United Railway has asked the Council for a franchise on Manchester Avenue to the terminus of the Hamilton line, a line from Victor and Oakland Street to Manchester Avenue and a double track on John Street in Highland Park.

East Syracuse, N. Y.—The East Side Traction Company has asked the Council for a franchise to double-track part of the East Syracuse line in upper James Street, East Syracuse.

Toronto, Ont.—The Toronto & York Radial Railway has received permission from the Railroad Commission to double-track its line on Yonge Street from the Canadian Pacific Railway tracks to the city limits and the right to connect up the Scarboro, Mimico and Metropolitan divisions subject to the municipal franchise act.

Nashville, Tenn.—The Nashville Traction Company, backed by W. O. Palmer and other capitalists of Detroit, Mich., has secured the consent of the Council of Nashville to reconsider its application for a franchise to operate an electric railway in Nashville. The application was originally refused, but subsequent action makes it possible that the franchise will be awarded this month. The Nashville Traction Company seeks the privilege to compete with the Nashville Railway & Light Company. [E. R. J., Jan. 11, '13.]

Dallas, Tex.—E. P. Turner, Dallas, and associates have asked for a franchise through Cooke County. This proposed 100-mile electric railway will extend from Glen Rose, Somerville County, to Gainesville, Cooke County, and will traverse Johnson, Tarrant, Dallas and Denton Counties. The line will extend north from Dallas as the center to Letot, Farmers' Branch, Carrollton, Trinity Mills, Lewisville, Denton, Sanger and Gainesville. South from Dallas the proposed line will connect Eagle Ford, Grand Prairie, Mansfield, Lillian, Keene, Cleburne and Glen Rose. From Eagle Ford a spur is planned to Irving.

Houston, Tex.—The Houston Electric Company has asked the Council for a franchise from the Fifth Ward to the Houston Harbor addition in Houston.

***Vancouver, Wash.**—I. S. Putnam, Vancouver, has asked the Council for a fifty-year franchise to build an electric line over certain streets in Vancouver.

TRACK AND ROADWAY

Medicine Hat (Alta.) Railway.—This company has awarded the contract to build its electric railway in Medicine Hat and work will be begun as soon as this agreement can be ratified by the ratepayers. Max Aitken, Medicine Hat, is interested. [E. R. J., Feb. 10, '13.]

San Joaquin Light & Power Company, Fresno, Cal.—This company plans to spend over $1,000,000 in improvements during the year. It is now connecting up the substation at Strathmore with the main plant above Springville.

Los Angeles (Cal.) Railway.—Arrangements have been completed for the construction of this company's extension of the Fifty-fourth Street line in Los Angeles. Material has been ordered. Work has been begun by the company on the extension of the Dalton-Vernon Avenue line to the western city limits of Los Angeles.

Pacific Electric Railway, Los Angeles, Cal.—This company plans to spend about $70,000 repairing its lines in Long Beach. It has decided to use Trilby rails in relaying the tracks on Pine Avenue from Ocean Avenue to Sixth Street. The company has placed in operation its new line to San Fernando.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company, through its subsidiary corporation, the San Ramon Valley Railway, has awarded the contract for the building of the electric line from Walnut Creek to Danville, 7 miles, to Palmer, McBride & Quayle.

San José (Cal.) Railways.—Within the next few months this company plans to begin the construction of its Empire Street line in San José.

Big Four Electric Railway, Tulare, Cal.—This company has received permission from the State Railroad Commission to issue capital stock to the amount of $400,000. The proceeds from the sale of the stock are to be used for the construction of the line between Tulare, Porterville and Visalia. [E. R. J., April 12, '13.]

St. Petersburg, Fla.—Surveys are being made from St. Petersburg to Indian Rocks by W. W. Barton, Tarpon Springs. This line is being promoted by Thomas E. Lucas, St. Petersburg; M. Joel McMullen, Largo, and S. R. Morey, St. Petersburg.

Waycross Street & Suburban Railway, Waycross, Ga.—Following the completion of this company's line through Gilchrist Park, for which extension material is now being placed, the line will be carried to Hebardville.

Chicago (Ill.) City Railway.—About 8 miles of city track will be built by this company during the year.

Hillsboro Electric Light & Power Company, Hillsboro, Ill.—Surveys are being made by this company for a line between Hillsboro and Nokomis.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—The stockholders of this company will meet at Quincy on June 20 to vote upon an increase of the capital stock of the company from $200,000 to $300,000 and to discuss the question of borrowing $3,000,000 for the completion of the railway. W. E. Elliott, Quincy, general manager. [E. R. J., Feb. 22, '13.]

Springfield (Ill.) Consolidated Railway.—Residents on South Spring Street have filed a petition with the City Commission asking that this company be asked to extend its South Spring Street line from Cedar Street to Ash Street in Springfield.

Union Traction Company of Indiana, Anderson, Ind.—Extensive improvements will be made by this company on its Third Street line in Anderson.

Indianapolis, Columbus & Southern Traction Company, Columbus, Ind.—Plans are being made by this company to build a new bridge to replace the present bayou bridge at Edinburg.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Work will soon be begun by this company improving its lines in Fort Wayne. New rails will be laid on Main Street.

Cedar Rapids & Iowa City Railway, Cedar Rapids, Ia.—This company plans to build a 15-mile line from Cedar Rapids to Mount Vernon during the year.

Ottumwa Railway & Light Company, Ottumwa, Ia.—About 1 mile of track will be built by this company during 1913.

Interstate Railroad & Traction Company, Arkansas City, Kan.—Plans are being made by this company to build soon its line south from Arkansas City to Blackwell, Chilocco, Newkirk, Ponca City and other towns in Kay County, and eventually south through Red Rock, Perry, Orlando and Mulhall to Guthrie, Okla. Headquarters, Arkansas City, Kan. O. L. Brown, Arkansas City, is interested. [E. R. J., March 22, '13.]

Union Traction Company, Independence, Kan.—Announcement has been made by this company that construction will be begun on its line between Chanute and Iola. This railway will ultimately be extended south to connect with the Cherryvale-Independence-Coffeyville-Parsons line and then north to Kansas City.

Fort Scott & Pittsburg Railway, Pittsburg, Kan.—Preliminary surveys have been made by this company on its line between Fort Scott and Pittsburg. Later this line will be extended to Olathe to connect with the Strang line which runs into Kansas City. [E. R. J., Nov. 23, '12.]

Arkansas Valley Interurban Railway, Wichita, Kan.—During 1913 this company will build a 24-mile line to connect Halstead and Hutchinson and a 2-mile line between Newton and College.

Louisville (Ky.) Railway.—It is expected that the Audubon Park extension of this railway will be in operation May 1. A spur line 3000 ft. long is to be constructed from the Okolona interurban line of the company at Audubon station to Audubon Park.

New Orleans Railway & Light Company, New Orleans, La.—Plans are being considered by this company to extend its Clio Street line in New Orleans up Claiborne Avenue from Napoleon Avenue to the boundary of the parish.

Southwestern Traction & Power Company, New Orleans, La.—During the year this company will build a 175-mile line between Abbeville, Erath, Delcambrie, St. Martinville, Breaux Bridge, Lafayette, Broussard, Cades, Adeline, Cherenton, Baldwin, Franklin, Garden City, Patterson, Centerville, Berwick and Morgan City, La.

***North Beach Railway, Baltimore, Md.**—This company has asked the Public Service Commission for the approval of the issue of $10,000 of 5 per cent twenty-year bonds and the sale of $50,000 of stock. This is part of a plan to build a 2½-mile electric railway in Calvert and lower Anne Arundel Counties. Among those interested are John C. Shaw and V. W. Hughes.

Hagerstown & Clear Spring Railway, Hagerstown, Md.—The project to build the 12-mile line between Clear Spring and Hagerstown has been revived. About two years ago a company was formed to construct this railway, but the enterprise failed. John R. Bear, Philadelphia, and L. O. Davis, Harrisburg, are now interested in the project. [E. R. J., May 18, '12.]

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—This company has been asked to consider plans to extend its Franklin Street line for about 1 mile along Franklin Road in West Fitchburg.

Miller's River Street Railway, Miller's Falls, Mass.—Work will be begun in the spring by this company on its line between Orange and Miller's Falls. D. P. Abercrombie is interested. [E. R. J., Nov. 11, '11.]

***Muskegon-Casnovia Land & Development Company, Muskegon, Mich.**—This company has been organized to promote the building of an interurban railway from Muskegon to Saginaw. Among those interested are: Norman B. Lawson and James L. Smith, Muskegon; W. W. Putney, Kent City; James L. Norris, F. R. Davis and John O. Fraligh, Casnovia.

Columbus Railway, Light & Power Company, Columbus, Miss.—This company will change the route of its line in northeast Columbus. Instead of extending down Lake Park the line will continue northward and make a loop around the plant of the Interstate Lumber Company.

***Fallon (Nev.) Electric Railroad.**—This company has been organized with a capital stock of $300,000 to build an electric railway between Fallon and Stillwater. Officers: A. R. Merritt, president; Scott Harmon, treasurer; E. E. Winters, secretary, and C. A. Hascall, general manager.

International Railway, Buffalo, N. Y.—This company will begin at once to double-track its branch from Lockport to North Tonawanda. The work will be done as far as Oliver Street in North Tonawanda, and it is reported that the present right-of-way between Buffalo and North Tonawanda will be abandoned and a new line will be built over the right-of-way of the Frontier Electric Railway.

Jamestown (N. Y.) Street Railway.—This company plans to build a ½-mile loop during 1913.

Black River Traction Company, Watertown, N. Y.—Plans are being made by this company to double-track its line from High Street to the end of State Street in Watertown during the summer.

Piedmont & Northern Railway, Charlotte, N. C.—Plans are being considered by this company for an extension to Atlanta by way of Hartwell, Ga.

North Carolina Public Service Company, Salisbury, N. C.—Double-tracking its main line through the business center of Salisbury has been begun by this company.

Tidewater Power Company, Wilmington, N. C.—This company plans to build about 1 mile of new track during the year.

Piqua & Bradford Traction Company, Covington, Ohio.—Plans are being made by this company to begin work soon on a line to connect Covington and Bradford. J. H. Marlin is interested. [E. R. J., March 29, '13.]

Tri-State Railway & Electric Company, East Liverpool, Ohio.—During 1913 this company plans to build a 4400-ft. extension in Weirton.

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—During 1913 this company plans to build 6 miles of new track from Chauncey to Athens.

Ottawa (Ont.) Electric Railway.—This company will lay new track on Queen Street as soon as the weather permits. The extension of the double-track Bank Street line from the exhibition grounds to Billings Bridge in Ottawa South, a distance of 1 mile, will be under way early next month.

Portland Railway, Light & Power Company, Portland, Ore.—This company plans to electrify the Mount Hood steam line from Gresham to the Mount Hood plant on the Bull Run River, a distance of 22½ miles.

West Penn Railway, Pittsburgh, Pa.—Work will be begun in the spring by this company on its line between West Newton and Hunkers. In the construction of this branch, it is said, four bridges will be required.

Pottstown & Reading Street Railway, Pottstown, Pa.—Work will soon be begun by this company on its extension to Spring City.

***Sioux Valley & Northwestern Railroad, Watertown, S. D.**—This company is being organized to build a 20-mile electric railway between Watertown and Strousetown. Among those interested are Frank Heathcote and J. C. Maxwell.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company is cutting a new road at the south end of the Tennessee River bridge over which it will lay tracks for outgoing Island Home and Sevierville pike cars. Work is also being done by this company on the old roadway around Rose Mill in South Knoxville.

Brownsville Street & Interurban Railway, Brownsville, Tex.—S. A. Robertson, of this company, is reported to have contracted with the Brownsville Improvement Company to begin at once the construction of a 2-mile line from Brownsville to the Country Club.

Dallas (Tex.) Consolidated Electric Street Railway.—Extensive improvements are now being made by this company on three of its lines in Dallas. These improvements include the laying of new track and paving on McKinney Avenue, Haskell Avenue and San Jacinto Street.

***Dallas & Terrell Interurban Railway, Dallas, Tex.**—The Stone & Webster Corporation will build this railway if the right-of-way is given free of cost. The line will connect Terrell, Lawrence, Forney, Musquite and the Orphans' Home in Dallas. A. M. Somers, Terrell, is securing the right-of-way.

Gainesville, Whitesboro & Sherman Railway, Dallas, Tex.—Right-of-way has been secured and franchises granted by all the towns through which this line will pass. About 12 miles of grading has been done and plans are being made to begin work soon. The line will connect Gainesville, Whitesboro and Sherman.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—Surveys have been completed by this company as far as New Braunfels, about one-third of the proposed line between Austin and San Antonio. The location and engineering work is being done by the Southwestern Engineering Company, Gunter Building, San Antonio. [E R. J., April 5, '13.]

Logan (Utah) Rapid Transit Company.—This company plans to build 20 miles of new track during the year.

Utah Light & Railway Company, Salt Lake City, Utah.—Plans are being made by this company to begin work on the extension to Bountiful.

Beloit, Delavan & Clinton Railway, Beloit, Wis.—This company plans to build an electric railway to connect Beloit, Delavan and Clinton. Joel P. Dow, president of the Beloit Traction Company, is interested. [E. R. J., March 8, '13.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company is asked to consider plans to build a new passenger station in Hermosa Beach.

St. John's Electric Company, St. Augustine, Fla.—It is reported that this company plans to build soon a new depot on Anastasia Island.

Boston (Mass.) Elevated Railway.—Plans are being made by this company to build new repair shops at Forest Hills. The cost is estimated to be about $300,000.

POWER HOUSES AND SUBSTATIONS

Havana Electric Railway, Light & Power Company, Havana, Cuba.—This company has awarded a contract to the Westinghouse Electric & Manufacturing Company for the complete equipment of a power plant now being built in Havana. The order, which involves about $500,000, calls for three 12,500-kw Westinghouse-Parsons alternating-current turbo-generators, four 100-kw direct-current generators, nine 2,000-kw transformers, twenty 100-light regulators, 2,000 of the new type flame-arc lamps, one complete switchboard, twenty-four automatic stokers and the complete condenser equipment for the turbine.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—J. G. White & Company are building for the Augusta-Aiken Railway & Electric Corporation a substation on the canal bank on the site of the old West plant from which power from the Stevens Creek development on the Savannah River will be distributed. The distributing plant will be 58 ft. x 39 ft. and of brick, concrete and steel construction. The cost is estimated at about $20,000 for the building and $80,000 for the equipment.

Public Service Company of Northern Illinois, Streator, Ill.—An order has been placed by this company with the General Electric Company for a 300-kw rotary converter with starting panels and three 100-kw transformers for the power house.

London (Ont.) Street Railway.—It is reported that two new 500-hp turbo-generators and other electrical equipment may be required shortly by this company.

Manufactures and Supplies

ROLLING STOCK

Manhattan Bridge Three-Cent Fare Line, Brooklyn, N. Y., is in the market for eight double-truck cars.

Gastonia (N. C.) Traction Company has ordered two single-truck cars from the Southern Car Company.

North Carolina Public Service Company, Greensboro, N. C., has ordered one double-truck car from the Southern Car Company.

Williamsport (Pa.) Passenger Railway has ordered from The J. G. Brill Company six 28-ft. semi-convertible pay-within car bodies mounted on Brill 39-E trucks.

New York State Railways, Rochester, N. Y., has ordered from the G. C. Kuhlman Car Company twenty-five pay-as-you-enter car bodies mounted on Brill 39-E trucks.

New York, New Haven & Hartford Railroad, New Haven, Conn., has ordered five multiple-body dump cars from the Wason Manufacturing Company. An order is about to be placed by the company for fourteen additional cars of this type.

Pittsburgh (Pa.) Railways has ordered from the St. Louis Car Company fifty all-steel side-entrance low-step motor cars and trucks. The company has also ordered ten double-deck trail cars from the McGuire-Cummings Manufacturing Company. These cars will be similar in design to the one placed on trial in 1912.

TRADE NOTES

Gould Storage Battery Company, New York, N. Y., has removed its office to 30 East Forty-second Street, New York.

D. C. & William B. Jackson, Boston, Mass., engineers, announce the appointment of Edward L. Moreland as manager of their Boston office.

Cambria Steel Company, Johnstown, Pa., has named Edwin E. Slick, general manager of the works at Johnstown, vice-president of the company.

Yale & Towne Manufacturing Company, New York, N. Y., has removed its general offices from 9 Murray Street to its new building at 9 East Fortieth Street, New York.

Western Railway & Mill Supply Company, San Francisco, Cal., has changed its name to the Edward S. Sullivan Company. The company will continue to handle the same line of railway supplies.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, states that its tool steel gear and pinions have been specified for an order of thirty cars placed by the Southern Traction Company, Dallas, Tex.

General Fire Extinguisher Company, Providence, R. I., has decided to issue $1,000,000 new common stock at par with stock of record April 1. This will bring the total up to $5,000,000, the limit of capital stock authorized.

New York Steel Tie Company, Wilmington, Del., has been incorporated with a capital stock of $1,000,000 to manufacture and deal in steel and concrete and steel ties. The incorporators are Francis H. Hoffecker, Thomas J. Brown. Jr., and Anthony McGarvey, all of Wilmington.

Ackley Brake & Supply Company, New York, N. Y., has just completed a shipment of 360 Ackley adjustable brakes for use on the cars of the Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil. With the installation of this equipment, every car in Sao Paulo will have been equipped with Ackley adjustable brakes.

Robert W. Hunt & Company, Chicago, Ill., held its annual conference of the heads of departments and managers of various offices at the general office in Chicago during the week of April 7. Papers on the various methods of conducting the work of inspection and testing were discussed. On April 10 and 11 a party was taken on inspection trips to Gary, South Chicago and Buffington.

Drew Electric & Manufacturing Company, Indianapolis, Ind., is the new name of the railway department of the Indianapolis Brass Company. This change has been effected so that the company might more properly indicate by its name the business in which it is engaged. The company has also moved its general offices to the Traction Terminal Building, Indianapolis, and is increasing its manufacturing facilities. The company will continue to manufacture a complete line of overhead material and a large number of car equipment specialties.

W. L. Holman Company, San Francisco, Cal., was recently adjudged an involuntary bankrupt by the United States District Court. The company has filed its schedule of debts and assets. The total liabilities are stated as $143,651 and the assets at $114,827. The heaviest individual creditors are The J. G. Brill Company, $12,275 for material, and the Westinghouse Electric & Manufacturing Company, $49,776. Of the assets $2,851 is the value of machinery and tools, $79,806 debts due the firm and $21,315 unliquidated claims. Most of the debts are secured by promissory notes of the corporation.

H. F. Keegan Company, Chicago, Ill., has been incorporated to engage in a general railway supply business. This company is an outgrowth of the supply business established by Harry F. Keegan, who is the president of the new company. He has associated with him several men prominent in the railway supply field. Among the companies whose accounts are handled by this company are the following: Tool Steel Gear & Pinion Company, Kerwin Machine Company, Hunter Illuminated Car Sign Company, Johnson Fare Box Company, American Abrasive Metals Company. The organization is such that the company can handle general or territorial accounts, as branch offices will be established in the East and the West. The office of the new company will be in the First National Bank Building, Chicago.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., which was formed recently to succeed the Allis-Chalmers Company as a result of the reorganization of the latter, took over the properties and began operation on April 16. J. H. McClement, chairman of the board of directors of the Allis-Chalmers Manufacturing Company, states that the receiver will be discharged shortly. He said also that no changes whatever are contemplated in the personnel of any of the departments of the former Allis-Chalmers Company. The business of the company during the receivership has been very good. During February under Receiver Falk the balance of $37,000 after $35,000 depreciation was earned. The net earnings in addition under the same amount of depreciation were $10,000. The officers of the new company are as follows: Otto H. Falk, president; Max W. Babb, vice-president and general attorney; L. F. Bower, secretary; F. Woodland, treasurer.

Dearborn Chemical Company, Chicago, Ill., announces that owing to the rapid development of its business in Canada a Canadian company has been organized recently to carry on the business there and make further extensions. A reinforced concrete plant is now being erected at West Toronto, with shipping facilities on the Canadian Pacific and the Grand Trunk Pacific railroads. The building will be completed about midsummer. The active head of the Canadian enterprise as vice-president and general manager is A. W. Crouch, who will make his home at Toronto. Mr. Crouch has been connected with the Dearborn Chemical Company for fifteen years, having established its Pittsburgh office, at which office he has been for the past eight years district manager, in charge of several of the company's branches. The Canadian company will specialize on the analysis and scientific treatment of boiler-feed waters both for steam railroads and stationary steam plants.

ADVERTISING LITERATURE

Hemingray Glass Company, Covington, Ky., has issued a sixteen-page booklet which contains some interesting facts about Hemingray glass insulators.

Crocker-Wheeler Company, Ampere, N. J., has issued Bulletin No. 148, which describes and illustrates Crocker-Wheeler direct-current generators for railway service and other heavy duty from 150-kw to 160-kw capacity.

United States Electric Signal Company, West Newton, Mass., has reprinted in pamphlet form a description of the overhead signal system which it installed at Yonkers. This account appeared in the Electric Railway Journal of Feb. 15, 1913.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, APRIL 26, 1913 No. 17

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.

Chicago Office.............................1570 Old Colony Building
Philadelphia Office.........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8100 *copies are printed.*

CULTIVATION OF UNUSED RIGHT-OF-WAY

On an electric railway which owns right-of-way sufficient for double track but has only a single-track line the unused width of the right-of-way is apt to prove somewhat of a nuisance from the operating point of view. Either it becomes unsightly through a growth of weeds which encroach upon the track, or in a dry country it becomes dusty and the dust is drawn into the cars by the passage of the train. The only obvious alternative, the cultivation of the right-of-way by the planting of grass, is expensive. This problem has been solved, however, on some of the Far Western roads by still another method. This is the temporary lease of the unused land on the right-of-way to the farmers along the line. Sometimes a nominal rent is charged; at other times the use of the land is given to the abutting property owner under the condition that he will keep it in cultivation. While the width of the strip is not great, its total area when it lies alongside a large farm is considerable, and where the adjoining land is productive the arrangement is usually welcomed by the farmer, who can thus continue his planting across the division line and right up almost to the track. The method, therefore, works out to the satisfaction of both parties, and when the ground is needed later for railway purposes its possession can be re-assumed.

SENIORITY RIGHTS IN THE CHOICE OF RUNS

Two years ago in a majority report a committee at the A. E. R. A. convention approved the application of the seniority principle for the selection of runs by platform men. Considerable opposition developed at the time, and apparently much of this is still in existence. No definite recommendation was made regarding the rigidity with which the plan should be followed, yet it is certain that such limited advantages as the principle affords to the railways were emphasized by the elimination of qualifications in the report. It is, of course, true that an agreement by a railway company to observe a rigid rule that platform men shall have a choice of runs in accordance with their lengths of service presents the men with "rights" which may at times prove embarrassing. But the man who is assured of his choice of runs after he has earned it by a sufficient length of employment is by no means as likely to throw up his position and privileges because of a minor disagreement or temporary fit of irritation as is one who feels that his rights are subject to abrogation by an arbitrary decision of his superior. Since the street railway industry suffers to a remarkable degree from the lack of old and experienced employees, the elements of advantage due to rigid seniority rules would seem to balance to no inconsiderable degree the objectionable features. No better example of this can be found than upon the steam railroads, where the locomotive engineers' "seniority rights" are so jealously guarded that they have become actually inviolable. Yet this very feature binds every locomotive engineer to the railroad with which his service was commenced and leaves him, after the expiration of a few years, practically without any incentive to obtain similar employment elsewhere.

PREPAYMENT POSSIBILITIES ABROAD

The inauguration of prepayment car service within the past twelve months at Gateshead and Aberdeen, its more recent introduction at Leicester and the experiments with separate entrances and exits which are now under way at Liverpool foreshadow a change in European methods of fare collection which may prove as radical as our own. At first sight it would seem that the present foreign custom of giving the passenger a receipt which must be displayed to an inspector upon demand should be ideal for securing all of the fares. In practice, however, it is quite as easy for a passenger to avoid paying the proper fare or any fare at all as it is on other non-prepayment cars. Over-riding is the crying evil of cities with zone fares, but even where a straight fare obtains, as in Berlin, it is possible to deceive the forgetful conductor of a crowded car by prominently showing a fare receipt which has been received upon a previous trip. On the other hand, some conductors do not scruple to pick up discarded receipts which they pretend later to tear from their serially numbered pads. In Milan an endeavor is being made to limit these practices by the use of different colors for the incoming and outgoing cars, but any attempt to go further than this would appear to be impracticable. In Zurich the conductor is expected to tear the fare receipt almost completely in two, but elsewhere the custom is merely to punch the ticket or to tear off a small portion. Of course, the possibility always exists that an inspector will board the car to see if the passenger receipts correspond to the date, line, conductor's number, serial number, etc., but this no more prevents theft utterly than do register checking and passenger counts in this country. As a matter of fact, one may ride on European tramway cars a score of times without seeing any inspector whatsoever. The foregoing recital of actual conditions shows that European street railways also have good reasons for seeking improvements in fare collection. Prepayment development abroad will doubtless follow different lines from our own because of the zone systems, but when the movement has once gained its proper momentum we may expect to see repeated in Europe the same wonderful advance in rolling stock design and operation which has characterized the evolution of the prepayment car in Canada and the United States.

CONTROL CIRCUITS OF STORAGE BATTERY CARS

The return of the storage battery car as a factor in some fields of railway service has revived the query as to why the resistance losses should not be eliminated by substituting parallel connection of the batteries at starting for straight series connection. This has always been an interesting problem in view of the fact that a possible saving in energy is relatively more important to a storage battery car than to one which receives energy from outside.

The point made by the inquirers is that the speed should be built up by successively adding cells or groups of cells instead of gradually cutting out resistances from a full-voltage series or series-parallel circuit. A little consideration of the practical conditions, however, will show that the change from the standard control is not worth while unless regeneration of energy on down grades is a factor. It is true that there would be a theoretical gain if the cells were connected into circuit gradually with increasing speed, but this would cause a variable discharge in the different cells which would have to be taken into account on charging. In this case the connections would be analogous to those of a stationary battery with a number of end cells and an end cell switch, and the care of such a battery would require a skilled attendant. The eight to ten stops per mile of a car in city service do not involve such great resistance losses as to justify this complication.

Even the smallest accumulator cars have two-motor equipments, and their standard controller connections provide for starting the motors in series on the first steps and in parallel on the last steps. This gives the same effect as would be obtained by connecting the battery in two halves in parallel. Very little would be gained by applying less than half voltage to the motors, as the principal losses occur when the motor connections are changed from series to parallel. The problem is, in fact, similar to that of a four-motor car and except in very special cases, as where heavy locomotives are required to have a very wide range of speed, the controller connections do not permit starting with four motors in series. Furthermore, in automobile trucks equipped with a single motor the present general practice is to keep the battery in series and secure control by a series-parallel arrangement of the field. The reduced efficiency of a motor operated on less than its normal voltage seems to offset largely any losses encountered in the unit-voltage method.

So far as is known, all of the present American single accumulator cars have their batteries connected in straight series, although in early days the series-parallel connection was tried. It is interesting to observe that in 1907 the Prussian State Railroads purchased a storage battery car for service at Limburg in which the use of starting resistances was avoided by subdividing the battery, and energy was returned to the battery on down grades by using four shunt-wound motors with regenerative control. It was found that the regulating devices necessary to secure the correct operation of the motors on this car were very complicated. However, five cars with a simplified regenerative control were ordered in 1910, and these were placed on lines where the grade conditions make regeneration a factor of importance. In general, it may be said that the control system of the modern accumulator car with series motors is as efficient as simplicity and reliability in operation permit.

ELECTRIC RAILWAY EXPRESS STATION DESIGNS

On most electric railways where an express and freight handling business has been developed within recent years rigid economy in the design and construction of stations and equipment has been a necessity. Managers have done wisely in leaving to the future the completion of extensive plants for the quick and economical reception and delivery of merchandise, but it is a question if more might not be made of the available facilities in a good many instances. Close study of a number of electric express stations during the past year inclines one to the idea that, except in the matter of size, the securing of a highly efficient installation is not much more costly than the establishment of a mediocre outfit, except perhaps in some cases where old buildings have to be used on unfavorable and greatly restricted sites.

It would be rash to attempt to lay down any general design for this class of service, but certain features of the best stations of moderate cost may well be outlined. Referring chiefly to the design of express terminal stations, nothing is of more importance than adequate lighting, both of the natural and the artificial type. Plenty of tungsten lamps of the 40-watt or 60-watt size equipped with reflectors throwing the illumination downward upon the shipping floor are a cheap but vitally important accessory to the rapid transferring and weighing of merchandise, the avoidance of errors in reading tags and bills of lading and the reduction of eye strain to the minimum. The character of the incandescent lighting in force even at this late day in some installations is almost below criticism, and it ought not to be necessary to set forth here the futility of trying to handle merchandise efficiently with a few old-fashioned carbon-filament lamps swinging from the rafters of an ancient shed in the proportion of say one lighting unit to every 300 or 400 sq. ft. of floor area. Even in cases where a local express organization handles the goods at the station, the railway company should realize that the full capacity of its express car bodies and motors may be largely offset if the flow of merchandise is throttled in its passage to and from the cars. Along this line, therefore, the provision of a paved approach and exit for teams and trucks serving the platforms is a good investment, as well as the arrangement, so far as possible, for separate inward and outward trucking movements. Where parallel storage tracks are available at the side of the building, provision for the simultaneous loading or discharge of as many cars as possible by the use of plenty of gangplanks should not be overlooked. Here again ample artificial lighting is desirable, particularly at stations shipping or receiving milk and other farm products during the night or early morning.

Other desirable points cover the arrangement of the foreman's office overlooking the shipping department, provision of lockers and modern lavatory facilities, the installation of wooden guard rails or bumpers at the walls, platforms and doors so that trucks cannot chip off pieces of the building, use of concrete flooring, or at least the employment of this material for a floor foundation, and the installation of platform scales at one or more points where goods can be handled with minimum lifting. As the business increases, it may pay to consider the installation of power hoists and telpher equipment—something with which very few express stations are as yet provided. Depots of this kind are as yet of comparatively small size, but it is not improbable that as this business grows the distances to be covered in hand trucking may justify the purchase of one or two electrically operated baggage trucks where the volume of merchandise to be handled is sufficient to warrant the investment.

"A SERIOUS BLOW TO ARBITRATION"

The words above are used by the international president of the Amalgamated Association of Street & Electric Railway Employees to characterize the outcome of the arbitration in the case of the dispute between the Chicago City Railway Company and its employees. But this mild phrase does not adequately express the feelings of President Mahon, who says further of the majority decision of the board: "It is the same old rot and corporation contentions that I have listened to for twenty-one years as an officer of this association, and the award of Carter and Fleming is in line with these fossilized opinions." The minority member of the arbitration board uses less strenuous language, but his dissenting opinion, or rather his criticism of the majority opinion, is about 8000 words in length and emphatically disagrees with every feature of the award and with the reasoning that led up to it.

We have no desire to go into the merits of the Chicago arbitration and its results, but it is worth while to examine some features of this arbitration and the spirit in which the award was received in their relation to the whole question of the arbitration of labor disputes. It has long been a privilege of the defeated litigant to "cuss the court," but rarely has there been a more impressive exhibition than this case affords of how a compromise may accentuate rather than lessen the dissatisfaction of those who sought a settlement by arbitration in the first place.

Judge Kickham Scanlan was selected by the employees to represent them in the arbitration. The company designated Harvey B. Fleming as its representative. Judge Scanlan suggested as the third member of the board Judge Orrin N. Carter, of the Illinois Supreme Court. An enormous amount of evidence, consisting of some 3500 typewritten pages and more than 200 exhibits, was introduced. The very volume and completeness of the testimony, however, seem merely to have multiplied the opportunity for differences of opinion, and after reading the statement by Mr. Fleming and the dissenting opinion by Judge Scanlan one is prepared to accept the latter's statement that "this case proves one thing clearly, and that is that you can find statistics to prove anything." And, notwithstanding the high character of the arbitrators, the fairness of the method of their selection from the employees' standpoint and the care with which they investigated the matter referred to them, the losing side now declares that the award is "rot" and that arbitration has received a serious blow.

As a matter of fact, arbitration of the kind exemplified in the Chicago case needed a blow, not for the reason that in this case it happened to result in an award unsatisfactory to the employees, but because it is a farcical, unfair and much abused method of attempting to settle labor disputes. Arbitration is a complete misnomer for a proceeding in which two so-called arbitrators have made up their minds before investigation of the case begins and in which the office of the third arbitrator is to bring about some kind of a compromise between the extremes represented by his co-arbitrators. At the very best this is no more than a makeshift to avoid strikes. It seldom results in justice or decisions resting on the weight of evidence or the merits of the case presented. And when the award does rest on the merits of the case, as it appears to do in the Chicago case, the declaration is made that arbitration is discredited.

In the criticisms of the Erdman act recently made by the steam railroads it has been very forcibly pointed out that there cannot be a judicial decision in a labor dispute of any great scope unless there are a considerable number of disinterested arbitrators on the board. Cases at law involving only a very trifling proportion of the sum concerned in an arbitration on wages are tried before a jury of twelve men because that number is considered more likely to take a fair and judicial view of the matters under consideration than one man. Moreover, a decision made by a number of men acting in this way carries much greater weight than that of a single man. We do not mean that an arbitration board should consist of twelve men, but it should contain more than one disinterested umpire and should be a board of arbitration in fact as well as in name. Hence we believe that the arguments made by the steam railroads in favor of a larger number of disinterested arbitrators under the Erdman act are sound.

Arbitration always has an agreeable sound to a community that is inconvenienced or in fear of being inconvenienced by a strike. But if a consistent effort were made by electric railways to convince the public that arbitration, as it works out in most electric railway controversies, is merely a measure of coercion directed against the company to force it to great demands not justified by the merits of the case, and that continual surrender to this form of coercion will ultimately produce results far worse than the inconvenience of a few days' strike, there is reason to hope that so-called settlements of labor troubles by arbitration as it is usually practised would lose the popularity they now enjoy.

New Woodworking Shop of Omaha & Council Bluffs Street Railway

A Detailed Description of Building Construction and Arrangement of Woodworking Tools as Well as the General Shop Layout

In planning the general repair shop layout of the Omaha & Council Bluffs Street Railway future extensions received unusually careful consideration, because existing requirements did not demand a large shop building, although prospects indicated that increased shop capacity would become necessary at an early date. The first shop building was constructed on property sufficient in size to allow for ample additions, and these were planned in a tentative way at the time of construction. A shop building, 120 ft. x 245 ft. in plan, and an adjoining building for offices and heating plant were built in 1907. These gave ample capacity for existing requirements and allowed space for additions to the machine tool equipment from time to time. A short time ago it became evident that at least one of the contemplated extensions would be necessary and a new wood mill and erecting shop has been built.

Omaha Wood Shop—View of New Wood Mill and Repair Shop Showing Method of Supporting Shavings Exhaust Duct

The original layout included a transfer table giving maximum outside storage capacity on the vacant property and facilitated movement of cars through the original shop building. At the same time the transfer table was so located as to serve future shop buildings, so that there was no difficulty in selecting a site for the new building. This was constructed on the opposite side of the transfer table pit from the old shop building. The space allowed for the transfer table and track approaches made it necessary to locate the wood shop 80 ft. from the old shop building, with the wood mill and erecting shop approximately opposite the paint shop section of the original building.

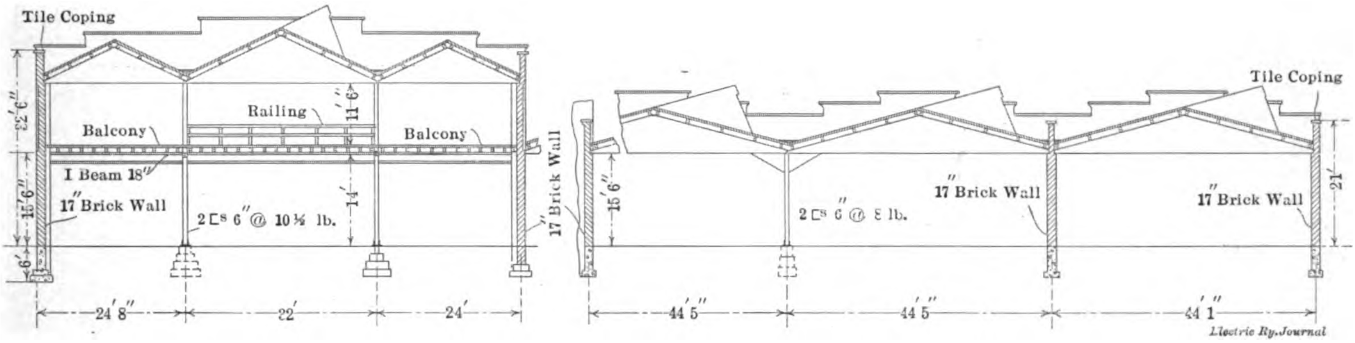
PLAN AND CONSTRUCTION DETAILS OF WOOD SHOP

The general plan of the wood shop includes a two-story mill room, 80 ft. x 112 ft. in size, which adjoins the erecting shop, 134 ft. x 144 ft. in size. This latter portion of the building is divided into two sections separated by a 17-in. fire wall. The larger bay, which is approximately 90 ft. wide, will be heated and used as an erecting shop, and the smaller section, which is 45 ft. in width, is used to provide additional carpenter and paint shop capacity when required. The building is constructed on concrete foundations, with 17-in. common brick exterior walls and partitions. Structural steel columns and floor beams support the balcony in the mill room, and the built-up steel trusses resting on the columns and building walls support the roof throughout. The first floor in both the mill room and the carpenter shop is of concrete with a sidewalk finish, and the floor on the balcony is of dressed and matched 2-in. x 6-in. yellow pine.

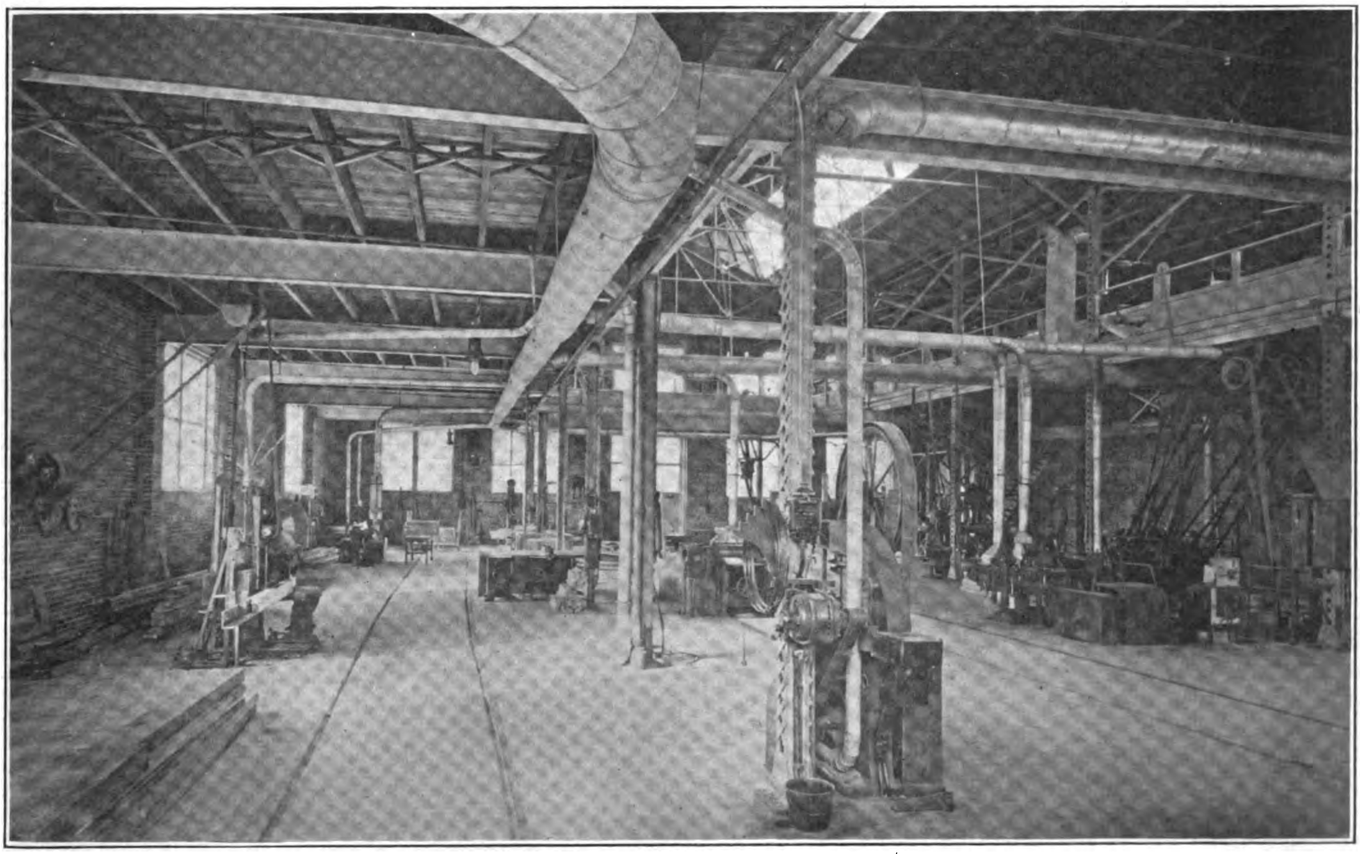
The mill room is divided into three bays which permitted the construction of balconies over the two outside bays with saw-tooth skylights over the central bay. The roof over the carpenter shop and storeroom is supported on three trusses arranged for three saw-tooth skylights. These skylights are continuous over the five central panels in the mill room and the seven central panels in the carpenter shop. The liberal spacing of twin windows on both the first and second floors of the mill room as well as the carpenter shop, in addition to the skylights, provides excellent natural illumination. The roof proper is built of 2-in. matched sheathing on wooden purlins and covered with Barrett's "Amazon" composition roofing. All flashing is of sheet lead and drainage is provided by sloping each of the valleys to two down-spouts which lead down along the building columns to the shop drainage system.

Two tracks lead into the mill room from the transfer table pit, one passing entirely through this section to the dry kiln in the rear. Nine tracks lead into the carpenter shop, extending for the full length of the building. These are spaced on approximately 14-ft. centers throughout. The tracks enter the building through 10-ft. openings provided with swinging one-sash doors. In order to provide continuous overhead trolley contact over the space between the transfer table pit and the carpenter shop, structural steel brackets attached to the roof framing extend out over the center of each door to meet the stub end of the trolley on the transfer table.

The new wood shop is supplied with heat from the central heating plant in the old shop, which was made sufficiently large to take care of the additional radiation necessary to heat the new building. The heating system is of the indirect type, the steam-heating coils and a 6-ft. fan being installed in one corner of the mill room. Hot-air ducts are carried overhead on the floor beams of the second floor of the mill room and roof trusses of this portion of the building, as well as in the carpenter shop. The steam is carried into this building through a heavily insulated main supported on a structural steel bridge and is thus carried over the transfer table. The bridge also supports the shavings exhaust duct for removing sawdust and refuse from the mill room.



Omaha Wood Shop—Cross-Section Through Wood Mill and Erecting Shop



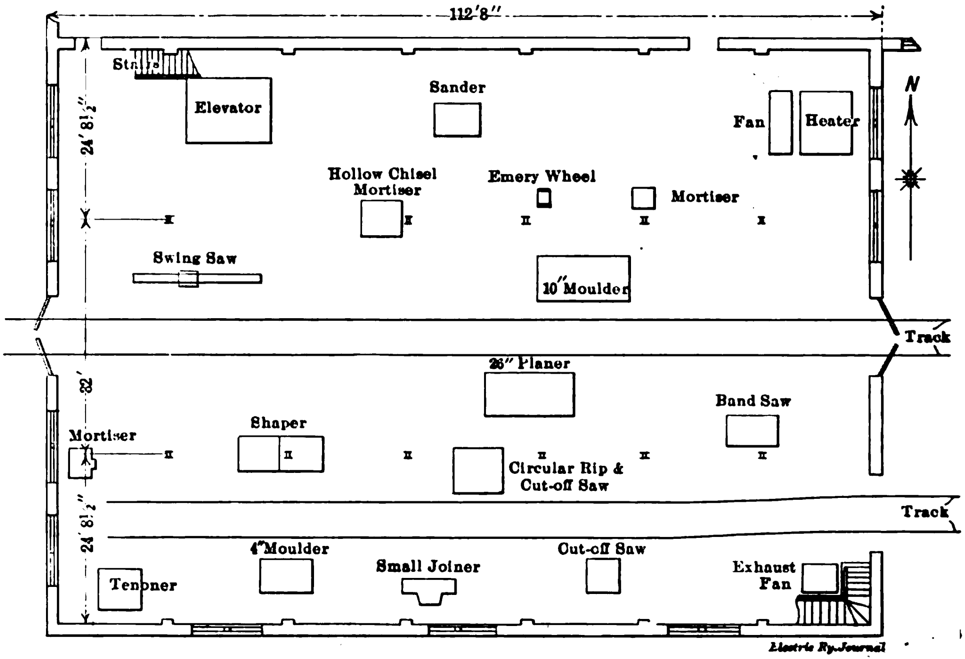
Omaha Wood Shop—Interior View of Wood Mill from First Floor, Showing Balconies Along Both Sides

Artificial light is provided by arc lamps which are swung from the floor beams and roof trusses and spaced to give a uniform illumination at the working level of the machine. Individual lighting is provided as needed by tungsten lamps swung from drop cords. Both the mill room and the carpenter shop have been equipped with a dry sprinkler system. The water supply for this system as well as that in the old shop building is taken from the city mains. Other means of reducing fire hazard include a 17-in. brick partition wall and double fire doors built under the underwriters' specifications. The latter, in case of fire, automatically close the two openings between the mill room and the carpenter shop.

WOOD MILL

As mentioned previously, the wood mill is two stories in height, the mill room being on the first floor and the cabinet shop occupying the balcony on the second floor. A 2-ton electric freight elevator operating at 25 ft. per minute was installed to handle material between the two departments. The woodworking machine installation includes the following: a circular cut-off saw, small joiner, 4-in. molder, 10-in. molder, a tenoner, a plain mortiser, a hollow chisel mortiser, a shaper, a 26-in. planer, a circular rip and cut-off saw, a swing saw, a band saw, a sander and an emery wheel for sharpening tools.

The shavings and sawdust are removed from all machines


112'8"
Stairs
Elevator
Sander
Fan
Heater
N
Hollow Chisel Mortiser
Emery Wheel
Mortiser
Swing Saw
10" Moulder
Track
26" Planer
Band Saw
Shaper
Mortiser
Circular Rip & Cut-off Saw
Track
4" Moulder
Small Joiner
Cut-off Saw
Exhaust Fan
Tenoner
24'8½"
32'
24'8½"
Electric Ry. Journal

Omaha Wood Shop—Arrangement of Mill-Working Machinery in Mill.

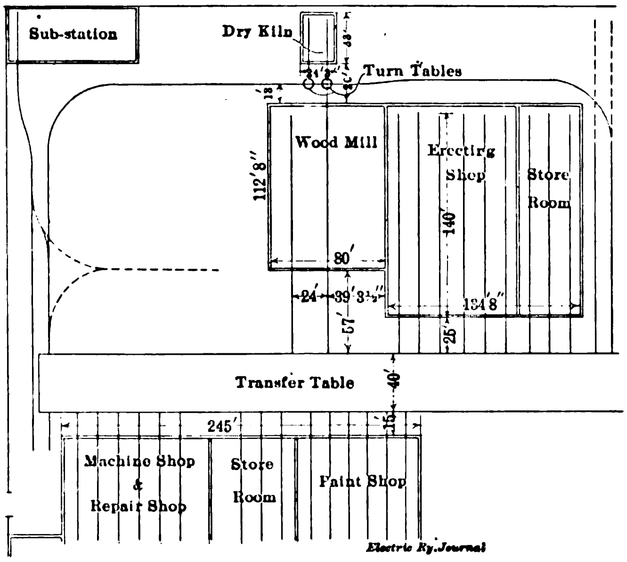
by means of an exhaust duct system. The fan delivers the shavings and sawdust to a discharge duct which is carried on a bridge over the transfer table pit to the boiler room about 200 ft. away. Situated conveniently about the shop and at the floor level are several rectangular intakes or floor sweeps into which is swept all refuse material collecting on the floor.

Individual motor drives have been installed for practically all the woodworking machines, and this made it possible to install the machinery to the best working advantage. The resulting elimination of long line shafting also permitted a considerable reduction in the structural steel frame which supports the balcony. The small cut-off saw and the rip saw in the cabinet shop on the balcony are driven by the motor which operates the sander on the first floor by means of a jack shaft supported beneath the balcony floor.

The individual motors were installed as near as possible to the machines which they drive, and in every instance the motor control is mounted either on the machine or so close to it that there is no time lost in cutting it in or out of service. Most of the wiring is installed in conduit under the floor which also serves to carry the lighting circuits.

Each machine in the wood shop received special attention with a view to providing protective devices for the workmen without interfering with efficient operation. In most instances sheet-steel hoods are provided over the motors and driving pulleys and shields have been installed at all other dangerous points.

The installation of the two tracks in the wood mill permits all longitudinal movement of heavy material to be handled by a push car. This push car is also used in handling material to and from the dry kiln by way of the large entrance door at the rear of the mill room building. Transverse movements of material are handled by means of two-wheeled trucks, which also serve in moving material from the mill room to the cabinet shop by way of the electric elevator.


Sub-station
Dry Kiln
Turn Tables
Wood Mill
Erecting Shop
Store Room
112'8"
140'
80'
24'
39'3½"
134'8"
57'
25'
18'
40'
15'
Transfer Table
245'
LAKE ST.
Machine Shop & Repair Shop
Store Room
Paint Shop
Electric Ry. Journal

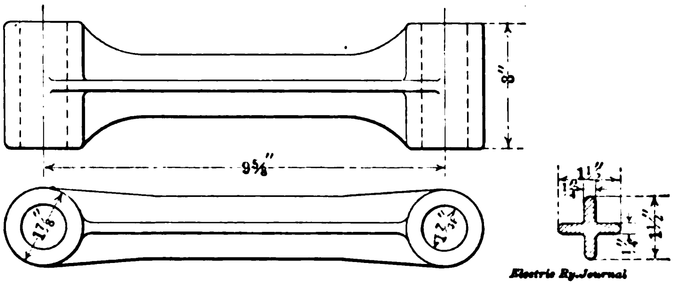
Omaha Wood Shop—General Arrrangement of New Building

The erecting or carpenter shop required no special machine tools. Workbenches arranged along the building walls and a complete set of air-driven tools, such as drills, chisels and hammers, were included in the equipment. The work in this department is confined to assembling the car bodies preparatory to painting (although priming coats of paint are usually applied here) and installing the interior fittings after the finishing coats of paint have been applied in the paint shop. Both the wood mill and erecting shop are especially busy at the present time building new double-truck cars of the pay-as-you-enter type as well as overhauling and standardizing the old rolling stock.

The work of designing the wood mill and carpenter shop as well as of planning the general shop layout was handled by the engineering department under the general supervision of T. E. Woods, master mechanic, Omaha-Council Bluffs Street Railway Company.

A LIGHT-WEIGHT BRAKE HANGER

A saving in weight of brake rigging of nearly 50 lb. per car has resulted from the adoption by the New York State Railways, Rochester Lines, of the form of hanger shown in the accompanying figure, which was designed by G. M. Cameron, master mechanic. On the basis of a cost of 5 cents a year for hauling a pound of car weight, this reduction saves $2.50 annually per car. The hanger is so proportioned as to utilize the steel to the best advantage. All bearings are easily replaceable hardened-steel bushings, so that, except for breakage, the life of the hanger is unlimited.


8"
9⅛"
Electric Ry. Journal

Light-Weight Brake Hanger for Rochester City Cars

Municipal Railway Line in Seattle

An Account of the Equipment of the Municipal Electric Railway Which Has Recently Been Built in Seattle, with Some of the Events Which Preceded Its Construction

The city of Seattle has had under construction during the past year a municipal street railway which has a length of single track of 7.88 miles. The line extends from the corner of Stewart Street and Third Avenue West along the shore of Lake Union and Lake Washington Canal to the northwestern part of the city, as shown in the accompanying map by the solid line. The track construction is largely completed but the overhead work has not been erected. The first four cars for operation on the line are due in Seattle May 1. The line has been built under the direction of the Department of Public Utilities of Seattle, and the route was selected so that it would form a continuation of the Seattle, Renton & Southern Railroad, which is at present in the hands of receivers and which the city hopes to purchase.

HISTORY OF MUNICIPAL ELECTRIC RAILWAY IN SEATTLE

The history of the municipal railway in Seattle dates from January, 1911, when the City Council passed an ordinance providing for the submission to the electors of authority to issue bonds to the extent of $800,000 to construct the line and also to purchase by condemnation "any existing electric railways, private right-of-way, track or tracks, or the facilities and appurtenances, or any of them, in the judgment of the Board of Public Works suitable and necessary for use as part of the electric railway system." This later provision was intended to cover the system of the Seattle, Renton & Southern Railway with 9.8 miles of track within the city limits. The bonds to be issued were to be general bonds of the city of Seattle, payable twenty years from the date of issue and to bear not to exceed 4½ per cent annually. An affirmative vote of three-fifths or more of the qualified voters in the city of Seattle voting on the said proposition was necessary to carry the proposition. This ordinance was signed by Mayor H. C. Gill on Jan. 10, 1911, and it was officially published three days later. The ordinance created the post of superintendent and made A. L. Valentine, superintendent of public utilities, the head of the municipal railway system.

At the election held March 7, 1911, 25,634 votes, or 63.47 per cent, were cast for the bonds, and 14,754, or 36.53 per cent, against the bonds, a total vote of 40,388. In the same municipal election, which was bitterly contested, between 20,000 and 25,000 more votes were cast for the heads of the opposing tickets than for the bonds. The ordinance called only for a three-fifths vote, and the bonds were therefore carried.

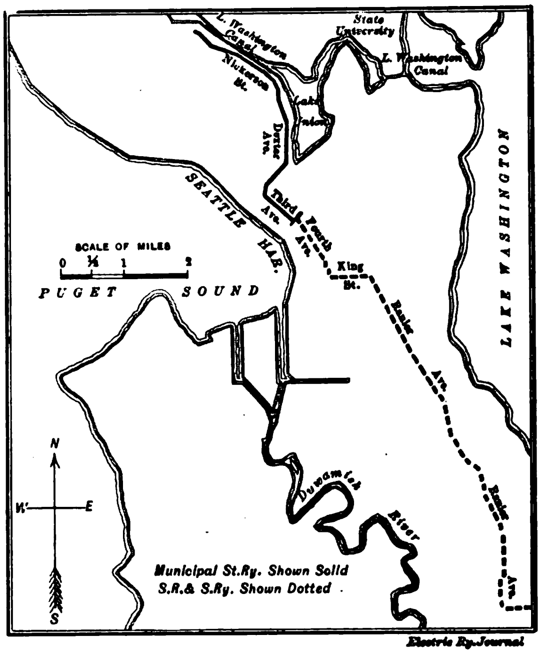
Under the terms of the ordinance and the bond issue correlatively, the Seattle, Renton & Southern Railway, from Third Avenue and Stewart Street, its northern terminus in the business section, to the southern city limits was to be taken over by the city as a part of the proposed municipal line, by condemnation. The city was first to appraise the property and make the Renton line an offer. Sixty days were given by the city to the company in which to accept or reject its tender. In the event of refusal the city was to proceed in court to force condemnation.

NEGOTIATION WITH THE SEATTLE, RENTON & SOUTHERN

The Board of Public Works, acting within its authority, offered the Renton line $386,053.59 for the entire line and equipment. The offer was refused. President W. R. Crawford, of the Renton line, replied with a counter proposition as provided in the ordinance, in which he offered the city common user rights on the same terms as are usually arranged under similar conditions.

Shortly thereafter ex-President Crawford, who had been deposed by a reorganized board of directors, sought a receivership in the state courts. He secured possession for two days under the court order, when the bondholders took the case into the federal courts and secured an order appointing two of their men as receivers. President Crawford appealed to the federal courts and obtained an order throwing the entire receivership back into the state courts, and two of his representatives were appoined receivers. These men are still in charge.

About three months ago Peabody, Houghteling & Company, acting for the bondholders, appeared before the City Council and requested it to submit to the people a proposition carrying the conditions of what is now known as proposition A. This plan provided generally that the city should share 50 per cent of its net earnings, participate in its management and audit all bills. It further provided that the city would have the right to purchase the line by giving not less than three months' notice. The proposition submitted by the bondholders to the city was put to a vote on March 4, 1913, and received a majority of 882 votes on a total vote on the proposition of 35,412. The proposition contained the provision that the result would not be binding in any way upon the city, but that it could be waived and the city proceed with the condemnation of the property of the old Renton line without prejudice.



Map Showing Existing and Proposed Municipal Railway in Seattle

In the meantime condemnation suits had been begun by the corporation counsel. On Feb. 18 Judge Mitchell Gilliam, in the Superior Court, after hearing the arguments of the city and counsel for the Renton line, made an order that the city could legally proceed to condemn the property, and on April 1 it was ordered to be sold. The sale is to be conducted by the receivers appointed by the State court. Counsel for the Renton line have applied for a writ of certiorari from the Supreme Court, and arguments will be heard in the higher tribunal on May 11.

SALE OF BONDS FOR CONSTRUCTION OF MUNICIPAL RAILWAY

The Council had advertised the municipal railway bonds for sale in the local newspapers and in recognized Eastern financial journals, but no bids were ever accepted. L. N. Rosenbaum, a local attorney, some months ago submitted a bid, but it was rejected because it was accompanied by no certified check as provided by law. A bid of $274,000 for the first $300,000 was rejected because the premium asked was too large. The matter of the sale of the bonds was then allowed to rest for about six months. Subsequently the City Council passed an ordinance transferring $300,000 from the sewer fund to be expended in the construction and maintenance of the municipal railway from Third Avenue and Stewart Street northward to the terminus, and on July 10, 1912, the Jahn Construction Company, which held a contract for $148,927.20, began work. Construction has proceeded so rapidly that the line is expected to be ready for the first four of the cars, which are due May 1.

FINAL SALE OF MUNICIPAL BONDS

The State of Washington is empowered by an old act to invest state school funds in any utility or bond issue of state, municipal, school or county purpose. Acting under this statute, on April 27 of this year Edward Meath, representing the state finance committee, after a conference with City Comptroller Harry Carroll, bought the $300,000 of the municipal railway bonds at par, with 4½ per cent interest, the interest to begin May 1, 1913. Mr. Meath intimated that the State was prepared to take the remaining $500,000 of the city railway bonds when the Council decided to offer them for sale. The two previous faulty bids, which were rejected, contained offers at 92 cents. By borrowing the money already expended on the line from the sewer fund the city has saved interest for nearly a year. The state finance committee is composed of Mr. Meath, Governor Ernest Lister and State Auditor Charles W. Claussen.

EQUIPMENT OF LINE

The section of municipal railway now constructed is laid with 60-lb. T-rail in the unpaved territory and 105-lb. Trilby section in the paved sections. The overhead construction has not yet been installed, but will be a complete metallic system with two trolley wires and adjustable trolleys to fit the single trolley wire system of the Renton line if necessary.

Twelve cars have been ordered from the Cincinnati Car Company, to be delivered at the rate of four cars per month from May 1 to July 1 this year. The cars will be dark green in color, with the lettering "Municipal Street Railway" throughout. It is officially announced that the car equipment is to be the most modern possible.

Bids for furnishing the cars were opened by the Board of Public Works on Dec. 13, 1912. The specifications called for twelve semi-steel cars equipped with maximum traction trucks. A. L. Valentine, superintendent of public utilities and ex-officio general superintendent of the municipal railway, in his annual report just issued, refers briefly to the proposed line, touching only upon the date of its commencement, its general construction and the pending condemnation suits and making recommendations regarding salaries of employees of the new line. His only comment is as follows:

"That excellent results will be attained in the conduct of the municipal street railway is to be expected, for construction costs will be low, a splendid revenue-producing territory is to be served and power can be secured at reasonable rates from our municipal lighting plant, the efficiency and utility of which will be increased by the street railway power load. Owing to our extended experience in regulating the operations of the present street railway companies, operating costs on the municipal street railway will be minimized to the lowest possible point consistent with the class of service the people expect and will receive."

PROPOSED AGREEMENT WITH RENTON LINE

Under proposition A, as ratified at the polls, the basis of the city's agreement as to profit sharing with the Renton line is as follows:

Annual settlement is required. From the gross receipts of the line and property from all sources there shall be deducted all expenses of operation, maintenance, repairs and renewals, all amounts contributed during the year and held in reserve, all taxes and assessments, including capital stock or franchise taxes (excepting such as are ordered by court), and all salaries and expenses of the board of supervising engineers. After deductions as named from the gross receipts the amount remaining shall be considered as the net receipts, 50 per cent of which are to be paid to the city.

The governing board is to consist of one engineer, appointed by the company, the superintendent of public utilities and an officer of the engineering corps of the United States Army with at least the rank of major, to be appointed by the company's and the city's representative. The Renton company is to execute a bond to preserve the city harmless as to its share of earnings, damages, judgments and decrees.

The transfer privileges and fares in the city limits are to be as follows: A 5-cent fare is to be good for a continuous ride on the Renton line or any of its branches hereafter to be constructed, and transfers shall be issued to all intersecting or contiguous lines. Four-cent tickets shall be good for one continuous ride on the Renton line and shall entitle passengers to an exchange of transfers with the city car line at the north terminus of the company's line at Stewart Street, so that there may be a continuous ride for a 4-cent fare over the Renton and municipal line. In case of dispute the passenger is to be permitted to enjoy the ride pending settlement.

No provision is made regarding the power of the Renton line in the event that the city takes the line over, as this company secures its power by rental. The city has ample power from its own municipal plant.

EVENTS PRIOR TO VOTE ON MUNICIPAL LINE

The events that led up to the passage of the ordinance authorizing a municipal line radiated largely about the protests of the people of the Rainier Valley, served by the principal trunk line of the Renton company, against the service as furnished formerly by the Seattle, Renton & Southern Railway, and dates back six years or more. The company refused to grant transfers to the lines of the Puget Sound Traction, Light & Power Company except on the mileage basis. The latter company declined to issue transfers to the Renton line except on the even split of the 5-cent fare.

At Kenyon Street the Renton line had been exacting a second fare to and from the southern city limits. This compelled residents of Rainier Beach and other well-settled suburbs to pay a 10-cent fare into the business section. The company also declined to stop the cars labeled "express" for local stops north of Kenyon Street outbound. Improvement clubs and mass meetings in the Rainier Valley protested against this system, the 10-cent fare dominating the cause, and committees waited upon the City Council to demand relief. The case went into court. Pending the decision, the Renton line was directed to issue receipts for the double fare, and if the company lost its suit the fares were to be remitted on presentation of these receipts.

Mayor H. C. Gill espoused the cause of the Rainier Valley people. Before a committee of fifty in the City Council chamber, while favoring a municipal railway system, he declared in an impassioned speech that if the Council did not order the tracks of the Renton line torn up, he would secure a gang of men and do it himself within a week.

Court proceedings were slow. The aid of the federal, superior and supreme courts was invoked by the Renton line, President Crawford, himself an attorney of record, directing the fight from his offices in the Alaska Building.

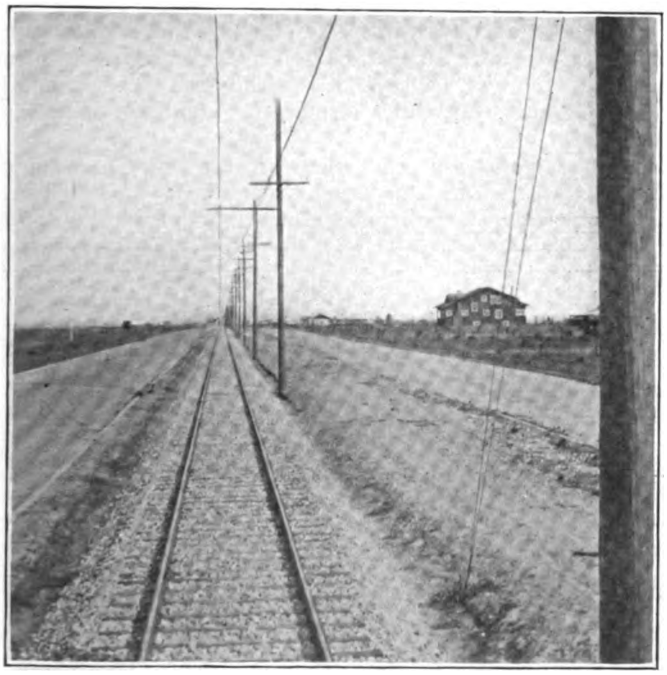
Committees from the Rainier Valley attended every "special order" meeting relative to the Rainier Valley troubles, and the result was the introduction and passage of the ordinance authorizing a municipal car line, which originally had for its object taking over the Crawford line.

CATENARY CONSTRUCTION OF THE PACIFIC ELECTRIC RAILWAY

During the past year and a half the Pacific Electric Railway, of Los Angeles, has installed about 51 miles of catenary overhead construction, on about 40 miles of route, and it is planning to make this class of construction its standard in the future, certainly for interurban lines.

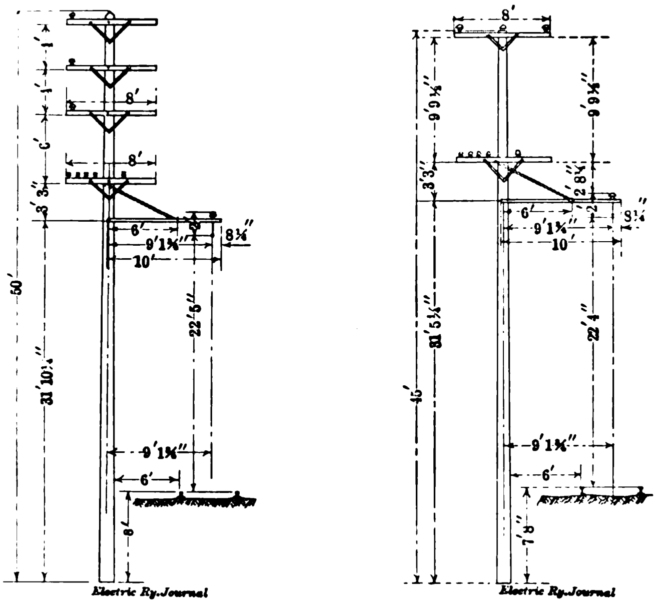
The heavy service conducted by the company makes a straight running, working conductor, such as is furnished by a catenary overhead construction, extremely desirable, as will be seen from the statement that the trains of three or more cars, each car weighing over 80,000 lb., are often run at speeds in the interurban stretches of 60 m.p.h. or more and long freight trains are operated by 60-ton locomotives. The amperage which is collected from the wire at high speeds is consequently very large, and it would probably have been impossible to have collected the requisite amount of current from the overhead system if the company had not for a long time been using a trolley with a pneumatic base. By this means a pressure is put upon the wire at the wheel of about 30 lb. The problems of overhead collection have thus been greatly reduced, but it is believed that with the catenary construction still further improvement is possible.

The accompanying two engravings illustrate the standard pole and bracket construction used in the latest catenary work of the company. One of these shows a pole designed to carry also a single transmission line; the other, a double transmission line. In the former case the three wires are carried in the same horizontal plane, an arrangement which differs from the usual triangular plan but is considered by the company better where the length of transmission is not too great so that there will not be any serious unbalancing effect from induction. The three transmission wires are carried on a single cross-arm so that they are easily accessible to the linemen. In the second arrangement the three transmission wires are in a vertical position, and as the cross-arms are 8 ft. in length this arrangement also permits easy access to the wires by the linemen. In tangent catenary construction the poles are spaced 150 ft. apart, this distance being shortened on curves to 60 ft., even for a 1 deg. curve. The transition from 150 ft. to 60 ft. is made gradually.



Pacific Electric Railway—Interurban Track and Pole Line

A variety of types of hangers and insulators has been used in the catenary construction already installed, including the Southern Pacific type of hanger with round loop at the top and the commercial type of strap hanger with an extended flap loop. The hangers are spaced 15 ft. apart. The company has found it necessary to use tie spans to the trolley wire at occasional intervals on tangents to hold the trolley wire in position. At present these spans are being used about every 300 ft. Otherwise the wire would cant, especially under heavy side wind pressure and when pressed up by the trolley pole. The company is constructing all of its catenary line for 1200 volts, because it has planned to change gradually to this high voltage on the interurban sections. It is also planning gradually to change from the ordinary overhead construction to the catenary construction, and probably within the next year and a half 72 miles in addition to that now constructed will be built.



Pacific Electric Railway—Standard Types of Pole Framing

POLE PRESERVATION

In all of its overhead construction the company treats the bases of its poles to prevent decay, the treatment being applied to the portion of the pole under the ground and for a distance of 1 ft. or 2 ft. above the ground. This corresponds to about one-seventh of the length of the pole. The process consists of charring the butts or portion treated over a fire made of shavings, and while the charred wood is still hot, pouring crude hot oil over it. In this way charcoal forms readily, and good penetration for the preservative material is secured. This process is applied in the pole yards and costs about 50 cents per pole for material and labor. The oil used is the ordinary crude oil, which costs in Los Angeles about 75 cents a barrel. After the pole is erected it is painted, and as the company is particular as to the character of the poles used, a catenary line on the Pacific Electric Railway, with its straight painted poles. is an attractive sight. The accompanying illustration shows a section of track of this kind recently completed on the Van Nuys line.

The recent order of the Berlin Hoch und Untergrundbahn Gesellschaft (Elevated & Subway Company) abolishing smoking cars has been abrogated by the police of that city. The original order was made partly on account of the fire danger from smoking and partly to minimize the confusion of passengers in reaching the desired compartment. Under the new rule, the trains will be made up in such a manner that the smoking compartment will be at either the front or rear end according to the direction of running.

RESISTORS FOR STREET RAILWAY SERVICE

BY F. W. HARRIS

The calculation of the necessary resistance and amount of resistance material in connection with ordinary street railway service is based on the hourly rating of the motors in horse-power. It is generally assumed that an amount of resistance should be used that will allow the hourly rating current to flow in the motors on the first notch of the controllers. A method of arriving at this value is given in the following paragraphs.

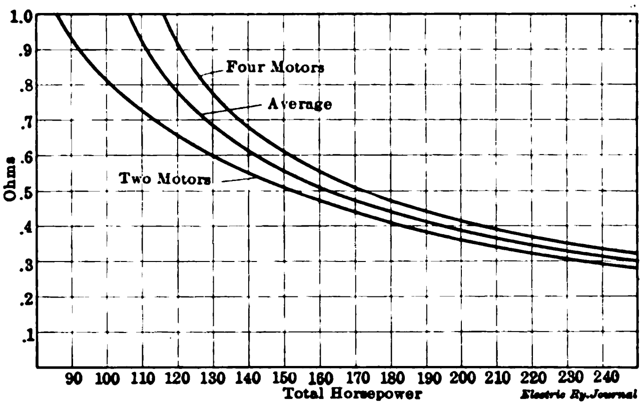


Fig. 1—Resistor Design—Method of Determining Average Motor Resistance

The first factor to be considered is the resistance of the motors themselves. This may be assumed as the average hot resistance of any line of motors, as the values for all motors now on the market are sufficiently near for the purpose. A close degree of accuracy is not necessary for this work. There are in general use both two-motor and four-motor equipments which cover a wide range of horse-power. Hence it is desirable so to calculate the resistance that it will be available for either two-motor or four-motor equipments. Fig. 1 gives the curves for these combinations, and from these is derived an intermediate curve shown as the average or mean curve. This curve is also an approximation, but it is close enough for the purpose.

The hourly current rating will flow in case the resistance equals 278 divided by the horse-power on the hourly rating basis. The hot resistor resistance is given by plotting the mean motor curve from Fig. 1 and subtracting the values of the mean motor resistance from the total resistance. For cast-iron grids an average increase of 10 per cent in resistance value when hot may be expected, and deducting this gives the value of the cold resistance. This represents the total resistance of the resistor, cold, on the first point of the controller.

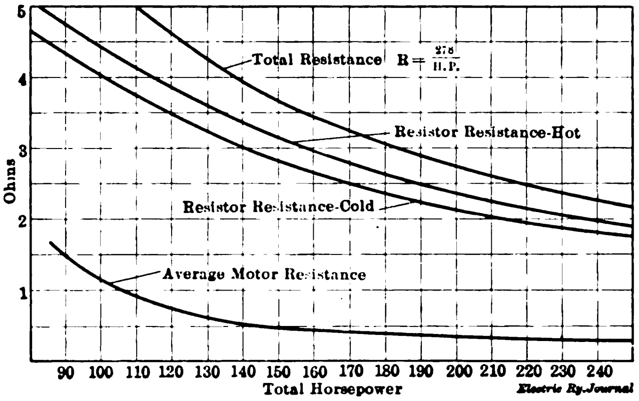


Fig. 2—Resistor Design—Method of Determining Required Grid Resistance

The number of grids will vary directly as the horsepower and will be different with different designs of grid. In standard grids now used by the large manufacturers of railway equipment it is often figured that about 4 hp per grid may be allowed for light service and about 3 hp per grid for heavy service. This practice varies with different manufacturers but is about as given in all applications. In Fig. 3 are plotted the total resistance and the number of grids, these representing average conditions as found in practice.

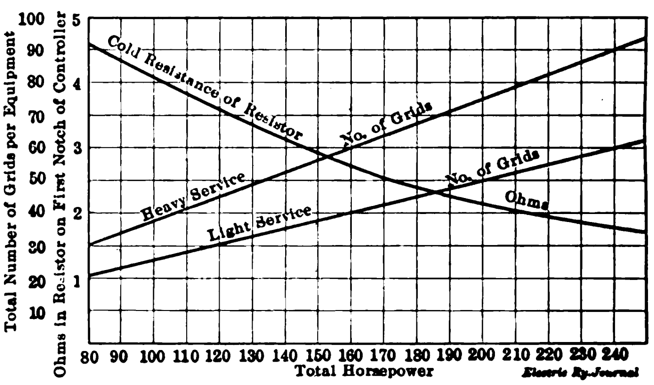


Fig. 3—Resistor Design—Number of Grids Required for Different Services

The proportioning of the various steps has been the subject of some deep investigation, but it becomes comparatively simple in practice. Since the object desired is to accelerate the car smoothly, the motorman is really the controlling factor, because the character of acceleration depends on the time interval. In fact, the men soon learn to manipulate almost any combination within reason. It is desirable to figure that the motorman will pass over the resistance notches in equal time intervals, but a small variation will not be noticed.

The most practical method for planning this is to make a curve as in Fig. 4. Here the percentages of resistance in circuit at any time are laid out vertically and the number of steps horizontally. In this instance ten controller steps are assumed.

The straight inclined line shown in the figure is a guide to the eye in drawing the curve, which may be done in about the proportion shown. This represents the resistance in circuit on any notch of the controller, the actual steps being found by subtraction.

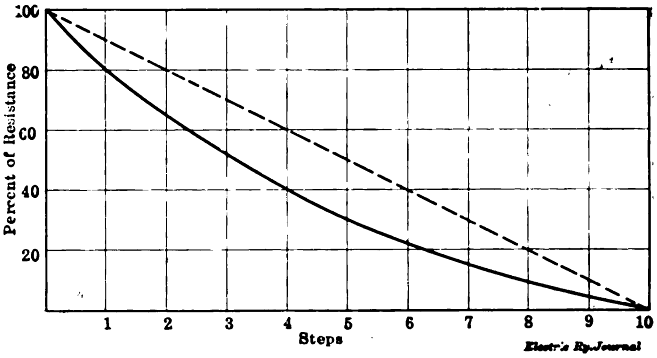


Fig. 4—Resistor Design—Proportions for Different Steps on Controller

In practice it will be found difficult to get the terminals conveniently placed if too much attention is paid to getting exact resistance values, and also that it is not advisable to be too particular about these values, because a wide variation from the calculated values, even 15 per cent, is rarely noticeable in the performance of the car under ordinary conditions.

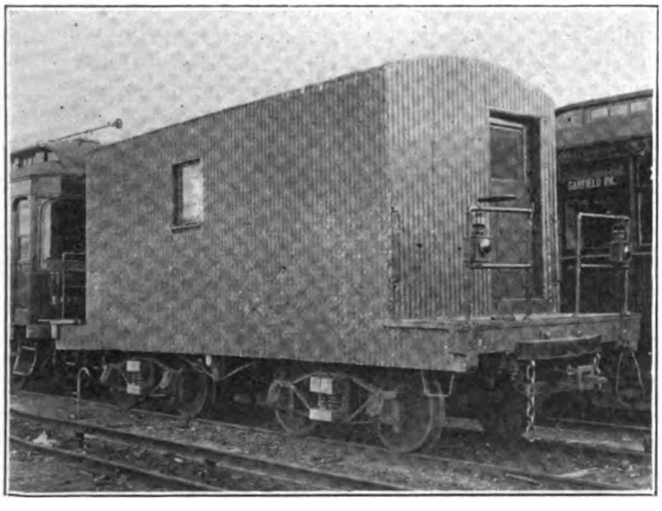
CHICAGO ELEVATED RAILWAYS FIRE ENGINE CAR

Eight chemical fire engine cars are kept in constant readiness to serve in case of fire on the elevated lines in Chicago. These cars are stored in the company's yards either on a separate stub track or first out on a storage yard track. They are always coupled to a motor car in perfect running condition with the air compressor in operation, so that there will be no delay while a sufficient rise in the air reservoir is obtained. These fire engines are for service not only to protect the railway company's rolling stock but also the elevated structure in case of fire in adjacent buildings. A crew properly organized and drilled is assigned to each fire engine car and on the sounding of a fire alarm takes charge of the fire-fighting apparatus. In addition to this equipment, elevator tanks, high-pressure fire pumps and a complete system of water mains and fire hydrants have been installed in all shops and yards, and a regular, organized crew has charge of this source of fire protection.

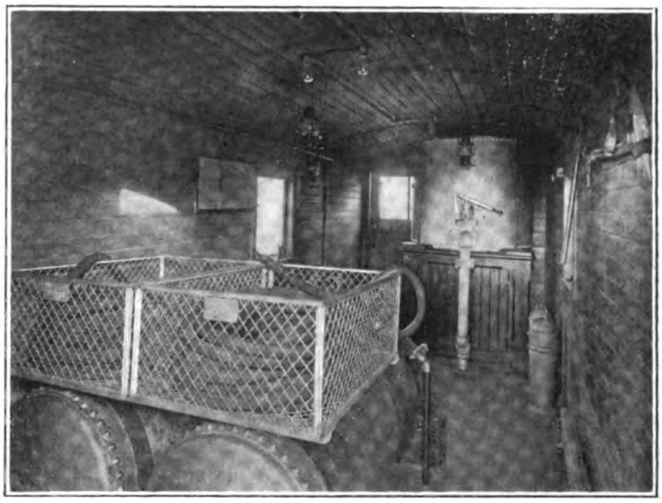
The general dimensions of the fire engine car are 27 ft. 4 in. over-all length and 8 ft. 5 in. width. The body, exclusive of the platforms, is 19 ft. in length and 8 ft. 6 in. in over-all height. The car is framed entirely of wood except for 3/8-in. x 1 1/4-in. iron carlines supporting an elliptical roof. The 24-gage corrugated-iron roofing and siding is applied outside of 1/2-in. poplar sheathing. The body is lined with 1/2-in. poplar, and a double floor of 7/8-in. pine interlaid with building paper is provided, which makes the car sufficiently weatherproof to prevent the solutions from freezing at low temperatures when the electric heaters are in service. Wire glass was included in the two doors and windows to reduce breakage which might be expected in the rush during a fire. Since the car is operated as a trailer it requires no other electrical equipment than the lighting and heating circuits, and these are supplied with electrical energy through standard third-rail shoes. Hand brakes with the brake wheel located on the platform were provided for use in emergency, and a thorough train line connection from the motor car provides automatic air brakes.

FIRE-FIGHTING EQUIPMENT

The fire-fighting equipment includes a 280-gal. reservoir, two chemical tanks of 100-gal. capacity each, 300 ft. of hose, three extra standard charges, two 6-gal. hand extinguishers, two 12-ft. regular pike poles, two 7-lb. fire axes, wrenches for unscrewing the cover of the chemical tanks and two lanterns kept lighted and ready for service at all times. The 280-gal. reservoir is elevated above the car floor level to give sufficient hydraulic head to fill the two chemical tanks quickly. The support for the tank is utilized as a locker, which contains additional soda packs and extra charges of acid. The reserve tank is made of No. 12 sheet steel and provided with an outlet to the chemical tanks through a 2 1/2-in. quick-opening valve. The pipe connecting the reservoir to the chemical tanks is carried down under the car floor so as to provide free access to the engines. The reserve tank which contains the water supply is filled by a hose through a 2-in. opening at the top. This opening is formed by a 2-in. pipe extending down 3 in. into the tank, which prevents the water from splashing out when the car is in transit. A gage glass on the side of the tank near the top records the water level inside, thus preventing overflow when it is being refilled, and indicates to the fire inspector that the reserve tank is filled with water at all times.



Fire Engine Car—General View, Showing Corrugated Iron Sheathing



Fire Engine Car—Interior View, Showing Hose Racks and Tanks

The 100-gal. chemical tanks are installed in one end of the car body so as to balance the load on either side of the body center line when all tanks are filled. These chemical tanks are made of homogeneous steel and designed for any possible pressure generated by the chemicals. Each tank is mounted on a trunnion passing through the center longitudinally and supported on bearings at each end, thus allowing the tank to be rotated, which action discharges the acid, making the solution ready for service. These trunnions are formed of pipes, one of which serves as the outlet. A manhole in each tank permits the acid charge to be placed within ready for instant service. After the soda charge is dumped in the tank it is partially filled with water and a standard charge of acid is placed in position before the manhole cover is replaced. So as to assure a thorough mixing of the chemicals when the engine is ready for service a shaft passes through the axis of the tank. Paddles provided on this shaft and a crank at one end permit the operator to agitate the mixture thoroughly after the acid charge has been opened.

Two wire-mesh baskets supported on racks over the chemical tanks provide space for storing 300 ft. of hose. This hose is 1 in. in size and cut in two sections of 150 ft. each. Each section is provided with a combination nozzle and valve, and is of special quality to withstand the action of the chemicals.

PERFORMANCE TESTS

An actual service test made with one of these fire engines recently demonstrated that but a few seconds was required to secure a pressure of 150 lb. in the tank after the discharge of the acid into the soda solution. At this pressure the nozzles will throw a stream 75 ft. in length, and a greater range may be had at greater pressures. Each tank will discharge at an initial pressure of 150 lb. for three minutes, and it requires two and a half minutes to refill and recharge an empty tank. This rate of discharge permits one tank to be charged while the other is discharging, the total time for which the engine is available for fire service being fifteen minutes. In case an outside source of water supply is available this time may be extended.

FIRE DRILLS

The primary purpose of these engines is to extinguish small fires and to keep large ones from spreading until the city fire department arrives on the ground. In order to insure the ready-to-serve feature of this equipment a permanent chemical fire engine organization is maintained at each point where a fire engine car is stored. These organizations are composed of at least four employees from the shop and transportation department. All shops and storage yards are provided with large fire bells installed so that they may be rung by anyone seeing a fire. At the sound of an alarm the men composing the engine organization drop their work and run to the fire car, the location of which has been noted in advance. Each man is assigned to special duties, with which he is familiarized by frequent drills. In case the fire crew is not expert these drills may take place once or twice a day, but when the men become expert a fire drill once a week is sufficient. A fire chief is appointed with each organization, and in case of his absence an assistant serves.

As soon as the man whose duties include charging the chemical tank boards the car he rotates one of the tanks, thus allowing pressure to accumulate until the fire is reached and the hose is brought into play. The hose is arranged in the wire basket with the nozzle resting on the side so that it may be picked up readily and run out through either one of the end doors. Two extra charges of acid are set on the car floor near the tanks so that they are available for instant use.

As mentioned before, the fire car is so stored on a separate track that it is unnecessary for the company to move other equipment to put it in service. The motor car, which is always coupled to it, is set so that the third-rail or trolley is in contact and the air compressor in service. Three of these equipments are stored in the shops and yards of the South Side Elevated Railroad, one on the Northwestern Elevated Railroad Company's lines, one on the Chicago & Oak Park Elevated Railroad and three on the lines of the Metropolitan & West Side Elevated Railway. Although they have not been required for fire service a great many times, their efficiency has been demonstrated and they have served to reduce insurance rates on rolling stock and the elevated structure.

The fire engine cars, an interior and an exterior view of which are shown in the illustrations, were designed and built by the mechanical departments of each road under the general supervision of H. A. Johnson, master mechanic. The total number of fire cars has been added to from time to time, but the general character of the fire engine equipment has obtained in all with but minor changes in the detailed design.

NEW GERMAN INTERURBAN RAILWAY

The Allgemeine Elektricitäts Gesellschaft has obtained a franchise for the construction and operation of a freight and passenger electric railway from Merserburg to Müchlen, Germany, a distance of 11 miles. The line will be of meter gage (39.37 in.), and a fifteen-minute service at a schedule speed of 12.5 m.p.h. will be given over a single track. Energy in the form of 6000-volt, three-phase current will be purchased from a power station located near a coal mine at an initial price of 1.1 cent per kw-hr. with a possible minimum of 0.9 cent per kw-hr. At two substations this current will be converted to 550 volts d.c. The district served by the line, including the terminal towns, has a population of about 40,000. The construction of a cross-country road of this character is looked upon in Germany as an interesting experiment in the development of narrow-gage (secondary) electric lines in coal-mining territory.

EXPERIENCES WITH RECENT FLOODS

The Evansville Railways had about 4 miles of the Rockport division under water during the extraordinary flood which extended over practically the entire State of Indiana four weeks ago with generally disastrous results. No damage was done to the track or grade, as this was back water and the only loss resulted from the inability to give service. The lines were out of service ten days. There was no damage to the power house or rolling stock. The Mount Vernon district was not interfered with at all on account of high water, either from head water or back water.

The Henderson division, which uses the Illinois Central Railroad tracks between Evansville and Henderson, was out of service because about 2 miles of the tracks of that company on the Indiana side of the river were washed off the grade. This was the only damage and no injury was done to the fill, as this is well rip-rapped. The line was out of service about two weeks.

There was no damage to any of the city tracks in Henderson, Ky., or Owensboro, Ky.

The Evansville, Suburban & Newburgh Railway was one of the fortunate lines and did not suspend operation of cars. While the tracks are located upon the levee of the Ohio River at Newburgh, the company was able to keep the water in check by the liberal use of sandbags and hard work and did not sustain any great losses.

FLOODS AT MEMPHIS

Some inconvenience has been experienced from the flood in Memphis. The city proper is from 70 ft. to 150 ft. above the extreme high-water mark of the Mississippi River, but a small bayou running through a portion of the city empties into the Mississippi River and a district of limited area near the mouth of this bayou overflows in very high water. On some streets the Memphis Street Railway was obliged to operate on temporary tracks. In other cases plank walks were built, and the street railway passengers walked across the flooded districts. This condition lasted about ten days. The water is now receding, and the difficulty has passed.

DAMAGE AT LITTLE ROCK FROM FLOOD

On April 9 there was a rainfall in the vicinity of Little Rock, Ark., of 9.58 in. in eighteen hours. All of the creeks immediately became raging torrents and bridges were washed out of the public roads throughout the counties, Pulaski and Saline Counties being the most affected. Approximately $100,000 damage was done to the county roads.

The Little Rock Electric & Railway Company suffered some loss. The natural-gas main which furnishes the city of Little Rock with natural gas from the Caddo fields in Louisiana was broken where it crosses a creek in Saline County and gas was cut off from the entire city without a moment's notice. The railway and electric company was using natural gas for fuel at its power house, but happened to have two boilers equipped for burning coal at the time the break occurred. The company also has an auxiliary fuel supply of crude oil, but the gas was discontinued so suddenly that there was not time to light the oil under the boilers that were equipped for burning gas; therefore the company was forced to shut down the railway load for twenty minutes. The lighting load was carried by the two boilers that were being fired with coal.

On one of the suburban lines, which runs to the town of Pulaski Heights, the company had two or three small washouts which delayed traffic for two hours on this line until temporary repairs could be made and the track made safe for operation. Other than this there was no damage.

The steam roads, however, in the territory about Little Rock suffered a great loss, due to the abandonment of all trains into the city from every direction with the sole exception of the Cotton Belt Railroad, which had no washouts.

Papers at the Iowa Convention

Abstracts Are Published of Two Papers Presented at the Waterloo Convention of the Iowa Electric Railway Association This Week—One Discusses Methods for Preventing Accidents on City and Interurban Railways—The Other Relates to Methods for Reducing Generating Costs

MODERN METHODS OF REDUCING GENERATING COSTS

BY D. W. GILBERT, SUPERINTENDENT OF POWER STATIONS
OMAHA & COUNCIL BLUFFS STREET RAILWAY

An investigation looking toward the reduction of the cost of power must begin by a study of the territory in which the proposed plant is to be placed and the work expected of it. The availability of fuel, water and other supplies, labor conditions, the nature of the grounds, transportation facilities, atmospheric conditions and permanency expected, all have a definite bearing on the methods to be used and the choice of apparatus.

To attain the greatest economy from a station entails the careful investigation of every piece of apparatus and every step connecting it in its proper relation to the others and giving due consideration to the cost of investment, depreciation and cost of repairs.

It is a matter of the greatest importance that provision be made at every step so that the operating force in the power station may know just what is taking place at all times in order to keep the apparatus in its best possible working order. Provision should be made so that the ash and the coal may be properly weighed. Wattmeters should be installed on the outgoing lines and also on each prime mover. Indicating instruments should be placed at all motors used on auxiliaries throughout the station and water meters should be provided on each prime mover if possible. If this is not possible, the piping to the water meter or meters should be so arranged that each unit can be tested at any time. There should also be a water meter on the make-up water for the station. Recording temperature gages should be placed on the inlet and outlet of the economizers and in the main flue leading to the chimney. The inlet and outlet temperatures of the circulating water through the condenser should be recorded. The temperature of the condensate from the condenser should be recorded in the same way. The main steam pressure and temperature of feed water from the heater should also furnish their recorded evidence. Recording electrical instruments such as voltmeters and ammeters should be placed on all the principal machines so that all fluctuations can be immediately noted. These instruments should be liberally supplied throughout the station so as to enable the engineer to refer to them as a current means for checking the operation of his plant, and the records should be carefully filed so that they may be referred to at times in the future where their evidence may be of very great value.

The importance of securing and maintaining an efficient operating force cannot be overestimated. For with the best equipment it is possible to obtain high operating costs will be the rule rather than the exception with inefficient operators. With an efficient and harmonious operating force surprising results are often obtained, even with what is not considered the last word in up-to-date equipment.

Among the points which may be readily determined by the use of the proper measuring instruments are whether the condenser is becoming dirty, thus avoiding a possible interruption of service, and whether the condenser is leaking, a very important item, especially where the circulating water is unfit for boiler-feed water, as the overlooking of this one thing for any length of time is liable to cause very expensive boiler cleaning and repair bills, which would amount to many times the cost of a water-weighing device.

It is also possible to determine whether the turbine blading is becoming dirty, as is sometimes the case where certain kinds of water are used for steam purposes, and if the prime mover is a reciprocating engine, leaking pistons may be discovered. It is often possible to save in operating cost as well as to avoid a possible repair bill and an interruption of service by thus keeping in daily touch with each piece of apparatus in operation.

Where coal is used for fuel it is very important that a regular analysis be made and a record be kept, so that the coal consumption for different months can be compared. This can be done by taking a small amount from each car unloaded during the month, quartering it down, making one sample, and having it tested by some responsible party. But where the plant is of sufficient size to warrant the expense it is much better to install instruments in the plant, so that an analysis can be made for each car of coal unloaded. The data thus obtained, together with the aid of a simple and inexpensive instrument for measuring the percentage of CO_2 in the gases of combustion, will be of great help in the boiler room.

A recording draft gage should be installed at the stack, or if induced draft be used, the gage should be placed on the suction side of the draft fans. Where it is not deemed advisable to install draft gages for each boiler a portable draft gage can be used with very good results. In addition to these instruments it is advisable to have a standard thermometer that can be used for taking the temperature of the uptake gases.

Another item of cost which should receive serious consideration is that of cleaning boilers, especially in a large station with water-tube boilers. It has been found, even in a station where surface condensers are used, that it is possible to make a very decided saving in the cost of cleaning boilers by using in connection with a mechanical cleaner some good feed-water treatment.

Another item very often lost sight of in turbine stations of this district where the temperature of circulating water used in surface condensers is very low for several months in the year is the temperature of the condensate as compared to the temperature which it should have with the vacuum carried.

To cite a concrete illustration of this point it was found in one plant by making a test that the temperature of the condensate leaving the turbine condenser was only 37 deg. Fahr. with a circulating-water inlet temperature of 34 deg. Fahr. and a vacuum of 28.52 in. referred to a 30-in. barometer. It should have been about 81 deg. Fahr., and with condenser equipment of the latest type this temperature could be raised to about 88 deg. Fahr., thus making a difference of about 51 b.t.u. for every pound of condensate returned to the hot-well. This reduced to dollars and cents represents a 6 per cent return on an investment of $47,000 based on a 4000-kw unit running twenty hours per day, with 10,500 b.t.u. coal costing $2.50 per ton.

In passing it may be well to call attention to a very important, if not the most important, point in connection with the successful and economical operation of even the most modern power station, and that is the point of keeping the repairs of the station "up to the minute." The motto of "Do it now" can very successfully be applied to the power station. While economy should always be the watchword, the fact must never be lost sight of in public service plants that continuous operation must always receive first consideration, even at the expense of economy.

SUCCESSFUL METHODS OF PREVENTING ACCIDENTS

BY ARTHUR G. RIPPEY, CLAIM ATTORNEY DES MOINES CITY RAILWAY AND INTER-URBAN RAILWAY, DES MOINES, IA.

No more vital problem confronts the electric street and interurban railway companies of this country to-day than that of accidents. As cities grow and populations increase it becomes more and more difficult to operate electric railway systems without proportionate increases in the number of accidents. It is becoming harder all the time successfully to defend actions for personal injuries and damages to property. This is true for several reasons.

One is that many jurors seem to be impressed with the idea that a plaintiff should have a verdict in these cases simply because the accident happened, regardless of whether there was any negligence on the part of the company through its employees or whether there was careless or negligent conduct of the person injured or whose property had been damaged. Another is that the courts of our country are becoming progressive, and there is a greater tendency, as time goes by, to submit all questions involving negligence to the determination of a jury. The so-called humanitarian, or last fair chance, doctrine has been invoked in a successful effort to get away from the doctrine of contributory negligence.

Another is that state legislatures have adopted laws changing the law relating to contributory negligence and assumption of the risk, especially where the relation of master and servant exists. Indeed, the present Legislature of Iowa has passed an employers' liability and workingmen's compensation bill the effect of which is to compel the payment of certain sums of money, according to certain injuries sustained by the servant while in the employment of the master, without reference to the question of negligence, unless it be that of wilful negligence on the part of the servant. If the company elects not to come under its operation, then, in case of injury and suit, the bill takes away from the master the defense of contributory negligence and assumption of risk and casts upon the master the burden of proof in the first instance that the accident was without fault on its part. The practical effect of this bill is to make the master an insurer of the safety of its employees and to compel payment for a servant's injuries, regardless of who is to blame for them.

Therefore the question of what to do with the accident problem is squarely before us. A fair average of the amount paid by electric railway companies on account of accidents in this country as a whole is said to be from 5 to 7 per cent of the gross earnings of the different companies. In view of this situation, there have been many suggestions as to methods of coping with it.

For the purpose of this paper the matter may be divided into two general classes:

(1) The proper training of motormen and conductors together with the proper equipment and inspection of cars

(2) The education of the great American public.

THE PROPER TRAINING OF MOTORMEN AND CONDUCTORS AND THE PROPER EQUIPMENT AND INSPECTION OF CARS

The first and fundamental thing is that the man who employs motormen and conductors shall be a keen judge of human nature, so that when motormen and conductors are secured, if properly trained, they will have such mental and physical ability as to become successful in the matter of properly operating their cars with the minimum number of accidents. The subject of employing men has been discussed quite fully by the American Electric Railway Claims Association and was admirably presented by E. T. Walsh, attorney for the United Railways of St. Louis, at the meeting of the association at Atlantic City in 1911. I quite agree with his conclusion that selection is really of as much importance as instruction.

After proper men have been secured they should receive thorough and painstaking instructions as to their various duties. In my judgment student motormen and conductors receive entirely too little preliminary instruction, rather than too much. In the first place, they should put in enough time in the car shops to become thoroughly familiar with the mechanism of the cars they propose to operate, particularly the construction, operation and use of the controllers, motors and air brakes. After passing through this stage of the matter they should be placed in charge of first-class motormen and conductors, or special teachers, for instruction in the actual operation of cars.

I am heartily in favor of designating a small number of conductors and motormen, who shall be carefully selected, to train and instruct students. Selection and instruction are of very great importance, because they determine the future of the various motormen or conductors and mark the difference between efficient employees, who have few if any accidents, and careless or indifferent employees, who have many accidents and cost the company large sums of money.

Having finished the course of preliminary preparation and before he starts out for regular or extra duty alone, each motorman and conductor should report to the claim department, where he should receive careful and minute instructions on various matters pertaining to accidents, such as making out full and detailed accident reports of facts and not inferences, securing names of witnesses, noting where and when bell was rung, speed of car, etc.

Regular meetings should be held for the instruction of trainmen as to the best methods of preventing accidents. All motormen and conductors should attend these meetings. The meetings should not be held spasmodically but regularly and should become a permanent institution. Lectures should be delivered by someone representing both the claim and operating departments. Part of each meeting should be devoted to discussion by the men themselves. In this way interest will be sustained.

There are many matters which may be taken up at the regular instruction meetings and aid in the prevention of accidents. Some of these I have personally tried and know are efficacious.

For instance, several years ago, when I first took charge of the claim departments of the Des Moines City and Interurban Railway companies I found we were having an unusual number of serious and fatal accidents, caused by persons alighting from cars, going directly behind them and colliding with cars coming from the opposite direction on the other track. I immediately brought this matter up in our meetings and urged the great importance of two things as a preventive. One was to ring the bell continuously as a moving car approached a standing car. The second was to reduce the speed of the moving car and get it under absolute control, so that the motorman could stop instantly if anyone came from behind the other car. I kept at this matter in season and out of season for more than a year, and the result has been that this class of accidents has been almost entirely eliminated.

After an accident happens the conductor or motorman should report to the claim department, where it may be discussed and means pointed out whereby its repetition may be avoided.

Training a motorman or a conductor to anticipate danger is a preventive measure that cannot be safely ignored. I have found that we have men who have operated cars on our lines for years and have never had a serious accident and have never cost the company a dollar in court or out of court. This seemed strange to me, and I began to study these men, with the result that I found they were constantly anticipating or foreseeing danger and dangerous situations. Consequently, they were avoiding accidents. They are what I call, for want of a better term, "accident anticipators."

For instance, I discovered that certain motormen studied and knew the rail conditions and operated their cars accordingly. If they saw a closed vehicle, such as a covered milk or laundry wagon traveling in the same direction as their cars, they reasoned that there was danger, because the driver might pull onto the track in front of the car at any time without looking; so, instead of running rapidly up to and by the vehicle, they reduced the speed of their cars to such an extent that if the careless driver turned onto the track or toward it as the cars approached or passed they could stop their cars and avoid the accident.

Again, when these men saw small children playing in the streets or on the parkings, they reduced the speed of their cars and rang their bells vigorously, so that if any heedless boy or girl ran toward the tracks the cars could be stopped and an accident prevented. They took into consideration the thoughtlessness of childhood. And so the illustrations might be multiplied indefinitely.

I therefore lay particular stress in my lectures to the men on the plan of developing the power to anticipate and avoid dangerous situations and consequently the accident itself. The result has been entirely worth while. Criticism may be made that trainmen may spend so much time anticipating dangerous situations as seriously to delay their cars. The fact is, however, from our experience, that these men make their time and are almost invariably on their schedules.

I assume every street railway company has a rule requiring gongs to be rung on approaching street intersections. Many cities have ordinances requiring it. As an accident preventer intelligent gong ringing has no equal. These rules should be rigidly enforced. My observation has been that most motormen obey the rule, but many of them content themselves with a tap or two, instead of a steady continuous ringing as they approach the danger zone. Do not neglect this important matter. Haven't you ever sat in court and been robbed, the larceny being perpetrated under the guise of testimony of people on the car or near the accident who were positive the bell was not rung because they did not hear it? It is a regular yeggman's trick and the favorite refuge of the personal injury lawyer. The remedy is to compel motormen to ring gongs loudly and insistently when they approach and enter danger zones. And beyond all shadow of doubt a street intersection is a danger zone.

Where cars are used without gates or doors on the boarding and alighting platforms, it is a common practice for people to get on and off while the cars are in motion. We have had considerable trouble with this class of accidents. To meet one phase of it, particularly where women and children alighted before the car stopped, we insisted that conductors, instead of standing still and watching them, should move over and block their passage. This has proved by our experience to be an efficient method of preventing many people from alighting from moving cars. The result has been gratifying because a large number of our conductors have been trained now to block the exit until the car has completely stopped. This has not been accomplished without a great deal of persistent and painstaking effort.

Perhaps all electric railways have had accidents caused by people slipping on snow and ice which had accumulated on car steps and platforms. Five years ago we had a considerable number of such accidents. This class of accidents has been eliminated by compelling carhouse men to remove ice and snow from all steps and platforms before putting the cars into service and by installing brooms and ice scrapers on each car and seeing to it that the conductors keep the steps and platforms free from snow and ice.

Another preventive measure that, in my judgment, will eliminate a large number of head-end as well as boarding and alighting accidents is the adoption of the near-side stop for cars, especially in the congested portion of our large cities. It has two great advantages: (1) the saving of time by eliminating one stop, and (2) after the stop has been made, motormen have an opportunity to look both directions for approaching pedestrians and vehicles of all kinds. There can be little, if any, excuse for a collision at such points.

Boarding and alighting accidents have become so numerous with us on our city lines that we have been forced to do something to eliminate them, aside from carefully drilling our conductors in preventive methods. So about Jan. 1 of this year we equipped eight cars with doors in four sections which, when shut, completely close the rear entrance and exit. These doors divide in the middle, two sections opening toward the rear and two toward the front of the car. In connection with these doors we have disappearing steps, which lower when the doors are opened and fold up against the cars when the doors are closed. The mechanism is so arranged that conductors operate these doors and steps by turning levers which are located near where they stand in the car.

We put these cars on our heaviest lines where they have been constantly in service for approximately four months. The result has been astonishing, as we have not received a report of a single boarding or alighting accident in connection with these eight cars. We soon will have fifteen more cars in service with the same equipment. It is our intention to equip all city railway cars in the same manner. We apparently have found the solution of the vexing question of boarding and alighting accidents.

However, the adoption of the center-entrance type of car without steps may be the final solution of accidents of this character.

EQUIPMENT AND INSPECTION

All cars should be thoroughly equipped. The matter of inspection is of first importance. No car should be sent out without rigid inspection of steps, hand rails, platforms, and particularly of brakes, hand or air, and motors, and all defects should be immediately remedied. The reason is obvious. The law does not listen sympathetically to excuses regarding defective or inadequate equipment, and juries do not listen at all.

EDUCATION OF THE PUBLIC

That accidents may be prevented by educating the public has been demonstrated. One of the effective methods of doing this is by means of cards illustrating the various kinds of accidents which ordinarily happen. These cards should be placed in the street cars in such positions as to be readily seen by the passengers. We put one card in the front of each car and one in the rear so as to catch them coming and going. On these cards are printed certain warnings, such as "Never alight from or board a moving car," "Look both ways before crossing street car tracks," "Do not take hold of wires," and other good advice, with all of which this association is familiar.

We have adopted another method supplementing the card system in the cars for preventing accidents, and that is the distribution of a large number of blotters among the pupils of the public schools in Des Moines. On the back of the blotters are pictures that correspond to the pictures installed in the cars with appropriate warnings and reading matter. We secured enough of these blotters to supply each scholar with one a month, for a period of nine months, each blotter being different, with different pictures and reading matter. The reception given to this matter has been favorable. Just how many accidents it has prevented of course it is impossible to state, but we have reason to believe it is getting the young people and children started in the right direction, and having once acquired the safety habit, they will follow it through life.

In addition to the foregoing, we propose to deliver lectures before the school children at regular periods, illustrating them with appropriate pictures.

This matter of educating the school children has probably received more attention in the Far West than anywhere else. Mr. Boynton, general claim agent of the Portland Railway, Light & Power Company, Portland, Ore., is the pioneer in this line and seems to have accomplished a great deal. The Public Service Railway of New Jersey has also within recent months paid especial attention to this school work.

We are co-operating with the large teaming interests of our city to the end that the teamsters using the streets shall exercise greater care in avoiding accidents with street cars. It is my purpose to interest in this campaign of education the various automobile clubs and taxicab companies, as we have many automobile accidents in the city of Des Moines, practically all of them due to the careless driving of automobiles.

This paper has been written largely from the viewpoint of our experience in operating a street railway system in a city of about 100,oco people, where all cars are operated past a central point. We also operate about 75 miles of interurban railroad and have found that the accidents thereon are not nearly so numerous or troublesome as are those connected with our urban system.

ACCIDENTS ON INTERURBAN LINES

We follow the same general methods of prevention in dealing with our interurban accidents as we do with the street railway. There are, however, certain radical distinctions that must be borne in mind. For instance, interurbans are operated largely upon private rights-of-way in the country, while street railways in cities operate usually over the streets of the muncipality. The courts have adopted somewhat different standards of care to be exercised by the trainmen. As illustrating this, the courts hold that an interurban car has the right-of-way over travelers at country crossings, while at crossings or street intersections in cities the rights of the street cars and other travelers are equal.

Again, in cities you are usually prohibited by ordinance from operating street cars at a greater rate of speed than a certain number of miles per hour, while in the country no rate of speed is negligent as a matter of law, although it may become a question of fact for a jury to say whether a car running at a given rate of speed is negligently operated. In Des Moines the speed limit prescribed by ordinance is 8 m.p.h. in the business districts and 12 m.p.h. in the residence districts.

Most of our interurban accidents are collisions with vehicles at crossings, derailments and head-end collisions between our own cars. We have really had comparatively few interurban accidents.

Many interurban roads have some blind or dangerous crossings where the view of both the traveler and motorman is obstructed. At such crossing we have carefully instructed our motormen not only always to give the statutory signals, but to do the obviously sensible thing, and that is to reduce the speed of their cars so that they can stop and avoid a collision if some careless driver comes suddenly onto the track ahead of their cars.

In cities and towns in Iowa the operation of interurban cars on streets is governed by the same laws as the operation of street cars. The Supreme Court of Iowa, in Swisher versus Inter-Urban Railway Company (130 N. W. Rep., page 404), has held that the bell and whistle statute compelling steam engines to be equipped with steam whistles and bells and requiring certain crossing signals applies to interurban railroads. Two justices of this court dissented, and the decision is squarely opposed to well-reasoned cases of the Supreme Courts of California and Louisiana.

To obey the law as laid down in the Swisher case you must require your interurban motorman while operating in the country to blow the whistle twice sharply 60 rods from the highway crossing and to ring the bell continuously from that point until the crossing is passed.

EJECTMENTS

Perhaps all companies, both street and interurban railways, have had trouble over ejectments. The law reports contain many cases arising over disputes as to transfers, failure to pay fare and ejection of drunken persons from cars. The Legislature of Iowa has taken cognizance of the situation in so far as it relates to intoxicated persons and the use of profane language and in 1909 passed a statute which, undoubtedly, gives more protection to the railroad companies in handling intoxicated people.

This statute is Chapter 141 of the Acts of the Thirty-third General Assembly and is as follows:

"Section 1. Misdemeanor.—Any person who shall drink intoxicating liquors as a beverage on any passenger railway car or street car in service or who shall use profane or indecent language on such railway or street car shall be guilty of a misdemeanor.

"Sec. 2. Powers of Conductor.—Any conductor of a railway train or street car carrying passengers shall have the right to refuse to permit any person not in the custody of an officer to enter any passenger car on his train or street car in his charge who shall be in a state of intoxication, and shall have the further right to eject from his train at any station or from his street car at any regular stop any person found in a state of intoxication, or drinking intoxicating liquors as a beverage, or using profane or indecent language, on any passenger car of his train or any street car under his charge, and for that purpose may call to his aid any employee of the railway or street car company."

Our experience has been that it is better not to eject a drunken person so long as he is not seriously annoying or disturbing other passengers. If it becomes necessary to make an ejection, our men are instructed to take the person to some place where he may receive some attention. I am opposed to putting a drunken man off the car on a cold or stormy night at a highway crossing, or at any point where he is liable to get back on the track or where he cannot secure shelter. Drunken men usually develop an intense desire to go to sleep on the railroad track.

BLOCK SIGNALS AND CONCLUSION

That many accidents may be avoided by the installation of proper signaling systems on interurban roads would seem to follow, judging the result by a table recently compiled by P. J. Simmen, based on the reports of the steam roads to the Interstate Commerce Commission. [For this table see ELECTRIC RAILWAY JOURNAL for March 22, 1913, page 551.—EDS.]

Some distinguished patriot has said: "Eternal vigilance is the price of liberty." Paraphrasing this language so that it may be a guide to the patriotic gentlemen who are ably presiding over the destinies of the electric street and interurban railways of this country, I beg to offer this: "Eternal vigilance is the price of safety."

PERCENTAGE OF 5-CENT FARES COLLECTED IN CLEVELAND

John J. Stanley, president of the Cleveland Railway, in his testimony at Detroit, Mich., during the suit against the 3-cent fare ordinance which was passed by the Detroit City Council, said that out of the total number of fares taken by the Cleveland Railway in 1911 1.33 per cent were 5-cent fares. This percentage was determined by taking all of the 5-cent and 10-cent pieces in the fare boxes as 5-cent fares, the pennies and tickets in the fare boxes being counted as constituting the 3-cent fares. Mr. Stanley explained that while a passenger might pay two fares with a 5-cent piece and a penny, the 5-cent piece would be counted as a 5-cent fare in this computation, because that was the only practical way of determining the results. Tests made on five different lines of the Cleveland Railway on different days for the purpose of checking the accuracy of this figure showed a percentage of 1.35.

TRAFFIC DELAYS—THEIR CAUSES AND REMEDIES

Through the courtesy of President W. A. Bancroft of the Boston Elevated Railway Company, a résumé is given below of an extended discussion of the causes and prevention of traffic delays, a topic handled at a meeting of the company's Efficiency Club.

CONDUCT OF EMPLOYEES

A primary cause of traffic delays is stubbornness and indifference on the part of transportation employees. An inefficient switchman will cause more congestion at points where two or three switches are to be operated than almost any other class of employees. Conductors and motormen who are indifferent about reaching junction points on time delay the schedule badly in many cases. When behind time they carry more than their quota of passengers, and when they reach junction points they cut off cars that should be from one to three minutes ahead of them. This tends to delay these other cars perhaps two or three times this amount of time in reaching the ends of their routes and adds to the expense of set-back movements. Many such cars start from points other than the carhouse and do not get set-back service, and after the first one or two trips they tend to become bunched in leaving route terminals. This condition continues until one or more trips are lost. The remedy seems to be to hold street inspectors responsible for the arrival of cars on schedule time at junction points, fitting them in so far as possible in proper order and keeping a closer watch of the service to ascertain whether the trouble lies with the manner in which cars are handled or whether additional service is required to meet the demands of heavy travel. Progress is retarded when those who object to orders for the improvement of service fail to complete their work until urged on to do so by additional orders. Causes of complaint from the public are often based on this condition. All suggestions from reliable persons should receive respectful consideration, and when orders are given for certain work to be done it should be started and completed within a reasonable time.

Boston Elevated Railway Company, Transportation Department Record of Car Delays in Minutes for October, 1912

Div.	Car Body				Mechanical				Electrical				Total				Miscellaneous			
	1912		1911		1912		1911		1912		1911		1912		1911		1912		1911	
	Def.	Del.	Def.	Del.	Def.	Del.	Def.	Del.	Def.	Del.	Def.	Del.	Def.	Del.	Def.	Del.	Def.	Del.	Def.	Del.
1	144	26	110	42	152	30	63	16	301	400	169	354	597	456	342	412	148	495	72	248
2	121	66	134	49	77	50	58	23	184	366	210	245	382	482	402	317	83	380	94	404
3	179	32	138	65	42	19	50	51	306	247	315	242	527	298	503	358	52	197	78	240
4	4	3	55	26	14	55	15	401	27	106	64	331	45	164	134	758	6	35	15	77
5	59	34	70	18	28	10	20	3	178	220	121	93	265	264	211	114	81	311	29	85
6	190	16	106	36	79	45	39	26	122	130	173	259	391	191	318	321	24	62	42	205
7	264	46	200	119	103	16	142	93	236	262	343	567	603	324	685	779	79	215	55	225
9	136	66	168	18	83	47	72	32	214	329	212	281	433	442	452	331	24	100	32	120
Total....	1097	289	981	373	578	272	459	645	1568	2060	1607	2372	3243	2621	3047	3390	497	1795	417	1604

	1912	1911
Total delay for month................	43 hr. 41 min.	56 hr. 30 min.
Average delay per defect...............	0.81 mile	1.1 mile
Average defect per day...............	104	98
Miles per defect......................	1255	1255

Standing of Different Divisions for Month of October

Division:	1st	2d	3d	4th	5th	6th	7th	8th
Standing in 1912......	5	4	8	1	7	2	3	6
Standing in 1911......	2	4	8	7	5	1	3	6

DERAILMENTS

A large percentage of derailments occur at switches and on curves, and a small percentage at low joints, wide and narrow gage. The cause of derailments at switches may be a loose tongue, tongue low at the point, or switch mate badly worn in one or both ways. The only remedy is frequent inspection by men having a knowledge of both tracks and trucks. On straight lines, where the gage is wide because heavy teams pull in and out of the track and break tie rods or nuts, the track inspector should pick out the places where the paving is low or worn and have it raised, so that when a heavy team pulls out the wheels will creep up on the rail and not grind against it. On curves where the gage is wide the gage should be regulated according to the wear. It is good practice to oil curves and switches at least twice every twenty-four hours. A more rigid inspection of run-off switches is also desirable in many cases. In order to reduce the percentage of derailments caused by trucks, the latter should be kept in good condition, with wheels carefully inspected and center bearings well oiled. Pit foremen should see that no bolts are left long enough to interfere with proper swiveling in rounding curves and that no tools are left on the tops of motors after repairs. Equipment inspectors as well as the division superintendent should make inspections after derailments.

UNDERPOWERED CARS

To prevent traffic delays by cars which are not in the best condition special consideration must be given to the capacity of the equipment. The use of old motors may easily disarrange the schedule, particularly when the traffic is heavy. Unless the type of truck is suited to the car design and schedule conditions, a car will lose a large amount of time through slow-downs, particularly when passing over poor rail and special-work sections. The only remedy appears to be to replace old equipment with more efficient and powerful motors and improved designs of trucks. Another cause of delay is the practice of keeping fuses of different sizes in a common box. After fuses have been in service for some time the amperage marks tend to become scratched or obliterated, and delay results from mistakes in fuse selection. A 1-amp fuse for a lighting circuit may be put into a control circuit requiring from 3-amp to 25-amp fuses. Standardization of coupling and shackling methods is also important. When small box cars and semi-convertible cars are run on the same line and fitted with several different types of coupling equipment confusion often occurs. Uniform drawbars and cages of sufficient strength to push any car or snow plow on the system are necessary.

EXTERNAL CAUSES OF DELAY

Delays from fires are unavoidable but in many cases can be reduced when the apparatus is being ordered back to headquarters, if the street railway officials request the fire chief to co-operate in giving the company a main line. Funerals often seriously interrupt traffic and often cause hold-ups of from five to twenty minutes in crowded thoroughfares. The passage of an ordinance requiring an opening of 300 ft. between every ten carriages would be a decided help. Drawbridges should not be opened during rush hours, and excavations should not be opened on main thoroughfares during the daytime. So far as possible, work of this character ought to be done at night, and an appeal to municipal authorities to limit the hours of opening to between 6 p. m. and 6 a. m. would be a step in the right direction. Where new buildings are being erected more or less delay is often caused, and the tendency of contractors to occupy an undue share of the street should be officially discouraged. The condition of track is a far more important factor in the punctuality of the service than is sometimes realized. If the track is in poor condition, it protracts the length of stops, since passengers will not walk through cars toward the doors if their footing is rendered more or less insecure by side motion. A change in the roadbed construction such as the installation of longitudinal and cross drains in reservations subject to water accumulation would be a decided help in facilitating car operation at normal speed. Patch paving by company trackmen should also be prohibited on main thoroughfares between 6 p. m. and 6 a. m. It goes without saying that the co-operation of police, fire and other city departments is necessary for the maintenance of a proper schedule. Where practicable light-riding cars should be regulated so that two or three different lines of cars will not be due at junction points at the same time. The provision of short-cut track routes is also a matter worth consideration. On outside sections of the system the use of motor-driven wrecking vehicles should be considered in place of cars and teams. In the urban center it is a question if motor trucks for emergency repairs could cover the field much more effectively than horses.

WRECKING OUTFITS

There is room for a careful analysis of prospective service conditions in connection with the arrangement of wrecking outfits, the laying out of districts to be covered in emergencies, the organization of crews and the provision of suitable equipment with which to pick up disabled cars or broken-down teams. The management should know the average time required for a wrecking outfit to reach the most remote point where trouble may occur. On a typical division, with four carhouses as centers, the average run required was 1.9 miles, and, based upon the usual running time, the interval required for the wrecking car to reach the most distant scene of trouble was about ten minutes. The placing of wrecking tools at various points for the use of street inspectors is a useful policy. The addition of a chemical extinguisher to the regular equipment of a wrecking outfit is a valuable course to follow in connection with the occurrence of fires caused by overheated resistance grids or motor leads.

By the use of a clamp which fits over the head of the T-rail on reservation trackwork much delay can be avoided when jacks are employed under trucks which are derailed with one pair of wheels on each side of the rail. The usual method of getting the truck on the rail is to jack up and block the truck, and then, with another jack at an angle against the corner of the truck frame, to force it upon the rail. Without the clamp it is difficult to prevent the jack from slipping at its base. One of the hardest jobs of the wrecking crew is to deal with a broken axle or truck frame when one corner of the truck frame rests on the pavement. This work has been much lightened by the use of a skid of hard wood about 8 in. high, 20 in. long and 5 in. wide, bound with ½-in. iron. It is lashed to the truck frame and enables the car to be slid home with comparative speed. It is much easier to use and lighter than the usual wheel skid or cradle, can be handled more quickly, and reduces the amount of jacking required. The use of high-powered lights in place of lanterns for night work on wrecking jobs is also an important matter. In one case, where two frogs were not protected by guard rails on account of their location immediately opposite one another, permanent oak fillers were installed at the angles. With these a derailed car can be backed upon the frogs and upon the rail again without waiting for blocking.

RECORDS OF CAR DELAYS

About two years ago a system was instituted in the transportation department of the Boston Elevated Railway Company whereby all delays to a car in excess of 2 minutes were reported by divisions to the superintendent of the day at the main office. This record shows the delay to the car on which the failure occurred, but not the delays caused thereby to other cars. For October, 1911, the total car delays were 56 hours 30 minutes; for October, 1912, they were 43 hours 41 minutes, total defects in the former month being 3047 and in the latter, 3243. The average delay per defect was 1.1 minute in the first and 0.81 minute in the second case. To create rivalry among carhouse foremen it is the practice at their monthly meetings to announce the record of the longest and shortest delays for carhouses of comparable class and size. Occasionally special analyses of the causes of delays are made, a typical week's operations showing the following:

Material	50 min.
Manufacture	4 min.
Unsuitable equipment	35 min.
Improper maintenance	4 hr. 29 min.
Improper operation	2 hr. 19 min.
Track	12 min.
Undetermined	1 hr. 46 min.

The item of proper maintenance included all such troubles as grounded armatures, fields, etc., and unnecessary time lost on account of a failure, as in the case of a motorman who attributed a difficulty to binding brakes when the trouble with the car was a motor breakdown. This caused a loss of 40 minutes when not over 5 minutes would have been required by an experienced man to locate the cause and cut out the offending apparatus.

POWER STATION PROTECTION AT LOUISVILLE DURING THE RECENT FLOOD

During the flood at Louisville the water rose considerably above the windows and doors of the electric power station of the local electric lighting company, of which Gen. George H. Harries is president. Floods, however, are not uncommon in Louisville, although that of this year was unsurpassed as regards volume except by the famous floods of 1884. Hence the engineers of the power station were prepared to combat emergencies of this kind and adopted an ingenious method of making the doors and windows watertight and of preventing the power station from floating away because of its buoyancy when surrounded by water. A part of the equipment of the power station is an ice-manufacturing plant, and as the water rose in the streets refrigerating coils connected with this plant were laid around the edges of the windows and doors, whose chinks were filled with sawdust. After the sawdust became saturated with water it was frozen by means of the refrigerating coils and thus the inflow of water was prevented. To counteract the tendency of the station building to rise when immersed to the depth reached by the water, some water was permitted to run into the basement as ballast. During the flood communication with dry land was maintained by a number of rowboats moored to the chimneys.

Now that the relocation and reconstruction of the Panama Railroad is completed surveys are being made for the transmission of power for the operation of the line by electricity. The Gatun hydroelectric plant which is under construction will supply the energy required under normal conditions, but there will also be a connection with the present steam-driven electric plant at Miraflores. The transmission voltage will be 44,000, and this potential will be stepped down at various distribution centers for running the trains, lighting the canal and supplying the power required for operating the various machine shops, the gates and other appliances at the dams and locks. Bridges of the customary type for carrying the cables, etc., will span the tracks, the distance between them varying from 200 ft. to 300 ft. according to the local curvature conditions of the railroad.

COMMUNICATION

RELATIONS OF STEAM AND ELECTRIC RAILWAY TRAFFIC DEPARTMENTS

Tidewater Southern Railway Company
Stockton, Cal., April 17, 1913.

To the Editors:

I crave your indulgence for a moment for the purpose of calling attention to an item appearing in the Pacific Coast items of last week's *Railway Record,* which reads in part as follows: '"The electric lines of California are adding to the burdens of the steam roads by asking for admission to the Transcontinental Scrip Bureau," or words to that effect.

Viewed from an unprejudiced angle, such a contention surely seems to be unfair or the product of an unprogressive theory, and is one which is destined to become shorn at an early date of its moss covering.

Being myself a steam road undergraduate and having for years unconsciously been accustomed to feeling that the electric line, although a factor, was to be considered more or less as an interloper and not a railroad in the regular sense, I can readily appreciate the other fellow's seeming position. These taints of prejudice, however, are due for relegation to the dark ages whence they came. Especially can this be said after one reflects that the B. & O. at Baltimore, the Pennsylvania and New York Central lines at their terminals at New York, etc., which are steam properties by origin and nature, have resorted to electricity as a means of economy and efficiency. Finally within the last few weeks, at a meeting of Pennsylvania Railroad directors, it was voted to electrify at once the Philadelphia terminals and their immediate extensions. So away with these prehistoric relics and their blindness!

The steam roads of California and elsewhere, when operating joint territory with electric roads, should welcome the latter into their tariff, scrip, weighing and other bureaus with open arms. It would seem they should appreciate the willingness of the little fellow, erstwhile outcast, to come into the fold, for by so doing the modern tendency toward uniformity and standardizing generally would but be receiving additional impetus toward its logical goal.

The electric lines of California have but made application for membership in the Transcontinental Scrip Bureau at San Francisco. What can be the objection to their admittance?

The electric and steam lines operate in direct competition between quite a few California points, some of which are of considerable importance, hence have quite a volume of passenger traffic. Can there be any real reason why the public should not be handled on an equality, so far as concerns fares? Do the steam lines advocate that the electric roads be obliged to publish open rates, upon basis of "net fares" to holders of steam road scrip books, or do they anticipate that the electric lines will sit quietly by and permit the steam roads to secure the travel because the electric ones have the higher rates?

Present indications point strongly toward the electrification of all steam lines operating out of San Francisco for a zone extending several hundred miles in any direction. Will such transformation of roads eliminate the lines at issue from participation in local scrip and other bureaus?

Within ten years, in view of the rapid and economical hydroelectric development possibilities of central and northern California, steam roads there will be looked upon as being about as progressive or modern as a "century plant."

With the increasing science of ton miles per train developed in steam road practice, the natural argument is for a reduction in number of station stops. All this affords the electrically operated lines a useful field of endeavor. They distribute and develop traffic under conditions prohibited to and unprofitable in steam operation.

The conclusion is safe and certain that the electric roads are here to stay. So let's get together on lines sufficiently broad to insure efficient service to public and honest returns to stockholders and patrons alike.

L. H. Landis, Traffic Manager.

NEW STREET ORDINANCE IN LOS ANGELES

Upon recommendations of Charles K. Mohler, chief engineer railway department, Board of Public Utilities, the City Council of Los Angeles has revised the ordinance in regard to the space on the streets which can be occupied by standing vehicles and has increased the distance which must now be kept free. The old ordinance allowed 40 ft. from the curb corner. Under the new ordinance the Board of Public Works is authorized to make that distance not less than 80 ft. or more than 150 ft. and to place signs showing the space in which it is unlawful for vehicles to stand.

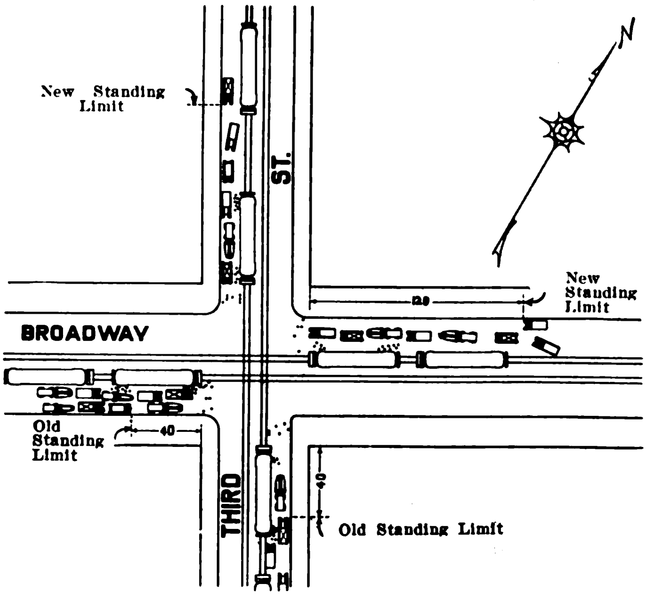


Diagram Showing Position of Cars and Vehicles in Los Angeles with Old and New Standing Limits

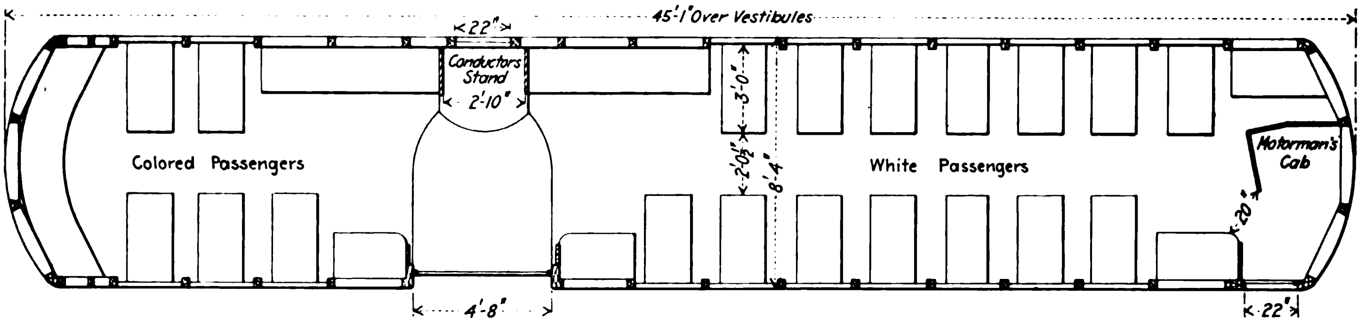
The new law has been brought about principally by the congestion at corners and the danger to the passengers entering and leaving the trolley cars. This condition has been aggravated by the increasing number of motor-driven vehicles which, according to Mr. Mohler, have a low factor of capacity—that is, of number of passengers to the standpoint of space of roadway occupied. The accompanying sketch shows the old and new standing limits and the position of the cars when discharging and receiving passengers. The old and lew limits are shown on both a single-track and the double-track line.

SWISS STREET RAILWAYS FOR 1911

The annual railway statistics of the Swiss government for the year 1911 show thirty-seven purely city railways and 275 miles of route, corresponding to 374 miles of single track, an increase of 9.4 miles compared with 1910. Thirty-one undertakings used direct current, two of them at 800 volts and two at 1000 volts; three of these city lines used three-phase at 550 volts and one used single-phase at 200 volts within the city limits. The rolling stock consisted of forty-five single-truck, one-motor cars; 670 single-truck, two-motor cars; fifty-seven double-truck, two-motor cars; fourteen double-truck, four-motor cars, and 289 trailers—a total of 1075 cars, seating 37,567 passengers. The total gross earnings were $3,064,658, equivalent to 17 cents per train mile. The total operating expenses were 79 per cent of the gross earnings. The number of employees was 4259, or 7.48 per km.

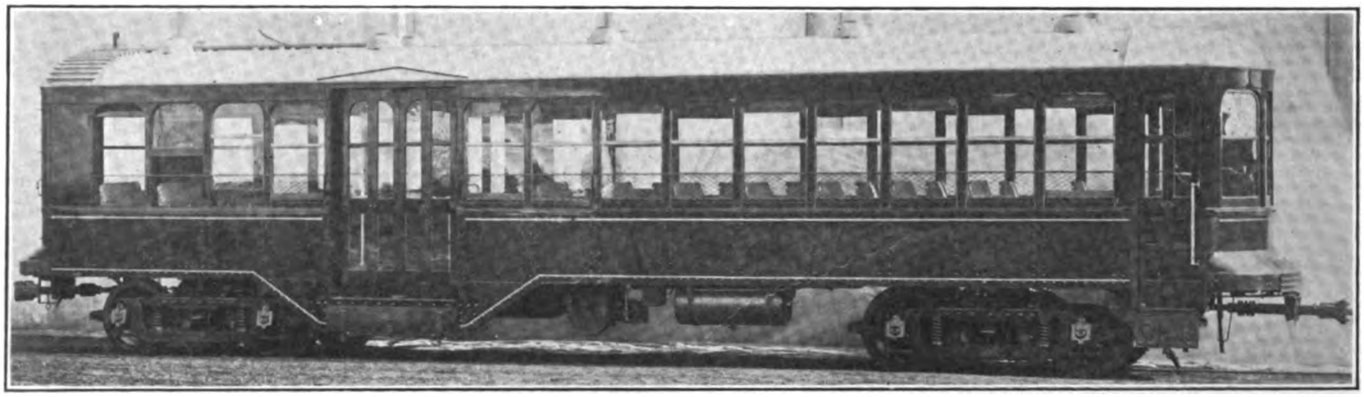
SIDE-ENTRANCE CAR FOR WHITE AND COLORED PASSENGERS.

The Birmingham (Ala.) Ensley & Bessemer Railway has recently purchased from The J. G. Brill Company ten steel arch-roof side-entrance cars of the type shown in the accompanying illustrations. In these cars the side-entrance principle has been adopted as a convenient means for separating white from colored passengers. The general dimensions of this type are as follows: Length over bumpers, 46 ft. 9 in.; width over all, 8 ft. 4 in.; width of double transverse seats, 36 in.; width between transverse seats, 12 in.; width of aisle between transverse seats, 24½ in.; width of main side opening, 56 in.; width of exit door of motorman's cab, 22 in.; width of emergency exit behind conductor's stand, 22 in. The seating plan as reproduced shows that transverse seats have been favored so far as possible without prejudice to insure freedom of passenger movement at the entrance and exit aisles. As the car is operated single-ended, there is but one cab for the motorman, and this is placed in the compartment for white passengers, as indicated.



Birmingham Car—Plan of Side-Entrance Car for White and Colored Passengers

The main opening of the car, which is used for the combined entrance-exit aisles to the white and colored compartments, comprises double sliding doors 58 in. wide and a folding step. The exit door of the motorman's cab is an inwardly folding two-leaf door. As the inwardly folding double door behind the conductor is for pole-setting use only, it has no folding step, and, in fact, it is located above the level of the car floor. The steps at the side entrance are low despite the fact that 34-in. diameter wheels are used. The first step is 14 in. from the top of the rails; the next step, which leads to the platform well, or subfloor, is 14 in. high, while the last step—namely, from the well to the main floor—is 10 in. high. In addition, from a point 5½ in. on each side of the doors the main floor is sloped upward 3 in. and the subfloor 1 in.



Birmingham Car—Side View, Showing Main Side Entrance and Exit for Two-Compartment Car; Also Front Exit from Compartment for White Passengers

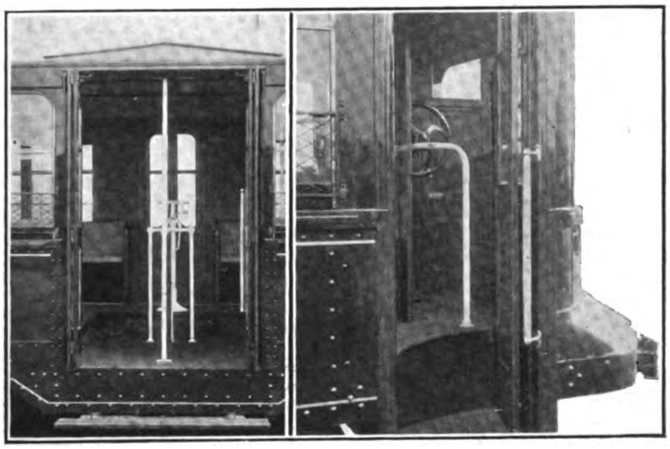
The conductor stands on the main floor between two longitudinal seats in a niche 34 in. wide, from which position he can face the passengers and control the doors. A triple step for the front exit is obtained by forming a well in the motorman's platform as in the Pittsburgh Railways' prepayment cars. This arrangement gives three exit steps as follows: 13 in. from main floor to well, 13 in. from well to folding step and 15 in. from step to ground.

The ash side and corner posts are 2⅞ in. and 3⅝ in. thick respectively and measure 30 in. between centers; they are set between and securely bolted to vertical angles that are riveted to the inner faces of the side-sill angles and exterior sheathing. Their upper ends are tenoned into a continuous 2½-in. x 2¾-in. yellow pine top rail, reinforced by a 1⅛-in. x 9¼-in. letter panel. A one-piece belt rail, into which the posts are gained, relieves the top rail of considerable stress along each section.

The most noteworthy feature of the bottom frame is the careful distribution of metal to obtain the greatest possible strength—allowing for a factor of safety of five—with adherence to commercial shapes and flat bars. The side sills are 6-in. x 3½-in. x ½-in. angles and run through from bumper to bumper, except that the sill on the right is interrupted at the front corner on account of the single front exit door. They are depressed 21 in. under the center platform on both sides of the car, and the sill on the right is reinforced under the entrance with a 24-in. x ½-in. steel plate, to the top edge of which a 3½-in. x 3½-in. x ½-in. angle is riveted. This angle forms the outer edge of the center platform. Further reinforcement at the center entrance is given by the ⅛-in. steel side sheathing that extends from the lowest part of the bottom framing to the windows along the entire car body. The left side sill does not require the same degree of reinforcement opposite the entrance as the right sill, as the body framing is not interrupted on that side. The only other longitudinal members are two 5-in. I-beam center stringers in each end, extending from the bumper to the nearer center platform cross bearer. The cross bearers are plate girders, 13½ in. deep at the ends, where they are secured to the side-sill reinforcing plates with angles, and 8 in. deep at the center, and are reinforced along the top and bottom edges with 2½-in. x 2½-in. x ⅜-in. angles. They are connected with 2-in. x 2-in. x ¼-in. angles that act as longitudinal platform-floor supports. The purpose of such heavy cross bearers is to transfer the entire load carried by the center stringers to the sides at the center entrance, where the former are interrupted and, inversely, the load of the entrance back to the stringers. Other crossings are 4-in. channels, which are riveted to the longitudinal members through angles.

Diagonal braces, 4 in. x ¼ in., reinforce the center of the framing against braking strains. Diagonal end braces of 4-in. x 3-in. x ⅜-in. angles distribute shocks, attributable to the draft gear, over the other bottom-frame components. At the right forward corner, where the side sill is interrupted for the low floor of the front exit door, compensation is made for the interruption by two 4-in. channels, forged to a "U" shape, in the horizontal portion of which the subfloor rests, and by a forged angle knee that is riveted to the under sides of the sill and channel on the right-hand side of the car.

The cars are mounted on No. 27-M. C. B-2 trucks having solid forged side frames with integral pedestal jaws and fitted with four GE-216 50-hp motors to give a maximum speed of 60 m.p.h. The car seats thirty-nine white passengers and twenty-two colored passengers, the total seating capacity being thus sixty-one.



Birmingham Car—Views of Dividing Aisles in Main Doorway, and of Front Exit

The detail weights of the car, as supplied by the manufacturer, are as follows: car body less electrical equipment, 18,000 lb.; electrical equipment, 2800 lb.; air-brake equipment, 1800 lb.; trucks, 16,000 lb.; motors, 11,200 lb.; total weight, 49,800 lb.

SERVICE AND INAUGURAL PERFORMANCES OF BEACH-EDISON STORAGE BATTERY CARS.

The following figures from a cross-country railway show the performance of Beach-Edison storage battery cars. This company now operates three cars on 4.5 miles of track. Operation was begun in 1911 with one car. The low average mileage per car per annum shown in the table is due to the condition that all three cars are run only from June to September. The cars are of the single-truck type, No. 1 design, each seating twenty-eight passengers and weighing 6.5 tons. The battery equipment consists of 105 A-6 cells for traction and five A-6 cells for lighting.

The data covering the operation as well as the car-mile costs for a period of nearly two years are given in the accompanying tables.

Report for June, July, August and September, 1912

Passengers carried	129,500
Energy purchased, 2410 kw-hr.	$846.76
Car miles	22,500
Total weight of car, including passengers, averaged, tons	7.36
Total watt-hour output ot cars at motor brushes	66,620
Average voltage of each cell taken as	1.2
Alternating-current power input	1.307 kw-hr. per car mile, or 176 watt-hr. per ton mile
Direct-current power input, assuming motor set efficiency of 70 per cent	90 watt-hr. per car mile, or 124 watt-hr. per ton mile
Battery output at car motors	374 watt-hr. per car mile, or 51 watt-hr. per ton mile
Cost of energy purchased	3.7634 cents per car mile
Cost of energy purchased	0.5113 cents per ton mile
Cost of energy purchased	2.88 cents per kw-hr.
Battery electrolyte cost	1.29 mills per car mile*

*This is based on the total performance of 59,984 miles made by cars Nos. 1 and 2 before their battery solution was renewed. The railway purchased 1000 lb. of potash solution at 8 cents per lb.

Report of Car-Mile Costs from July 1, 1911, to April 1, 1913, Inclusive

Mileage, 82,450 Car Miles

Maintenance of way and structures	$0.00178
Energy purchased	0.04063
Power plant, wages, materials	0.01357
Maintenance cars, labor and materials	0.00460
Maintenance battery, water and electrolyte, labor and materials	0.00197
Wages, motormen and conductors	0.05566
Miscellaneous equipment, labor and supplies	0.00097
Superintendence	0.00563
General expense	0.00022
Total operating and maintenance expense	$0.12503
Taxes	0.01574
Accidents	0.00109
Total operating and maintenance expense, including taxes and accidents	$0.14182

PERFORMANCE OF BOSTON & ALBANY CAR

An account of the New York to Boston run by way of Hudson, N. Y., made on March 6 by the Beach-Edison car was published on page 429 of the Electric Railway Journal for March 8, 1913, but since then the following condensed report has been compiled by H. S. Baldwin and J. C. Glendenin, engineers of the Lynn works of the General Electric Company:

Weight of car without battery and passengers	48,255 lb.
Weight of regular battery	8,525 lb.
Weight of auxiliary battery	8,525 lb.
Weight of battery for light	266 lb.
Weight of accessories on car	500 lb.
Average weight, eighteen passengers on run	2,700 lb.
Total weight (54.37 tons)	68,751 lb.

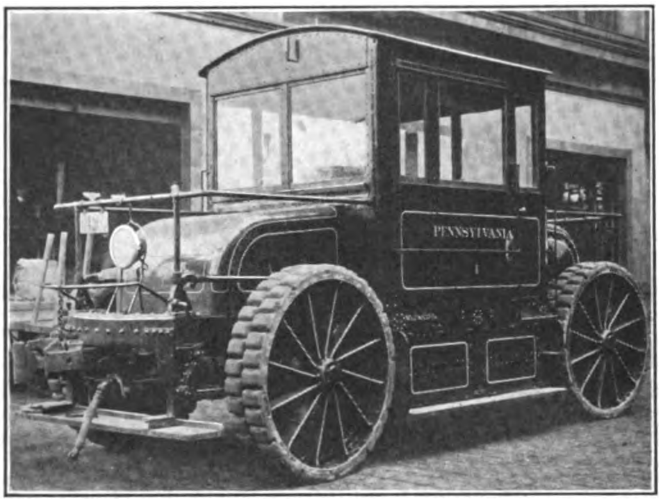
Number of motors	4
Gear reduction	3.5
Rating of motor, 200 volts at 75 amp	700 r.p.m.
Type of battery	Edison-A/8/H
Number of cells in each set	250
Actual running time	11 hr. 6 min. 51 sec.
Total distance, miles	306.71
Average m.p.h.	27.6
Total number kilowatt-hours	309.1
Average kilowatt-hours per car mile	1.2
Average watt-hours per ton mile	35.0
Total ampere-hours	1303
Average ampere-hours per car mile	4.25
Average ampere-hours per ton mile	1.24
Average voltage calculated from ampere-hours and kilowatt-hours	283
Average current calculated from volts and kilowatt-hours	117
Free running, amperes	176
Free running, volts	285
Free running speed, m.p.h.	37
Free running, watt-hours per ton mile	39.5
Free running car friction, pounds drawbar pull	16.4
Maximum speed, m.p.h.	42
Average of accelerating current, amperes	203.7
Total charging time on run	3 hr. 27 min.
Total ampere-hours from charging	275
Amerage charging current, amperes	355
Average charging, volts	429
Total kilowatt-hours, charging	522
Kilowatt-hours discharged by battery during entire trip	219.4
Ampere-hours discharged by battery during entire trip	778
Average voltage calculated from ampere-hours and kilowatt-hours, entire trip	282
Excess kilowatt-hours available at end of run	55
Excess ampere-hours available at end of run	195
Battery efficiency calculated from test figures, per cent	52.7

Average cell temperatures were taken by E. J. Ross, Jr., at different stages of the trip as follows:

March 6:
8:50 a.m.—Grand Central Terminal, just previous to start, 105 deg. Fahr.
10:25 a.m.—Poughkeepsie, average cell temperature, 100 deg.
2:12 p.m.—Upper Hudson, previous to boost, 97.60 deg.
4:30 p.m.—After boost of two hours at an average of 270 amp, 110 deg.
6:15 p.m.—Springfield, previous to boost, 98.4 deg.
10:50 p.m.—After boost of approximately one and three-quarter hours at 248 amp, 106.8 deg
March 7:
3:45 a.m.—Boston, just previous to completion of trip, 89.6 deg.

ELECTRIC TRACTOR FOR SWITCHING SERVICE IN CITY STREETS

An extraordinarily powerful electric automobile has been placed in the service of the Pennsylvania Railroad at its Jersey City yards for moving freight cars through city streets. It is intended for use where steam locomotives are not available or desirable, and it is arranged to run on the ground, the 7-ft. gage of its wheels easily spanning the standard track. The car can thus be maneuvered around an ordinary train, since its movement is not confined to the rails. The wheels are 5 ft. in diameter and they have rubber block tires. A normal drawbar pull of 8000 lb. is developed, which can be increased to a maximum of 21,500 lb. if required. Running light, the tractor maintains a speed of about 6 miles per hour.



Storage Battery Tractor for City Switching Service

Energy for the two 20-hp General Electric motors is supplied by eighty cells of Edison A-12-H storage battery, weighing 4350 lb. Herringbone gears connect the motors to the countershafts, a total reduction of 1 to 40 being obtained at the wheelshafts. The tractor utilizes all four wheels for driving, steering and braking. With this arrangement the car can be turned in a circle of 20-ft. radius. By means of duplicate equipment in the cab the tractor can also be operated in either direction from either position. Compressed air actuates the internal expanding brakes in the four wheels and an arrangement of interlocks prevents the controller being operated to turn on power while the brakes are set. Through standard hose connections compressed air is also supplied for braking the freight cars. In over-all length, including the M. C. B. couplers, the tractor measures 23 ft., the chassis being 19 ft. 6 in. long. The wheelbase is 12 ft. The over-all width of the machine is 8 ft. 4 in. and the height 11 ft. 3 in.

The tractor, which weighs 28,850 lb., was built in the Altoona (Pa.) shops of the Pennsylvania Railroad. While being tested at Altoona it successfully bucked a large steam locomotive which was attached to three freight cars and headed against the tractor with a wide-open throttle. The tractor was able to withstand the push from the steam machine and actually moved the cars and locomotive backward.

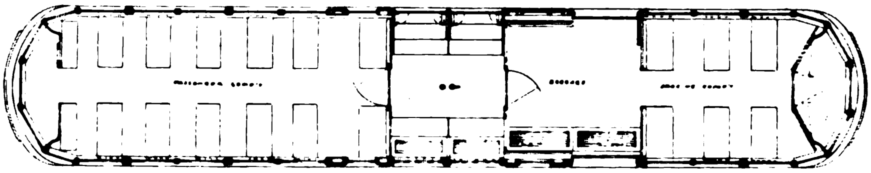
NEW CENTER-ENTRANCE COMBINATION CARS

Two cars designed by W. A. Haller, of the Federal Light & Traction Company, have just been built by the Niles Car & Manufacturing Company for the South Fork-Portage Railway. This road is now under construction between South Fork and Portage by the Portage Construction Company, of which G. U. G. Holman is president. An extension of the line will be made as rapidly as possible so as to operate through cars crossing the mountain range between Johnstown and Altoona. Between South Fork and Johnstown the cars will run over the tracks of the Southern Cambria Railway Company.

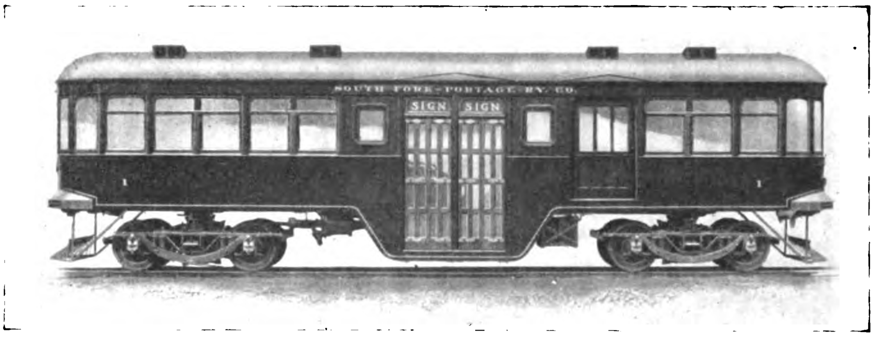
Owing to the almost continuous climb from both Johnstown and Altoona to the summit, it was considered necessary to have cars as light as possible yet with great seating capacity to accommodate the mining population in the small coal towns through which the road runs. In fact, for a considerable portion of the distance, these mining towns are at close intervals, and the traffic at present will be principally local. Larger cars of the same type are contemplated for through service when the road is extended. While the extreme length of the present car is only 45 ft. 7 in. and 44 ft. 7 in. over vestibules, the seating capacity is fifty-six persons. There is also a baggage compartment 8 ft. long which also can be occupied by passengers.

One of the novel features is the folding motorman's cab, which isolates the motorman at the front end and which, when at the rear end, swings transversely with the car and supports two folding seats, increasing the seating capacity by four persons. The left sides of the center vestibule and of the baggage room also are fitted with folding slat seats as it is intended to open only the right-hand side.

Each side of the center vestibule is fitted with four pairs of two-panel folding doors glazed with clear glass from top to bottom, so that the conductor can observe the pavement from his station. These doors are operated by handles from the conductor's station only. The step openings are covered by Edwards automatic steel trap doors.



South Fork-Portage Cars—Seating Arrangement



South Fork-Portage Cars—Exterior View

The entire underframe, side frame and outside sheathing are of steel—the interior finish being of agasote and mahogany. Each car is equipped with four Westinghouse 1200-volt, 75-hp motors with HL double-end control and geared for a speed of 45 m.p.h.

On account of local clearances, the car is mounted with the bottoms of side sills 7 in. above the rails, the first step being 15 in. high. This may, however, be lowered to 11 in. if obstructions permit.

News of Electric Railways

Increase in Cleveland Ordinance Allowance Refused

At its regular meeting on the evening of April 21, 1913, the City Council of Cleveland, Ohio, refused the request of the Cleveland Railway for an increase in operating and maintenance allowances and ordered that a fare of 3 cents cash or two tickets for 5 cents, with a charge of 1 cent for transfer, be put into effect on May 1. The company immediately demanded arbitration under the terms of the Tayler ordinance and announced the selection of C. N. Duffy, vice-president of The Milwaukee Electric Railway & Light Company, as its arbitrator. A. B. DuPont was selected by the city and these two men must select a third within a reasonable time or allow Judge Day of the federal court to make the selection.

The city seems determined to force a decision upon the important disputed point as to whether the company has the right to spend more than the allowances made in the Tayler franchise for operation and maintenance. The city claims that if the company has this right the whole principle of city control, one of the two basic principles of the franchise, fails. On the other hand, President Stanley of the company asserts that if the company cannot exceed these allowances when need be, the other fundamental principle of the franchise, service rendered at cost plus 6 per cent, is denied.

It is said that Mayor Baker had prepared a proposition to be made at a meeting of the street railway committee the morning before the Council meeting, in which the company would have been allowed an increase of ½ cent per car mile for operating expenses on condition that it would agree to keep within that allowance in the future. The company was unwilling to make such an agreement and believes it not in keeping with the spirit of the Tayler franchise.

The letter from Mr. Stanley demanding arbitration follows:

"We regret that you refused our request for an increase in the maintenance and operating expense allowances provided for by our franchise, and we now respectfully ask for an arbitration to determine the amounts per car mile that should be allowed for maintenance, renewal and depreciation of our property, and to enable the company 'to meet the legitimate expenses of operation, insurance, accident and damage claims,' 'to make good any deficit' now existing and 'to prevent any deficit' in the future on account of maintenance or operating expenses; and we name as our arbitrator C. N. Duffy, Milwaukee."

At a meeting of representatives of the Cleveland Railway and the employees on April 18, it was agreed to allow the present scale of wages to continue for another year. President Stanley arranged to meet a grievance committee of the men relative to minor complaints, as in the past, and this was satisfactory to the men. In a statement issued after the withdrawal of the demands, the men said they realized that the company could not increase their wages while it received a 3-cent fare.

A 3-cent fare will be put into effect on May 1, 1913, in that portion of the city which was formerly Newburg City.

Detroit's Charter Commission

In the organization of the charter commission at Detroit, Mich., a committee on municipal ownership will be named to formulate the amendments relating to that subject. Herbert S. Bigelow, Cincinnati; Mayor Newton D. Baker, Cleveland; Mayor Brand Whitlock, Toledo; John Z. White, Chicago; Roger I. Wykes, Grand Rapids, and former Comptrollers Herman A. Metz and Bird S. Coler, New York, have been invited to speak in Detroit on different phases of charter revision. The City Council appropriated only $500 in advance for the charter commission. William T. Dust is chairman of the charter commission and the members of the municipal ownership and public utilities committee are Messrs. Ingram, Ahern, Dandell, Fischer and Funke. Mr. Campbell is chairman of the civil service committee.

What is known as the Keifer-Penniman ordinance, limiting the number of persons that shall be carried on a street car, is pending in Council. At a meeting of the ordinance committee recently Henry Bullen, general superintendent of the Detroit United Railway, argued that the ordinance should make it a misdemeanor for a person to board a loaded car. Conductors and motormen have no police powers and cannot enforce such an ordinance. In its present shape, the ordinance puts the entire burden of enforcement upon the company.

Corporation Counsel Lawson has rendered an opinion to the effect that the city cannot issue bonds to purchase storage battery cars for operation on Junction Avenue, as has been proposed.

Report on Toronto Traffic—Municipal Ownership Proposed

The report on the street railway situation at Toronto prepared by Bion J. Arnold, Chicago, Ill., has been made public. Briefly, two plans are proposed. One contemplates the operation of all lines under one management, the other provides for an independent system with an entrance into the heart of the city's business district for many of the proposed civic lines, so planned as to be eventually co-ordinated with the present system when the franchise expires. The total cost of additions to the present system, as proposed by Mr. Arnold, is $8,762,000 for 127 miles of new track, 600 pay-as-you-enter cars, carhouses, substations and other equipment. It is suggested that this expenditure should cover a period of five years. An estimate of the probable earnings, if the improvements are completed in 1917, is made as follows for 240 miles of trackage: gross earnings, $10,800,000; operating expenses, taxes, renewals, pavement charges, etc., at 70 per cent, $7,560,000; net earnings, $3,420,000.

The rules of procedure were suspended in the Ontario Legislature recently and a bill authorizing the city to proceed with its plans to acquire the property of the Toronto Railway and the Toronto Electric Light Company was put through its first and second readings. The measure would authorize the city to purchase the properties and place their management and control with a commission of three or five men. Approximately $21,000,000 is the figure at which the city may acquire the Toronto Railway according to the statement made by Mayor Hocken at a special meeting of the City Council recently. At this meeting the Mayor asked the confidence of the members, citizens and the press until such time as he could submit the proposition in detail. The purchase price of $21,000,000 for the railway is on the basis of $160 a share for the stock. The total figure for the Toronto Electric Light Company was not given, but Mayor Hocken announced that this was on the basis of approximately $135 a share for the stock.

The Toronto *Mail and Empire*, commenting editorially on the proposal of Mayor Hocken for municipal ownership, said:

"That the public have heard nothing of the negotiations, or even that negotiations were pending, is evidence that its representatives in the matter had at least this qualification for their work, that they were able to keep their own counsel.

"It is understood that the several stumbling blocks to agreement in times gone by have all been removed and that the way has been paved for the city's undertaking of the enterprise now carried on by the Toronto Railway and possibly that carried on by the Toronto Electric Light Company. This preliminary and preparatory work includes the disappearance of difference in the matter of assuming the railway company's long-term contract with the Electrical Development Company, the reaching of a basis on the radial railway question, the finding of terms for the purchase of the Toronto Electric Light Company, the drawing up of a scheme of government for the street railway system, the financing of the transaction, and other difficult points.

"It is believed that the legislation which is to be introduced provides for all the conditions to be satisfied. This legislation would enable the City Council to submit to the ratepayers, possibly as early as next June, a by-law to authorize the raising of about $30,000,000 for the purchase of the stock of the companies concerned. We learn that for the financing of the transaction the city has already the assurance of the purchase of a sufficient issue of 4½ per cent bonds at a price close to par. The ends of the radial lines within Toronto would be transferred to the city along with the Toronto Railway system, and the radial railways are to have entrance to the city. Those railways are being linked up by a line taking the suburbs within its sweep."

The Toronto Railway has replied to the city's request for more cars and new lines. The company says that it is turning out cars as fast as possible. It agrees to construct the Teraulay Street line as soon as the location is decided on by the engineers. It agrees to extend the Wilton Avenue line to Teraulay Street and is prepared to build lines on Pape Avenue and Greenwood as soon as the grade crossings on those streets are eliminated. The company is willing to extend the Dupon Street line along Royce Avenue, but thinks that the extension of the Harbour Street line would give better service. The company objects to the Bloor Street extension west. It does not consider the proposed Christie, Clinton, Claremont, Niagara and Bathhurst Street extension necessary at this time. Regarding the Dufferin Street line the company prefers to decide this matter next year. The experts recommended that this line be constructed in 1915.

Concern for Boston Elevated Expressed by Mayor

Mayor Fitzgerald of Boston, Mass., who not so long ago called attention to the investment of Massachusetts capital elsewhere than in that State, in an interview in the Boston *Herald* recently in regard to the Boston Elevated Railway said:

"I appreciate that it is not the popular thing at present for a man in public office to champion a public service corporation, but I think the time has come when the public who use the Boston Elevated Railway should look the local transportation problem square in the face. To-day Boston Elevated stock sold on the Boston Stock Exchange at $92 a share. This is less than one-half of the price at which the stock sold twelve years ago. It must be obvious that something is the matter and it is a problem to which the attention of all fair-minded citizens of the community should be directed. Ten years ago the company issued some of its stock at $165 a share, with the approval of the Massachusetts Railroad Commission. Only a few weeks ago the company sold some of its stock to the public at $105, with the approval of that same commission, and even to-day stockholders are paying an instalment upon it.

"The employees of the company have presented demands for an increase in pay. The men ought to receive a fair living wage and we all are in sympathy with them in their efforts to better their condition. But how are they going to get an increase if the company is not in a position to pay out any more money? The stockholders have put the money into the development of our local street railway system and they are entitled to a fair return on their investment. They are entitled to 6 per cent and they must have 6 per cent. I pity a community which is not willing to allow a fair return on the actual capital invested in the development of its local transportation system.

"The situation has reached a point where it should engage the attention of public men. The time has come when consideration must be given to how far a street railway can carry a person for 5 cents and pay its own way. When we go into a store to purchase five yards of cloth, we pay for five yards. In Europe when a man goes to ride on a street railroad he pays so much for the first mile and so much more for the second. In other words, in buying other commodities, or even in street railway systems in other countries, a man pays for what he gets and not a nickel for an indefinite service as he does here. I do not know of any reason why a man should be carried from Mattapan to Arlington for a nickel when it must be very obvious that the carrying charge to the company is more than this.

"A year ago, when the employees' strike was on, I told the employees that there was a limit to what the company could stand. If the men were to get what they ought to in the way of pay, I told them that they ought to see to it that the public pays the company more for the service it receives. The company is paying the interest and sinking fund requirements on more than $20,000,000 of subway bonds and also a big franchise and property tax. The public is crowding the company too hard. I believe the public in this community wants to do the right thing. If the public was properly educated as to the real condition of affairs, I am confident it would want to do the right thing. I believe it would be willing to pay an amount for the service it receives sufficient to allow the company to pay a fair return on its capital and at the same time to insure an adequate wage for the company's employees."

Report on Proposed Subway in Philadelphia

A. Merritt Taylor, transit commissioner of Philadelphia, submitted a report on April 16 to Mayor Blankenburg in regard to the proposed subway on Broad Street. In the report the cost of construction is estimated at $30,000,000, exclusive of interest during construction. The plan comprises a subway under North Broad Street, consisting of four tracks to Allegheny Avenue and two tracks to Olney Avenue, with a suitable two-track delivery loop in the business district and a two-track subway on South Broad Street to Oregon Avenue, with an extension southwardly to League Island. The cost of equipping this line by the operating or lessee corporation, including interest during construction, is estimated by Mr. Taylor at approximately $8,000,000. This comprises the items usually furnished by the operator, of track, signal and station equipment, of track, stock, feeders, substations and their electrical equipment, storage yards, shops and offices, and assumes that electrical power will be purchased.

Mr. Taylor estimates the income and expenses as follows: gross revenue, $3,600,000; operating expenses and taxes, $1,900,000; net earnings, $1,700,000. This, he says, equals approximately 4½ per cent upon an investment of $38,000,000.

He believes that in succeeding years, owing to the natural growth of traffic, the increased profits will be more than a sufficient inducement for a lease to provide for the difference during the first few years between this 4½ per cent and the interest charge on the securities representing cost of equipment to be issued by the operating corporation plus the sinking fund payments, which, he believes, should begin from five to ten years after the commencement of operation and should increase by sliding scale.

Mr. Taylor also reported on proposed elevated lines to Frankford and Darby, which, he believes, would show a net income of about 5 per cent on the cost of construction and equipment. The report is to be followed by another containing further information bearing upon the rapid transit situation in Philadelphia. Commenting upon this forthcoming report, Mr. Taylor says:

"The figures have been carefully compiled by leading experts of the country, and it is believed that this report will represent one of the most complete studies of this subject which have ever been made and will provide Councils with information upon which they can base an intelligent and sound decision regarding the extent and details of the transit problem."

Appointments to Missouri Utility Commission

Governor Major of Missouri has announced the appointment of John M. Atkinson, former assistant attorney general; John Kennish, former Supreme Court judge; H. B. Shaw, dean of the engineering department of the Missouri State University, and Frank A. Wightman, of the Missouri Railroad Commission, as members of the Public Service Commission created by the recent Assembly. Mr. Wightman's term will expire on April 15, 1915. Mr. Shaw and Mr. Kennish are to serve four years. Mr. Atkinson is to serve for six years. This leaves one member still to be appointed. Mr. Atkinson, who has been elected chairman of the commission, and Mr. Shaw are Democrats, while Mr. Kennish and Mr. Wightman are Republicans. It is announced that John A. Knott, of the Railroad Commission, will be appointed State coal oil inspector and that

James Bradshaw, the third member of the Railroad Commission, will be appointed State warehouse commissioner.

The question having arisen in regard to the present status of the Public Service Commission of St. Louis, City Counselor William E. Baird of the city reported to the Municipal Assembly in part as follows:

"The local body may continue to make investigation concerning matters connected with franchises of public utilities and violations of them, in order that the best interests of the city may be protected by the proper authorities; to investigate methods of operation, facilities furnished and quality of service given, in order that the Assembly may, if it sees fit, cause the matter to be brought before the State Commission, or in order to afford the results of its investigation to the public who may desire to take such action, and to furnish information to the Municipal Assembly concerning the granting of its consent for the operation of a street railroad or the execution of contracts between the city and the public utilities companies. I am of the opinion that the city has the power to continue the commission for these purposes and that the ordinance with the modifications mentioned continues in force until repealed."

Supplementary Report on Montreal Traffic

John P. Fox has submitted to the Montreal Board of Trade a report on Montreal traffic conditions supplementing that which was abstracted in the Electrical Railway Journal of March 22, 1913, page 560. In this report Mr. Fox suggests that the question of smoking on cars be decided by public vote as was done last year in Kansas City. He does not believe that subways should be constructed for the use of cars of surface type, and points out that several important streets could readily be supplied with an èxtra track if the city would give permission. Even if Notre Dame and St. James Streets are not double-tracked, a great improvement will be effected if the speed of cars in taking junctions and intersections is accelerated. Congestion would be relieved and greater seating capacity afforded by using double-deck or trail cars. If the latter, they should be of low-floor design in order to make them more attractive than the motor cars.

The storage of cars at a downtown terminal would also tend to relieve rush-hour conditions. For a city like Montreal double-end cars would be preferable to the single-end cars now standard. The one-man car is suggested for use on suburban lines. In addition to proposing improvements in minor equipment such as fenders, heating, car signs and installation of trolley catchers, Mr. Fox suggests that a thorough study be made of the Montreal transit situation before the Montreal Tramways undertakes with or without the co-operation of the city to expend large sums for permanent improvements.

Petition of Buffalo Employees Presented

The grievance committee representing the employees of the International Railway, Buffalo, N. Y., called on E. G. Connette, president of the company, on the morning of April 21, 1913, and laid before him a petition covering the complaints of the men. This was in accordance with the provisions under which the men returned to work following the recent strike. Mr. Connette discussed the contents of the petition briefly with the men and then asked that another meeting be arranged for April 28. The committee agreed to this. Following the meeting Mr. Connette issued this statement:

"The committee called on me this morning and presented a petition covering its complaints, grievances and demands. After some preliminary remarks, the meeting was adjourned until 10 a. m. Monday, April 28, in order to give the company an opportunity to analyze the requests of the men, so that they could be discussed intelligently at the next meeting."

The petition submitted by the committee is said to embody in detail every demand originally made by the men, namely a flat rate of wage of 32 cents an hour, time and one-half for all time worked over the daily schedule, 75 per cent of all runs to be completed in eleven hours, and nine hours' time to be paid for all runs of less than nine hours.

Franchise Applications in Connection with Newark Terminal Improvement Plans

Amended plans of the Public Service Corporation of New Jersey for the improvement and extension of its electric railway service in Newark have been presented to the Board of Works for its approval. The company has submitted twenty-seven applications for franchises for new lines, extensions and connecting links. Most of the franchises desired are for lines contemplated in connection with the new terminal building to be erected in Park Place, Newark. They are made chiefly under the provisions of the law passed by the recent Legislature, which permits the granting of franchises for connections and extensions not exceeding one-half mile long, without the consent of the abutting property holders. One of the applications is for a subway in Cedar Street to extend into the proposed terminal building, carrying from many surface lines cars that will be diverted from their present routes. Another application is for the proposed overhead road to carry cars into the terminal from Mulberry Street.

New Franchise in Bangor

The Bangor Railway & Electric Company, Bangor, Maine, has succeeded in renewing its franchise in the city streets of Bangor, Maine. The franchise under which the company has been operating was awarded originally to the Bangor Street Railway in 1887 and expired in 1912. The Bangor Railway & Electric Company, the successor of the Bangor Street Railway, has been endeavoring for more than a year to renew the grant. Under the franchise, the company receives practically the same powers which were given to the Bangor Street Railway, but the rates of payment have been modified.

New Chicago Electrolysis Ordinance Now Effective

The new electrolysis ordinance passed by the Chicago City Council on July 15, 1912, became effective on April 15, 1913, or nine months after its passage, as required by the enacting clause. Reports of the hearings held by the gas, oil and light committee of the Chicago City Council prior to the passage of the ordinance were published in the Electric Railway Journal. It will be remembered that the requirements of the proposed electrolysis ordinance include the following principal features:

1. Allows use of grounded return.
2. Maximum drop between any two points on the return system shall not exceed 12 volts.
3. Requires a potential gradient not to exceed 1 volt per 1000 ft. within a radius of 1 mile of the city hall, and 1 volt per 700 ft. for points outside of this territory.
4. Requires the addition of a drainage system to protect underground structures.
5. Limits the amount of current on pipes and cable sheaths.
6. Provides for circuits and recording instruments to determine whether the requirements as to maximum drop are fulfilled.
7. Provides for equipment at each power station to record and limit the maximum current drained from metallic substructures to less than 10 per cent of the total current output of the station.
8. Allows the companies a period of nine months to comply with the conditions of the ordinance.
9. Repeals ordinance of Feb. 1, 1909, governing ground return systems.

On April 15 Ray Palmer, city electrician, sent a notice to all the surface and elevated railways, as well as the Illinois Telephone & Telegraph Company, which operates an electric narrow-gage freight subway underneath the business district of the city, advising them that the ordinance was effective. Mr. Palmer also asked for permit to enable himself or his representatives to make the inspections required under the ordinances at the generating plants and substations of the various companies. He also said that he would be glad to co-operate with the engineers of the companies in carrying on the inspections and tests. During the discussion of the ordinance all of the transportation companies affected have held that the ordinance cannot be complied with literally, but have either installed or are arranging to install additional substations and have extended the drainage systems, portions of which were under way when the ordinance was passed.

Other specific requirements of the electrolysis ordinance provide that the return current on pipes and cable sheaths must not be greater than 0.5 amp per pound-foot for calked cast-iron pipes, 8 amp per pound-foot for screwed wrought-iron pipe and 16 amp per pound-foot for standard lead or lead alloy sheaths and cables. All uninsulated return current systems must be equipped with insulated pilot wire circuits and voltmeters, as well as recording ammeters and automatic reverse load or overload circuit breakers which will record and limit the maximum amperes drained from all the metallic work, excepting return feeders, to less than 10 per cent of the total output of the station. It is the intention of the city electrician to prepare accurate chart records obtained from daily readings to show the difference of potential between the negative busbars in each station and at least four extreme limits on the return circuit in the territory served. The penalty clause made a part of the electrolysis ordinance calls for a fine of not less than $50 nor more than $200 for each failure to comply with its provisions. Each day's operation of the equipment contrary to these provisions is to be considered a separate offense.

Changes on the New Haven System

Announcement has been made that E. H. McHenry, vice-president of the New York, New Haven & Hartford Railroad, who recently sent in his resignation to take effect on May 1 next, will form a partnership with W. S. Murray, now chief electrical engineer of the company, who will also retire from his present position May 1. The new firm, to be known as McHenry & Murray, engineers, will open an office in the Second National Bank Building, New Haven, as railway engineers and will take over practically the entire electrical engineering force of the New Haven Railroad and will direct all the new electrification work of that company as consulting and constructing engineers. This means that the members of the firm will have charge of the completion of the electrification between Stamford and New Haven and of all the proposed and projected work, including the electrification of the Boston & Providence division and the Dedham branches, the improvement of the Boston terminal and other work still under consideration. The firm will be prepared to undertake, however, other railroad work and already has been brought into consultation in regard to several important electrification projects in the West.

The long experience of both members of the firm with railroad work and the electrification of the New Haven system, during which they have supervised the expenditure of more than $15,000,000 and the conversion of some 550 miles of track, well fits them for the field in which they will engage, especially as recent decisions have ratified their application of the a. c. overhead system in the field of heavy electric traction. Their familiarity also with the operating department of railroads will enable them to co-operate especially closely with existing organizations without creating the necessity for many outside overhead charges. While the firm will pay special attention to the electrification of suburban and trunk-line railroads and the design of freight and passenger terminals, it will be prepared also to furnish plans and estimates and supervise other allied lines of railroad work.

Service Resumed in Corpus Christi.—The Corpus Christi Street & Interurban Railway, Corpus Christi, Tex., has resumed its railway service. The operation of cars has been suspended since Feb. 19, 1913, during rehabilitation.

Change of Address of International Association.—The International Street & Interurban Railway Association, with headquarters at Brussels, has moved its main office from 15 Avenue de la Toison d'Or to 23 Rue d'Arlon, Brussels.

Service Resumed in Paducah.—The first electric railway service since the early April flood was given Paducah, Ky., on April 12 by the Paducah Traction Company, the company's power house and many of its lines having been under water for ten days or more during the 55-ft. stage at the Western Kentucky point. The company is busy repairing the damage done to its property by the flood.

Electrification of Branch of Norfolk & Western Railway.—The Norfolk & Western Railway, Roanoke, Va., according to L. E. Johnson, the president, is arranging to electrify its line from Eckman to Bluefield, 27 miles. The preliminary work in connection therewith is now under way, but the plans are not sufficiently advanced to give out any details as yet. Negotiations are in progress with the Appalachian Power Company, but whether the company will take power from it or not is as yet undecided.

Protection from Flood Proposed at Louisville.—Frank H. Miller, superintendent of motive power of the Louisville (Ky.) Railway, and president of the Engineers and Architects' Club of that city, has appointed a special committee of club members to investigate the practicability of building a retaining wall about the "Point," an industrial district of the city subject to flood in times of high water in the Ohio River. The wall, which, it is proposed, will be erected through the co-operation of federal, State and municipal authorities, will not only protect the Point but will also extend along the river front and protect the Campbell Street power plant of the Louisville Railway, a structure which was threatened during the high-water period early in April and was saved only by the fact that the rise of the river was not so disastrous as in 1884.

Tunnels to New Jersey Suggested Instead of Bridge.—The New York State Bridge and Tunnel Commission, in its report filed with the Legislature at Albany, strongly urges the construction of a tunnel rather than a bridge to connect New York and adjacent suburbs in New Jersey. The cost of two tunnels across the Hudson River is estimated at $11,000,000, while the approximate expense of a suspension bridge across the river at Fifty-seventh Street is placed at $42,000,000. The location of the first interstate tunnel is suggested from the foot of Canal Street, New York, to the extended line of Twelfth Street, Jersey City. According to the recommendations of the engineers, a pair of tunnels should be constructed at this point each with a roadway 17 ft. wide, one for east-bound and the other for west-bound traffic. Such tunnels would have a capacity for 5,000,000 vehicles yearly.

Scranton Railway Contracts for Central-Station Energy.—The Scranton (Pa.) Railway, a subsidiary of the American Railways, Philadelphia, has signed a contract with the Scranton (Pa.) Electric Company for all electrical energy required by it for the operation of its street-railway system. The contract becomes effective Oct. 1 and is operative for twenty years. The load will range from 5000 kw to 6000 kw, and by the terms of the contract the Scranton Electric Company will lease the 1500-kw station of the railway and acquire a culm bank owned by the latter company. The 1500-kw station is comparatively new and contains a single Rice & Sargent engine and railway generator. The equipment is operated non-condensing and, the coal from the culm bank costing about 50 cents a ton in the bins, the cost of energy at the switchboard is about 8 or 9 mills. The old station of the railway company will be dismantled, but the 1500-kw station will be held in reserve.

Appointments to Indiana Commission.—Governor Ralston of Indiana has named three members of the Public Service Commission of Indiana, which is to begin its duties on May 1. Thomas Duncan, Democrat, Princeton, and James L. Clark, Republican, Danville, have been appointed to serve four years, and Charles J. Murphy, Democrat, Brookston, has been appointed to serve for two years. John F. McClure, Anderson, and Frank E. Payne, Jeffersonville, the two members of the Railroad Commission of Indiana whose terms have not expired, are continued in office under the utility commission act. Burt New will be the general counsel of the commission and will serve as legal adviser of both the Governor and the commission. Mr. Duncan will be the chairman of the commission. He was appointed as successor to W. J. Wood, chairman of the Railroad Commission, whose term expires on May 1, the date on which the utility act takes effect. Mr. Wood has served eight years as a member of the Railroad Commission.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

Senator Connors has introduced Senate Bill No. 382, which is an anti-pass law, applicable to electric railways as well as steam railroads. It prohibits giving passes to all persons except employees and their families, agents of other lines, watch inspectors, surgeons, attorneys at law, annually retained, except those who are members of the General Assembly, etc. Senate Bill No. 399 is to the same effect, except that it does not provide that passes may be issued to retained attorneys who are not members of the General Assembly.

Senator Shaw has introduced a bill which is a new "full train crew" measure, including electric railways in its provision. Senator Beall has introduced a bill requiring every common carrier of passengers, except street surface railways, to furnish its passengers or attendants with seats and transportation. A fine of not less than $100 or more than $500 is provided. The "Jim Crow" passenger coach bill introduced by Senator Campbell, providing for separate coaches or compartments for negro passengers, was killed in the sub-committee of the Senate.

The Senate bill authorizing cities to acquire, construct, own and lease street railways and to provide the means therefor has been reported back by the committee on public utilities and recommended for passage. The bill provides that every city can own or operate railways and lease them to any incorporated company for not longer than twenty years. A three-fifths vote of all the voters of any city is necessary before a grant becomes effective. Any city can incorporate, in any franchise granting a right to construct or operate street railways, a reservation of the right on the part of the city to take over all or part of the street railways at or before the expiration of the grant upon such terms as are provided in the grant. If the city does not exercise this option and grants a right to another company, the new company shall purchase and take over the property of the old one on the terms on which the city might have taken it over.

Representative Clyne has introduced a bill giving any city power to acquire, construct, own and operate any public utility for not longer than twenty years. This bill is similar to the Senate bill to the same end, but only a majority vote of the voters of the city is required. Any utility may be taken over by the city by an agreement with the company or condemnation by law. The same measure has been introduced by Senator Piercy in the Senate.

The bill introduced by Senator Keller providing for semimonthly pay for all wage earners in the State has been reported out of the Senate labor committee with a recommendation that it pass.

Street railway companies in cities of more than 100,000 population may be taxed for the benefit of the teachers' retirement and pension fund in a bill introduced into the House by Representative Hubbard by request.

Representative Clyne has introduced a bill appropriating $300,000 for salaries and expenses of the State Public Utilities Commission for a two-year period beginning July 1, 1913.

The Dailey public utility bill provides for one commission for the entire State. There are to be five members of the commission, each to receive a salary of $10,000. Two of these are to be from Chicago, one from northern Illinois, one from central Illinois and the remaining member from southern Illinois. The bill provides for uniform accounting, the supervision of stock and bond issues, power to investigate the affairs of utility companies, power to make physical valuations, to fix rates and to make rules and regulations necessary to conduct a just and equitable system of regulation. The bill does not affect the existence of the present Railroad and Warehouse Commission, although the committee recommends that ultimately this commission shall be abolished. It is provided in the bill that a tax of $100 for maintaining the commission be made upon each utility company in the State, with an additional imposition of one-tenth of 1 per cent upon the gross earnings of such companies. In the judgment of the Dailey committee a single commission for Illinois would require an expenditure of about $400,000 a year.

MASSACHUSETTS

Governor Foss has signed the bill extending the powers of the Railroad Commission and the Gas and Electric Light Commission to the investigation of the books, accounts, records, contracts and memoranda of voluntary associations or holding companies owned by the same interests which control public utility corporations under the jurisdiction of either board or which hold the securities of such corporations. An important feature of the law, which is Chapter 509, Acts of 1913, is a provision that nothing in its terms is to be construed as requiring either board, in making any recommendations, rulings or orders with respect to rates charged or the service furnished by any corporation subject to the supervision of either board, to take into consideration any certificate of participation or shares issued under a declaration of trust and representing the beneficial interest in the securities or notes of such a corporation. The Senate has ordered the Boston Transit Commission to report the probable cost of extending the Boylston Street subway to the Post Office Square district instead of terminating it at Park Street. The change in route, if adopted, is likely to mean facilities for the exchange of traffic between the new subway, the Tremont Street and Dorchester subways and the Washington Street tunnel at the points of geographical intersection.

NEW JERSEY

Governor Fielder has signed the House bill giving the Board of Public Utility Commissioners authority to direct street railways to place tracks, wires and appurtenances on certain public bridges when there is a dispute as to the right-of-way between the railway company and the municipalities. The Governor has signed the bill limiting the speed of vehicles of less than 6 tons to 15 m.p.h. when crossing bridges and of vehicles of more than 6 tons when crossing such structures to 6 m.p.h. He has also signed the bill increasing the annual appropriation of the Board of Public Utility Commissioners from $100,000 to $200,000. The Governor has vetoed the bill giving the Board of Public Utility Commissioners power to authorize electric railways to operate freight cars through municipalities which object to the operation of such cars.

NEW YORK

The following radical bill, known as the Cronin measure, has been passed by the Assembly and is now in the Senate:

"All motormen engaged in operating electric multiple-unit trains with one or more cars with high-speed brakes or electric engines or gasoline engines or other power must have at least one or more years' experience on steam or electric railroads and must be familiar with train orders, with the standard code of signals, hand signals and book of rules before operating a passenger or freight train in the transportation service. A record of such experience and of the time of entry upon such service shall be made by the company and furnished to the Public Service Commission in respect to each such employee at the time of the beginning of such employment. Employees taken from different departments of the train transportation service to be made motormen on elevated or subway trains must enter into the yard service for at least one year for the purpose of becoming familiar with the hand signals and book of rules, standard code of signals, train orders, the handling of motor cars and the making up of trains and the nature of the power equipment on such railway, before being permitted to move a motor car or train on any part of the main track of such railway. Such employees during such probationary period shall be classed, as at present, motor switchmen. A record as to such employees shall be kept by the company and furnished to the Public Service Commission when they enter such service, relating to the same matters as the record first above mentioned. A violation of the provisions of this section by any railroad, corporation, officer or servant thereof, or by any such employee, shall constitute a misdemeanor, punishable by imprisonment for not more than one year or a fine of $500, or both. This act shall take effect immediately."

The proposed workmen's compensation act was made a special order of business in the Senate on April 22 after hanging fire all through the session. A sub-committee of the judiciary committee is at work on a compromise.

OHIO

The public utilities committee of the Senate at its session on April 17 undid the work of the House of Representatives by reinserting practically all of the provisions of Sections 32 and 33 which had been taken from the Mills public utilities bill before it was passed by the lower branch. These sections provide that any stockholder, bondholder or other persons pecuniarily interested may apply for a rehearing before the commission. The bill provides for a physical valuation of all utility corporations, including railroads. The House intended to omit railroads, since the Interstate Commerce Commission will soon make a valuation of these properties. The bill, if enacted as it stands, will legislate out of office all three of the present members of the Public Service Commission and remove the maximum expense limit of the commission, which has been $75,000 a year in the past.

A second Mills bill, which was passed by the House recently, provides for the issue of bonds in small denominations by municipalities to secure funds to construct or purchase public utility properties, but specifically states that in case of deficits in the receipts of municipally owned utility properties the shortage cannot be made up from a tax upon the people. Bonds for acquiring any utility may be issued only when the income from the property is sufficient to pay operating expenses and interest charges, besides providing proper amounts for a sinking fund. The bonds may be considered outside the debt limit, but are subject to a referendum under the Crosser act.

Every franchise in the State, with the exception of street railway grants, could be terminated after a life of twenty-five years, if the Black bill, passed by the House, becomes a law. In urging the passage of the bill, the plea was made that it is better than the Wise bill, which provides for the revocation of indeterminate franchises at will. The sponsors of the measure contend that it was introduced to permit interurban railways which are less than 10 miles long but connect two towns or cities to enter the cities. The revocation clause was put into the bill by amendment. The Senate committee on public utilities has reported the measure out for passage.

Three of the four bills necessary to the settlement of the Cincinnati traction question under Mayor Hunt's plans have been voted upon favorably by both houses of the Legislature and will undoubtedly be signed by Governor Cox. The fourth, which permits the surrender of the present franchise for one of indeterminate length, has been delayed by objections from Mayor Baker of Cleveland. Representative Bigelow's bill, intended to revoke all franchises having more than twenty-five years to run from the date of granting, is reposing in the Senate committee on municipal affairs, and it is thought that it will remain there.

PENNSYLVANIA

There are indications that the State Senate will manifest a better disposition to act promptly in the matter of the various measures pledged to the people in the Republican and Democratic State platforms which have been pigeonholed in committees for some weeks, now that the legislative committee of the Republican state convention has met and reminded the Senators of their pre-election pledges to their constituents. One of these platform measures, the public utilities bill, is still in committee, and a further public hearing is promised before the committee will report the bill to the House. Among the Senate bills passed recently by the House was the measure fixing a penalty for attempts at train wrecking. The bill regulating the location of trolley wire was recommitted to the public roads committee of the House. Senator Hoke has introduced a bill authorizing the State Highway Department to take over the rights of way of railroad and railway companies that have been abandoned or not built. Representative Shern of Philadelphia has introduced the Philadelphia subway bill in the House. He explained that the bill, which is to establish personal property as a basis on which to levy county taxes, as a revenue measure must originate in the House. He further explained that the bill applies alike to all counties of the Commonwealth. The bill providing for the establishment of public comfort stations in cities and boroughs of over 12,000 population has been passed by the House. It is expected that efforts will be made in a number of cities to secure the financial assistance of electric railways in erecting these stations.

ONTARIO

Adam Beck has introduced an act for the public construction and operation of electric railways that provides the machinery by which municipalities throughout the Province can secure transportation service for themselves. The bill provides that the Hydroelectric Power Commission, whenever required by the Lieutenant-Governor-in-Council so to do, may investigate and report upon the cost of constructing and operating electric railways in any locality where power is supplied by the commission, with an estimate of the probable revenue, etc. Two or more municipal corporations may be authorized by the Lieutenant-Governor-in-Council to enter into an agreement with the commission for the construction, equipment and operation of an electric railway, to be operated by power supplied by the commission, or for the construction of a line by the commission and for its operation by the corporation, or for its construction and operation by supply of power by the commission.

WISCONSIN

The Jennings bill regarding street railway service has been passed by the Assembly. Any company, according to the bill, which has been ordered by the Railroad Commission to put on extra cars and fails to do so within the time designated cannot enforce collection of fares from passengers who are not furnished with seats. The bill is not confined in its operation to any one class of cities, but applies to all parts of the State.

PROGRAMS OF ASSOCIATION MEETINGS

Keystone Railway Club

It has been decided to hold the next meeting of the Keystone Railway Club at the Colonial Hotel, York, Pa., on June 2 and 3, 1913, to avoid conflicting with the convention of the Master Car Builders Association. Suggestions for the question box are earnestly requested as it will be necessary to publish all questions not later than April 30.

Arkansas Association of Public Utility Operators

The following program of papers has been announced for the meeting of the Arkansas Association of Public Utility Operators which will convene at the Marion Hotel, Little Rock, on May 5, for a three-day session:

May 5

Paper, "Operation of Small Central Stations," by W. H. Walkup, superintendent and chief electrician of the Batesville Electric Light & Power Company, Batesville, Ark.

May 6

Paper, "Relation of Public Utility Companies to Public," by J. Walter Gillette, general manager of the Fort Smith Light & Traction Company, Fort Smith, Ark.

Paper, "Legislation Affecting Public Utilities," by C. J. Griffith, general manager of the Little Rock Railway & Electric Company, Little Rock, Ark.

Paper, "Operation of Small Water Plants," by W. C. Maguire, manager of the Arkadelphia (Ark.) Electric Lighting Company, and E. T. Reynolds, superintendent of the Camden (Ark.) Power Company.

Paper, "Benefits to Be Derived from the Association," by Mrs. LaSalle Stoops, manager of the Stuttgart Water & Electric Company, Stuttgart, Ark.

Paper, "Modern Practice on Feeder and Voltage Regulation," by V. A. Hain, district regulator specialist of the General Electric Company, Chicago.

May 7

Paper, "Effect of Tungsten Lighting on Revenue," by A. E. Main, superintendent of electrical department of the Hot Springs (Ark.) Railway.

Paper, "Electric Light Accounting Applied to Small Companies," by R. B. Fowles, auditor of the Pine Bluff (Ark.) Company.

Financial and Corporate

Stock and Money Markets

April 23, 1913.

Trading on the New York Stock Exchange to-day ceased entirely at times and the total sales for the day represented only a good half hour's business in times of active speculation. The sales to-day totaled 150,986 shares, as compared with 564,920 shares for the same day last year. The traction stocks, which have been neglected for some time, showed increased activity. Moderate gains were made in Interborough-Metropolitan preferred and in Brooklyn Rapid Transit. Rates in the money market to-day were: Call, 2¾ to 3 per cent, with the last loan at 2¾ per cent; sixty days, 4 to 4¼ per cent; eleven and twelve months, 5 per cent.

The Philadelphia market to-day was broad and steady. The demand for bonds was good.

The feature of the Boston market to-day was the activity in New Haven shares. The market was narrow but firm.

In the Chicago market to-day dealings were small and the movement was irregular and narrow. There was very little demand for bonds.

In Baltimore United Railways common again led the stock market, which was extremely narrow and dull.

Quotations of traction and manufacturing securities as compared with last week foilow:

	April 16.	April 23.
American Brake Shoe & Foundry (common)	92	92
American Brake Shoe & Foundry (preferred)	131	130½
American Cities Company (common)	40	37¾
American Cities Company (preferred)	70¼	70½
American Light & Traction Company (common)	380	365
American Light & Traction Company (preferred)	105	105
American Railways Company	38¾	38
Aurora, Elgin & Chicago Railroad (common)	42	42
Aurora, Elgin & Chicago Railroad (preferred)	85½	85
Boston Elevated Railway	98	96¾
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	a66	a66
Boston & Worcester Electric Companies (common)	a8	8
Boston & Worcester Electric Companies (preferred)	43	a43
Brooklyn Rapid Transit Company	90¼	90⅝
Capital Traction Company, Washington	123¾	122¾
Chicago City Railways	150	150
Chicago Elevated Railways (common)	29	25
Chicago Elevated Railways (preferred)	88	85
Chicago Railways, ptcptg., ctf. 1	90	91
Chicago Railways, ptcptg., ctf. 2	22	21¾
Chicago Railways, ptcptg., ctf. 3	7	7½
Chicago Railways, ptcptg., ctf. 4	3½	3½
Cincinnati Street Railway	111	112
Cleveland Railway	103	103
Cleveland, Southwestern & Columbus Ry. (common)	5½	*5½
Cleveland, Southwestern & Columbus Ry (preferred)	30	*30
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	69½
Columbus Railway (preferred)	82½	82½
Denver & Northwestern Railway	*108	*108
Detroit United Railway	80	72½
General Electric Company	139⅞	140¼
Georgia Railway & Electric Company (common)	118	*120
Georgia Railway & Electric Company (preferred)	83¼	83¾
Interborough Metropolitan Company (common)	17	16⅝
Interborough Metropolitan Company (preferred)	58	57⅝
International Traction Company (common)	*35	*35
International Traction Company (preferred)	*95	*95
Kansas City Railway & Light Company (common)	15	15
Kansas City Railway & Light Company (preferred)	*30	*30
Lake Shore Electric Railway (common)	*6½	*6½
Lake Shore Electric Railway (1st preferred)	*91	*91
Lake Shore Electric Railway (2d preferred)	*25½	*25½
Manhattan Railway	128¼	128¾
Massachusetts Electric Companies (common)	17½	a17¾
Massachusetts Electric Companies (preferred)	76	75½
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*25¾	*25¾
North American Company	76	76
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	44	44
Philadelphia Company, Pittsburgh (preferred)	40	39¾
Philadelphia Rapid Transit Company	25¼	25¼
Portland Railway, Light & Power Company	*67	*67
Public Service Corporation	115	113
Third Avenue Railway, New York	36	35
Toledo Railways & Light Company	a12½	a12
Twin City Rapid Transit Co., Minneapolis (common)	105	105
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	25	26½
United Rys. Inv. Company (common)	27½	26½
United Rys. Inv. Company (preferred)	49	48
Virginia Railway & Power Company (common)	52	51¾
Virginia Railway & Power Company (preferred)	93	93
Washington Ry. & Electric Company (common)	91½	93
Washington Ry. & Electric Company (preferred)	91⅝	92½
West End Street Railway, Boston (common)	75½	75½
West End Street Railway, Boston (preferred)	95	a95
Westinghouse Elec. & Mfg. Company	63⅛	64⅛
Westinghouse Elec. & Mfg. Company (1st preferred)	116	117½

*Last sale. aAsked.

ANNUAL REPORTS

Chicago Railways Company

The income statement of the Chicago (Ill.) Railways shows the city's share of the net income to be $1,413,404 for the year ended Jan. 31, 1913, and the company's share to be $1,156,422. The comparative statement of income for the years ended Jan. 31, 1913 and 1912, follows:

JOINT ACCOUNT

Income from:	1913	1912
Passengers	$17.709,206	$16,737,407
Chartered cars	4,806	4,699
Mail	31,489	37,809
Advertising	100,000	100,000
Rent of equipment	12.545	14,054
Rent of land and buildings	8,024	15,205
Sale of power	60,413	120.090
Interest on deposits	61,361	51,737
Miscellaneous income	88,933	75,494
Gross income	$18,076,777	$17,156,495
Expenses:		
Maintenance way and structures	$738,174	$747,581
Maintenance equipment	682.862	868,279
Renewals	1,446,142	1,381,179
Operation of power plants	1,852,719	1,771,302
Operation of cars	4,881,644	4,643,183
General expenses	1,410.693	1,820.280
Investment real estate expense	39,309	25,908
Taxes	676,959	855,390
Total expense	$11,728,502	$12,113,102
Balance	$6,348.275	$5,043,393
Deduct interest at 5 per cent on valuation	3,778.449	3,549.018
Net income	$2,569,826	$1,494,375
Division of new income:		
City of Chicago, 55 per cent	$1,413.404	$821,906
Chicago Railways Company, 45 per cent	1,156,422	672,469

The income statement for the years ended Jan. 31, 1913 and 1912, for the non-partnership account, follows:

Items of income:	1913	1912
The company's proportion of income from joint operation	$1,156,422	$672,469
Interest allowance on valuation of property	3,778,449	3,549,018
Interest on bank balances	122,775	125,877
Interest on treasury securities	90,653	54,041
Interest on bonds and collateral notes not issued	....	25,784
Miscellaneous income	840	2,457
Gross income	$5,149,139	$4,429,648
Deductions:		
Interest accrued on—		
First mortgage bonds	$2,297,750	$2,180.267
Consolidated mortgage bonds	1,817,919	1,218.792
Collateral and funding notes	24,900	396,900
Purchase money mortgage bonds	162,920	162,920
Current liabilities	....	1,144
Sinking fund reserve accrued	250,000	250,000
Corporate expenses and adjustments	120,574	118,400
Total deductions	$4,674,063	$4,328,423
Net income	$475,076	$101,224

The surplus account for year ended Jan. 31, 1913, follows:

Surplus at first of year	$306,515
Net income for year	475,076
Total	$781,591
Deductions:	
Interest on adjustment income bonds for thirteen months ended Jan. 31, 1912 (net)	$103,079
Dividend on partnership certificate No. 1 and expenses	243.000
Total	$346,079
Balance of surplus at close of year	$435,511

Note.—Payable out of the surplus at Jan. 31, 1913, a dividend was declared on No. 1 partnership certificates, amounting with expenses to $209,800, and same was paid on Feb. 1. There has accrued, and same is payable May 1, 1913, interest on adjustment income bonds for the year ended Jan 31, 1913, amounting to (net) $95,172.

Traffic statistics for the years ended Jan. 31, 1913 and 1912, follow:

Car mileage:	1913	1912
Passenger cars	59,276,772	57,208,131
Mail cars	188,575	196,074
Total	59,465,347	57,404,205
Passengers carried:		
Revenue	355,518,500	334,769,338
Transfer	256,408,891	239,589,482
Total	611,927,391	574,358,820
Percentage of operating expenses to gross income	53.14	57.56
Percentage of renewals to gross income	8.00	8.05
Percentage of taxes to gross income	3.74	4.99
	64.88	70.60
Percentage of interest on plant value to gross income	20.90	20.69
Percentage of net divisible income to gross income	14.22	8.71
	100.00	100.00

United Railways & Electric Company

The United Railways & Electric Company, Baltimore, Md., makes the following report of earnings and expenses for the fiscal year ended Dec. 31, 1912:

Gross earnings of lines (owned and leased)	$8,571,489
Operating expenses (including insurance)	3,868,876
Net earnings from operation	$4,702,613
Other income	5,515
Total net income applicable to fixed charges, taxes, etc.	$4,708,128
Fixed charges, including park and other taxes, bond interest, interest on car trust certificates and three-year notes, rentals for Maryland Electric Railways and other leased properties	2,944,415
	$1,763,713
Rental account, 1½ per cent sinking fund, Maryland Electric Railways 5 per cent bonds	60,000
	$1,703,713
Extinguishment of discount on securities	38,056
	$1,665,656
Interest on income bonds and dividend on preferred stock	560,000
	$1,105,656
Of which there has been credited to depreciation reserve fund	428,574
Balance carried to the credit of profit and loss	$677,082

Note.—There was paid in dividends during 1912 the sum of $463,050. The dividends, however, were not specifically declared out of 1912 earnings, and they were therefore charged to the profit and loss account.

William A. House, the president, says in part:

"Comparing the results for 1912 with those for 1911, the increase in gross earnings was $545,731, or 6.8 per cent, while the increase in operating expenses was $187,782, or 5.1 per cent, and the increase in fixed charges was $84,729, or 2.96 per cent. The percentage of operating expenses to gross earnings was 45.14 per cent, as compared with 45.87 per cent in 1911. If the charges to depreciation were included in the operating expenses, the percentage of operating expenses to gross earnings would have been 50.14 per cent. For maintenance of way, structures and equipment there was spent during the year $843,914 in addition to the $379,115 depreciation, or a total of $1,233,030.

"After deducting operating expenses, taxes, interest, rentals, depreciation, etc., $677,082 was left available for dividends. This is at the rate of 4½ per cent on the $15,000,000 of common stock outstanding on Jan. 1, 1912, which amount, however, increased during the year owing to the conversion of notes into common stock. The board of directors did not distribute this full amount to stockholders, but in furtherance of its conservative dividend policy declared in April, 1912, a dividend of 75 cents per share, the first dividend ever paid on the common stock, and in October another dividend of 75 cents per share.

"The company has no floating debt. As of Dec. 31 it had cash on hand amounting to $485,595. The company also had in its treasury $450,000 notes of the Baltimore, Sparrows Point & Chesapeake Railway and $100,000 of notes of the Baltimore, Halethorpe & Elkridge Railway, representing in part the construction cost of those properties. It also had unpledged $889,000 of its own first consolidated mortgage 4 per cent bonds.

"The total taxes and public charges in 1912 paid by the company were $992,396. This represents the total net earnings (after paying cost of operation only) of about one car in every five.

"In recognition of the loyal and efficient service of employees wages were increased April 11, 1912, to motormen, conductors and employees of several departments of the company.

"During the year the Central Railway mortgage, maturing July 1, 1912, was released. The first consolidated mortgage 4 per cent bonds of your company are now an absolute first lien upon 182 miles of the system.

"The average earnings per car mile were 29.08 cents, an increase of 1.11 cents, and the cost of service 13.13 cents, an increase of 0.30 cent. The number of car miles run was 29,472,537, an increase of 774,198 miles. The total number of revenue passengers carried was 172,233,341, an increase of 10,765,614. The number of transfers used was 69,344,828, an increase of 4,701,192, more than 40 per cent of the paying passengers having availed themselves of the transfer privilege. During the year there was charged to depreciation 5 per cent of the gross earnings, or $428,574, of which there was expended $379,115 for improvement to road, its equipment and property generally under the normal standard of efficiency, in contradistinction to ordinary maintenance and repairs, leaving a balance of $49,458 held as reserve for depreciation. Current assets as of Dec. 31, 1912, were $1,555,730 in excess of current liabilities; accounts payable were increased $8,397, and cash on hand increased $17,164.

"Under the arrangement with the Maryland Electric Railways there was expended during the year $8,448 out of Maryland Electric bond proceeds, leaving a balance of $105,828, which will practically be absorbed by payments for the Harford Road carhouse, now in course of erection. There was also expended, under the terms of the Maryland Electric Railways mortgage, $305,853 out of the special sinking fund for the purchase of cars, and for converters, transformers and switching gear for the Central and Northern substations.

"The total amount of taxes and public charges, including park tax, cost of paving streets, track changes necessitated by re-grading of streets and highways, sewerage commission work, widening of streets, etc., was $992,396, an increase of $164,014, or more than 11½ per cent of the gross revenue of your company and more than 21 per cent of the net receipts after paying costs of operation. The park tax for the year was $550,677, as against $515,741 in 1911, an increase of $34,935. The federal excise tax amounted to $15,719. The increase in fixed charges, amounting to $84,729, is due to increase in park tax, the additional obligations incurred for rentals on property leased from the Maryland Electric Railways and tax assessments.

"Under the terms of indenture dated July 15, 1911, your company issued $3,125,000 three-year secured convertible notes. Up to Dec. 31, 1912, the holders of $435,000 of these notes had exercised their right of conversion, and 17,400 shares of common stock (par $50) were issued in exchange.

"As part collateral for these notes, there was also deposited with the trustee $2,500,000 of first consolidated mortgage 4 per cent bonds. Under the provisions of the indenture this company had the right to withdraw and has withdrawn an amount of these bonds proportional to the notes converted. The first consolidated 4 per cent bonds so withdrawn aggregated $348,000. As the company already held free in its treasury $541,000 of first consolidated 4 per cent bonds, the amount now so held is $889,000.

"During the year tracks were reconstructed along thirty-four different stretches, aggregating 7.3 miles of single track. There was also constructed 0.3 mile of new track and 5.5 miles of track was removed. At 298 locations special work pieces were installed, among which are included the layouts for extending the St. Paul Street line to Light and Conway Streets. Considerable special work was built at the company's own shops during the past season. Five thousand six hundred and ten joints on 9-in. girder rail, equivalent to 25 miles of single track, were electrically welded. Forty-four thousand and sixty-three ties were installed on suburban lines.

"In view of the fact that the company's power requirements were to a large extent supplied from the Holtwood plant of the Pennsylvania Water & Power Company, very little work was necessary at the Pratt street power house. This station, however, as well as all its apparatus has been maintained in a high state of efficiency in order to be prepared for immediate service in the event of a serious interruption of hydro-energy. The boilers at this station are always kept ready for emergency service.

"During the year a section of the North Charles Street carhouse was reconstructed with reinforced concrete, to adapt it to the purposes of a trouble station. A 2-ton motor truck has been assigned to this station for use of the overhead line department. This new station replaces the former trouble station on Maryland Avenue, near North Avenue, which has been abandoned. Owing to the sale of the East Baltimore Street power house it became necessary to abandon this building for trouble station purposes. Property located at the southeast corner of Caroline Street and Fairmount Avenue was purchased and remodeled to adapt it to trouble station uses.

"A contract was awarded on Oct. 1 for the construction of a modern carhouse on the Hartford Road just beyond the city line and in close proximity to the new Herring

Run Park, recently acquired by the park board. The building will be ready for occupancy this spring, and with its completion your company will be provided with seven modern fireproof carhouses. A modern fireproof reinforced concrete oil house was erected at the Carroll Park shops.

"Recognizing the loyal and efficient service of its employees, your board of directors at a special meeting, held on April 10, authorized an increase in rates of pay to employees in the transportation, car shops, overhead line, power house and engineer departments. This increase became effective April 11.

"Sixty new double-truck semi-convertible cars were placed in service during the year on the Gay Street line. Five double-truck, semi-convertible cars were remodeled at the company's shops to the P-A-Y-E type, and added to the equipment of the Calvert Street line. The total number of P-A-Y-E cars now in operation on the company's system is 182."

Protest by New York Railways Against Commission Order Regarding Depreciation.

The New York (N. Y.) Railways has served upon the Public Service Commission for the First District a writ of certiorari, issued by Supreme Court Justice M. Warley Platzek, to review the action of the commission in requiring the company to set aside 20 per cent of its gross earnings each month for maintenance and depreciation. An account of the disagreement between the New York Railways and the Public Service Commission, First District, New York, in regard to the orders of the latter about amortization, maintenance and depreciation funds was published in the ELECTRIC RAILWAY JOURNAL for Dec. 14, 1912, page 1209. The original order of the Public Service Commission, First District, on this subject was issued Feb. 27, 1912, and required the New York Railways to establish an amortization fund to make up the alleged difference between the value of the property under its mortgages and the face value of the bonds, and before paying interest on its adjustment mortgage bonds or paying dividends on its stock to pay in cash into this fund each year $108,000, plus 4 per cent on all prior payments into the fund until the fund should amount to $16,500,000. This fund was to be used only for the purchase and retirement of mortgage bonds or for the acquisition of property for capital or investment purposes. At the same time the company was also ordered to set aside for maintenance and depreciation during each month a sum at least equal to 20 per cent of its gross operating revenue for that month, and if this amount was not expended for repairs and maintenance within that month the unexpended portion was to be credited as at the end of that month to the accounts "accrued amortization of capital," in accordance with the provision of the uniform system of accounts prescribed by the commission for street and electric railways.

As stated in the article in the issue of Dec. 14, the commission later modified its order so as to require only the payment of the 20 per cent for the maintenance and depreciation. It stated at that time that while it believed the company ought to provide an amortization fund for making up the difference which the commission claimed existed between the face of the securities and the value of the property, the public service laws were not broad enough to authorize the commission to issue an order requiring the company to do so.

The present petition of the New York Railways Company on which the writ of certiorari was issued says:

"Your petitioner further shows that said final or amended order adopted by the commission on Dec. 10, 1912, providing that your petitioner, New York Railways Company, before declaring or paying any dividend on its shares of stock or interest on its income bonds secured by said adjustment mortgage, should expend or set aside each month, beginning Jan. 1, 1912, for maintenance and depreciation a sum at least equal to 20 per cent of its gross operating revenue for such month, the unexpended portion thereof to be credited at the end of each month to the account known as 'accrued amortization of capital' in accordance with the provisions of the uniform system of accounts prescribed by the commission for street and electric railways, is unauthorized and illegal; that said commission had no statutory authority or power to make said order; that said commission had no jurisdiction of your petitioner, New York Railways Company, to make said order in the proceeding then pending entitled 'Case No. 1305, in the matter of the plan for the reorganization of the Metropolitan Street Railway Company'; that by said order the said commission has illegally and in violation of your petitioner's rights sought to substitute its judgment for the judgment of the board of directors of your petitioner in the management of its railroad, and more particularly in determining the proper amount to be expended or set aside each month for the maintenance and depreciation of its railroad properties; that by attempting to establish a fixed and arbitrary percentage of gross operating revenue to be expended or set aside for maintenance and depreciation the said order prevents your petitioner from complying with the obligation of its contract with its adjustment bondholders to pay and distribute as interest on said bonds the net income of the company, as defined and determined in accordance with the provisions of said adjustment mortgage, and that by adopting said order the said commission has illegally and unreasonably discriminated against your petitioner, New York Railways Company, in that a special and different rule in respect of maintenance and depreciation accounts is sought to be applied to it, which does not uniformly apply to all street railroad corporations subject to the supervision of the Public Service Commission for the First District or which does not uniformly apply to all the street surface railway corporations in the class to which your petitioner belongs, according to the classification heretofore adopted by said commission."

The petition further requests that the commissioners be directed to return all their proceedings, decisions and actions arising under these orders and the evidence and exhibits submitted to the commissioners upon which these orders were based with their determinations as commissioners, "to the end that the said proceedings, decisions and actions of the said commissioners in the premises may be vacated and set aside and adjudged null and void and that your petitioner may have such other and further relief as to the court may seem just."

Hearing on Toledo Injunction Case

The so-called Barton Smith faction of stockholders of the Toledo Railways & Light Company, Toledo, Ohio, requested Attorney General Hogan on April 17, 1913, to bring quo warranto proceedings to oust the Toledo Traction, Light & Power Company from doing business in Ohio. Mr. Hogan stated that unless extraordinary circumstances should develop he would not interfere in the case.

The petition upon which the temporary injunction was granted by Judge J. M. Killits in favor of the Toledo Traction Light & Power Company asserts that the combined holdings of Maurice Allen, Louis E. Beilstein, H. S. Swift, William R. Hodge, E. R. Effler, Conrad Weil, Frank Hafer, Jay K. Secor, Charles F. Meilink and William H. McClellan, Jr., defendants in the suit and directors and officers under the Smith election, do not amount to more than twenty shares and that their financial interest in the Toledo Railways & Light Company is not more than $60. It is contended that stock was assigned in some cases to make the men eligible as directors. In ousting the old officers and putting in new ones it is claimed that the Smith interests violated their agreement with the plaintiff.

The hearing on the injunction case was begun in Judge Killits' court on the afternoon of April 18, the answer of the defendants, with the exception of Mr. Smith and Mr. McClellan, having been filed earlier the same day. They deny that they are attempting to aid Barton Smith to collect any sum of money and claim the United States court does not have jurisdiction in the case. They also deny that the plaintiff is the owner of 117,447 shares of stock of the Toledo Railways & Light Company or any shares whatever in the company and they also deny that there was any arrangement made through which Maurice Allen was elected president and L. E. Beilstein general manager. Attorney Barton Smith and William H. McClellan, Jr., will file separate answers dealing with their own particular cases.

A lengthy statement was submitted to Attorney General Hogan by the law firm of Smith & Baker on April 18. The weight of the argument is that neither the Toledo Traction, Light & Power Company nor the Doherty Operating Company is eligible to operate under the public service laws of Ohio.

Cost of Electric Properties to the New Haven Railroad

According to the testimony of David E. Brown, an examining accountant of the Interstate Commerce Commission, at a hearing before Commissioner Charles A. Prouty at Boston, Mass., on April 21, 1913, the capital stock of the New York, New Haven & Hartford Railroad system has increased from $80,000,000 in 1903 to $180,000,000 at the present time and the total liabilities in the same period have increased from $94,000,000 to $415,000,000. The road's operated mileage in 1903 was 2057 and in 1912 it was 2090. Of the mileage operated in 1903 the road owned only 438 miles, while to-day it owns 1236 miles. The additional mileage was acquired at an expenditure of about $40,000,000. Mr. Brown detailed the facts in connection with the acquisition by the New York, New Haven & Hartford Railroad of the Rhode Island Company, which operates the electric railways in Rhode Island. He said that the New Haven company's ownership of less than $10,000,000 of stock of the Rhode Island Company cost the railroad $24,000,000. The New York, Westchester & Boston Railway cost the New Haven company $33,000,000 in principal and interest, or about $1,500,000 a mile. Electric railways in Connecticut operated by the Connecticut Company, a New Haven company subsidiary, were purchased at the following prices per share, according to the witness: Fairhaven & Westville Railroad, par $25, sold to the New Haven company for $45; Hartford Street Railway, par $100, sold for $285; Montville Street Railway, par $100, sold for an average price of $115.31; Norwich Street Railway, par $100, sold for an average of $121; Suffield Street Railway, par $100, sold for $150; East Hartford & Glastonbury Street Railway, par $100, sold for $285.

Earnings of Georgia Companies for Year

A statement of the earnings of the electric railways in Georgia for the year ended Dec. 31, 1912, as contained in the report of the Georgia Railroad Commission, follows:

	Gross Earnings.	Operating Expenses.	Net Earnings.
Athens Ry. & Elec. Co.	$214,663	$71,589	$143,073
Atlanta Northern Ry. Co.	138,438	103,215	35,222
Augusta-Aiken Ry. & Elec. Cor.	483,838	219,446	264,391
Chattanooga Ry. & Light Co.	22,732	16,683	6,050
City & Suburban Ry., Brunswick	36,647	21,683	14,963
Clarkesville Ry.	1,400	1,734	†334
Columbus R. R.	310,158	310,458	99,699
Covington & Oxford St. Ry.	8,522	6,430	2,091
Fairburn & Atlanta Ry. & Elec. Co.	27,622	15,707	11,914
Gainesville Ry. & Power Co.	35,304	18,759	16,545
*Georgia Power Co.	20,938	4,396	16,541
*Georgia Ry. & Elec. Co.	880,651	399,304	481,347
*Georgia Ry. & Power Co.	3,686,604	1,563,853	2,122,751
Macon Ry. & Light Co.	554,742	361,880	192,861
Rome Ry. & Light Co.	190,779	107,792	82,986
Savannah Elec. Co.	747,058	512,218	234,840
Valdosta Street Ry. Co.	8,791	6,745	2,046

*Georgia Power Company and Georgia Railway & Electric Company operated from Jan. 1 to March 17, 1912, when they were merged with the Georgia Railway & Power Company, which commenced operation on March 18, 1912. †Deficit.

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—Howard R. Taylor, Baltimore, Md., has been elected a director of the Birmingham, Ensley & Bessemer Railroad.

Cincinnati & Columbus Traction Company, Cincinnati, Ohio.—The Union Savings Bank & Trust Company, Cincinnati, was appointed receiver of the Cincinnati & Columbus Traction Company on April 12, 1913, under a bond of $25,000. This railway was incorporated in 1901 with an authorized capital stock of $2,500,000. In January, 1905, the Union Savings Bank & Trust Company, as trustee, purchased $600,000 of the railway's bonds, secured by a first mortgage on the entire property and franchises, and in July, 1907, the same bank, as trustee, purchased $250,000 of the bonds secured by a second mortgage on the property. With interest coming due within a short time on some of its obligations and other conditions unsatisfactory on account of damage by the flood, the directors of the railway felt that the court should take charge of the property.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The Cleveland, Southwestern & Columbus Railway has applied to the Public Service Commission for permission to issue $5,103,000 of first mortgage bonds and $1,500,000 of first preferred stock, this stock to be exchanged for an equal amount of the present outstanding preferred stock. The securities which it is desired to issue are to be placed in accordance with the plan for refinancing the company referred to at length in the ELECTRIC RAILWAY JOURNAL of Dec. 14, 1912, page 1210.

Cleveland (Ohio) Interurban Railroad.—Following a public hearing at Columbus recently the Public Service Commission of Ohio decided to take under advisement the application of the Cleveland Interurban Railroad for permission to issue $300,000 of bonds and a like amount of stock.

Denver (Col.) City Tramway.—First improvement mortgage 5 per cent gold bonds of the Denver Tramway Power Company to the amount of $47,000, dated 1903, have been called for payment at 105 and interest on May 10, 1913, at the office of the International Trust Company, Denver, Col.

Evansville (Ind.) Railway.—The Evansville Railway has filed amended articles of incorporation increasing its capital stock from $1,000,000 to $2,000,000 to take over the holdings of the Evansville, Henderson & Owensboro Traction Company.

Geneva & Auburn Railway, Seneca Falls, N. Y.—The proposed financial plan of the protective committee of note holders of the Geneva & Auburn Railway as presented to the Public Service Commission of the Second District of New York involves the issue of $300,000 of common stock and the issuance at this time of $500,000 of 5 per cent bonds under a refunding mortgage, the amount of which is to be determined hereafter. These securities are to be taken in exchange at par by the owners of the outstanding securities of the company. The company has not paid any dividends on its bonds since 1910. Frederick B. Campbell, attorney, stated before the commission recently that the engineer's appraisal of the company's physical property totaled $609,000, while the report submitted by the commission's engineer valued the property at $575,000. Mr. Campbell stated that the company in the reorganization plan would be willing to accept $600,000 as the compromised value of such property. William W. Atwood, one of the receivers of the company, testified that the net earnings during 1912 totaled $36,000, but explained that these returns and those of preceding years were necessarily low because of the large expenditures from earnings made by the company for improvements. He stated that the company planned to lay heavier rails in Waterloo and Geneva, acquire new cars and build a 12-mile extension from its present terminal near Seneca Falls to Auburn, this construction to be accomplished by the building of a new bridge. Mr. Campbell asked the commission to advise the company whether it believed such construction should be handled by the company itself or by a separate corporation created for that purpose. The matter has been taken under advisement by the commission.

Hummelstown & Campbelltown Street Railway, Hershey, Pa.—The Hummelstown & Campbelltown Street Railway will be known in the future as the Hershey Transit Company. The line connects Hummelstown, Campbell, Palmyra and Lebanon. M. S. Hershey, Hershey, president.

Joplin & Pittsburg Railway, Pittsburg, Kan.—The Joplin & Pittsburg Railway has applied to the Public Service Commission of Missouri for authority to issue $1,050,000 of 6 per cent refunding bonds. The application has been taken under advisement by the commission.

Tampa (Fla.) Electric Company.—The property of the Tampa & Sulphur Springs Traction Company has been sold under foreclosure to the Tampa Electric Company for $221,635.

Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.—A mortgage for $750,000 has been placed on the property of the Trenton, Bristol & Philadelphia Street

Railway, under which an issue of $406,000 of first mortgage 5 per cent bonds has been authorized to take up certain floating debt. The bonds are dated March 1, 1913, and are due March 1, 1943. The interest is payable in May and September.

United Railways & Electric Company, Baltimore, Md.—More than $1,950,000 of the United Railway & Electric Company's convertible notes have been exchanged for common stock. This leaves about $750,000 of the notes outstanding. The time for conversion expires Jan. 14, 1914.

Western Ohio Railway, Lima, Ohio.—The Western Ohio Railway has applied to the Public Service Commission for authority to issue $50,000 par value of second preferred stock. The proceeds of the issue are to reimburse the company for expenses incurred in making betterments and extensions to the property, which is situated in Auglaize and Allen Counties.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Brazilian Traction, Light & Power Company, Ltd., Montreal, Can., quarterly, 1½ per cent.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, preferred.

Easton (Pa.) Consolidated Electric Company, 2 per cent.

Railways Company General, New York, N. Y., quarterly, 1 per cent.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, quarterly, 1¼ per cent, preferred.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$6,848	*$6,754	$94	$1,086	†$922
1 "	"	'12	6,883	*5,971	911	1,048	†137
12 "	"	'13	120,684	*91,968	28,717	12,629	16,088
12 "	"	'12	119,356	*90,687	28,667	12,797	15,870
BATON ROUGE (LA.) ELECTRIC COMPANY							
1 mo.	Feb.	'13	$11,835	*$7,077	$4,757	$2,074	$2,683
1 "	"	'12	11,018	*5,959	5,059	1,729	3,330
12 "	"	'13	149,463	*91,182	58,280	21,116	37,163
12 "	"	'12	124,467	*76,106	48,361	20,732	27,629
CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, C. B.							
1 mo.	Feb.	'13	$26,141	*$17,005	$9,135	$6,071	$3,064
1 "	"	'12	23,693	*15,356	8,337	5,635	2,702
12 "	"	'13	366,132	*196,795	169,337	68,727	100,610
12 "	"	'12	340,049	*185,112	154,937	67,792	87,145
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO							
1 mo.	Feb.	'13	$81,277	$52,728	$28,549	$30,705	$2,154
1 "	"	'12	77,419	51,489	25,929	30,135	4,206
2 "	"	'13	172,820	112,006	60,813	61,647	834
2 "	"	'12	156,989	104,287	52,701	60,318	7,617
DALLAS (TEX.) ELECTRIC CORPORATION							
1 mo.	Feb.	'13	$163,243	*$93,829	$69,414	$24,635	$44,779
1 "	"	'12	129,751	*82,315	47,436	24,019	23,417
12 "	"	'13	1,890,698	*1,124,160	766,538	295,094	470,644
12 "	"	'12	1,642,068	*1,104,925	534,142	247,135	290,007
EL PASO (TEX.) ELECTRIC COMPANY							
1 mo.	Feb.	'13	$75,298	*$36,070	$39,228	$4,240	$34,989
1 "	"	'12	61,644	*32,257	29,387	7,128	22,259
12 "	"	'13	818,121	*440,254	377,967	61,589	316,278
12 "	"	'12	706,407	*406,521	299,886	82,066	217,820
GALVESTON-HOUSTON ELECTRIC COMPANY, HOUSTON, TEX.							
1 mo.	Feb.	'13	$158,773	*$99,155	$59,618	$33,660	$25,959
1 "	"	'12	136,445	*88,256	48,089	34,702	13,487
12 "	"	'13	2,073,593	*1,207,868	865,725	404,255	461,470
12 "	"	'12	1,594,526	*995,503	599,023	260,353	338,670
HOUGHTON (MICH.) COUNTY TRACTION COMPANY							
1 mo.	Feb.	'13	$22,111	*$16,520	$5,592	$5,689	†$97
1 "	"	'12	21,970	*14,384	7,586	5,227	2,359
12 "	"	'13	309,901	*174,303	135,599	68,220	67,379
12 "	"	'12	301,235	*178,386	122,848	62,670	60,178
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY							
1 mo.	Mar.	'13	$2,009,443	$1,219,268	$790,175	$765,093	$25,082
1 "	"	'12	1,883,374	1,169,084	714,289	744,578	30,289
9 "	"	'13	17,712,793	10,638,715	7,074,078	6,862,519	211,559
9 "	"	'12	16,761,663	10,314,920	6,446,743	6,654,665	207,923

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*Includes taxes. †Deficit.

Traffic and Transportation

Low Rates of Fare Versus Efficiency of Service

The following statement is made under the heading "Low Rates of Fare Versus Efficiency of Service," by William A. House, president of the United Railways & Electric Company, Baltimore, Md., in the pamphlet report of the company for the year ended Dec. 31, 1912, recently made public:

"In one of your company's previous reports attention was called to the rigidity of fares with relation to street railways. Throughout commercial centers efforts are constantly being made to produce the necessaries of life at a minimum expense, with a view to reducing the selling price. In many instances this represents a deterioration in quality, whereas in the case of an improvement in the quality of certain commodities an advance in the selling price usually follows to cover the cost of the better quality. It would hardly be expected that any manufacturer would strive for both ends at the same time; yet the average community, doubtless owing to the fact that it does not stop to consider, demands this performance from its street railway.

"Electric transportation has become one of the most important necessities of life, yet it is practically the only necessity which has not advanced in price. This situation cannot exist indefinitely. By a gradual improvement of rolling stock, by costly reconstruction of tracks, by long and patient experimenting with means of producing and distributing motive power, by careful drilling of employees in their duties, and by constant campaigning for the purpose of reducing accidents to a minimum and educating the public in the method of using street cars, passengers are to-day afforded better, quicker, safer and more comfortable service than ever before in the history of street railways. To furnish this superior quality of transportation, however, means a large increase in the cost price of every item chargeable to service. Viewed from the manufacturer's standpoint, the natural assumption would be that the selling price of a car ride should be increased. On the contrary, however, this selling price has actually been lowered. The purchasing power of a nickel has been steadily decreasing for a number of years. To-day it will not buy nearly so much as it did five, ten or fifteen years ago, with possibly one exception, and that is when invested in a car ride, and yet the fact that the high cost of living hits the railway as hard as the individual is apt to be overlooked.

"An electric railway like the United Railways & Electric Company is an extremely intricate and complicated proposition, involving many delicate adjustments of means to ends and calling for the most expert and specialized kind of knowledge of all the multitudinous facts and conditions involved in its operations.

"Your company does not wish to and will not take any step that will tend to impair the efficiency of its service. It feels that it has brought the car ride to the highest reasonable quality of service for the minimum reasonable selling price. The same service could not be produced at a marginally lower figure without turning narrow profits into serious losses. Were the question asked, 'What motive has prompted the company to increase the quality of its commodity and yet permit an actual lowering of the selling price?' the answer would be, 'The belief that it is good business policy to please the public to the fullest extent possible, the company realizing that its good will is a priceless asset, as well as the chief guaranty of success, and not a matter of sentiment.'

"It has been the aim of the company to give the public a square deal, and it has acted and is acting in the belief that as it deals by the public so will the public deal by it. The company asks in return the patronage of the public and at all times the willing co-operation of the people, in short, a welding of the two interdependent interests to maintain the highest standard of efficiency at a rate that will secure a fair return to those who have faith in the future of the property—those who in the past, owing to the constant improvements and evolutions in street railway equipment and methods, have paid for frequent and costly changes and seen millions of dollars go to the scrap heap and to the profit and loss account of experience."

Portland Without Power to Enforce Fare Reduction Ordinance

City Attorney Frank S. Grant of Portland, Ore., in a letter submitted for transmission to the City Council holds that the city of Portland is without power to enforce the Clyde ordinance reducing street railway fares during the morning and evening rush hours. His letter to the Council follows:

"You have pending before the Council an ordinance having for its purpose the reduction of street car fares, in that you desire to require that all street railway companies operating within the city of Portland sell tickets at a reduced rate. Since that ordinance was prepared, and since the resolution calling for a hearing before the Council was prepared, you are advised that Judge Bean, of the United States District Court for the district of Oregon, has rendered an opinion that, under the Malarkey bill, municipal corporations are without power to act in the matter of fixing or regulating rates where the company to be regulated has filed its tariff with the Railroad Commission. The Railroad Commission advises me that the Portland Railway, Light & Power Company and other companies have filed their tariff with it showing local passenger fares, and therefore Judge Bean's opinion will control.

"The only remedy the city of Portland now has is to say that the tariff now in existence is unreasonable, and in order to have that question determined the Council of the city of Portland will have to appeal to the Railroad Commission from the present rates. If the complaint is filed it will then be incumbent upon the Council to produce evidence to the effect that said tariff is unreasonable. Whether or not you are in a position to furnish this evidence is a question, of course, which you alone must determine. This letter is for your information, and it will be my duty to inform the Council of its legal rights in the premises in view of this decision, if any attempt is made to enact the ordinance."

Transfers to Promote Power Use.—The Lexington (Ky.) Utilities Company is advertising electrical appliances and various features of central-station service upon the back of transfers issued by the Kentucky Traction & Terminal Company, operating extensive interurban and local lines, of which the Lexington company is a subsidiary corporation.

Increase in Wages in Toledo.—The Toledo Railways & Light Company, Toledo, Ohio, has announced an increase in the wages of conductors, motormen, car washers, etc., of the city lines. The minimum wages of conductors and motormen, which apply to beginners, have been increased from 22 cents to 23 cents an hour and the maximum from 25 cents to 27 cents an hour. The increases in the other branches of work are in about the same proportion. The salaries of several inspectors and dispatchers have also been increased.

Hearing on Height of Step in New Jersey.—A further hearing was held before the Board of Public Utility Commissioners of New Jersey in Jersey City on April 18, 1913, in regard to the height of steps on the cars of the Public Service Railway. The petition to the commission for the reduction of the height of steps was filed by the New Jersey Federation of Women's Clubs and by individual women and their case was presented by A. T. Dear. L. H. Gilmore, of counsel for the Public Service Railway, cross-examined the witnesses. The hearing will be continued on May 2.

Freight Franchise Asked in Salt Lake City.—A petition has been filed with the City Commission by the Utah Light & Railway Company, Salt Lake City, Utah, asking for permission to carry mail, express and small freight over its lines in the city in cars built for that purpose. The company has a line to Holliday, one to Sandy, Midvale and Murray, and is building to Bountiful. The plan is to construct special cars for the express work. Some mail is carried now, but if it has specially prepared cars the company hopes to carry all the mail on these cars instead of on the passenger cars.

St. Louis Car Service Bill Reintroduced.—The bill, based on the recommendations of the St. Louis Public Service Commission, to require the United Railways of that city to provide additional equipment, which was thrice defeated in the Municipal Assembly, was reintroduced in the City Council on April 15, 1913. This makes the fourth time the measure has been before the Council in six weeks. The measure provides for the addition of 135 motor cars and 165 trailers, increased service, etc. Eight months' time is allowed the company in which to comply with the provisions of the measure.

New Fare-Collecting System in Muskogee.—The Muskogee (Okla.) Electric Traction Company carried a card 6½ in. wide by 13½ in. high in the Muskogee *Phoenix* recently announcing the installation on its cars on April 14, 1913, of the Rooke system of fare collection. The concluding paragraph of the advertisement follows: "This system is of obvious utility for prepayment cars. Thousands of these registers are in successful use by conservatively managed companies in many cities. Please have your nickels ready. Read the notice posted in our cars. The passenger tendering five cents will be handed a nickel in exchange, for insertion."

Fort Wayne Companies Praised.—The following quotation is from an editorial published recently in the Fort Wayne *Gazette:* "The people of Fort Wayne are a unit in giving credit to the Fort Wayne & Northern Indiana Traction Company and to the Indiana Lighting Company for their conduct during the flood. The traction company was able to furnish lights on the ornamental circuits, gave light at the bridges and gave liberally from its funds to the general relief association. Not in the least behind the Fort Wayne & Northern Indiana Traction Company was the Indiana Lighting Company, which established lights wherever possible and also contributed to the relief funds. Each company has quickly restored its service in the flooded districts and the example furnished by them is one that should be taken to heart by the city."

Brief Filed in New Jersey Fare Case.—In a brief filed with the Board of Public Utility Commissioners of New Jersey in answer to petitions by the city of Long Branch and the township of Eatontown for a fare reduction, the Monmouth County Electric Company argues that it would bankrupt the company to reduce the fare from Eatontown to Long Branch to 5 cents. The company says that the Eatontown-Long Branch route is run at a loss because the company was compelled to make a detour in building the road. The private right-of-way from the city limits to Second Avenue cost $40,000 and the overhead structure across the tracks of the New York & Long Branch Railroad cost $28,000. As a concession in connection with the charge of two fares between Eatontown and the shore and only one between Eatontown and Red Bank, the company suggests that five return-trip tickets be sold from any point in Eatontown to any point in Long Branch for 75 cents instead of $1.

The Twin Cities To-day.—The Twin City Rapid Transit Company, Minneapolis, Minn., of which A. W. Warnock is general passenger agent, has issued a very attractive folder, "The Twin Cities To-day." Minneapolis and St. Paul, the twin cities of Minnesota, have a population of more than 500,000. They are called the cities of "lakes, rivers and parks." Within the limits of St. Paul and Minneapolis there are fourteen lakes with a shore line of more than 28 miles, while within a radius of 25 miles of these cities there are 100 more lakes. In both cities there are 4875 acres of parks and parkways, 1618 acres of park lakes and 51 miles of boulevards and river drives which border both sides of the Mississippi River from Fort Snelling to Minneapolis. According to the last census reports the death rate in the twin cities is lower than that of any other large community in the United States. The folder is an extremely artistic one, illustrated with many halftone engravings and colored map plates. In the center of the folder there is a map which represents an area of 16 miles by 48 miles with a population of more than 600,000. This territory is served by 402 miles of electric railway and 22 miles of express boat routes owned and controlled by the Twin City Rapid Transit Company. "The Twin Cities To-day" contains the story of Lake Minnetonka and other historical and general information of much interest to local residents and indispensable to visitors to the twin cities and vicinity.

Personal Mention

Mr. P. C. Reinking has been appointed auditor of the Fort Wayne & Springfield Railway, with headquarters at Decatur, Ind., vice Mr. Edwin Fledderjohann, resigned.

Mr. F. W. Johnson, formerly assistant general claim agent of the Philadelphia (Pa.) Rapid Transit Company, has been appointed superintendent of surface lines of the company.

Mr. Albert Scheumann has been appointed general freight and passenger agent of the Fort Wayne & Springfield Railway, with headquarters at Decatur, Ind., vice Mr. Edwin Fledderjohann, resigned.

Mr. C. H. James has resigned as traveling passenger agent of the Central California Traction Company, Stockton, Cal., to become connected with the Oakland, Antioch & Eastern Railway, with headquarters in Oakland, Cal.

Mr. H. G. Tulley has been appointed superintendent of transportation of the Philadelphia (Pa.) Rapid Transit Company to succeed the late James Bricker. Mr. Tulley was formerly assistant superintendent of transportation of the company in charge of discipline.

Mr. T. C. McReynolds, secretary, treasurer and general manager of the Indiana Railways & Light Company, Kokomo, Ind., has been appointed by Governor Ralston of Indiana as a member of the Panama-Pacific Exposition Commission to succeed Mr. Thomas Taggart.

Mr. William R. Willcox, until recently chairman of the Public Service Commission for the First District of New York, has been elected a director of the Merchants' Association of New York, to succeed Representative Herman A. Metz, who resigned from the board upon his election to Congress.

Mr. F. B. Lasher, whose appointment as auditor of the New York State Railways and the Mohawk Valley Company was noted in the Electric Railway Journal of April 5, 1913, was on April 21, 1913, appointed general auditor of the Schenectady (N. Y.) Railway with headquarters at the Grand Central Terminal, New York City.

Mr. Albert Akers, Quincy, Ill., has been appointed general manager of the Chicago, Peoria & Quincy Traction Company, Quincy, Ill., to succeed Mr. W. E. Elliott, who is no longer connected with the company as an officer, director or stockholder. The Chapman Company, Chicago, Ill., is the general contractor for the construction of the company's proposed electric railway.

Mr. C. N. Duffy, vice-president of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been named by Mr. J. J. Stanley, president of the Cleveland (Ohio) Railway, to represent it on the board of arbitration of three members which is to consider the question of an increase in the operating and maintenance allowances of the Cleveland Railway under the Tayler franchise ordinance.

Mr. Charles H. Hubbell, formerly connected with various electric railways in Ohio, Indiana and Illinois and secretary and assistant treasurer of the Texas Power & Light Company since its organization, has resigned to accept the position of vice-president and treasurer of the Southern States Audit Corporation, Dallas, Tex. On severing his connection with the Texas Power & Light Company Mr. Hubbell was presented by the employees of the treasury department with a watch fob set with diamonds.

Capt. William B. Kelley, who has just completed ten years of service as night superintendent of the transportation department of the Metropolitan Street Railway, Kansas City, Mo., has been appointed general supervisor of the system. Captain Kelley is a native of West Virginia, and earned his title of captain in the Civil War, serving with distinction throughout that conflict on the staffs of Generals Sigel and Kelley, the latter his father. In the early days Captain Kelley's health became impaired and he journeyed West. Seeking outdoor work, he accepted a position in the train service of the Metropolitan Street Railway. His executive ability soon asserted itself, and he rose rapidly from one position of trust to another. In 1903 he was appointed night superintendent, which position he relinquishes to take up his new duties.

Mr. G. W. Esslinger, whose appointment as chief engineer of the Lackawanna & Wyoming Valley Power Company, Scranton, Pa., was noted in the Electric Railway Journal of April 12, 1913, began his electrical career in 1892 as superintendent of power and transmission for the Wasthnaw Electric Company at Ypsilanti, Mich., in which capacity he served for six years, resigning in 1898 to accept a position as superintendent of electric lines with the Detroit, Ypsilanti & Ann Arbor Railway, operating between Detroit and Jackson, Mich. In 1902 Mr. Esslinger resigned from the last-named company to enter construction work with Westinghouse, Church, Kerr & Company on the Lackawanna & Wyoming Valley Railroad, Scranton, Pa. In 1903 he accepted the position of electric line foreman with the Lackawanna & Wyoming Valley Railroad, in which capacity he remained up to the time of his appointment as chief engineer of the Lackawanna & Wyoming Valley Power Company, which leases and operates the power station of the Lackawanna & Wyoming Valley Railroad and supplies that road with power.

S. W. Greenland

Mr. Sam W. Greenland, whose appointment as general manager of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., was noted in the Electric Railway Journal of April 19, 1913, was formerly assistant general manager of the company. Before becoming connected with the Fort Wayne & Northern Indiana Traction Company Mr. Greenland was general manager and treasurer of the Columbus Railway, Light & Power Company, Columbus, Miss., which operates both the railway and the lighting service in that city. Prior to his connection with the Columbus Railway, Light & Power Company he was associated with Mr. Robert W. Watson, then of Harrisburg, now of New York City, who was formerly general manager of the Fort Wayne & Northern Indiana Traction Company, a place which he resigned some months ago. Mr. Greenland has had the title of assistant general manager of the Fort Wayne & Northern Indiana Traction Company since June, 1911. He was appointed to the company in May, 1911, as purchasing agent and retains that title in addition to general manager. The Fort Wayne & Northern Indiana Traction Company is one of the best known interurban properties in the Central West. It operates 220 miles of line, has more than 250 motor and other cars and furnishes power for lighting purposes.

Mr. C. A. Coolidge has resigned as first vice-president and general manager of the Spokane & Inland Empire Railroad, as general manager of the United Railways, Portland, Ore., and as general manager of the Oregon Electric Railway, controlled by the Hill interests. During Mr. Coolidge's connection with the Oregon Electric Railway the line was extended from Salem to Eugene and a branch was built from Gray to Corvallis, and upon his recommendation the operating voltage was changed from 600 volts to 1200 volts and the transmission voltage from 33,000 volts to 60,000 volts. This work was all done without interruption to the service. Mr. Coolidge also supervised the installation of the extensive system of automatic block signals between Portland and Garden Home. This installation has attracted attention on account of the number of signals installed and their location. He also introduced with success methods of operation in connection with the line which are very different from the usual practice in the East. The Spokane & Inland Empire Railroad has been practically rehabilitated within the last two years under Mr. Coolidge's supervision and economies have been effected which have resulted in reducing the operation and maintenance expenses, especially those of the single-phase apparatus, so that the single-phase installation on the Spokane & Inland Empire Railroad is a commercial and engineering success. Before becoming connected with the properties at Portland and Spokane Mr. Coolidge was for eight years general manager of the Astoria Electric Company's lighting plants and railway lines at Astoria, Ore. He became connected with the Oregon Electric Railway in 1907 and in July, 1910, was appointed general manager of the Oregon Electric Railway. In September, 1910, he was also appointed general manager of the United Railways, Portland, and in July, 1911, was, in addition, elected first vice-president and general manager of the Spokane & Inland Empire Railroad. Mr. Coolidge has been continuously in service for the last thirteen years and contemplates taking a vacation of several months before re-entering the public utility field.

F. T. Griffith

Mr. Franklin T. Griffith, who has been elected vice-president of the Portland Railway, Light & Power Company, Portland, Ore., and will succeed Mr. B. S. Josselyn, resigned, as president of the company, was born in Minneapolis, Minn., on Feb. 6, 1870. With his parents he moved to Oakland, Cal., while still in his teens. Here he attended school and was graduated from the high school and later on from Oakland Academy. Shortly after becoming of age he became cashier of the Oregon Woolen Mills. He studied law at night and was admitted to the bar. He has served as legal counsel in one capacity or another for the Portland Railway, Light & Power Company for nineteen years, his service previous to the consolidation being with the Portland General Electric Company, which had its power house at Oregon City. Few men possess a broader acquaintance among Oregon men than Mr. Griffith, and his administration of the sixty-five-million-dollar property of which he is soon to be the head will without a doubt be successful. The Portland *Oregonian* of April 8, 1913, concluded an editorial on Mr. Griffith's election as follows: "Mr. Griffith has made an excellent record as a citizen, as a lawyer and as attorney for the Portland Railway, Light & Power Company. He has given diligent study to public service problems and he knows as well as anybody else the relations of a corporation to its patrons and its duty to serve them satisfactorily and equitably. He is yet a young man, energetic, conciliatory and capable; and it is the opinion of all that know him that he will measure up fully to the exacting requirements of his important position."

OBITUARY

Thies Jacob Lefens, one of the directors of the South Side Elevated Railroad and of the Merchants' Loan & Trust Company, Chicago, Ill., died at his home in Chicago on April 15, 1913. He entered business in Chicago as a commission merchant and in 1878 he was made secretary of the Conrad Seipp Brewing Company, with which he continued until 1892, when the property was sold.

George P. Brophy, one of the organizers of the Ottawa (Ont.) Electric Railway and the Ottawa Electric Company, is dead. Mr. Brophy was born in Carrillon, Que., in 1848. When a young man he accepted a position with the Department of Public Works as a draftsman and assistant engineer in New Brunswick. After a year in that position he was appointed by the late Alexander Mackenzie as superintendent engineer of the Ottawa River Works, an office he held up to the time of his death. He was also a director of the Ottawa Gas Company and vice-president of the Ottawa Trust & Deposit Company.

Local electric service will be established on the main line of the Long Island Railroad between Jamaica and Long Island City as soon as the new station at Jamaica has been completed and service has been established on the Woodside cut-off and through the Steinway tunnel from New York at Van Alst Avenue, Long Island City.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Lomax Terminal Railroad, Nauvoo, Ill.**—Incorporated in Illinois to build an interurban railway from Nauvoo through Henderson and Hancock Counties to Stronghurst. Capital stock, $25,000. Incorporators and directors: William T. Love, J. F. Smith, C. H. Kisner, H. W. Beardsley and L. O. Beardsley, all of Lomax, Ill.

***Middleport & Northwestern Railway, Columbus, Ohio.**—Incorporated in Ohio to build an electric railway between Columbus and Marietta, via Meigs, Athens and Washington Counties. Incorporators: D. N. Postlewaite, Charles P. Outhwaite, Singleton P. Outhwaite, N. Bragunier and J. C. Nickert.

Fallon (Nev.) Electric Railroad.—Incorporated in Nevada to build an electric railway between Fallon and Stillwater. Capital stock, $300,000. Directors: C. A. Hascall, president: E. E. Winters, secretary; A. B. Merritt, C. E. Kent, W. H. Harmon, A. Barman and C. L. Weaver. [E. R. J., April 19, '13.]

Public Service Newark Terminal Railway, Newark, N. J.—Incorporated in New Jersey to further the plans of the Public Service Corporation with regard to its proposed terminal improvements for the Public Service Railway. Capital stock, $5,000,000. Incorporators: Thomas N. McCarter, Rumson; George J. Roberts, East Orange, and John J. Burleigh, Merchantville, all officers of the Public Service Corporation, Newark, N. J.

***Tri-County Power & Traction Company, Newark, N. J.**—Incorporated in New Jersey to operate electric railways and other public utilities. Capital stock, $150,000. Incorporators: George H. Williams, George G. Teller and Wilber F. Brown.

***Albemarle & Whitney Street Railroad, Albemarle, N. C.**—Chartered in North Carolina to build electric railways and operate public utilities within 50 miles of Albemarle. Capital stock authorized, $100,000. Incorporators: T. H. Vanderford, Salisbury; J. H. Moss and L. L. Cotton.

Beloit, Delavan & Clinton Railway, Beloit, Wis.—Application for a charter has been made by this company in Wisconsin to build an electric railway from Beloit to Delavan, via Turtle, Clinton, Darien and Delavan, a distance of 30 miles. Capital stock, $50,000. Among the incorporators are: Charles F. Lathers, Joel B. Dow, H. A. Von Oven, William S. Perrigo, B. P. Eldred, W. B. Tyrrell and A. N. Bort, all of Beloit. [E. R. J., April 19, '13.]

FRANCHISES

Edmonton, Alta.—The Council has approved the plans of the Edmonton Interurban Railway to build 10 miles of additional track in Edmonton.

Pine Bluff, Ark.—The Pine Bluff Company has received a franchise from the Council to double-track Main Street from Tenth Avenue to Martin Avenue in Pine Bluff.

Corona, Cal.—Sealed bids will be received up to June 3, 1913, by the Board of Trustees for a franchise, applied for by the Pacific Electric Railway, to build an electric line in Corona.

Los Angeles, Cal.—The Los Angeles Railway has received two franchises from the Council for extensions of its Fifty-fourth Street line from Denker Avenue to the western city limits and for the Tenth Street line to a point near the western city limits of Los Angeles.

Oakland, Cal.—The San Francisco-Oakland Terminal Railways has received a franchise to lay a third track on Grove Street from Fortieth Street to the city limits and to construct a spur track in Twenty-sixth Street, Oakland.

Orange, Cal.—The Pacific Electric Railway has received a fifty-year franchise from the Board of Supervisors, Orange. The company has asked the Council for a franchise for a line from the southern section of Los Angeles through the eastern portion of the city.

Atlanta, Ga.—The Georgia Railway & Power Company has received a franchise from the County Commissioners for a line from Brady and Emmett Streets through the Miller Union stock yards to the Howell Mill road and out to the Collier road in Atlanta.

Bassett, Kan.—The Union Traction Company, Independence, has received a franchise from the Council in Bassett. The company has accepted the franchise granted by the Council in Iola.

Bangor, Maine.—The Bangor Railway & Electric Company has received a franchise from the Council to extend its line across the Bangor bridge to Brewer.

Abbeville, Miss.—The Southwestern Traction & Power Company, New Orleans, has received a twenty-five-year franchise from the Council in Abbeville. This company will build a line from New Iberia to Abbeville.

Newark, N. J.—The Public Service Railway, Newark, has submitted plans to the Board of Works for the improvement and extensions of its line in Newark. The plans include twenty-seven applications for franchises for new lines, extensions and connecting links. Most of the franchises desired are for the lines contemplated in connection with the new terminal building to be erected in Park Place.

Jamestown, N. Y.—The Jamestown Street Railway has received a fifty-year franchise from the Council to extend its lines in Jamestown.

Dayton, Ohio.—The City Railway will ask the Council for a franchise over Bank Street to Fifth Street in Dayton.

Portland, Ore.—The Portland Railway, Light & Power Company will ask the Council for a franchise for a crosstown line on East Twenty-eighth Street in Portland.

Saskatoon, Sask.—The City Council has awarded the contract to the Saskatoon & Sutherland Contracting Company, Saskatoon, to build the Eighth Street line in Saskatoon.

Chattanooga, Tenn.—This company has received a franchise to double-track and extend some of its lines in Chattanooga.

Houston, Tex.—The Houston Electric Company has received a franchise from the Council for a 2-mile line from the Fifth Ward to the Houston Harbor addition in Houston.

Salt Lake City, Utah.—The Salt Lake & Utah Railway has asked the county commissioners for a new franchise through Salt Lake County in place of the old franchise. [E. R. J., Jan. 11, '13.]

Richmond, Va.—The Board of Aldermen has concurred in the resolution adopted by the Common Council authorizing the advertisement for sale of the franchise west of the Boulevard, petitioned for by the Virginia Railway & Power Company, operating on Broad Street from Robinson to the corporate limits of Richmond, with a spur southward along West Street from Broad to Leonard, to Sheppard, and south on Sheppard to Cary. A franchise asked for by the Richmond & Henrico Railway north on Thirty-fifth Street from Marshall to Dickinson, and thence along Dickinson to Oakwood Cemetery, was also ordered advertised, as required by law.

Tacoma, Wash.—The City Council will soon consider the question of submitting a proposal to the Tacoma Railway, Light & Power Company to build an electric line over the Eleventh Street bridge and across the tide flats. This is the route of the proposed municipal line the bonds for which will be voted on May 10.

TRACK AND ROADWAY

Gadsden, Ala.—Plans are being considered to build an electric railway from Gadsden, Ala., to Rome, Ga., via Center and Cave Spring, Ala. It is said that financial backing has been secured and preliminary arrangements will soon be made. [E. R. J., Dec. 28, '12.]

British Columbia Electric Railway, Vancouver, B. C.—This company has agreed to extend its line from Earls Road, Westminster, to Joyce Road, Collingwood, at once, and eventually to Boundary Road, Central Park, if the municipality will agree to several conditions of the company.

Pacific Electric Railway, Los Angeles, Cal.—This company has placed in operation the 1½-mile extension from the northern terminus of the old Glendale-Verdugo Park branch of the Glendale-Eagle Rock electric line to Montrose.

Sacramento Valley West Side Electric Railway, Willows, Cal.—Announcement has been made by this company that $410,000 worth of stock has been sold and that it is planned to let the first contract for grading the railway in Solano County in May. C. L. Donohue, Willows, president. [E. R. J., Feb. 15, '13.]

Connecticut Company, New Haven, Conn.—The committee on railroads has sent a favorable report on the proposed amendments to this company's charter granting extensions in New Britain, Newington, Farmington and West Hartford. The company has received permission to extend its North Street line in Hartford to connect Newington, Elmwood and West Hartford with Hartford in a direct route.

Washington Railway & Electric Company, Washington, D. C.—The Congress Heights Citizens' Association will make a proposal for the extension of this company's line south along Nichols Avenue in Washington.

Macon Railway & Light Company, Macon, Ga.—This company expects to repave about 10 miles of track in Macon.

Valdosta (Ga.) Street Railway.—During the next few weeks this company will award contracts to build 2½ miles of new track in Valdosta.

Alton, Granite & St. Louis Traction Company, Alton, Ill.—Plans are being made by this company to extend its line from Alton to the site of the new State Hospital for the Insane and from there to Bethalto and Fosterburg.

Fox & Illinois Union Railway, Aurora, Ill.—Work has been begun by this company in Morris on the partially constructed 20-mile line between Yorkville and Morris. It is now expected that the rails will be laid and the wires strung within the next sixty days and the line placed in operation within the next three months. [E. R. J., Aug. 5, '11.]

Chicago & Joliet Electric Railway, Joliet, Ill.—Work has been begun by this company relaying new tracks in new concrete work along Eastern Avenue in Joliet.

Peoria & Galesburg Railway, Peoria, Ill.—Surveys are under way by this company on its 60-mile line between Peoria and Galesburg. S. T. Atwood, secretary. [E. R. J., Oct. 26, '12.]

Iowa Railway & Light Company, Cedar Rapids, Ia.—Work will be begun at once by this company relaying its line in Cedar Rapids with 80-lb. rails, and preparations are being made to build extensions of its lines. The company has placed an order for $40,000 worth of copper wire.

Davenport-Muscatine Railway, Davenport, Ia.—Work will be begun in the spring by this company on the extension to northwest Muscatine as far as Roscoe Avenue.

Keokuk (Ia.) Electric Company.—This company is rebuilding 3 miles of track with 60-lb. T-rails and 5½ miles of new overhead work.

Waterloo, Cedar Falls & Northern Railways, Waterloo, Ia.—Among the improvements planned by this company in the near future will be the laying of new rails on portions of its track still carrying the old rails, and also a new track for loop purposes in Cedar Falls.

Union Traction Company, Independence, Kan.—A $30,000 bonus to this company, insuring the immediate construction of a 22-mile extension of this railway to Nowata, Okla., passing through South Coffeyville, Elliott, Lenapah and Delaware and the Nowata County oil fields, was voted by the city of Coffeyville recently.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next six weeks this company will award contracts to build 12 miles of new track and new steel bridges.

Louisville & Interurban Railway, Louisville, Ky.—This company has been asked by the citizens of Milton and Bedford to build an extension of its present line terminating at Lagrange to Milton, directly across the Ohio River from Bedford, Ind.

Louisville (Ky.) Railway.—This company has been asked by the Shawnee Democratic Club, Louisville, to build an extension a distance of several miles west on Madison or Walnut Street to Shawnee Park, and also to consider the advisability of a line through Thirty-fourth Street connecting the outlying suburban precincts of Parkland and Portland.

New Orleans Railway & Light Company, New Orleans, La.—About 2 miles of new track will be built in New Orleans by this company during 1913.

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—Work has been begun by this company rebuilding the line between North Chelmsford and Ayer. The company plans soon to join the tracks of the Fitchburg & Lowell line with the tracks of the Fitchburg & Leominster line at Ayer.

Springfield (Mass.) Street Railway.—This company will build about 5 miles of new track during the year.

Battle Creek, Cold Water & Southern Railway, Cold Water, Mich.—About 30 miles of new track will be built by this company during the year.

Michigan United Traction Company, Lansing, Mich.—Surveys will be begun at once by this company for the proposed double-track line between Lansing and East Lansing.

Meridian Light & Railway Company, Meridian, Miss.—This company has placed contracts to build about 3 miles of track in Meridian.

Metropolitan Street Railway, Kansas City, Mo.—This company is asked to consider plans to build a line from the Kansas side through the business section of Kansas City to the new Union Station.

Southwest Missouri Railroad, Webb City, Mo.—The work of changing the roadbed of this company's railway at Lakeside is well under way. A large amount of grading has been done and work has been begun erecting a series of concrete arches across Center Creek, and a series of seven arches each of 55 ft. span will extend across the creek bottom northeastward from the bridge.

Butte (Mont.) Electric Railway.—Plans are being made by this company to award at once the contract for grading the extension of its Bryn Mawr and Emmett Street line in Butte.

Cloudcroft-Pecos Valley Railway, Cloudcroft, N. M.—Right-of-way has been secured by this company between Cloudcroft and the Pecos Valley and plans are being made to begin soon the construction of the line. J. C. Jones, Cloudcroft, is interested. [E. R. J., Feb. 22, '13.]

United Traction Company, Albany, N. Y.—This company contemplates expending $600,000 during the next two years in the extension and betterment of its lines. Among the improvements will be a line on New Scotland Avenue and an extension of its Arbor Hill line in Albany.

Frontier Electric Railway, Niagara Falls, N. Y.—Announcement has been made by this company that work will be begun within the next three months on its line to connect Niagara Falls, Buffalo, Tonawanda and North Tonawanda. [E. R. J., Dec. 9, '11.]

New York State Railways, Rochester, N. Y.—Work has been begun by this company rebuilding 2½ miles of its Sodus Bay branch, Rochester lines.

Schenectady (N. Y.) Railway.—This company plans to spend about $350,000 for improvements of its lines in Schenectady. Among the improvements will be 12 miles of extensions.

Guelph (Ont.) Radial Railway.—This company expects to build 3000 ft. of permanent roadway with 80-lb. rails.

Bloomsburg, Millville & Northern Railway, Bloomsburg, Pa.—In the near future this company will award contracts to build 10 miles of new track. About 9 miles of new material will be required.

Chambersburg & Shippensburg Street Railway, Chambersburg, Pa.—This company will soon award contracts to build 9 miles of new track with T-rails.

West Side Electric Street Railway, Charleroi, Pa.—This company is now building its line from Charleroi to Ellsworth. About 3 miles of grading and track work has been completed between Bentleyville and Ellsworth, Pa.

Easton (Pa.) Transit Company.—During 1913 this company will rebuild 7 miles of old city track.

Pittsburgh, Steubenville & Wheeling Street Railway, Pittsburgh, Pa.—Announcement has been made by this company that plans are completed to begin the construction of its line within the next sixty days. A prospectus submitted by the company was approved some time ago by a New York construction company, which, it is said, approved the plans and stated that it would do the work. It is proposed that the line will enter Pittsburgh over the tracks of the Pittsburgh Railway Company's line, connecting in West Liberty about 4 miles from the business center of Pittsburgh.

Pottstown & Reading Street Railway, Pottstown, Pa.—During 1913 this company will build 5½ miles of new track from Pottstown to Spring City, via Sanatoga and Linfield.

South Bethlehem & Saucon Street Railway, South Bethlehem, Pa.—During the next few weeks this company will award contracts to build four double-end turnouts.

Erie & Central Pennsylvania Railway, Titusville, Pa.—This railway, which is controlled by the Titusville Electric Traction Company, states that it has placed a contract with the P. A. Velotta Construction Company, Cleveland, Ohio, for the construction of 17½ miles of track needed to complete the line between Titusville and Cambridge Springs, Crawford County, Pa. The construction company is to furnish all material and supplies except the structural iron for bridges and the necessary equipment. The latter two items are to be furnished by the railway. For these no contracts have been let.

Philadelphia & Western Railway, Upper Darby, Pa.—The surveys for the line between Valley Forge and Bridgeport are being made by the Phoenix, Valley Forge & Stratford Street Railway and not by the Philadelphia & Western Railway, as reported in the ELECTRIC RAILWAY JOURNAL for April 5. The new line expects to connect with the Philadelphia & Western Railway at Bridgeport.

Southern Traction Company, Dallas, Tex.—During March this company built three bridges and laid 20 miles of track on the section of its line between Dallas and Corsicana and 20 miles of track on its line between Waxahachie and Waco. The total of track under construction for this company at present is 125 miles.

Rio Grande Valley Traction Company, El Paso, Tex.—This company has completed 10½ miles of grading between El Paso and Ysleta and the remaining 3 miles will soon be completed. Overhead work has been begun and 100 tons of rails have been ordered. This 16-mile line will extend from El Paso down the Rio Grande Valley to Socorro and Ysleta. C. W. Kellogg, El Paso, general manager. [E. R. J., Jan. 18, '13.]

***Madisonville, Tex.**—W. H. Krehlman and associates are considering plans to build an electric railway from Paris to Houston, via Madisonville.

San Benito & Rio Grande Valley Interurban Railway, San Benito, Tex.—This company announces that it completed 1 mile of track between Mission and Monte Christo during March and 1 mile of grading on the Brown Loop, 20 miles of which is now under construction. A. Robertson, San Benito, president.

Ogden (Utah) Rapid Transit Company.—This company has been authorized to double-track its Washington Avenue line in Ogden between Thirteenth Street and Canyon Road at once.

Lynchburg Traction & Light Company, Lynchburg, Va.—Within the next few months this company expects to build 4 miles of track on Rivermont Avenue and other short lengths of track in Lynchburg.

Spokane & Inland Empire Railroad, Spokane, Wash.—This company has awarded a contract to the Guthrie-McDougal Company covering about 300,000 cu. yd. of bridge filling on its Inland division. This work is now under way and will be completed during the summer.

Appalachian Power Company, Bluefield, W. Va.—During the next three weeks this company will award contracts to reconstruct and pave between the tracks for a distance of 4500 ft.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company to build a new carhouse at Seventh Street and Central Avenue in Los Angeles. The structure will be 70 ft. x 250 ft. and in three sections.

Macon Railway & Light Company, Macon, Ga.—This company is now completing its new carhouses and will remodel its present carhouse during the year.

Valdosta (Ga.) Street Railway.—During the next few weeks this company will award contracts to build new carhouses and repair shops in Valdosta.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next few weeks this company will award contracts to build a new carhouse in Manhattan.

Cumberland (Md.) Railway.—During the next few weeks this company will award contracts to build new paint and repair shops in Cumberland.

International Railway, Buffalo, N. Y.—This company expects to build a new carhouse west of Main Street in Niagara Falls.

South Bethlehem & Saucon Street Railway, South Bethlehem, Pa.—During the next ten weeks this company will award contracts to build a new repair shop.

Knoxville Railway & Light Company, Knoxville, Tenn.—Plans are being made by this company to remodel the auditorium building in Knoxville at a cost of $3,000 and make a loop for the cars to run through the building.

Eastern Texas Traction Company, Dallas, Tex.—This company has obtained an option on a building in Greenville and will convert it into an interurban station.

Pacific Northwest Traction Company, Bellingham, Wash.—Plans are being made by this company to begin the construction of a new passenger terminal station and train sheds on the southeast corner of Sixth Street and Olive Street, Seattle. The cost is estimated to be about $50,000.

Merrill Railway & Lighting Company, Merrill, Wis.—During the summer this company expects to build an addition to its carhouse in Merrill.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by this company to build a new substation on Bodwell Road and Main Street in South Vancouver. The structure will be one story high, with a gallery for the switching apparatus, and of reinforced concrete construction. The equipment will comprise three motor-generator sets of 1000-kw capacity each and a transforming equipment of 7000-kw capacity.

Colorado Springs & Interurban Railway, Colorado Springs, Col.—This company has placed an order for a 120-kw booster set for its power house in Colorado Springs.

Wilmington, New Castle & Delaware City Railway, New Castle, Del.—During the next few weeks this company expects to purchase a rotary converter for charging its Edison storage battery cars.

Tampa (Fla.) Electric Company.—Work will be begun by this company within the next few days on the addition to its power house, which is to cost $400,000. The capacity of the plant will be doubled. As soon as the building is sufficiently near completion the machinery at the substation at Tampa and Cass Streets will be moved and the old building torn down to give place to a new office building for the company. One of the improvements necessary to the addition to the power plant will be the construction of a tunnel from the river 175 ft. back to condense the steam from the machinery. The tunnel will cost about $30,000.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next few weeks this company will award contracts to build a new substation in Manhattan.

Meridian Light & Railway Company, Meridian, Miss.—This company has purchased one 2000-kw turbine from the General Electric Company and 1500-hp Murphy stokers for its power house in Meridian.

Chambersburg & Shippensburg Street Railway, Chambersburg, Pa.—During the next few weeks this company will award contracts to build a new substation with a capacity of 300 kw at Chambersburg.

Manufactures and Supplies

ROLLING STOCK

Austin (Texas) Street Railway expects to purchase two closed cars.

Denver (Col.) City Tramway is building six motor cars and twenty-five trail cars in its own shops.

Macon Railway & Light Company, Macon, Ga., is figuring on six 40-ft. double-truck pay-as-you-enter cars.

Meridian Light & Railway Company, Meridian, Miss., has ordered four cars from the St. Louis Car Company.

Charlottesville & Albemarle Railway, Charlottesville, Va., expects to purchase six convertible single-truck cars.

Newbern-Ghent Street Railway, Newbern, N. C., has ordered one storage battery car from the Cincinnati Car Company.

West Side Electric Street Railway, Charleroi, Pa., is in the market for one broad-gage combination express and construction car.

Milledgeville (Ga.) Railway has ordered from The J. G. Brill Company one 18-ft. storage battery car mounted on a Brill special storage battery truck.

Shreveport (La.) Traction Company has ordered from the American Car Company three 28-ft. 10-in. closed car bodies mounted on Brill 39-E trucks.

Union Electric Company, Dubuque, Ia., has ordered from the American Car Company six closed pay-as-you-enter car bodies mounted on Brill 39-E trucks.

Chambersburg & Shippensburg Street Railway, Chambersburg, Pa., expects to purchase two new double-truck cars and several single-truck open and closed cars.

Columbus Railway & Light Company, Columbus, Ohio, has ordered from The J. G. Brill Company one 45-ft. 6-in. double-deck stepless car body mounted on Brill 62-E trucks.

Tri-City Railway, Davenport, Ia., has ordered from the St. Louis Car Company thirty 30-ft. double-truck pay-as-you-enter cars. Twenty of these cars will be used in Moline and Rock Island, Ill., and Davenport, Ia., and ten in Cedar Rapids, Ia.

TRADE NOTES

St. Louis Southern Railroad Supply Company, St. Louis, Mo., has increased its capital stock from $25,000 to $65,000.

Union Spring & Manufacturing Company, Pittsburgh, Pa., has removed its New York office from 50 Church Street to 140 Broadway, New York.

A. Eugene Michel and Staff, New York, N. Y., advertising engineers, have removed from 21 Park Row into larger offices, Rooms 1001-7 Woolworth Building.

Manhattan Electrical & Supply Company, New York, N. Y., has elected J. J. Gorman its president to succeed H. T. Johnson, deceased. B. H. Ellis, treasurer of the company, was also elected vice-president.

Henry Floy, New York, N. Y., consulting engineer, who specializes in the appraisal of public service properties, is traveling through most of the important cities of Italy and Austria inspecting electric railway operation, fare zones, etc., as well as construction.

Davis-Bournonville Company, New York, N. Y., has moved its general offices to the Hudson Terminal Building, 30 Church Street, New York. The Chicago sales office of the company has been moved from 515 Laflin Street to 202-206 Monadnock Block, Chicago.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., announces that the sale of its products will hereafter be in charge of the general manager, Andrew Thompson, with offices at Niagara Falls, N. Y. A. C. Hawley will represent the company in the Pittsburgh district, being located at the company's office in the Oliver Building, Pittsburgh.

Electric Railway Equipment Company, Cincinnati, Ohio, announces that owing to increased business it has been compelled to secure larger quarters for its New York office and that on and after May 1 the Eastern office will be located at the Hudson Terminal Building, 30 Church

Street, New York. J. G. Kipp will remain in charge of the New York office.

International Pay-As-You-Enter Tramcar Company, Ltd., London, Eng., announces that the Aberdeen Tramways will inaugurate prepayment service on April 28 with ten new cars of the double-deck type described and illustrated on page 385 of the ELECTRIC RAILWAY JOURNAL for March 1, 1913. These tramways were the first to adopt the prepayment idea in Europe, as a converted car has been in use at Aberdeen since December, 1912. The Pay-As-You-Enter Company also advises that a proposal to use prepayment cars is now before the tramways committee of St. Petersburg, Russia.

Clark Electric & Manufacturing Company, New York, N. Y., will furnish the splicing sleeves for use on the transmission lines in the Canal Zone, where, owing to the severe atmospheric conditions, the use of a soldered joint is practically out of the question. These splicing sleeves will be furnished for copper and copper-clad steel conductor. The conductivity of the joint where copper conductor is used is about 250 per cent that of the incased conductor, the strength of each joint being guaranteed to be more than that of the conductor. Other orders have recently been received from the India office, London, for shipment to India and from a large power development on the Pacific Coast, this latter shipment including tinned copper sleeves for steel ground lines.

Anger Manufacturing & Supply Company, Ltd., Preston, England, is the name of a company recently organized in England, with headquarters at Bank Chambers, Fishergate, Preston, to take over the manufacture and sale of the Anger automatic brake adjuster, described in the ELECTRIC RAILWAY JOURNAL for June 1, 1912. Arthur Foster is chairman of the new company and George Herman Anger is the managing director. This brake adjuster has been applied to more than forty railway systems in England, and the company has on its books orders for 100 adjusters for Birmingham and 100 for Sheffield as well as orders from other tramways. The agency for Belgium, Holland, Denmark, Germany, Italy, Austria and Russia has been taken by the Continental Railway & Tramway Company, Brussels, and The J. G. Brill Company, Paris, France, will manufacture the control or selling rights of the device in France, Spain and Algeria. The Anger company reports that its first brake adjuster had not been touched in any way for adjustment after a period of nine month and ten days, and that the brakeshoes to which it had been applied had worn out evenly. During this time the car to which the adjuster was fitted had run 28,000 miles.

General Electric Company, Schenectady, N. Y., has received the following orders for railway motors: Butte (Mont.) Electric Railway, four GE-200 40-hp four-motor equipments and fourteen extra control equipments; Southern Pacific Company, New York, N. Y., fourteen Sprague-General Electric type M multiple-unit control equipments and fifty-six GE-207 145-hp, 600-1200-volt two-motor equipments; Portland (Ore.) Railway, Light & Power Company, six GE-210 70-hp four-motor equipments; Public Service Railway, Newark, N. J., seven K-35-G controllers and forty-four complete air-brake equipments with CP-27 compressors; Schenectady (N. Y.) Railway, six GE-203 50-hp four-motor equipments and six straight-air-brake equipments; Iowa Railway & Light Company, Cedar Rapids, Ia., three Sprague-General Electric type M multiple-unit control equipments; North Carolina Public Service Company, Greensboro, N. C., two GE-216 50-hp two-motor equipments; Paducah (Ky.) Traction Company, four GE-80 40-hp two-motor equipments; Ohio Valley Electric Railway, Huntington, W. Va., nineteen GE-201 55-hp four-motor equipments; Southwest Missouri Railroad, Webb City, Mo., eighteen GE-203 50-hp motors; Benton Harbor & St. Joe Railway & Light Company, Benton Harbor, Mich., twelve GE-57 50-hp motors.

Johnson Fare Box Company, New York, N. Y., has just published in pamphlet form an interesting analysis of the receipts by quarters of the Third Avenue Railway from July, 1909, to June, 1912, which tends to show the effect of the use of fare boxes and of registering fare boxes on that system. It is difficult, of course, to determine exactly the effect, owing to the normal increase in traffic and other elements which may influence the result. Nevertheless, the pamphlet, which is entitled "Documents in Evidence," presents some very striking figures. Thus on the Third Avenue division of the railway the complete installation of P.A.Y.E. cars, equipped with non-registering fare boxes, was followed by an increase in the gross receipts of from 9.1 to 10.8 per cent during three quarters, as compared with the corresponding quarters in the previous year. Subsequent quarters showed an increase of only between 1.5 and 2.5 per cent over the corresponding quarters in the previous year until the Johnson fare boxes were installed, when the figures ran up to from 3.9 per cent to 8.4 per cent. During the next year the increase for the first quarter dropped to 1.4 per cent, which the Johnson company believes to be about the normal yearly increase due to traffic. This assumption is strengthened by the fact that this was about the increase during all these years on the Metropolitan system. The figures employed in the analysis are those of the Public Service Commission, New York, and they were compiled by an experienced street railway accountant connected with one of the largest street railway systems.

ADVERTISING LITERATURE

Sangamo Electric Company, Springfield, Ill., has issued Bulletin No. 35, in which Sangamo type D and type D4 direct-current watt-hour meters are described and illustrated.

Cook Railway Signal Company, Denver, Col., has printed a booklet which illustrates the various types of "ReVivo" dry storage batteries made by the company. These batteries are adapted for all purposes.

Pittsburgh Insulating Company, Pittsburgh, Pa., has issued a folder on Pico refined linseed oil which is used in the company's paints. A small piece of cloth coated with this oil is attached to the folder.

Standard Underground Cable Company, Pittsburgh, Pa., has issued a new price list on Sterling new code rubber insulated wire. Appended are explanatory notes and a list of electric wires and cables and cable accessories manufactured by the company.

Railway Improvement Company, New York, N. Y., has issued a twenty-page catalog entitled "The Car Beautiful." The catalog illustrates the various types of Rico sanitary strap covers, the stirrup strap and the "Steelkar" strap. Numerous illustrations are presented showing a few of the many types of cars in which Rico straps have been installed.

Lawrence & Wiggin, Boston, Mass., are distributing a statement regarding the lumber market, in which they set forth that they handle nearly 90 per cent of the long-ash lumber sold in the United States. This firm's St. Louis yards now hold a stock of 200,000 ft. of long ash. Attention is called by them to the fact that they are in a position to make immediate shipments to those roads which have recently suffered losses to their rolling stock and need material for making quick repairs.

J. G. White & Company, Inc., New York, N. Y., have reprinted in attractive pamphlet form the address "The Relation Between Capital and Rates," delivered at the University Club, New York, on March 7, 1912, by Frederick Strauss, of J. & N. Seligman & Company, on the occasion of the dinner tendered by J. G. White to the members of the J. G. White Club. Mr. Strauss is a director of J. G. White & Company, Inc., and was a member of the railroad securities commission appointed by President Taft.

Union Switch & Signal Company, Swissvale, Pa., has issued Bulletin No. 63, which describes the Hill automatic train stop. The following are some of the most important and interesting features of this device: The valve on the engine is protected by guards against false operation due to contact with obstructions other than the roadway trip designed for the purpose. The tripper itself is so designed that one of its parts must first be struck by one of the guards on the engine in order to bring the proper projection into operating contact with the engine valve. The engine valve needs only a slight impulse to cause it to act, as the operation is accomplished indirectly through a pilot valve, the plunger of which is struck by the trip.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MAY 3, 1913 No 18

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.
Chicago Office..............................1570 Old Colony Building
Philadelphia Office..........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8100 *copies are printed.*

ATLANTIC CITY SELECTED FOR 1913

Announcement has been made this week that the American Electric Railway Association has selected Atlantic City as the place for the 1913 convention. The date is Oct. 13 to 17. This time was selected after a careful consideration of all of the different weeks in October as the one best adapted to avoid conflict with other events in different cities which would prevent the presence of delegates at the convention. The choice of Atlantic City, we believe, will give general satisfaction as well as assurance of a large attendance and a good exhibit. There is nothing experimental in the holding of a convention at Atlantic City. Everyone understands what to expect there and also knows that the hotel accommodations as well as the arrangements for exhibits and meeting halls will be good. There will be lacking, it is true, the opportunity for inspecting a large railway system such as would have been possible if the convention, like that of last year, was to be in some large city. This is undoubtedly an important advantage of the plan of holding the convention in different places, and the opportunity which most of the delegates at Chicago last year improved by inspecting the rehabilitation work of the Chicago railway companies was generally welcomed. This, however, is not the sole purpose, or indeed the main purpose, of a convention. There will be this opportunity in 1915, when the convention meets in San Francisco, and those who wish to follow the plan this year will find a great deal of new and interesting electric railway construction and practice in the neighboring cities of Philadelphia, New York, Newark and Baltimore, not to mention other cities more distant.

LATEST STEAM RAILROAD ELECTRIFICATION

The most recent of the electrification projects which have been planned within the past few months is unique in that it is solely a heavy freight traffic proposition. The plan, of which a preliminary account is given elsewhere in this issue, includes a section of the main line of the Norfolk & Western Railway where passenger traffic is exceedingly light, being limited to two through trains and four local trains daily in each direction. While there are tunnels within the limits of the proposed electric zone, none of these is long enough to establish in itself a reason for dispensing with the steam locomotive even if the extent of the passenger traffic should warrant an expenditure on that score. The freight traffic is, however, enormously heavy, and this, owing to the preponderance of coal shipments, is handled in the largest trainloads which are permitted by the existing grades, power and equipment. The ruling grades near the summit of the Alleghany Mountains are so severe as to involve the alternatives of using an unreasonable number of locomotives per train or else of breaking up trains into small and uneconomical units which, after passing the summit, would have to be combined again into the maximum train capable of being handled over the descending grades to the seaboard. Under such conditions the advantages of the almost unlimited power and even tractive effort of the electric locomotive are obvious. They have, in fact, been pointed out many times. Indeed, the only surprising feature of the proposed electrification is that it can be classed as the first of its kind in this country, where so many similar situations exist.

ELECTRIFICATION OF BRITISH RAILWAYS

In an address delivered Sept. 15, 1911, before the Turin International Electrical Congress, C. O. Mailloux enumerated what he felicitously termed the "peremptory factors" of electrification. The peremptory factor in the case of the suburban steam lines about London has not been the one usual in this country under similar conditions, to increase the capacity of already burdened steam tracks, but to stop a decline in traffic. This decline began with the development of the motor bus and electric tramway in the London metropolitan district and has continued as a result of the enormous expansion of the auto-bus industry. The British railway director may be conservatism incarnate, but even he is spurred to action when the choice lies between sure loss with steam and possible gain with electrification. A noticeable feature of the contemplated changes by the London & North Western and the London & South Western Companies, whose plans for electrification are described elsewhere in this issue, is that while the happy results of the Brighton electrification have been instrumental in their decision to abandon steam, the electric system to be employed by them will be different. They are to adopt 600 volts direct current instead of the high-tension, single-phase system, which is being used with entire satisfaction by the London, Brighton & South Coast Railway. The chief reason for this choice of direct-current equipment is the desire on the part of these roads to have rolling stock which can be operated over the connecting tracks of the London underground railways. This need is not felt by the Brighton system since its main termini at Victoria and London Bridge are conveniently located for both commuter and through traffic from all parts of the metropolis. Finally, the fact that the North Eastern Railway has placed contracts for 1500-volt direct-current equipment for an important line in the north of England would indicate that the British engineers are not wedded to existing standards but, like their American and Continental brethren, are prepared to study each case on the basis of what is best for the individual conditions.

TREND OF ELECTRIFICATION IN EUROPE

Greater breadth of view in the choice of systems of electrification appears from a survey of recent work in France, Spain, Italy, Holland, Germany and elsewhere. In American discussions on this subject it is usually assumed that electrification on the Continent spells three-phase for Italy and single-phase for all the other nations which have electrified some lines to date. This assumption is correct so far as trunk-line railroading is concerned, but it is a fact that high-tension direct current has also found its place in the scheme of things. A conspicuous example of catholicity is offered by the two electrifications of the Midi Railway which are described in this issue. Both installations are in the extreme south of France but comprise practically independent systems. The 12,000-volt, 16 2/3-cycle line between Perpignan and Ille is a 15.5-mile section of a 175-mile electrification to center at Toulouse, while the 850-volt d.c. third-rail line between Villefranche and Bourg-Madame is a 35-mile trans-mountain railway which is operated with multiple-unit trains. About 150 miles southwest of this territory lies the Pamplona-Aoiz-Sanguesa Railway, which is also described in this issue. This is a 6600-volt, 25-cycle line and the first single-phase railway in Spain. Other branches of the company which furnished the equipment for this Spanish line have equipped the 1200-volt d.c. Leyden-Katwyk-Noordwyk Railway, a 14.3-mile line, as described in the ELECTRIC RAILWAY JOURNAL for Jan. 25, 1912, and the 1300-volt d.c. 14-mile Verona-San Bonifaccio Railway of Italy, while the parent company installed 1000-volt d.c. equipment on the Cologne-Bonn Railway as early as 1906 and has supplied like equipment for an extension of that line to Siegsburg. Another large company which has built many single-phase lines in the past is not only continuing in that direction but has also contracted recently to build a 22-mile high-tension d.c. narrow-gage line between Maastricht, Holland, and Aix, Belgium. The same company has announced that its choice between single-phase and 1200-volt direct current for a new 17.2-mile narrow-gage railway for the Prussian Riesengebierge will depend chiefly upon the source of energy supply. These facts indicate that while alternating current, either three-phase or single-phase, is favored by Continental engineers for trunk-line conditions, consideration is also given to the possibilities of high-tension direct current for isolated installations, especially where operation through towns is a factor.

SOME LESSONS IN INSULATION

The discussion on turbo-alternators published in the last number of the "Proceedings" of the American Institute of Electrical Engineers contains a very large amount of miscellaneous information regarding insulation and its faults. In modern machines there has been a marked tendency toward a steady increase of the working temperature to obtain improved output. This applies both to turbo-generators, in which very peculiar conditions as to dimensions have to be met, and to railway motors as well. Thorough ventilation, forced if necessary, has enabled outputs to be greatly increased, but there is always a little residual doubt as to how far the process is a safe one from the standpoint of insulation. The ventilation of armatures and fields has been greatly improved, and forced draft will do wonders in getting rid of the heat so as to obtain large output without impossibly high temperatures. The great difficulty in the way of continuing the process is to obtain insulation which will stand up, first, against prolonged heating to a moderate temperature and, second, against exceptionally great heating in some parts of the machine which are almost impossible to ventilate. Finally, in railway motor work in particular, the insulation must be able to endure steady and sometimes violent vibration and mechanical shock.

Most of those who took part in the discussion had an extremely good word to say for the old reliable mica as the mainstay of insulation, but, as one of the speakers pointed out, mica insulation is usually far from being made of that material pure and unalloyed. It is generally composed of a combination of mica, paper and varnish in various proportions. Mica itself, being a peculiarly stable inorganic substance, is probably not affected by the prolonged action of electrical strains which are unable to puncture. The coronal effect produces no damage to the mica itself, which is practically unoxidizable, but it may attack, through the formation of ozone, the materials associated with the mica rather violently, and, beyond this, one limitation of the mica is its lack of the mechanical qualities which enable it to resist prolonged application of shocks.

One of the participants in the discussion made the interesting suggestion that while the built-up mica insulation may char and be attacked by the coronal effects, there is a possibility of obtaining some synthetic chemical product which will stand a higher temperature than any of the ordinary organic materials used for insulation and so will make it feasible to run machines with safety at higher temperature than is now possible. As against this there stands the initial difficulty that nearly all stable organic compounds contain a rather large percentage of carbon, which tends to be set free and then even in small amounts tends to destroy the insulating properties of the material. A fact not generally appreciated is that many chemical reactions are affected by a time factor, so that substances apparently inert, for instance, at a moderate temperature may undergo change if that temperature is kept up for a long period. The slow carbonization of organic materials at temperatures considerably below that at which the immediate carbonization takes place is a well-known and dangerous phenomenon which has been responsible for many fires.

A slight tendency to oxidation, such as can be furnished by coronal discharge, may stimulate chemical change with astonishing effects, so that the wonder is not that our insulating materials as a whole do not stand any higher temperatures but that they endure for the length of time they do in the working conditions found in modern electrical machinery. It is a distinguished tribute to the skill of the maker of insulating material that it stands up for long periods under the mechanical, thermal and electrical strains that are put upon it.

Considerable progress has been made of late in the production of heat-resisting compounds, progress much greater than would have been believed possible a few years ago. How much further we can go is another matter. At present mica comes the nearest of everything available to being a fireproof insulation, and perhaps the best task for the chemist is not to attempt to find a material as good in this particular as mica but to discover something which allied with mica will give it the necessary mechanical support with the minimum danger of chemical failure. At the present time big generators, even turbo-generators, present less formidable problems in insulation than do railway motors, since the generators as now constructed can be by forced draft much more easily ventilated. One must, therefore, live in hope that the chemist will come to the rescue and improve the insulation, already surprisingly good from the standpoint of earlier practice, to a point that will give even better service; but a solution of the difficulty available for big generators may still fail, for mechanical reasons, under the exacting conditions of railway service.

ELECTRIC LOCOMOTIVE RATINGS

In a communication published elsewhere in these columns a correspondent takes exception to discrepancies which appear in connection with the capacities assigned to certain electric locomotives. The subject is one inviting careful consideration, for with the rapid increase in electrification of steam railroads which appears to be inevitable in the immediate future some simple standard of comparison between different locomotives will soon become necessary.

Unfortunately the need is much more obvious than is a satisfactory means for meeting it. The steam locomotive has been rated for some thirty years past on the rough-and-ready basis of weight on driving wheels, the approximate equivalent of the more technical expression, drawbar pull, which has of late come into practical use. In addition there are the three very well-defined classes of passenger, freight and switching locomotives which exist through limitations of design. As these classes are under no circumstances interchangeable, a steam locomotive is necessarily compared with others of the same class and the weight on drivers serves as a satisfactory measure of the hauling power.

Fortunately for electric locomotives but unfortunately for convenience in rating them, no rigid separation of them into classes is necessary. The large drivers of the passenger locomotive which are required to keep down the piston speed when the engine is running fast are not necessary with electric traction, except indirectly as a means to raise the center of gravity or the center line of tractive effort. Nor is there anything which demands in the electric locomotive the equivalent of the small boiler and the absence of guiding truck wheels found with steam switch engines. The result is that, so far as its mechanical structure goes, the same type of electric locomotive could be satisfactorily used in any of the three classes of service which go to make up the traffic of a trunk line.

Electrically, however, there are vast differences in the requirements. Switching service, essentially intermittent, imposes upon motors very different conditions from those of freight service where heavy continuous tractive efforts must be sustained for long periods. Also, if no reduction gearing is interposed between the motors and the wheels, passenger service will involve much smaller motors for a given drawbar pull than freight service. In fact, the question of ratings resolves itself largely into one of duration of load. The motors of the original type of New York Central locomotive, referred to by our correspondent, are reported to have such a small heat-radiating ability that they can hardly be run continuously with any load at all. They have, however, an extremely high capacity for absorbing heat so that their hourly and intermittent rating is exceedingly high. The design is justified by the fact that the service at the New York terminal is practically all switching or the equivalent, short runs with many stops.

To say whether these locomotives are more powerful or less powerful than the latest type on the New York Central is at best difficult. The latter have with forced draft an exceedingly high continuous capacity and they are capable of making long sustained runs which would cause the original type of New York Central locomotive literally to go up in smoke. Forced draft for the original type would be useless in the service for which the locomotive was designed and could not satisfactorily be applied even if it was desirable. Based upon the arbitrary A. I. E. E. standard of hourly rating, the new type, as our correspondent points out, is not so powerful as the original locomotive. Yet the claim of the manufacturer to the contrary is not without justification, because the older locomotive was designed for special service and on account of its inability to stand continuous runs it may be looked upon with disfavor on a trunk line where for reasons of ill-advised expediency or oversight it might be coupled onto a through freight or passenger train.

If electric locomotives are to have ratings which are understandable to steam railroad men, and there is every reason why they should be, it is evident that the horsepower standard already adopted for street and interurban railway motors will not do. The drawbar pull is from the steam railroad standpoint the really useful means of comparison, and since the electric locomotive does not possess the automatic safeguard against continuous overload which is given to the steam machine through the limitations of boiler capacity it might be advisable that a distinction between continuous and intermittent service be made. The hourly rating which happened to fit conveniently into street railway service leads only to confusion when it is applied to locomotives which may easily be called upon for practically full rating for four or five hours at a stretch.

LABELING EQUIPMENT

Certain advantages apply to the more general labeling of apparatus, both for stationary and movable service, which deserve consideration in view of efforts now being made to facilitate the operation of machinery at all times. The practice of painting the names of auxiliary switches carried in car vestibules either on the car molding or paneling or upon the switch bases, in cases where the latter are of insulating material, has several points in its favor which offset the slight cost of putting on the inscriptions. This identification of apparatus is unquestionably useful when reports upon accidents, real or apparent, are being prepared by motormen and conductors, and it is also a good thing for unbiased passengers to know the exact purpose of such equipment in case there is any chance of their being called upon as witnesses. The average passenger on a street car does not know the difference between a heater switch and a curling iron and cares less; but when a possible court case looms up from some incident occurring in the vestibule, positive convictions are highly important in regard to the behavior of apparatus which, if of unknown purpose, might serve only to mystify the recollections of the passenger. The final disposition of a case may rest upon such a simple matter as whether the car-lighting switch was closed or open in the vestibule at some critical moment, and the marking of such a switch with its function and the necessary on and off indications may easily be the means of saving hundreds of dollars to the company under proper conditions. Again, such marking reduces the opportunities for mistakes and false movements in the handling of apparatus by new platform men. The proper movements become second nature in time, but they always consume valuable seconds or fractions of them.

In the power plant there is room for much more to be done along the line of marking apparatus for the benefit of those responsible for operating it. Name plates are on the whole entirely satisfactory in these days so far as electrical equipment goes, but less can be said for the mechanical side of the situation. The sizes of pump cylinders may be given, but the normal speed and rated capacity of such units is seldom put down except in the case of underwriters' fire pumps, which offer a refreshing contrast in the completeness of their essential data to the apparatus usually found in other parts of the station. It would serve the operating force well if the practicable speed limits of centrifugal and reciprocating pumps designed for speed adjustment according to load conditions were inscribed on a suitable plate in each case for handy consultation. The maintenance of the proper speed in a circulating pump of the centrifugal type often makes a great difference in the amount of water and steam required to hold the best vacuum under given load conditions, and it sometimes seems as though too much were left to the memories of the men on shifts in dealing economically with what are often very large volumes of water or steam. Along this same line, the complete listing of lines or districts controlled by feeder switches on the switchboard panels is often overlooked. Nothing is lost, to take a merely negative view of this practice, by having full information in front of the operating department in black and white, in legible form, and kept up to date at all times. The really vital statistics of power plant machinery are few enough to bear their being permanently put down in accessible places for the convenience of the men who run the installation.

EFFICIENCY IN THE DRAFTING ROOM

The work of the drafting room assumes an increasing importance as the size of an electric railway system grows. Even in a small company the occasional need of accurate and effective drawings is urgent enough to warrant the incurring of some expense to obtain the desired results in the shortest feasible time, and labor-saving methods are worth knowing, even if the volume of work turned out does not justify the installation of elaborate equipment. Blue prints must be made regardless of weather conditions and dried in the shortest possible time, photographs are needed of some unusual condition on the property, data are called for at a moment's notice by the executive officers, and new ideas along designing lines must be put on paper in tangible form in connection with the comparison of estimates or the hurried purchase of equipment and material.

These every-day demands upon the drafting department require efficient planning for their prompt satisfaction. Whether the force at the drawing board is large or small, systematic work tells. The time-saving results of eliminating superfluities from drawings are little realized in organizations where intensified production has never characterized the drafting board. Attractive economies may be secured by such simple means as using only one line per phase in alternating-current wiring diagrams, by abbreviating company titles or by using initials in place of the corporate full name on drawings for use inside the organization, by showing different sections of the same subject upon the same sheet and by omitting minute details in outline drawings. Many piping and valve diagrams can be made on the single-line basis just as electrical sketches are usually made. Instead of showing the details of a car body, truck or seating design on several sheets, it is ordinarily sufficient to present typical plan and sectional views on one or two large tracings by avoiding the repetition of all symmetrical duplications. On a rush job requiring the exhibition of details in a car-lighting layout, for example, where several different arrangements are to be compared, it may serve the purpose to show only half or possibly one-quarter of the car. In the design of substations and power plants, where different arrangements of apparatus units are to be shown in comparative locations, the preparation of cardboard templates to outline the principal machines, boiler batteries and switchboard length required has been found to save a great deal of time. Again, there are doubtless cases where stenciling can be used to great advantage to save time instead of the draftsman spending effort on elaborate free-hand lettering. At other times, where duplicates and triplicates of sketched schemes are wanted practically the instant they are made in the original, pencil diagrams made on sheets interleaved with carbon copy paper are of the greatest value. There is no question that the drafting board furnishes with its auxiliaries an excellent field for economical time study. Home-made arc-lamp printing outfits, electrically heated print driers and the use of fan motors in drying plates and films are all worth investigation.

The efficiency of not a few drafting rooms could be raised by more attention to the inclusion of important dimensions on drawings and the better filing of sketches and tracings. In the last analysis, the drafting board is only a means to an end, and that end is often the saving of the time of high-priced men in executive chairs. No drafting department attains maximum efficiency until its products are complete within the desired limit of accuracy. The amount of time lost by busy men in poring over confusing drawings during conferences and in scaling dimensions which ought to have been written upon the plans themselves cannot be expressed with accuracy, but on not a few roads it is too large to be justified. Clear-cut productions with non-essentials omitted are almost invaluable at such times.

COMPULSORY ARBITRATION

Periodically threatened as we are by labor troubles on transportation lines and other public utilities, and listening as we have been for months to the accounts of railway wage demands and adjustments, there is naturally a more or less constant consideration of compulsory arbitration as a means to prevent strikes of the kind that paralyze industry and transportation. Because of this fact and owing to its comprehensive character there are material and information of much interest to be obtained from the report and discussion on "The Question of Compulsory Arbitration in the Railway Service" before the Société d'Études Législatives of Paris, reported in the April issue of the *Bulletin* of the International Railway Congress.

The report and discussion appear to have been brought about in connection with the proposal of a French commission for the adoption of a law which should provide for: (1) regular meetings between the heads of departments and the central administration of the railway system, on the one hand, and delegates elected by the railroad servants, on the other; (2) in case of dispute about the conditions of work, recourse to compulsory arbitration when the railways, the men or the minister of public works demand it; (3) the absence of penalties when the decision of the arbitration court is not carried out; (4) the promise of compensation in certain cases to the railway affected by the arbitration.

The discussion upon these proposals is noteworthy, although from one point of view or another objection was made to every one of the commission's recommendations, and in a concluding note the official reporter says that while the discussion terminated without a vote, "the remarks made show that the opinion of the great majority was against the project proposed." It is further intimated that "the discussion, though not completed, will not be resumed." The railway men who participated in the discussion were almost unanimous in disapproving of the commission's proposals on the general ground that the machinery for the representation of the employees would be, as one speaker said, "an instrument of war, not an instrument of peace." The political economists and lawyers who spoke were likewise opposed to the commission's ideas, though for different reasons.

Frequent reference throughout the discussion was made to the compulsory arbitration and conciliation laws of other countries, from which it would appear that there is hardly any nation which has not attempted to prevent strikes, and incidentally to evade its responsibilities, by the enactment of some sort of compulsory or semi-compulsory arbitration legislation.

Even Turkey has a law, dating from 1909, which provides for compulsory recourse to conciliation "in the case of the public service." Strange as it may seem, the provisions of the Turkish law show a thorough grasp of the possibilities of evil in such legislation. Among these provisions is one that no demand made by employees or workmen shall have as its object interference in the internal affairs of the company or the exercise of control over the management and its regulations. According to another article it is forbidden to form any union in a public service enterprise, and all persons who form unions in enterprises of this kind which would prevent others from working or would induce the stoppage of work are made liable to imprisonment from a week to six months or a fine from 1 pound to 25 pounds Turkish. A penalty of imprisonment is also provided for those who take part in the stoppage of work on a public service while efforts at conciliation are pending under the law.

Australia usually receives the credit of being the discoverer of compulsory arbitration as a means of avoiding industrial disputes, but in respect to Australian attempts in this direction, as well as to other similar attempts elsewhere, the facts show that complete failure or only very limited success is the result to be expected. This is a confirmation of the statement made by J. S. Badger, manager of the Brisbane Tramway Company, in his address before the last meeting of the American Electric Railway Association (Electric Railway Journal, Vol. XL, page 759).

About the only unqualified evidence to be found in favor of compulsory arbitration or conciliation is that offered on behalf of the Canadian conciliation act, familiar to most of us in this country. As for the rest little or no evidence has been produced, even by the proponents of compulsory arbitration, to show that it is sufficiently productive of good and positive results to warrant recourse to it. This, the teaching of foreign experience, should be taken as all the more impressive when applied to American conditions for the reason that here we have relatively few incorporated or even responsible trade unions against which an award can be enforced. It is in this respect that the Australian laws have most signally failed. When awards are pleasing to the employees they are observed; when awards are objectionable they are ignored, and no method of enforcing them has been found. In the light of this experience it can hardly be claimed that there is sound foundation for the belief that compulsory arbitration is an effective remedy for labor troubles. But if we are to have arbitration, compulsory or otherwise, it should be so conducted as to contain the promise of judicial inquiry and award—not the kind of pseudo arbitration upon which comment was made in these columns last week, conducted by two prejudiced advocates and a supposedly neutral compromiser. The outcome of such proceedings almost invariably represents expediency rather than justice.

Notes on Midi D.C. and A.C. Electrifications

Descriptions Are Presented of an 850-Volt D.C. Third-Rail Local System and an Experimental Section Operated at 16⅔ Cycles, 12,000 Volts, Single-Phase

The Midi (Southern) Railway, one of the great French railway systems, has recently carried out two distinct electrifications in southern France. One is a 35-mile d.c. 850-volt third-rail installation between Bourg-Madame and Villefranche-Vernet le Bains, which is 20 miles southeast of Toulouse; the other is a 15.5-mile single-phase 12,000-volt, 16 2/3-cycle railway between Perpignan and Ille, forming the experimental section of a 175-mile electrification for the vicinity of Toulouse. A description of each installation follows.

D. C. ELECTRIFICATION

Several unusual features are embodied in the equipment installed for the third-rail standard-gage railway of the Midi Railway, one being the fact that the direct-current energy for traction and 25-cycle, six-phase energy for transmission are obtained from common generators.

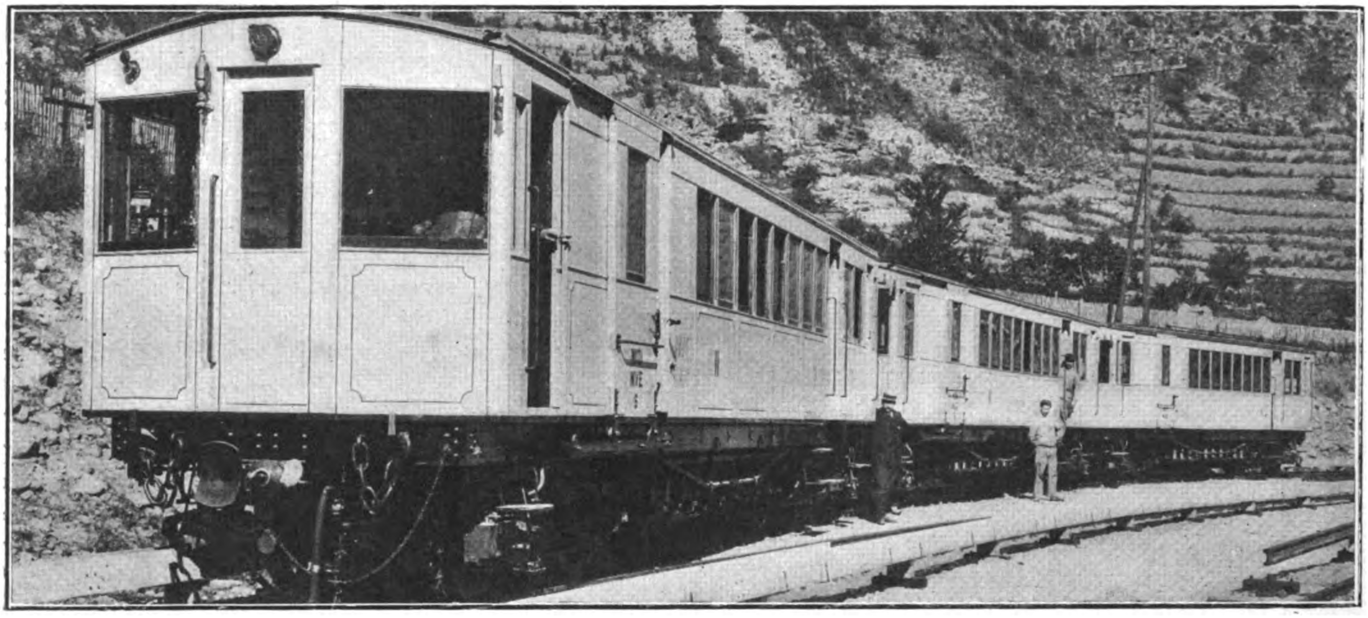
The power plant is at La Cassagne, 12 miles from Villefranche, the terminal of the steam railroad. From this place the electric railway extends up-grade to the mountain pass of La Perche, at an altitude of 5220 ft. above sea level. After crossing the pass, the line proceeds upon a high plateau to the Rigat Pass and then descends into the Cardagne plain, ending at the terminal station of Bourg-Madame, which lies near the Spanish frontier, with an altitude of 3750 ft. The total length of the electric road is 35 miles, and the maximum grade is approximately 6 per cent.

The generators are of the so-called "double-current" type, each being provided with a bar-wound armature connected at one end to a commutator of the usual type and at the other to six collector rings. They are compound-wound machines so proportioned that the commutator emf rises from 800 volts to 850 volts when the load varies from the no-load to the full-load value. The machine has eight commutating poles, to eliminate sparking and allow the brushes to be kept in one position. Each generator, of which there are four, is a 650-kw machine driven by a 1500-hp Pelton waterwheel.

Each machine forms a unit with a step-up transformer, the primary circuit of which receives energy at 600 volts, six-phase, while the secondary end delivers it at 20,000 volts, three-phase. Each transformer has three vertical cores and is mounted in an oil tank, which is cooled by water circulation. Since each transformer on the lower floor is directly connected by a cable with the generator no bus-bars are necessary for these circuits. The advantage in using the double-current machine is the reduction in first cost, owing to the fact that no special direct-current generators are needed.

Rotary converters are placed in substations at five points along the road for feeding direct current to the third-rail at 850 volts. A step-down transformer of the air-cooled type receives energy at 20,000 volts from the three-phase line and delivers it at 600 volts, six-phase, to a rotary converter, which furnishes direct-current energy for the third-rail. The rotary converters are started as d.c. motors with energy taken from the third-rail through an oil rheostat, which is operated from the switchboard panels.

The three-phase transmission line comprises a double line of six wires mounted on pine poles, which have been impregnated with copper sulphate and are spaced from 115 ft. to 140 ft. apart. Two cross-arms of creosoted oak are used, fitted with large porcelain pin-type insulators. In the tunnels, of which there are eighteen, having a total length of 7800 ft., two underground cables of three wires each are mounted along the vaulting and are protected at each end by lightning arresters. A junction box is provided for connecting the cables to the overhead lines.



Midi Electrifications—Train of Three Motor Cars on Direct-Current Line

Between the main station and the Villefranche junction a special construction was used. It consisted of concrete poles carrying aluminum cables, of which two types were tried. Those on one line were 30 sq. mm (No. 2 B. & S.) in section and were made up of three conductors, while on the other line a single stranded conductor of 70 sq. mm (No. 00 B. & S.) was used.

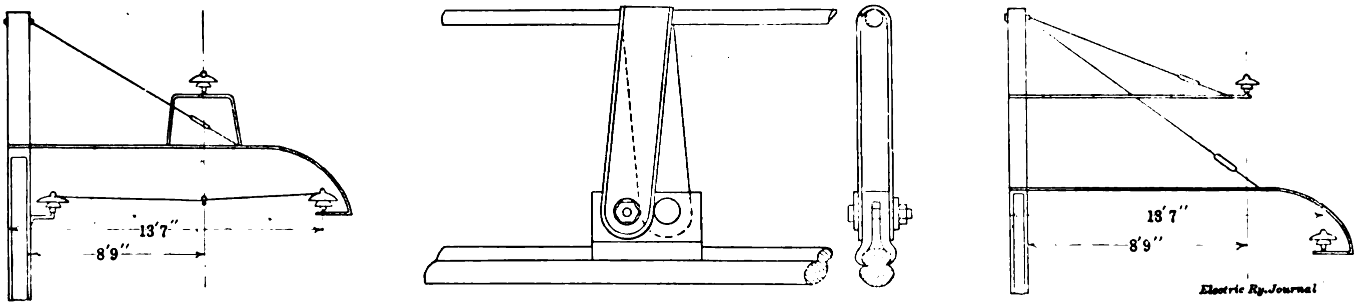
The passenger and freight cars which are used on this line are mounted on double trucks, and the electrical equipment is the same for each. Each passenger car has a motorman's cab at each end, a first-class compartment with eight seats, a second-class compartment with thirty-two seats, and a baggage compartment. The freight cars have a clear floor space with a motorman's position at each end. The motor equipment of each car consists of four 50-hp, 400-volt motors, using a gear reduction of 1:4.3. The two motors of each truck are permanently connected in series so that they may operate at from 800 volts to 850 volts. All cars have Sprague multiple-unit control. Use is made of three braking systems, to avoid trouble on the many steep grades encountered. The main system is the ordinary Westinghouse straight-air brake. The controller has three extra points for connecting the motor across a resistor carried under the car, and this type of brake is used on steep down grades. In addition to these two systems hand brakes are provided for a possible emergency. The rolling stock and the electrical equipment of the main plant and that of the substations were furnished by the Société Alsacienne de Constructions Mécaniques, Belfort.

SINGLE-PHASE LINE

The Electric Railway Journal for July 6, 1912, contained a description of two forms of catenary construction submitted for the experimental single-phase line of the Midi Railway, one of these being the design of Vedovelli, Priestley & Company and the other that of M. Paul, chief engineer of this railway. The following paragraphs contain a description of other forms of catenary equipment and also of the single-phase locomotives furnished by the French Thomson-Houston and the French Westinghouse companies. The Jeumont locomotive for this line was described in the Electric Railway Journal for Feb. 15, 1913.

CATENARY SYSTEMS

The catenary equipment furnished by the French Thomson-Houston company is built with reinforced concrete poles for spans of 164 ft. and 328 ft. The curved bracket is composed of two pieces of angle iron which are held horizontally by a tie rod secured by a through bolt to the top of the pole. The outer end of the bracket is turned inward toward the rails. The insulator on which the catenary cable is carried is mounted on a saddle somewhat like the construction used in Germany. The trolley wire is suspended from a span wire which is attached to an insulator at each end, the insulator being supported as shown. On the longer span the catenary cable is carried on an independent horizontal arm with separate tie rod. The trolley wire is suspended from the auxiliary catenary by means of clips which allow it to be slightly displaced with respect to this auxiliary catenary. The trolley wire is zigzagged and it is also sectionalized at the point where the pole spacing is changed from 164 ft. to 328 ft. In a tunnel on this section the suspension has been simplified by omitting the main cable and carrying the auxiliary catenary and trolley wire from span wires suspended between insulators on the opposite sides of the tunnel.

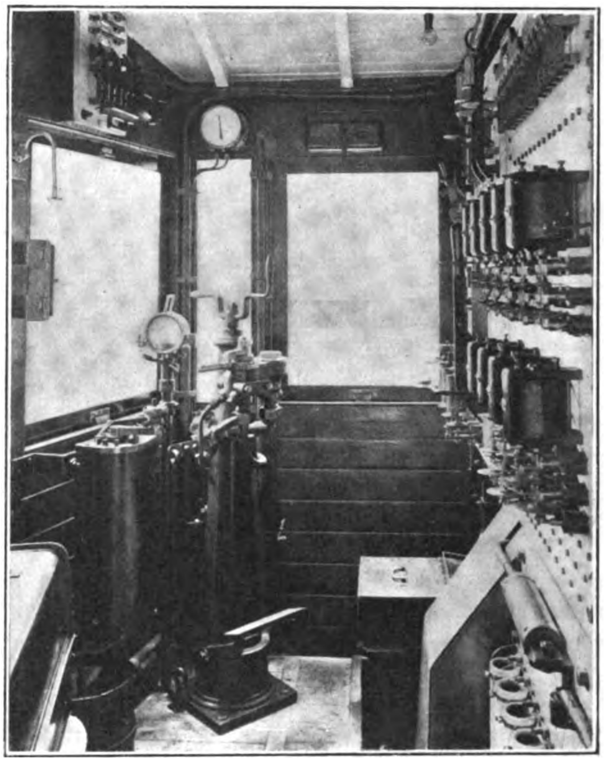


Midi Electrifications—Overhead Construction for 164-Ft. Span, Hanger and Suspension Clip and Construction on Curves

The catenary construction of the French Westinghouse company consists of poles built up of old rails, to which horizontal brackets are attached for carrying the suspension insulators. The conductor is a copper wire attached to the catenary cable by hangers and to the poles by horizontal arms. Tension take-up weights are used on one part of the line where the spans exceed 328 ft.

LOCOMOTIVE REQUIREMENTS

The requirements laid down for the six competing locomotive builders were that the locomotive should be capable of starting and hauling on any part of the line a trailing weight of 400 metric tons; that with a trailing load of 280 tons the maximum speed should not be less than 24.8 m.p.h. and with a load of 100 tons not less than 37.2 m.p.h.



Midi Electrifications—Motorman's Cab of D. C. Motor Car

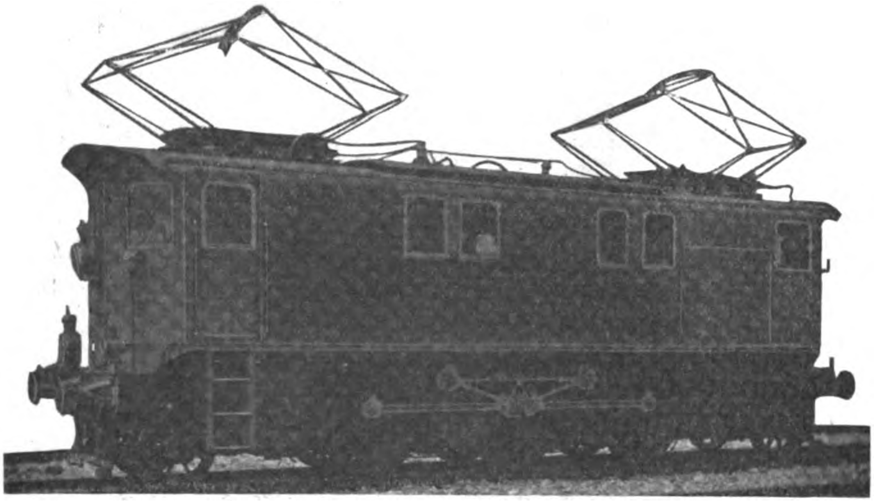
The weight of the locomotives was limited to about 80 tons with a maximum of 18 tons per axle and an adhesive weight of 54 tons. It was specified that in running from Villefranche to Ille, upon which there are many grades of about 2 per cent, the motors should be capable of sending current back to the line and of being so regulated that half the normal speed could be obtained if desired; that when operating at the normal voltage each motor should deliver 600 hp without a temperature rise exceeding 75 deg. C. after a run of six hours; that they should be capable of operating on 25 per cent overloads for one hour within the temperature limit mentioned; that the insulation of the windings should be capable of withstanding a temperature of 100 deg. C. continuously, and that they should be capable of carrying the currents corresponding to the following tractive efforts: 27,500 lb. at starting, 17,600 lb. at a speed of 27.9 m.p.h. and 9240 lb. at a speed of 37.2 m.p.h.

The accompanying Table I gives particulars of the three locomotives which have been accepted by the Midi Railway, as announced on page 157 of the Electric Railway Journal for Jan. 25, 1913.

Table I—Comparison of Locomotives

	Thomson-Houston	Westinghouse	Jeumont
Total weight, metric tons...	88	81	80
Total length....	45 ft. 1 in.	37 ft. 3 in.	50 ft. 1 in.
Total wheelbase....	28 ft. 2 in.	28 ft. 10 in.	34 ft. 10 in.
Diameter of motor wheel...	4 ft. 3½ in.	3 ft. 11 in.	4 ft. 11 in.
Number of motors	2	2	3
Hp of each motor*....	600*	600	400
Method of drive	Coupling rods and jack shafts.	Gearing and jack shafts.	Geared direct through quill.

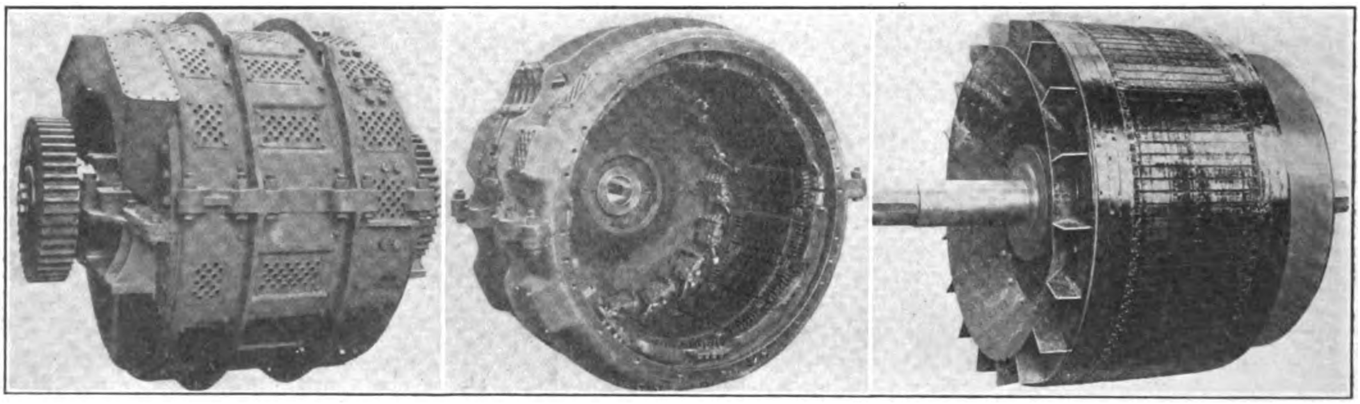
*In constant service.



Midi Electrifications—Locomotive Supplied by the French Westinghouse Company

FRENCH WESTINGHOUSE LOCOMOTIVE

In the locomotive built by the French Westinghouse company the pinions on the two motor shafts mesh with two gear wheels mounted on intermediate shafts and the power is then transmitted to the driving wheels by a yoke and side rods. The locomotive is divided into two parts with a separate transformer for each motor. Its electrical equipment weighs 43 metric tons and the mechanical parts 38 tons. The two motors and gearing alone weigh 56,760 lb., the transformers and preventive coils 21,230 lb., the electro-pneumatic control 7524 lb., the compressors 1980 lb., and the ventilators, current collectors and accessories 1954 lb. The motors are of the series-compensated type and, like the transformers, are operated with forced ventilation. The gear ratio is 45:74. The contactors are closed with compressed air and opened by springs. The electro-pneumatic valves are supplied from a transformer tap at a pressure of 65 volts.



Midi Electrifications—Single-Phase Motor and Parts of Same as Supplied by the French Westinghouse Company

The control connections of this locomotive and the order of closing the contactors are shown in two accompanying diagrams. In the wiring diagram the motor switches are marked *A*, the transformers switches *B*, the field winding *C*, the motors *M*-1 and *M*-2 and the transformers *T*-1 and *T*-2. The maximum pressure supplied to the motor terminals is 420 volts.

Originally this locomotive was designed for recuperation, but as the connections proved too complicated this purpose was abandoned and a system of electric braking was introduced. Instead of returning current to the line, resistances are now connected to the transformers. This arrangement eliminates recuperation but provides satisfactory braking. With the use of these resistances it has been found possible to brake a 100-ton train on a grade of 1.7 per cent and to regulate the speed between 6.2 m.p.h and 38.4 m.p.h.

The accompanying Table II gives the results of some trials carried out with this locomotive on a grade of 1.7 per cent when the weight of the train hauled was 280 metric tons and the approximate tractive effort 13,420 lb.

The accompanying Table III relates to a train weighing 100 tons, the tractive effort being 4840 lb.

The efficiency is calculated from the energy available for hauling and that measured by the instruments in the substation.

MOTOR CARS

The Westinghouse company has also received an order from the Midi Railway for thirty double-truck motor cars. Each truck will carry four 125-hp motors, operated at 16 2/3 cycles, and will take current through transformers from a 12,000-volt trolley. The motors are of the company's type No. 132 D, and the control system is of its well-known electro-pneumatic design. The cars will be 62 ft. 8 in. over all, 41 ft. 4 in. between the truck centers, 10 ft. 1 in. from the top of the rails to the roof and will have wheels of 39.37-in. diameter. The body will be divided into four second-class compartments seating a total of thirty-

Table II—Locomotive Trials

Speed in m.p.h....	26	Kva	1100
Power (drawbar), hp....	930	Kilowatts	970
Volts	11,000	Power factor	0.88
Amperes	100	Efficiency, per cent....	72.4

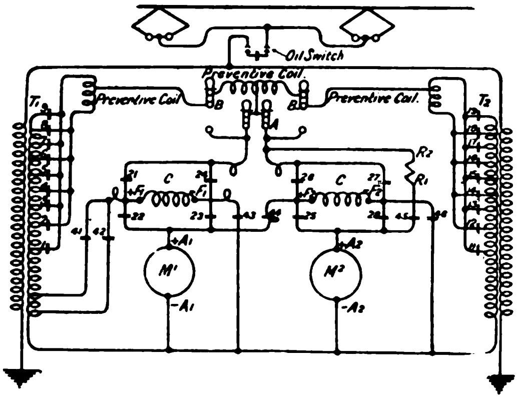
Table III—Locomotive Trials

Speed in m.p.h....	38.5	Kva	1100
Power (drawbar), hp....	540	Kilowatts	790
Volts	11,700	Power factor	0.92
Amperes	73	Efficiency, per cent....	47.4

two passengers. A baggage room and toilet will be included. The total weight of a car without passengers will be 52 metric tons. The cars will be arranged for double-end operation.

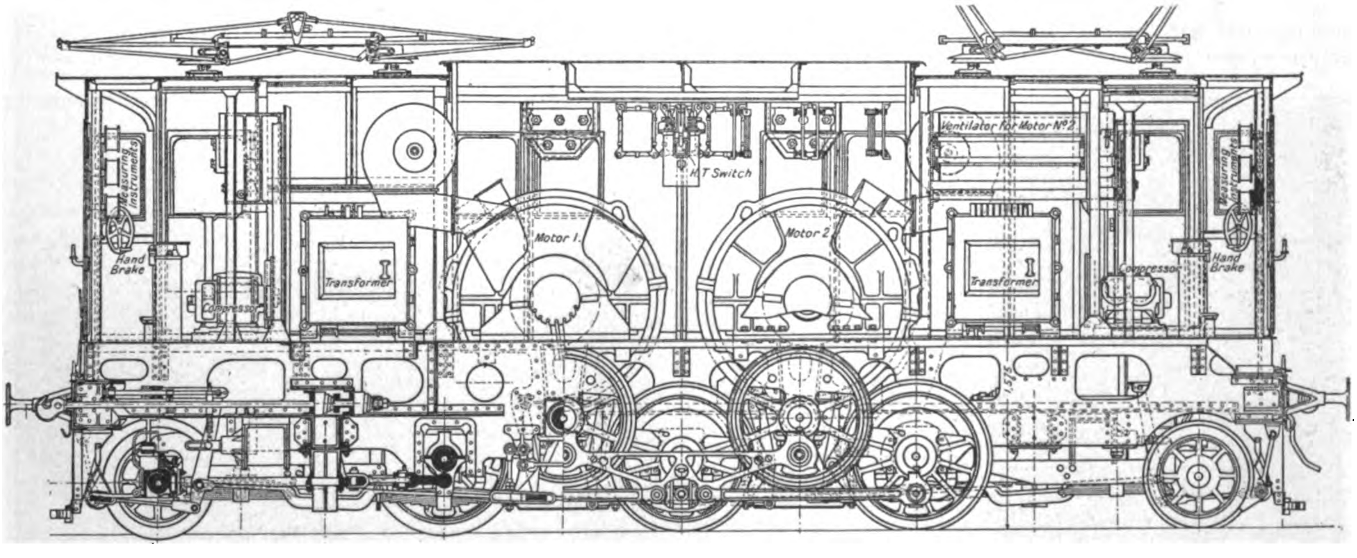
FRENCH THOMSON-HOUSTON LOCOMOTIVE

The French Thomson-Houston locomotive has two slow-speed motors with cranks at each end of their shafts. Connecting rods coupled to these cranks transmit the power to the jack shafts, which are set in the same plane as the driving axles. From these jack shafts the power is transmitted to the six driving axles by horizontal side rods. The connecting rods are inclined at the greatest possible angle, the motors being placed close to the center of the locomotive. Only one transformer is used. The motors and other equipment are mounted to secure a high center of gravity approaching that of the steam locomotive.



Midi Electrifications—Diagram of Connections for Westinghouse Locomotive

The motors are started as repulsion machines. To insure their good commutation, twenty poles are used so that the flux per pole is reduced with a corresponding reduction in the emf induced in the short-circuited coils of the armature at starting. When starting, the brushes are short-circuited and current is supplied to the stator terminals. After the motor has attained synchronous speed the armature is connected in series with the field windings. A voltage obtained from the secondary of the main transformer is also impressed on the compensating winding to produce a commutating flux. The synchronous speed of the motor when working as a repulsion machine is 100 r.p.m. at 16 2/3 cycles, corresponding to 15.5 m.p.h. When the armatures are connected in a series with the field windings the maximum locomotive speed is 48.4 m.p.h., more than three times the speed obtained when the motors run at synchronous speed.



Midi Electrifications—Longitudinal View of French Westinghouse Locomotive, Showing Character of Drive and Mounting of Equipment

The motors are designed to develop 600 hp continuously and 750 hp for one hour. The main oil switch is fitted with remote control so that it can be opened electrically from the motorman's platform. The main transformer is of the air-cooled type and is designed to stand four times the normal operating voltage. Its secondary has seven main taps giving various pressures for the auxiliaries, control, etc. The secondary circuits have twenty contactors. Seven contactors accelerate and reduce the speed of the locomotive, and three contactors control the resistances which serve to limit the current each time one of the secondary sections of the transformer is short-circuited. These resistances lessen the variations of the current of the motor each time a secondary section of the transformer is brought into service. More taps would be necessary in the absence of these resistances or their equivalent.

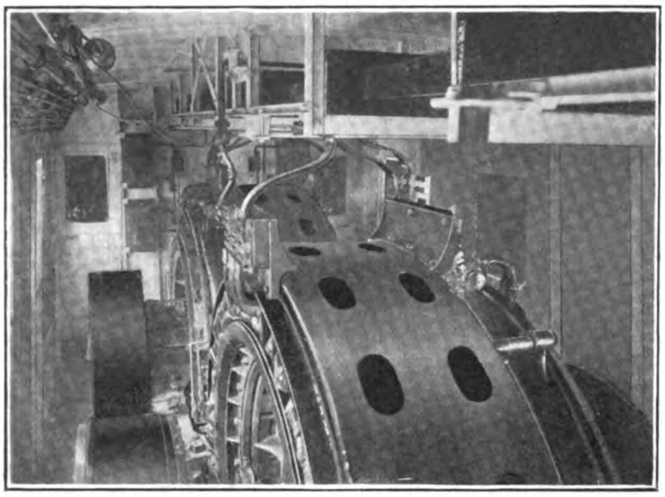
Positions of Controller Handle.	Running forward																															
	Disj.	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	41	42	43	44	45	46
Stop	○																															
1	○	○									○									○		○		○		○							
2	○	○	○								○									○		○		○		○							
3	○	○	○								○	○								○		○		○		○							
4	○		○	○							○	○								○		○		○		○							
5	○		○	○								○	○							○		○		○		○							
6	○			○	○							○	○							○		○		○		○							
7	○			○	○								○	○						○		○		○		○							
8	○				○	○							○	○						○		○		○		○							
9	○				○	○								○	○					○		○		○		○							
10	○					○	○							○	○					○		○		○		○							
11	○					○	○								○	○				○		○		○		○							
12	○						○	○							○	○				○		○		○		○							
13	○						○	○								○	○			○		○		○		○							
14	○							○	○							○	○			○		○		○		○							
15	○							○	○								○	○		○		○		○		○							
16	○								○	○							○	○		○		○		○		○							
17	○								○	○								○	○	○		○		○		○							

When the Engine is reversed, contactors 22. 24. 26. 28 operate instead of 21. 23. 25. 27.

Midi Electrifications—Crder of Closing Contactors on Westinghouse Locomotive

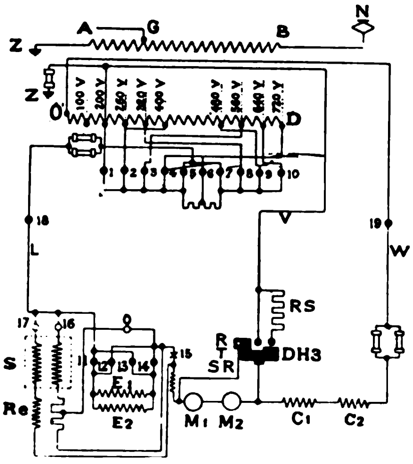
A simplified diagram is presented on page 796 wherein the elements of the two motors—armature, compensating and field coils—are represented respectively as M_1, C_1, E_1 and M_2, C_2, E_2. The elements M_1, M_2 and C_1, C_2 are connected permanently in series and E_1, E_2 permanently in parallel. The reversal of current in the two field coils E_1, E_2 is obtained by means of the contactors 11, 12, 13 and 14. Contactors 11 and 13 are used for one direction of running and contactors 12 and 14 for the opposite direction.

The electric braking and regeneration depend in principle on reversing the rotating tendency of the motors. In reversing the connections of a single-phase series motor without changing the direction in which the locomotive is run the motor is made to act as a series generator which receives its exciting current from the line. During regeneration the connections are altered so as to convert the machines from motors to generators. In the simplest form the converted machines have a preponderating tendency to act as generators of direct current. In order to avoid this action and at the same time permit the generation of alternating current, there is included in the braking circuit a transformer, the primary of which is connected to the field coils E_1 and E_2, and the secondary TS to the circuit formed by the armatures and the series-connected compensating coils C_1, C_2. This transformer is placed in circuit by contactors 16 and 17, which are closed at the time of braking while contactor 15 remains open; when the machine acts as a motor contactor 15 is closed and contactors 16 and 17 are open. In some cases the regenerated energy equals from 40 per cent to 50 per cent of the energy absorbed in climbing the grade.



Midi Electrifications—Interior of Thomson-Houston Locomotive

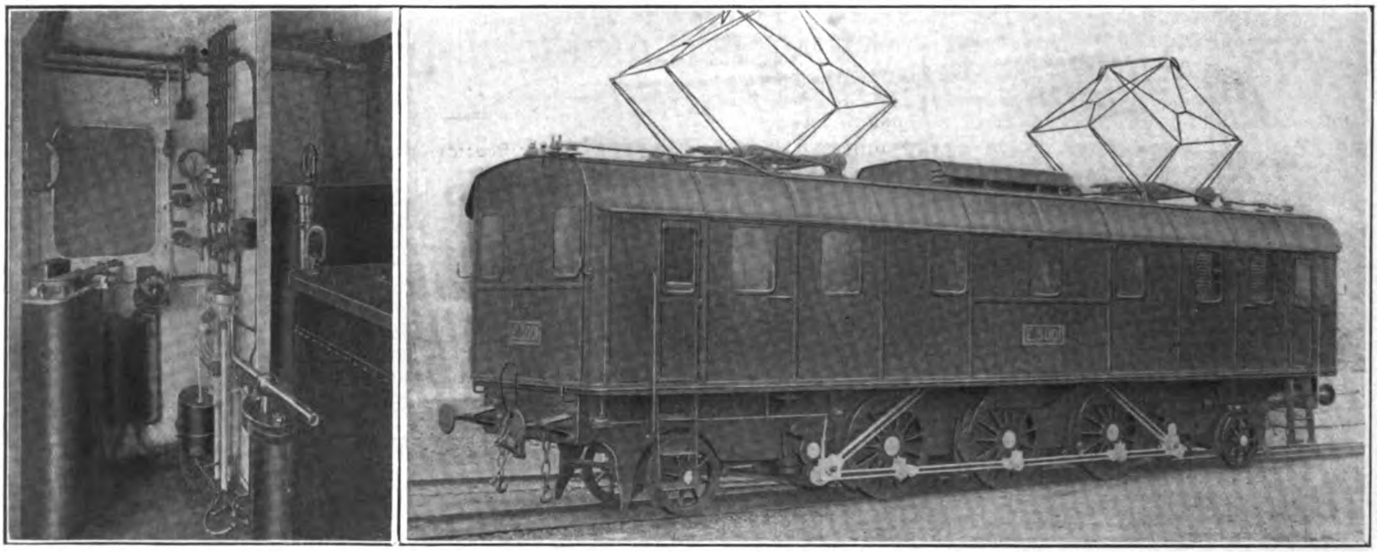
As previously noted, the synchronous speed of the motors gives a traction speed of only 15.5 m.p.h. The higher normal speed obtained after starting is due to the change of the connections so as to alter the motor from one of the repulsion type to a series-repulsion machine. This is obtained by impressing a potential of from zero to 200 volts (by way of tap V of the transformer secondary) upon the compensating coils C_1, C_2. The motors are connected in repulsion only at starting in order to permit easier commutation. To obtain this connection the brushes are short-circuited and the exciting and commutating coils are placed in series between them and tap V on the secondary coil of the transformer. The proportion established between the ampere-turns of the stator and rotor under these conditions is such that the combination of strong current but weak flux insures good commutation. Whenever the speed of the motor exceeds synchronism this method of connection fails to give satisfactory commutation and consequently the series-repulsion connection is established.



Midi Electrifications—Simplified Wiring Thomson-Houston Locomotive

Each controller has three handles, the main controlling handle, the braking handle and that used for reversing. There are also three separate drums. When the controller handle is turned to the ninth position the motor connections are automatically changed from repulsion to series.

The Public Service Commission for the First District of New York has arranged with the Bridge Department and the Bridge Operating Company for a change in the operation of the surface cars at the Manhattan end of the Williamsburg Bridge, New York. Owing to the increase of travel on the local bridge cars congestion on the loop where such cars receive and discharge their passengers has greatly increased. Accordingly the loading and unloading place for these cars will be shifted from Loop No. 7 to Loop No. 1, which is closer to the Manhattan entrance and much longer. The change will be made as soon as the proper ticket booths can be provided for the latter loop.



Midi Electrifications—Interior of Cab and General View of Thomson-Houston Locomotive

Electrification of British Railways

A Survey of Past and Present Electrification Work by British Steam Railroads In and Out of London, Including Data on an 18-Mile 1500-Volt D. C. Electrification of a Freight Line Between Shildon and Newport

The recent official announcement of plans for the extensive electrification of the London & South Western and the London & North Western Railway lines in and out of London makes it opportune to review the work which has hitherto been done in this direction in England and to present maps and other particulars of the lines which either have been or soon will be electrified.

LINES OF THE LONDON, BRIGHTON & SOUTH COAST RAILWAY

The most extensive steam railroad electrification in England to-day, neglecting the old Metropolitan and District tunnels, is that of the London, Brighton & South Coast Railway. This company has not only been the pioneer in electrification on a large scale, but with the exception of the Heysham-Morecambe line of the Midland Railway, 8.5 miles in length, it differs from all others in the use of high-tension single-phase overhead conductors instead of a d.c. low-tension contact rail. Single-phase operation has proved so satisfactory to the directors of the Brighton company that they have authorized their consulting engineer, Philip Dawson, to prepare plans for trunk-line electrification in addition to the enlarged suburban mileage hereinafter mentioned.

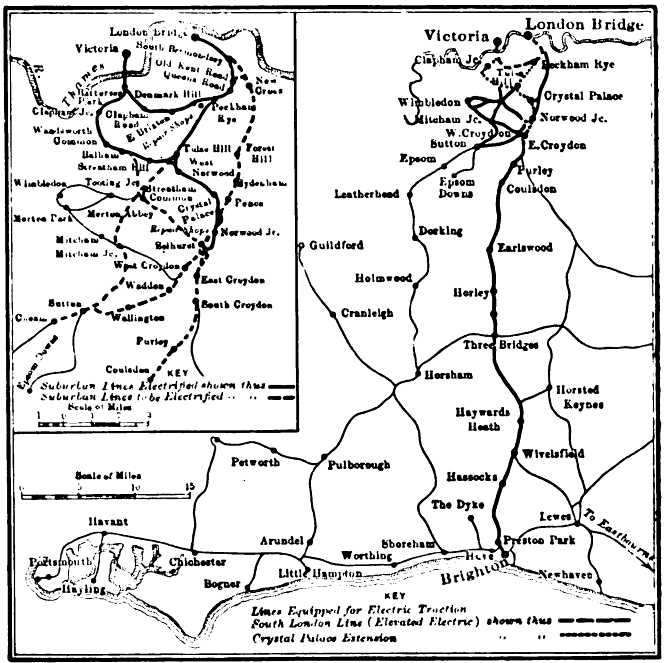
The first electrification of this company was open for service December, 1909. It consisted of a 6600-volt, 25-cycle catenary line from Victoria to London Bridge, via Queens Road and Peckham Rye, following the route shown in the accompanying map and known as the South London line. This route is 8.7 miles long, embracing 22 miles of single track. The average distance between stations is 0.87 mile. The schedule speed, including stops, is 22 m.p.h. and the maximum speed is 37 m.p.h. to 38 m.p.h.

The second section, opened in May, 1911, is known as the Crystal Palace extension. This extends from Battersea Park to Balham, West Norwood and Crystal Palace, with a branch to the inspection shops at Norwood Junction. The route is 10.3 miles long, consisting of 41.5 miles of single track. The distance between stations is 0.96 mile. The schedule speed, including stops, is 23.4 m.p.h., and the maximum speed is 38.6 m.p.h.

The third section, which was opened in May, 1912, consists of a line from Peckham Rye to Tulse Hill with an intermediate section from Tulse Hill connecting the South London line with the Crystal Palace extension. This line has 3.3 miles of route, consisting of 7.2 miles of single track. The distance between stations is 0.75 mile. The speeds are the same as those on the Crystal Palace extension.

No other lines are under construction at this time, but in accordance with Mr. Dawson's estimates, the board of directors has decided to electrify the principal remaining portions of the suburban system as follows: the area extending from London to Croydon, Purley and Coulsden and from London and Sutton to Cheam. As the map shows, the routes include four-track lines between Balham and East Croydon and between London Bridge, Croydon and Purley. The other lines to be electrified are two-track routes. It is expected that the first section to be opened will be that from Balham through Thornton Heath and Selhurst to Wallington and Sutton. Contracts for the new work will shortly be made with the Metropolitan Carriage Company for the motor cars (including Allgemeine electrical equipment) and with Messrs. Blackwell for the overhead construction. It is estimated that the work will require four years to complete but it is anticipated that the first section will be in use within eighteen months.

When all the lines named are equipped the suburban and outer suburban systems of the Brighton Railway, which are almost due south of London, will be electrically operated with the exception of some minor connections like the line from West Croydon to Mitcham and Merton Park, which has a very light service and is mostly single track. It has been proposed to double-track this line, and when this is done it will also be electrified. The additional suburban sections approved for electrification will amount to 54 miles of route. It should be stated that the non-electrified loop from Streatham Common to Tooting and Wimbledon is jointly owned by the South Eastern and Brighton railways. It is the intention of the Brighton company after the suburban electrification is completed to have all trains which make local stops electrically operated. Then the only important steam trains left would be the through trains which do not stop in the suburban area. It is obvious from this that the next step will be to haul to the terminals by means of electric locomotives all those trunk-line trains which now stop either at Sutton or Croydon.


London Bridge
Victoria
South Bermondsey
Old Kent Road
Queens Road
New Cross
R. Thames
Battersea Park
Denmark Hill
Clapham Jc.
Clapham Road
E. Brixton
Peckham Rye
Repair Shops
Wandsworth Common
Tulse Hill
Forest Hill
Balham
West Norwood
Streatham Hill
Wimbledon
Tooting Jc.
Streatham Common
Sydenham
Penge
Crystal Palace
Merton Park
Merton Abbey
Repair Shops
Norwood Jc.
Mitcham
Mitcham Jc.
Selhurst
West Croydon
Waddon
East Croydon
South Croydon
Sutton
Cheam
Wallington
Purley
Epsom Downs
Coulsden
KEY
Suburban Lines Electrified shown thus
Suburban Lines to be Electrified
Scale of Miles
Peckham Rye
Tulse Hill
Crystal Palace
Wimbledon
Mitcham Jc.
Norwood Jc.
W. Croydon
Sutton
E. Croydon
Epsom
Purley
Epsom Downs
Leatherhead
Coulsden
Dorking
Guildford
Earlswood
Holmwood
Horley
Cranleigh
Three Bridges
Horsham
Horsted Keynes
Haywards Heath
Petworth
Pulborough
Wivelsfield
Scale of Miles
0 5 10 15
Hassocks
The Dyke
Havant
Lewes
To Eastbourne
Arundel
Shoreham
Preston Park
Portsmouth
Chichester
Worthing
Hove
Hayling
Bognor
Little Hampton
Brighton
Newhaven
KEY
Lines Equipped for Electric Traction
South London Line (Elevated Electric) shown thus
Crystal Palace Extension
Electric Ry. Journal

English Electrifications—The London, Brighton & South Coast Railway

The energy for the new suburban lines which the London Electric Supply Corporation will have to furnish from Deptford in addition to that supplied by the present plant will be about 50,000 kw. The company will also require 200 motor cars with four 175-hp motors each, making a total of 250 motor cars. The total trackage of new and old lines will amount to about 220 miles of single track.

The board of directors has also authorized surveys to cover the electrification of the trunk line. Estimates are being prepared for the main line from Coulsden to Brighton, a route distance of 36 miles, about one-half of which is four-tracked. Following this, estimates are to be made of the cost of electrification between Brighton and Worthing, a 10-mile double-track route running west from the main line through a seashore resort section; also, in all probability, for the main line running east to Eastbourne—this being a branch from Wivelsfield station via Lewes Junction, comprising 25 miles of double-track route.

RESULTS OF BRIGHTON ELECTRIFICATION

The principal reason for the electrification of the London lines of the Brighton Railway was the desire to regain traffic which had been lost through the development of electric tramways in the South London district. Electrification has not only recovered the lost business but has even resulted in drawing traffic from motor buses. The quickness with which electrification brought back the business is indicated by the following statistics covering the business at Peckham Rye station: For the year ended Dec. 31, 1902, just before the opening of the London County Council Tramways, the steam trains carried 1,213,281 passengers; for the year ended Nov. 30, 1909, the last year of steam trains, the traffic had dropped to 526,373 passengers on account of the tramway competition; for the year ended Nov. 30, 1910, the first year of electric operation, the travel was 1,051,264 passengers, and for the year ended Nov. 30, 1911, the old business had been more than regained.

A slight reduction in fares was made on the South London line when electrification was inaugurated, but the real causes for recapturing the traffic were betterments in running time and shorter schedules. Some comparisons between the service given by steam and electric trains respectively appear in the following table:

	Steam	Electric
Average schedule speed on South London line, m.p.h....	14.8	22
Increased speed, percentage...........................	....	48.7
Average acceleration during total period of acceleration, m.p.h.p.s	0.4	1.0
Time of trip, Victoria to London Bridge, minutes......	35	24
Average schedule speed, stopping trains Victoria and Crystal Palace, m.p.h...........................	16.5	22.2
Time of trip, Victoria-Crystal Palace, minutes............	31	23
Increase in speed, percentage...........................	....	34.5
"Lay-over" time at Victoria as provided by timetable, minutes	6	1

Before the development of competing tramways the Brighton suburban lines carried about 8,000,000 passengers per annum. The actual number of passengers carried during the last year of steam operation on the South London line was 3,889,527, while during the first complete year of electrical operation the number was 7,918,059. In the second year of electrical operation the number of passengers rose to 8,941,481, an increase of 129.88 per cent over steam. At the present writing the travel amounts to about 10,000,000 passengers per annum. The Crystal Palace service was opened May 12, 1911, and from that date until the end of the year 5,870,241 passengers were carried, as compared with 4,182,396 passengers for the corresponding period of 1910, an increase of 40.36 per cent.

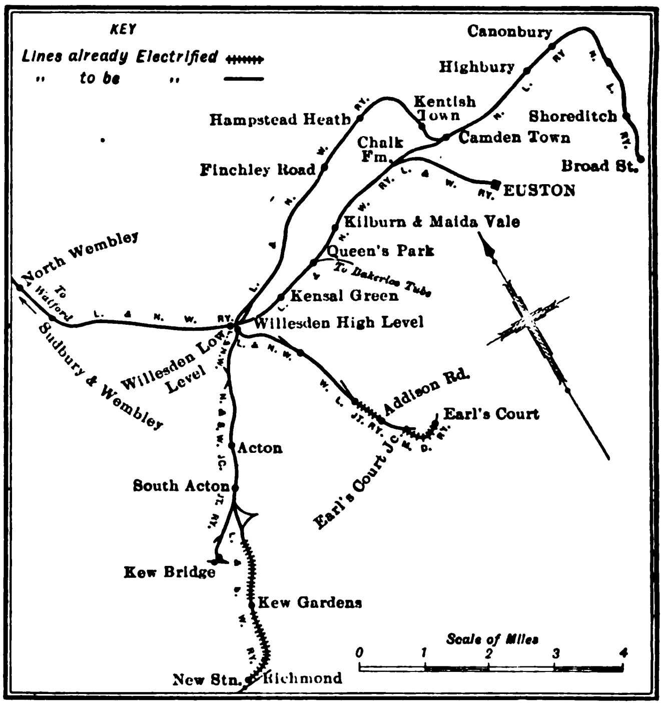
At a general meeting of the Brighton company held early in February, Lord Bessborough, chairman, said that the number of trains operating out of Victoria station had increased from 496 steam to 739 electric and at London Bridge had increased from 663 steam to 901 electric. The average number of passengers carried each year on the South London line since electrification was over 4,500,000 more than the number carried in the last year of steam service, or 14,000,000 more passengers during the whole period. Conditions will be still further improved when the electrification of the outer suburban zone makes it unnecessary to change at Crystal Palace from electric to steam trains and vice versa.

BRIGHTON MAINTENANCE FEATURES

Inspection of rolling stock is carried out at Norwood Junction, but heavy repairs are made at the first electrical shops at Peckham Rye. The cars receive a short inspection every day and a longer one once a week. The electrical equipment is thoroughly overhauled every 60,000 miles to 70,000 miles, corresponding to one year's service. The overhead work is inspected every day by a man who patrols the road and examines the line with field glasses. Any defects are reported to the foreman of the repair gangs which correct them at night after the traffic has been stopped. These repair gangs are provided with two gasoline-electric line cars which are fitted with roof platforms. The schedule is so arranged that all of the overhead lines are examined at least once a week. The company has recently given all of the overhead iron work a coating of tar, and this will be repeated from time to time to prolong the life of the overhead construction indefinitely. Even the contact wire on the first line has yet failed to show any signs of wear. The average life of the aluminum contact strips is about 5000 miles. According to Lord Bessborough, the cost of maintenance of the entire overhead equipment to date has been £2,927, equivalent to only £27 per mile per annum.

ELECTRIFICATION OF THE LONDON & NORTH WESTERN RAILWAY SUBURBAN LINES

The electrification of the London & North Western Railway's lines in and about London will not only provide for the introduction of electric traction on 79 miles of track, but it is also of interest in view of the arrangement to enter the heart of London by means of the Baker Street & Waterloo tube of the London Electric Railways. The present scheme dates from a Parliamentary act obtained by the company in 1907, by which it was authorized to construct a new line from Euston to Watford, running along the main line and intended to relieve the latter of its suburban traffic. This line was open for traffic on June 15, 1912, and at present is operated by steam. The scheme of electrification has now been made to include not only the electrification of this line, but also the electrification of the routes described below and shown in the accompanying map:



Electric Ry. Journal

English Electrifications—London & North Western Railway

The North London Railway from Broad Street to Chalk Farm; the London & North Western Railway from Camden Town via Hempstead and Brondesbury to Willesden (high level), thence over the West London & District lines to Earls Court; also from Willesden over the North & South West Junction and the London & South Western lines to Kew Bridge and Richmond. An extension of the Baker Street & Waterloo underground railway will be made from Paddington to Queens Park to join the Northwestern Euston-Watford electrified line. This junction will thereby give access to the whole underground railway system of London.

The new train arrangements comprehend a five-minute service from Watford for passengers who are bound for the tube system and a fifteen-minute service for those who wish to travel to the Elephant and Castle station, London.

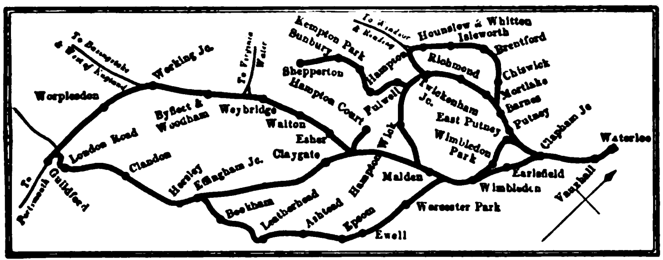
without change of trains. Part of the rolling stock will therefore be of the smaller size required to permit operation through the tube.

It is expected that about 100 end-door motor cars will be required, aside from trailers. These will be of the four-motor type and of sufficient capacity to permit high-schedule speeds and high acceleration. The inspection repair shops for rolling stock are to be located adjacent to the power station.

In accordance with the recommendations of the company's chief electrical engineer, F. A. Cortez-Leigh, it has been decided to adopt contact-rail distribution at 600 volts, using also a fourth or return-current rail to harmonize with the system of the Metropolitan District Railway and other London lines over which the North Western trains will run. Bids for some sections of the electrical equipment have already been invited, and it is hoped that all of the important contracts will be placed within a short time. The first section from which electric trains are to be operated is from Willesden over the West London line to Earls Court, the "White City" of London.

The company has already ordered from Siemens Brothers Dynamo Works, Ltd., London, four motor and eight trailer cars. Each motor car will be equipped with four motors, two per truck. The combined capacity of the motors is 230 hp on the one-hour rating. With the exception of the motors and compressors, all of the electrical equipment will be placed in a compartment adjacent to the motorman's cab.

The turbo-generator power plant is to be centrally located between the Stonebridge Park and Wembley stations on a site covering 17 acres. A remarkable feature of the station, which is to be completed within two years, is that the coal-handling arrangements will enable no less than three months' supply to be dealt with automatically, the old coal being used first. In addition to the reserve outside the power house, the usual bunkers will be provided above the boilers. The initial plant will have a capacity of about 25,000 kw. Energy will be generated at 11,000 volts, three-phase, 25 cycles, and will be transmitted by a duplicate system of cables to substations located at intervals of 3 to 4 miles. The 600-volt cables from the substations to the contactor rails will also be in duplicate. In addition to the customary transforming equipment, the substations will have automatic boosters and storage batteries of a capacity large enough to operate the entire line for some time aside from relieving the power house of peak loads.



Electric Ry.Journal

English Electrifications—Proposed Work of London & South Western Railway

LONDON & SOUTH WESTERN RAILWAY ELECTRIFICATION

The second extensive steam railroad electrification in London and vicinity involving the use of low-tension direct current is that of the London & South Western Railway. The directors of this company have approved the immediate electrification of the line between Waterloo, Wimbledon, Kingston, Twickenham and Richmond Loop, back to Waterloo, covering 73 miles of single track. The other portions of the scheme, which will follow in due course, will require the conversion of a further 173 miles of track. The estimated cost of the present work, which is to be begun immediately, is about £1,000,000. During the past six years the railway has lost over £100,000 of local traffic per annum over the sections which it is proposed to electrify. After careful consideration the directors came to the conclusion that the only way to regain this traffic was to electrify the suburban system, trusting that the results would be as apparent as in the case of its neighbor, the Brighton & South Coast Railway.

The choice of a 600-volt direct-current contact rail was influenced not only by the success of that system of current collection on electrified railroads in England and the United States, but also by the fact that it is the one in use on the London lines, including the District Railways and others which already run to Richmond and Wimbledon over the South Western Company's tracks. The possibility of being able to run through trains over the different lines was therefore an important element in the decision of this company as it was in the case of the London & North Western Railway.

The power house of this company will also be of 25,000-kw capacity. Its site has not yet been decided upon. Substations for the first stage of the work will be provided at Chatham Junction, Raynes Park, Barnes, Twickenham and Kingston. There will also be a substation at the present generating station at Waterloo. Three-phase high-tension energy will be transmitted to the substations, and the latter in turn will transmit 600 volts to the third-rail.

Two classes of cars, namely, first and third, will be used. They are to be of compartment design, like those of the London, Brighton & South Coast Railway, in preference to cars with open interiors like those used on the local London lines. The more important routes will have a ten-minute headway, and the average interval between the electric trains leaving the Waterloo terminus will be three minutes. A normal train will consist of one motor car and two trailers, the motor car being located in the middle of the train.

The motor cars will be new coaches 60 ft. long with two motors on each truck. The trail cars will be provided by the reconstruction of 51-ft. steam coaches. It is expected that 120 motor cars and about 210 trailers will be necessary, but only a comparatively small part of this number will be required for the first electrification. The Waterloo station is being rebuilt as rapidly as possible in anticipation of the enormous increase in traffic which electrification will bring. Several right-of-way improvements, such as an increase in the number of tracks, are also in process of development.

Sir Alexander Kennedy and his partners are consulting engineers for the electrification, but the electrical work generally will be in charge of the company's electrical engineer, Herbert Jones, who has recently returned from an investigation of electric traction work in the United States. Work on the permanent right-of-way will be under the direction of the company's chief resident engineer, J. W. Jacomb Hood, and the new electric rolling stock will be designed by the company's carriage and wagon superintendent, S. Warner, at the Eastleigh works, the entire scheme being under the supervision of the general manager, H. A. Walker.

ELECTRIFICATION OF NORTH EASTERN RAILWAY

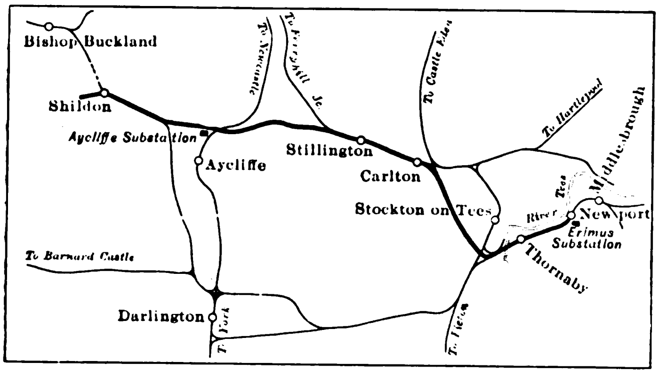
The North Eastern Railway has just announced that during the past eighteen months it has been considering the possibility of electrifying a large portion of its main and branch lines serving the colliery and industrial districts in Northumberland, Durham and Cleveland. As a preliminary to this larger scheme it has decided to commence the electrification of the Simpasture branch leading from a mineral yard at Shildon near Darlington to the Erimus sidings at Newport, Middlesborough. This branch is about 18 miles long and is used solely for freight and mineral carriage. New Shildon is the collecting base for the heavy traffic from the south and southwest Durham coal fields, and the sidings there are among the largest in England. Train loads average 900 tons and even the empties weigh as much as 350 tons. It is proposed to use locomotives capable of hauling 1400-ton trains at a minimum speed of 25 m.p.h. on the level.

For this purpose the locomotives are to be equipped with four completely inclosed motors driving through single reduction twin gearing and each capable of developing 275 hp on the one-hour rating at a speed of 20 m.p.h. The motors will be connected in pairs, each pair permanently in series, and on starting all four motors will be in series up to the full series position and then the two pairs will be put into parallel.

The control, which is purely electrical, will be of the automatic multiple-unit type. The tractive effort on the first notch will be quite small to enable the train to start without exerting unnecessary stresses on the couplers. This control will have seventeen steps, namely, eleven series and six parallel. The running in a forward or reverse direction will be controlled by means of four contactors instead of a reverser.

The compressor and heater circuits will be supplied direct by the line potential of 1500 volts direct current. Current at 750 volts for the lighting and control circuits will be taken from the two dynamotors, which will also drive fans for the ventilation of the motors.

The body of the locomotives will consist of a central cab and two sloping ends supported on two articulated trucks.



Electric Ry. Journal

English Electrifications—Map of Shildon-Newport Section of North Eastern Railway

The mechanical part of the locomotives is being built at the Darlington shops of the North Eastern Railway Company at an estimated cost of £15,000. The complete locomotive will weigh about 72 tons.

The railway will purchase three-phase, 40-cycle current from local power companies. This energy will be transmitted at 20,000 volts for two substations, one at Erimus and the other at Aycliffe, to be converted to 1500 volts direct current for use on the overhead line. The route length from Shildon to Newport is 18 miles, but including additional tracks, sidings, etc., the electrification will comprise 44 miles of single track. The two substations will be 14 miles apart, one being 4 miles from one end, and the second one being at the other end.

The overhead line will be of the Siemens catenary system, in which a special auxiliary wire for the suspension of the trolley is used in addition to the catenary cable. The line will be supported by two types of steel lattice poles, namely, flat and square. Along the double-track section the poles will be set on both sides of the line to carry light steel bridges, but on single track the poles will be fitted with bracket arms. Current will be delivered via two overhead wires of 100 sq. mm section per track with a bare feeder along the side of the track, making the amount of copper per track approximately ½ sq. in. The minimum overhead clearance will be 15 ft. Automatic tightening gear will be installed to compensate for alterations in length due to temperature changes. Those sidings which are not in frequent use will normally be kept dead by means of cut-out switches. It is stated that steam locomotives will be retained on those tracks where overhead electric operation is impracticable on account of cranes.

Contracts have already been awarded to Siemens Brothers Dynamo Works, Ltd., for ten electric locomotives for £39,000 and for permanent way for £61,795, to the British Thomson-Houston Company for substations for £12,615, and to the British Insulator and Helsby Cables Company, Ltd., for transmission lines. The scheme will be carried out according to the designs of Merz & McLellan, consulting engineers. Should the initial electrification prove successful the lines will be extended throughout the Tees-side and Cleveland districts.

ELECTRIFICATION OF NORFOLK & WESTERN RAILWAY

As mentioned in last week's issue, the Norfolk & Western Railway has authorized the electrification of a portion of its mountain division. This will include the most congested section of the main line, and upon it will be handled a freight traffic that is one of the heaviest in the country. The electrified zone will extend from Bluefield, W. Va., across the summit of the Alleghanies to the town of Vivian, W. Va., which lies on the western slope of the mountains.

The Norfolk & Western crosses the mountain divide at the extreme southern part of West Virginia about 300 miles from the coast. The region is famous as the source of the widely known Pocahontas coal, which has been practically standard for steamship use during the last half century, and vast supplies of steam fuel are found at various points in the vicinity.

The main line of the railroad is double-tracked except for a comparatively short distance through a tunnel in which only one track is installed. The tunnel is, however, thoroughly ventilated, so that the problem of smoke and gas from the steam locomotives is not a serious consideration. The traffic is exceedingly congested, and, owing to the severe grades, among which is one of approximately 2 per cent from Vivian eastward to the summit, the work has become too heavy to be efficiently handled by steam locomotives. The firm of Gibbs & Hill, which also acts as consulting engineer for the Pennsylvania Railroad electrification projects, has been retained by the Norfolk & Western Railway and is now making the necessary investigations upon which is to be based the determination as to the most satisfactory system of electrification for the line.

The problems involved by the local conditions are unusual. The use of a third rail is impracticable because the line runs through a number of mining towns at street level and because there is in addition a large and extremely busy yard where coal trains are made up. It will therefore be necessary for an overhead conductor to be used, whether the system adopted is single-phase, three-phase or high tension direct-current.

The service will naturally be of the heaviest class yet considered in connection with electrification, as 3250-ton trains are contemplated and these, on the 2 per cent grades, will require a total drawbar pull per train of approximately 150,000 lb.

To handle the heavy traffic twenty-five electric locomotives of exceptionally high power are to be purchased, the design to depend to some extent upon the electrical system installed. These will be used for both switching and main-line service, as the 30 miles of route to be electrified contains enough yard trackage and sidings to bring the total single-track mileage up to 75. The service is, however, to be designed exclusively for freight trains, as the coal shipments are far in excess of the passenger traffic on this section of the railroad.

THE FIRST SINGLE-PHASE RAILWAY IN SPAIN

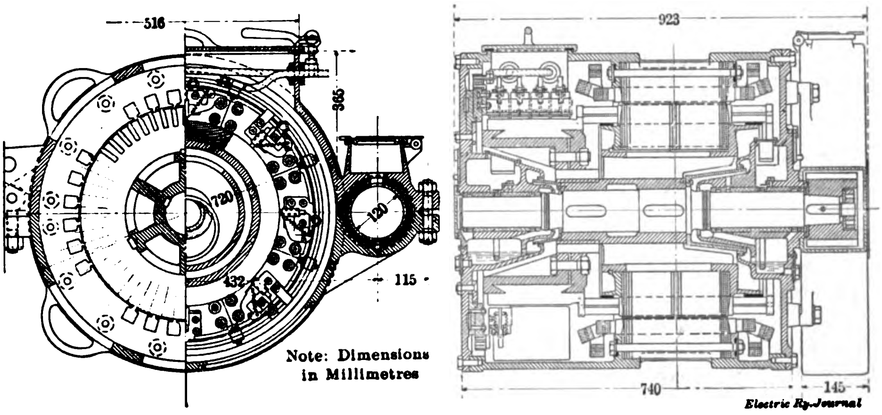
A recent issue of the *Electrotechnische Zeitschrift* states that during the past two years a single-phase line has been in successful operation in the province of Navarre, northern Spain, between the cities of Pamplona and Aoiz and Pamplona and Sanguesa, as shown in the accompanying map. The first of these lines connects with the Northern Railway at Pamplona, the capital of the province. The line from Pamplona to the Northern Railway station is but 1.24 miles long and some of the highway sections are on grades up to 7 per cent. Beyond Vileveta the line divides into a short branch to Aoiz and a long one to Sanguesa. The longest run is between the Pamplona station on the Northern Railway to Sanguesa, a distance of 34.72 miles, while the run from Pamplona to Aoiz is 20.22 miles.

The primary reason for building this line was to facilitate the transportation of timber from the mountain forests of the Irati Company, which is also the owner of the railway. Furthermore, this line connects the capital of the province with other important communities, the population of which is largely agricultural. The traffic of this road has already demonstrated that it will do much to develop a territory hitherto neglected.

Single-phase energy for the overhead line is transmitted directly at 6600 volts, twenty-five cycles, from a hydroelectric plant near Aoiz, to a point between Huarte, Aoiz and Sanguesa, but the potential is reduced to 600 volts for use between the Pamplona station of the Northern Railway and Huarte and also in the city of Pamplona.

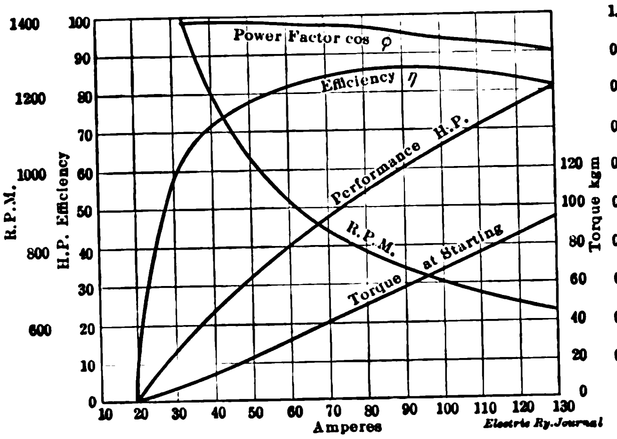
ROLLING STOCK AND ELECTRICAL EQUIPMENT

Both the single-truck and double-truck cars were built in Barcelona by the predecessor of the present Spanish Siemens-Schuckert company. The double-truck cars carry four 60-hp motors and the others two 60-hp motors. The large cars have room for thirty-three seated and sixteen standing passengers, and the small cars take care of fifteen seated and sixteen standing passengers. All cars are equipped with hand and air brakes. The compressor on the large cars is operated by a separate single-phase motor, but on the small cars it is axle-driven.

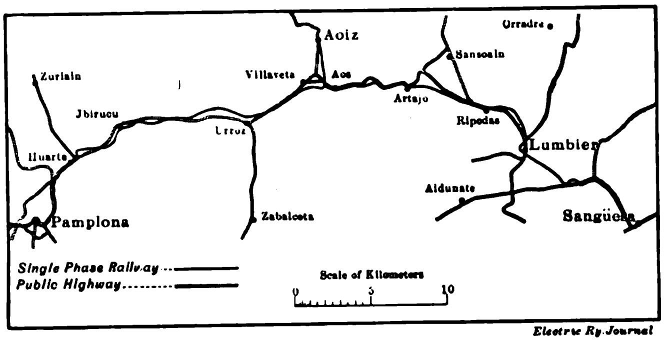


Pamplona-Sanguesa Railway—Sections of Motor

The electrical equipment consists of the motors, a transformer to reduce the potential from 6600 volts to 600 volts, controllers, choke coils, cut-out switches, fuses for high and low potential, lightning protection and the usual lighting and heating equipment. The motors are of Latour four-pole design, rated 60 hp each, at 735 r.p.m., 600 volts. Efficiency, speed, performance and torque curves of this motor are presented in an accompanying illustration. Although the motor is so completely inclosed that it receives no outside ventilation, its dimensions are comparatively small, owing particularly to a compact arrangement of the winding and the bearings. Oil rings are used for the lubrication of the bearings, as in stationary machines. The gear ratio is 1:4.7. The diameter of the car wheels is 37 in. The weight of the motor, including gearing and gear case, is 4410 lb. Acceleration and speed regulation are obtained by dividing the low-tension winding of the transformers in such a way that the manipulation of the controller will vary the voltage from 300 volts to 600 volts.



Pamplona-Sanguesa Railway—Motor Performance Curves



Pamplona-Sanguesa Railway—Map

The transformers, which are hung in sheet-steel cases under both the double-truck and single-truck cars, are rated at 230 kva and 110 kva respectively. The large transformer weighs 3454 lb. and the smaller transformer 2420 lb. without oil. The respective oil requirements are 90 gal. and 50 gal.

The controllers are like those used for direct-current work except that they have no blow-out coils. The main cylinder has two different sets of contacts which are electrically separated. A choke coil, which is inserted between these contacts, prevents the short-circuiting of the disconnected transformer winding when the controller connections pass from one contact position to the next.

The cut-out switches, fuses and lightning protection are in the motorman's cab, the door of which is so connected to a cut-out switch that the circuit is grounded, and the current collector leaves the wire whenever the door is opened. The respective switches for cutting out the high-tension and low-tension circuits deserve special attention as they minimize false connections when going from one potential to the other. Both switches have maximum and minimum relays and are operated from the motorman's platform by means of compressed air in connection with a shield which displays the direction in which the handle should be turned when air is applied to one or the other of the switches. The low-tension switch also has a second minimum relay with an interlock to prevent the circuit from being closed when the car is on a high-tension section.

The passage from the low-tension to the high-tension circuit occurs in the following fashion: The low-tension section terminates in a completely insulated contact wire about 39 ft. long. As soon as the current collector reaches this section the minimum current relay operates, and consequently the low-tension switch opens to break the circuit. When the car reaches the high-tension section the motorman operates the pneumatic change-over apparatus by moving his lever to the position marked "high tension," thus closing the high-tension circuit. A similar series of movements is made when the motorman changes from high tension to low tension, the only difference being that the handle of the change-over apparatus is brought to the position marked "low tension."

The current collector is of the pantograph type and is insulated from the roof by means of four bell insulators. It is air-operated and is equipped with springs which permit it to bear with uniform tension against the contact wire under all conditions of operation.

The pantograph collapses from its own weight when the compressed air is cut off. The removable contact piece is an aluminum strip with a longitudinal groove filled with graphite grease.

MEETING OF MANUFACTURERS' EXECUTIVE COMMITTEE

A meeting of the executive committee of the American Electric Railway Manufacturers' Association was held in New York Friday, April 25. Mr. Baker, chairman of the location committee for 1913, reported that the committee had visited Washington, D. C., with a committee of the parent association to look over the accommodations available for holding the 1913 convention in that city. While there they had discussed the matter with the Chamber of Commerce of Washington. The committee had also visited Atlantic City, from which it had received a proposition similar to that offered to the association in 1911. Upon motion, the committee decided to hold the 1913 convention in Atlantic City, provided that place was satisfactory to the parent association. This approval by the American Electric Railway Association was later given, so that the convention in 1913 will be held at Atlantic City. The dates are Oct. 13 to Oct. 17.

Mr. Baker also reported on the trip of the location committee to San Francisco, Cal., with a view to the selection of that city for the 1915 convention. He said that tentative arrangements had been made with a committee in San Francisco representing the Palace Hotel, the St. Francis Hotel and the Fairmont Hotel and also with the manager of the proposed Inside Inn. Mr. Baker said that, owing to the present situation in San Francisco, it was impossible to get anything very definite from the hotels or from the exposition company regarding the space for an exhibit, but the representatives of the association had been assured by the hotel committee that it will assist in every way possible to make as satisfactory arrangements as can be made under the conditions which will exist at that time. Mr. Baker further stated that the management of the Inside Inn had guaranteed 80 per cent of its rooms for the use of the association during convention week, and it also agreed to furnish meeting halls for the American Electric Railway Association at the Inside Inn. The Inside Inn will be a permanent building of 800 rooms with ballrooms and meeting rooms for conventions. It will be used after the close of the exposition for an apartment hotel. In addition to the main building of 800 rooms, the Inside Inn Company will build two wings, making the total capacity about 1500 rooms. The wings will be taken down after the exposition is over. It was voted to report these arrangements to the executive committee of the parent association.

The president then called the attention of the committee to the fact that Mr. Colby had resigned from the executive committee on account of severing his connection with Pierson, Roeding & Company and had accepted a position as vice-president of the firm of Allen & Peck, Inc. This resignation was accepted, and Mr. Colby was unanimously reelected a member of the executive committee as a representative of Allen & Peck, Inc.

The question of raising the fund for the publication of *Aera* by the American Electric Railway Association was then considered and the committee approved a form of letter which is to be sent to members of the Manufacturers' Association.

The president then read a letter from Major H. C. Evans, vice-president in charge of entertainment, resigning this office on account of his continued illness. The resignation was accepted with great regret, and Mr. Colby was elected in his place as vice-president in charge of entertainment.

The president then suggested that a change be made in the meetings of the executive committee for organization so that the advantage of a complete executive committee can be obtained during the convention period. Upon motion the secretary was requested to prepare a letter ballot on the question of altering Article III, Section 1, of the bylaws to read as follows:

"Section 1. Following the annual meeting and prior to the close of the convention the newly elected executive committee shall hold its meeting for organization and shall elect annually from its own body a president and four vice-presidents respectively in charge of entertainment, finance, exhibits and relations with the main association. They shall assume their duties on Jan. 1 of the year following their election and shall hold office for one year until their successors are elected. The above officers are to be elected by a majority vote of the members of the executive committee present in person and voting. The executive committee shall elect a secretary-treasurer, who shall hold office during the pleasure of the committee."

The attention of the executive committee was then called to sundry civil bill H. R. 2441, now before Congress. In this bill the Department of Justice is forbidden to use any of its appropriation to prosecute, under the Sherman anti-trust law, combinations or organizations of labor. Upon motion, the secretary of the association was instructed to send a telegram of protest to President Wilson and the Senate.

The committee also decided to enter the association as a member of the Chamber of Commerce of the United States.

The Engineer contains an article in which a German engineer gives the results of experience on the maintenance of the line through the Simplon Tunnel during the last six years. Some of the overhead insulators appear to have been found defective, and it seems likely that the use of glass as a portion of the construction will be found to be an improvement, as it is more capable than vulcanite of resisting the combined effects of heat and moisture. There have also been found to be certain oxidizing effects produced on the overhead conductors, with consequent considerable wear. At first it was supposed that this was due to the generation of ozone, but it seems now more likely that it is caused by a deposit of soot from the steam locomotives that occasionally pass through the tunnel. An aluminum conductor would be free from this oxidizing effect, but appears unsuitable on other grounds. Some method of painting the conductor seems to have been tried with satisfactory results.

Accounting Versus Statistics

The Writer Points Out Concrete Instances Where the Standard Classification Makes It Impossible Justly to Compare Energy Production Costs and Other Data of Electric Railways—Certain Changes to Correct This Condition Are Proposed

BY MILAN V. AYRES

From time to time the writer has had occasion to make use of the published reports of railroad commissions and similar bodies for the compilation of statistical tables showing comparative unit costs of operation for various railway companies. While so doing he has been much impressed with the abundance of the cunningly concealed pitfalls which they contain for the feet of innocent seekers after truth. Whoever may have been at fault in the past, when each commission was a law unto itself, the American Electric Railway Accountants' Association must shoulder at least part of the responsibility for such of these traps as remain in reports compiled, as is now usual, in accordance with the standard classification of accounts.

The principal purpose of a standard classification is to make the reports of different companies available for comparative statistics, or, in other words, to insure that items of the same name shall always relate to exactly the same subject and be composed of precisely the same elements. Unfortunately the standard classification falls far short of accomplishing this object and in effect provides that, under certain conditions, particular like-named items shall not be made up of the same elements and shall not be properly comparable.

To illustrate the facility with which misinformation may be derived from the standard classification, I have prepared Tables I, II and III from the report of the New York Public Service Commission, First District, for the year ended June 30, 1910. In passing, it may be well to explain that the reason for not taking a more recent year is that, at the time of writing, the report of 1910 is the latest one published.

TABLE I.—COST OF ENERGY AND MAINTENANCE ON NEW YORK LINES

		Interborough Rapid Transit Elevated	Interborough Rapid Transit Subway	Hudson & Manhattan	Brooklyn Union Elevated
Cost of energy per car mile, cents	A	1.63	2.26	2.83	4.59
	B	1.78	2.46	2.94	4.59
Maintenance of way and structure per mile of track.	A	$7,198	$8,108	$15,745	$3,223
	B	$6,537	$8,044	$ 9,391	$3,366
Maintenance of equipment per car mile, cents	A	1.39	1.58	1.66	2.00
	B	1.19	1.23	0.62	2.34

In Table I are given, for each of the four principal rapid transit lines of New York City, the cost of energy per car mile, the maintenance of way and structure per mile of track and the maintenance of equipment per car mile. Two values are given for each item. "A" values are derived directly from the published data. "B" values are corrected, so far as the available information permits, to make them really comparable, as applying to the same subjects. It will be noted that the discrepancy is in some cases startling.

Table II shows in detail the items going to make up the cost of energy. A glance reveals the reason for the very high cost of energy per car mile for the Brooklyn company, namely, that the power is purchased. The Manhattan elevated system also purchases from the subway energy to the amount of $114,000, the price of which is credited to the latter's power cost; and the Hudson & Manhattan Company is credited with $43,000 for power "jointly produced," thus reducing its power bill 20 per cent.

If we may assume that the power exchanged between the elevated and subway portions of the Interborough is charged for at operating cost of production, the cost per car mile is not invalidated by that transaction; but we have no assurance that it is not charged for at a price intended to cover overhead charges and profit.

TABLE II.—ITEMS MAKING UP COST OF ENERGY

	Interborough Rapid Transit Elevated	Interborough Rapid Transit Subway	Hudson & Manhattan	Brooklyn Union Elevated
Power plant employees	$183,704	$192,926	$70,264	......
Substation employees	54,952	68,047	13,455	......
Fuel for power	591,949	862,681	104,511	......
Other power supplies and expenses	93,169	125,382	11,704	......
Power purchased	......	......	400	$1,394,466
Power exchanged, balance	114,194	(Cr.)114,914	......	......
Other operation (power jointly produced)	......	......	(Cr.)43,406	......
Total power	$1,037,967	$1,134,843	$156,929	$1,394,466
Repair of power plant buildings	6,871	10,957	111	......
Repair of power equipment	86,263	92,567	5,753	......
Total cost of power	$1,131,101	$1,238,367	$162,793	$1,394,466

It seems altogether probable that the power disposed of by the Hudson & Manhattan Company under the mysterious designation "power jointly produced" is really sold on a profit-making basis which unjustifiably reduces the apparent power cost of operating its cars. The case of the Brooklyn company has no uncertain elements except the doubt as to whether the power is supplied on a genuinely commercial basis or in accordance with a wholly arbitrary price permissible because of the fact that the power company is owned by the same interests. At any rate, a fair price would include the cost of repair on power plant buildings and equipment, as well as taxes, insurance, interest and depreciation on the same, all of which items are absent from the power cost as given for the other companies.

In Table II, I have added the cost of repairs to power plant buildings and equipment, making the final amounts comparable, except as affected by the purchase or sale of power; but as the latter element enters into each total, there is no assurance that any two are on a really comparable basis. However, the second line of numbers in Table I is computed from these totals as the best available.

It is quite impossible, in the very nature of things, to devise any system of accounting or any form of annual report that will provide an entirely satisfactory comparison of power costs between companies manufacturing their own power and those purchasing it. Nevertheless, the great and growing frequency with which this problem is encountered demands the adoption of a form of report that shall provide all the available data upon which to base those corrections that would make possible a reasonably intelligent comparison between different companies.

What is needed is a recognition of the fact that the manufacture of electric power is an entirely distinct enterprise from operating a railway or "conducting transportation." As an illustration of the absurdity of the standard classification, consider the supposititious but not improbable case of a railway owning a power plant of about twice the capacity demanded by its own needs and selling its surplus power at slightly more than twice its unit cost of operation. It would then appear on the face of the returns that its power was costing it less than nothing, in spite of the fact that its income from power sales might not be sufficient, after meeting the bare operating costs, to pay for even the actual repairs on the power plant, to say nothing of the taxes and depreciation or the interest on the very large investment in this plant.

The production of electric power ought to be treated as a separate manufacturing operation, and every item essential to such treatment should be reported in a special account. This account should give the investment in the power plant, the detailed costs of operation, the output in kilowatt-hours, direct and alternating, the amount of this output used in operating the railway, the amount sold and the income from sale of power. It ought to be unnecessary to add that repairs of power plant and buildings should appear here, instead of being charged to two other entirely unrelated accounts, as at present. With such information available, it would be possible to make very useful and instructive comparisons between the power requirements of different railways, which it is not possible to make from the data given in the reports as now published.

Other errors caused by the present standard treatment of the power question are revealed in Table III.

Table III.—Maintenance Costs as Now Classified

	Interborough Rapid Transit Elevated	Interborough Rapid Transit Subway	Hudson & Manhattan	Brooklyn Union Elevated
Way and Structures:				
(1) Maintenance of way and structure, total	$849,624	$664,444	$202,634	$334,562
(2) Depreciation of way and structure	71,117	(Cr.) 5,605	81,653	(Cr.) 14,751
(3) Maintenance of way and structure, net	$778,507	$670,049	$120,981	$349,313
(4) Repair of power plant buildings	6,871	10,957	111	......
(5) Net maintenance of way and structure, excluding power plant	$771,636	$659,092	$120,870	$349,313
(6) Percentage correction (1) to (5)	−9.2	−0.8	−40.3	+4.4
Equipment:				
(7) Maintenance of equipment, total	$881,566	$792,221	$92,361	$608,285
(8) Depreciation of equipment	37,076	79,257	52,239	(Cr.) 102,710
(9) Maintenance of equipment, net	$844,490	$712,964	$40,122	$710,995
(10) Repairs of power plant	86,263	92,567	5,953	......
(11) Net maintenance of equipment, excluding power plant	$758,227	$620,397	$34,169	$710,995
(12) Percentage correction (7) to (11)	−14.0	−21.7	−63.0	+16.9

In Table III, line 1 shows "maintenance of way and structures" as given in the report, and line 5 shows the actual expenditures for this purpose, excluding power plant buildings. Line 7 shows "maintenance of equipment" as given in the report, and line 11 the actual expenditures, excluding repairs of power plant equipment. Lines 6 and 12 show the percentage difference between the reported and corrected amounts.

It will be noted that "maintenance of way and structures" includes considerable sums spent for repairs of power plant buildings, except in the case of the Brooklyn company, which buys its power. Similarly, "maintenance of equipment" includes repairs of power plant, again with the exception of the Brooklyn company; and in the case of the subway this item alone swells the account by very nearly 15 per cent. The Brooklyn company, of course, pays for both these expenses in cost of "power purchased," so we have here a demonstration of the fact that the standard classification puts these two items sometimes under one account and sometimes under two totally different ones, with the result of making all three accounts absolutely unreliable for comparative purposes.

Referring again to Table III, observe the tremendously disturbing effect of the items of depreciation. "Maintenance of way and structures" and "maintenance of equipment" each include an item of depreciation, usually as a debit, sometimes as a credit. In the former case it has been set aside, on the books, for future replacements; in the latter the fund thus established has been drawn upon for actual renewals. This is in strict accordance with the standard classification, but it results in robbing the totals of the two maintenance accounts of all significance.

As a matter of fact, an amount set aside for depreciation is not a maintenance expense and money taken from a special fund and spent for renewals is not a diminution of maintenance expense.

The first essential of statistical work is that the numbers used shall represent facts and not opinion, guess or estimate. Now, cash expended for maintenance is a matter of fact, but depreciation is a matter of opinion, and wedding matter of fact to matter of opinion is apt to produce a vicious hybrid having the good qualities of neither parent.

Several striking cases of this kind are to be found in Table III. The Hudson & Manhattan Company actually spent $120,981 for maintenance of way and structure and set aside $81,653 for depreciation in that account. In other words, this item was arbitrarily increased 67 per cent. In the same manner, its expenses for maintenance of equipment were increased 130 per cent. On the other hand, the Brooklyn Union Elevated spent $710,995 for repairs and renewals of equipment, of which $102,710 was withdrawn from the depreciation fund, and its expenses on this account were therefore reported 14 per cent less than the facts.

I suppose it will be asserted, for instance, in the case of the Hudson & Manhattan Company, that its maintenance is low because its "ways, works and machinery," to use a legal phrase, are new, and that the amounts allowed for depreciation only bring up the totals to a point they may be expected to reach on the average after a few years of operation, the result thus being a fairer indication of the real cost of operation than a true statement of expenditures would be. Similarly, it may be claimed that the Brooklyn company spent more than the average amount on its equipment in 1910 and that the result reached by subtracting the $100,000 taken from the depreciation fund is a true measure of the average expenditure for that account.

There are two answers to this kind of argument. First, in actual practice depreciation allowances are not made up in that way, as anyone familiar with the facts will testify. Second, even if they were, a maintenance cost arrived at by the process in question would have the same value for statistical purposes as a figure purporting to give the number of deaths by tuberculosis would have if it had been increased 25 per cent by the compiler on the ground that it was, in his opinion, that much below a proper average.

The treatment of depreciation is too controversial a question to be here discussed in all its ramifications, but it is permissible to express the opinion that there is no necessity, and no decent excuse, for intruding the controversy into the maintenance accounts. These accounts should cover the actual expenditure for repairs and renewals and nothing else.

It seems to me that depreciation should be handled as a special fund which might, if desired, be divided into three portions—"depreciation of ways and structures," "depreciation of power plant" and "depreciation of equipment"—although I think such a division would be of dubious advantage. Amounts paid into or taken from this fund should be treated in the annual report as debits or credits under "deductions from income." "Depreciation" should be placed as close as possible to "dividends," because, like the latter, it is not a result of operation but a matter of arbitrary decision and because it ruins for statistical purposes all operating items into which it enters as a constituent.

As a means of improving the value and availability of electric railway statistics, I suggest the adoption by public service commissions, municipal, state and national, of a standard form of report, to be based upon a revised standard classification of accounts. The principal revision of the standard classification should be, first, the removal of the items of repairs of power plant and buildings and power plant equipment from the two accounts, "maintenance of way and structures" and "maintenance of equipment," where they now appear and their segregation in a new account, "maintenance of power plant"; second, the inclusion in the general balance sheet of a separate item, "investment in power plant," and, third, the elimination of depreciation from the maintenance accounts and its treatment as a special fund classed with "deductions from income." The standard report should also include under "statistics of operation" the number of kilowatt-hours, direct and alternating, manufactured, sold and purchased.

Moreover, some of the other pitfalls referred to at the beginning of this paper but not yet touched upon could be avoided by wise provisions in the "statistics of operation." For instance, in the usual commission report "car miles operated" includes the mileage of all cars, home and foreign, on the company's own system. If this is the case, the derived statistics, "cost of power per car mile" and "maintenance of way and structures per car mile," are probably quite correct, but "maintenance of equipment per car mile" will certainly be wrong if there is much interchange of cars. A company which sends many of its cars over foreign tracks will be paying for a maintenance due to mileage which does not appear in the report, while the foreign company in question is credited with more mileage than its cars perform. For this reason "maintenance of equipment per car mile" as calculated from the commission reports usually appears higher than the facts justify in the case of interurban companies and correspondingly too low for the city companies concerned.

When the trainmen of the interurban company operate its cars on the city tracks, its cost of "operation of cars per car mile" is also unfairly inflated. These statistics could be accurately calculated if the necessary data were included in the proposed standard report, as also some other matter occasionally in error as a result of intercompany operations.

The form of standard report to be used by the commissions, should prescribe a complete set of original and derived statistics, and the exact meaning or method of derivation of each item should be authoritatively defined. The companies would, of course, report only their original accounts and statistics, the derived values being computed and tabulated by the commission.

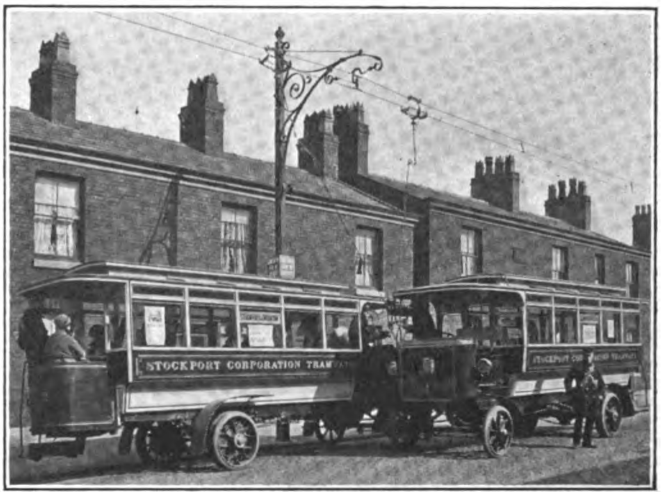
An authoritative selection of the most significant statistical facts and their embodiment in a standard classification for general adoption is to-day recognized by professional statisticians in all branches as of fundamental importance. This has been partially done for electric railway statistics by the adoption of the standard classification of accounts, but that work was done primarily for accounting purposes, principally by accountants, and from the accounting point of view. It needs to be revised now from a statistical point of view and merged into a new and more complete classification drawn by statisticians for statistical purposes.

NEW GERMAN NARROW-GAGE RAILWAY

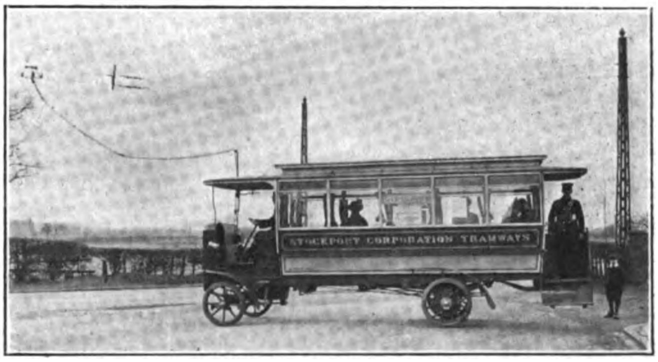
The Allgemeine Elektricitäts Gesellschaft has arranged to construct a meter-gage (39.37 in.) passenger and freight electric railway in the Prussian Riesengebirge for a total length of 17.2 miles, joining the towns of Schmiedeberg, Krummhübel, Brückenberg, Hermsdorf, Birkigt and Steinseiffen. The ruling grade will be 1.2 per cent. The maximum operating speed of the line will be about 18.6 m.p.h. The capital for the construction is $900,000, consisting of two lots of shares of $375,000 each, held respectively by the contractor and the communities concerned, and $150,000 in 4 per cent bonds, held by the latter. The communities will provide the right-of-way free in addition to which the town of Schmiedeberg will give a cash subsidy of $12,500.

STOCKPORT TROLLEY OMNIBUS SERVICE

Another addition to England's trackless trolley installations is that of the Stockport Corporation, which has now been in operation for several weeks on a route nearly 2 miles in length, starting from the center of the town. The undertaking is the first in England which is equipped with a flexible trolley connection, so that one pair of wires is sufficient for vehicles traveling in either direction. As shown in one of the accompanying illustrations, the current collector gear is unhooked and is then exchanged anywhere by the drivers of meeting cars. The Bremen system of current collection was adopted, the two wires being erected in perpendicular parallel, an arrangement which permits the upper or return wire to serve as a guard wire if necessary. Another special feature of this installation is the adoption of lattice steel poles, which are uncommon in England. R. Lomax, the corporation's electrical engineer, superintended the erection of the overhead work, which was carried out by the corporation's own staff.



Stockport Trackless Trolley—Opposing Cars Interchanging Current Collectors



Stockport Trackless Trolley—Standard Omnibus

The vehicles were supplied by the Brush Electrical Engineering Company, of Loughborough. They have a change speed control system which is operated entirely by means of pedals, leaving both hands of the driver free for steering purposes. A single 35-hp interpole motor is employed and in most respects the vehicle is similar to the best types of gasoline-electric motor omnibuses, but substitutes for the engine and generator the current collector device, which enables the use of central-station energy.

Public Service Publicity Work

An Account of the New Jersey Corporation's Experience Under a Policy of Keeping the Public Fully Informed—Methods and Results of a Four-Year Experiment in Publicity

The first door on the left of the street entrance to the Public Service Corporation Building in Newark, N. J., opens into the office of the corporation's publicity department. Note the accessibility of this department, for this is important; it is representative of the first fundamental of a policy of publicity, namely, to make it easy to get information.

Some four years ago the Public Service Corporation of New Jersey decided that there was need for the services of a publicity representative. The corporation was tired of misrepresentation. It was not trying to conceal anything, befuddle anybody, or to control the press. It had something to say; it had facts to present in place of popular misconceptions; it had to satisfy the entirely proper and natural curosity of some 2,000,000 people as to why it did this, why it did not do that, or what it was going to do about something else affecting the interests and convenience of these 2,000,000 car riders and users of the electricity and gas supplied by the corporation. And so it employed a publicity man whose business it is to keep the press and public informed about everything that they want to know or ought to know about a public utility company.

The corporation's publicity experience is worth knowing about; it rests on successful methods, the emulation of which will prove useful to other companies, and it amply confirms the conviction long held and often expressed in these pages that educational publicity is not only feasible, but is a thoroughly practical and necessary activity of the public utility company that stands four-square to the world and asks only for a fair hearing.

THE MAN FOR THE WORK

Following a decision to adopt a policy of systematic publicity, the next step is to find the man for the work. The Public Service Corporation found its man in John L. O'Toole, who had been in newspaper work for seventeen years, seven years of the time as city editor of the Newark *Evening News,* the most influential newspaper in New Jersey. He knew news and newspapers, and he was told that there were a desk and a chair and a stenographer; that the corporation wanted the public to know the facts about its operations and that the details were up to him. At first neither the corporation nor Mr. O'Toole knew exactly what he was to do—what was expected of him. Now his problem is to find time to attend to the duties that have steadily multiplied in number and character until they run all the way from a morning call for information from a commercial organization to a midnight telephone message from a newspaper that wants to know the details of the terrible accident at Pensauken which, when sifted down, proves perhaps to have been no more than that which often happens to a late car rider who alights backward while passing a trolley pole.

"TROLLEY TALKS"

At the start of its publicity campaign the publicity department ran, at weekly intervals for six months, a series of "trolley talks." These were paid advertisements covering every phase of electric railroading in which the public has an interest. This series laid the foundation of the campaign and was of no little educational value to employees of the company, as well as to the public at large.

Almost as important as the substance of these talks was the tone or style in which they were written. There was a man-to-man flavor about them that ought to have and probably did carry conviction. Facts were given about the trolley system and the business of supplying gas and electricity that were commonplaces to the corporation officials but eye-openers to the man in the street. In one of the early articles there was this statement:

"We are well aware of the fact that many of the criticisms leveled at us have been unjust and unmerited because they were based on a misapprehension of the facts. We are not finding fault with honest criticism. On the contrary, when just criticism is offered in a spirit of fairness, we will welcome it and try to profit by it, but we do not think that we should be measured by the standard of the irresponsible critic who puts surmises forth for facts, lets prejudice supplant judgment or permits a plain grouch to take the place of reason."

Another article contained these paragraphs:

"When you hear a young man talking about what he would do if he were only running the trolley roads it doesn't necessarily follow that the speaker is endowed with superior talent which would enable him to stand out pre-eminently as an operator in the street railway world. Maybe, when it came right down to facts, the same fellow wouldn't be able to tell the difference between a deck sign and a switch iron.

"But we all talk, and it seems to be one of the weaknesses of human nature that makes men believe they could do so much better than the other fellow if they were in the other fellow's place. That's why so many people think they could run a hotel, a newspaper or a baseball team."

Trolley Car As a
Bulider of Cities

HAVE you ever considered the electric street railway as a developer of property? If you haven't, let PUBLIC SERVICE give you a few facts to think over.

It is natural for people to want to live as comfortably as their means will permit.

It is essential that the home surroundings should be as healthful as it is possible to make them.

It is equally true that people must live within easy reaching distance of their places of employment.

Without reasonable transportation facilities people would have to live closer and closer together as the population of the cities increased.

That would mean congested districts. It would be detrimental to health and comfort.

TROLLEYS MAKE HOME SITES AVAILABLE.

With trolley cars operated at regular intervals and under short headway the available area for home sites is greatly extended.

That means a chance for the urban population to disperse. It affords an opportunity for the relief of congested districts It adds to the comforts of living. It promotes the public health.

In making it possible for people to live under more healthful conditions the street railway also confers material benefits of inestimable value.

No other single influence has contributed as much to the development of outlying city property and suburban territory as has the electric street railway. No other one factor has added as much to the public wealth.

TROLLEYS ADD TO PROPERTY VALUES.

Every outlying piece of property brought within easy access of a trolley road is thereby increased in value.

Every dollar of value added to a property by the proximity of a trolley road is a benefit conferred on the owner of that property.

Every increase in the value of a property benefited by a trolley road is an addition to the public wealth in which all the inhabitants of a community indirectly share.

Municipalities base their ability to perform the functions of government which add to the comforts of living on their taxable ratables. Street railways increase the land values, which means that the trolley car does more for a community than simply carry its inhabitants. It helps to build up cities.

Public Service Publicity—Typical "Trolley Talk"

The articles pointed out that from 1903 to the time they were written the company had expended more than $30,000,000 in improving its railway and gas and lighting systems, built or rebuilt 156 miles of track, added 860 cars to its rolling-stock equipment, and increased its power station capacity from 47,700 kw to 102,900 kw; that it was carrying annually about 300,000,000 passengers; that about 65 per cent of each day's riding was done within five hours, and that the cost of supplies of every kind and the cost of living had increased, but that more transportation was being given for 5 cents in the district served by the company than ever before.

RELATIONS WITH THE DAILY PRESS

Since the corporation's advertisements were completed, three and one-half years ago, the publicity work has been carried on by means of statements to the press in general and by supplying specific information to individuals and individual papers. Occasionally, if there is an event such as the gathering of a fleet of warships in the Hudson advertisements will be inserted calling attention to the fact and telling how best to reach the scene by means of the company's cars. But with such exceptions there is very little paid railway advertising put out by Mr. O'Toole's department.

When he began his work Mr. O'Toole advised every newspaper in Public Service territory—170 weeklies and thirty-two dailies in 202 municipalities—that he was at its service day or night whenever it wanted information. He told the newspapers that he would tell them the truth about Public Service affairs; that if he could not give them the details of any particular matter, he would tell them so, but he would not mislead them by the easily spoken formula, "There is nothing at all in that." As to the information sent to the press in general, Mr. O'Toole's rule has been this: "Never send to the newspapers a story that as a city editor I would not send for if I knew it was to be had." It is this rule that keeps publicity matter out of the editor's waste basket and lands it on the front page or near it.

As an example of the way news notes are handled, the statement sent out by the department on the progress of the corporation's welfare plan is reproduced herewith:

"A report has just been made to the executive committee of the Public Service Corporation of New Jersey showing the first year's operation of the company's welfare plan for employees. Put into operation Jan. 1, 1911, the system of paying life insurance, sick benefits and pensions to employees or their beneficiaries has cost the corporation and its subsidiaries $48,788.87 in twelve months. This money was paid without any assessments or dues levied on the men.

"When the plan was put into effect it was estimated that it would cost the corporation $50,000 a year to carry it along. This figure was based on 10,000 employees at a per capita cost of $5. In actual operation the per capita cost was below the estimate, for the $48,788.87 spent covered 10,215 employees on an average of $4.78 each.

"As might be expected, the sick benefit feature cost the most money. During the year 1068 employees were helped to the extent of $22,955.67. The list of ailments included pretty nearly every form of illness to be found in a hospital's catalog. There were sixty-three deaths which resulted in insurance payments amounting to $18,375.89, the odd amount being accounted for by the fact that the committee paid funeral expenses in several instances where the deceased had not been eligible for the insurance payment. Twenty-four employees were placed on the pension rolls after faithful service, for which the companies paid $5,495.65.

"Most of the burden of the welfare plan fell upon the Public Service Railway Company, owing to the fact that this company employs about 58 per cent of the Public Service army. These 58 per cent received 62 per cent of the total benefits conferred. Of the applications for insurance thirty-one were railway men, thirteen from the gas company, fifteen from the electric companies and four from other affiliated companies. Of the causes of death, pneumonia and tuberculosis led with twelve each, and heart disease followed with ten. Of fatal accidents there were only five out of the 10,215 employees, and these five were linemen. The railway company furnished 860 of the total number of applications for sick benefits, the gas company 111, the electric company sixty-two and other companies thirty-five. On the pension roll the railway company again leads with thirteen names, the gas company has seven, the electric company one and other companies one. Five men were eligible for pensions when the plan went into effect and these were at once placed on the list. Nineteen others were added and two died, leaving twenty-two on the roll at the close of the year.

"The welfare committee, which is in charge of the work and of which Second Vice-president John J. Burleigh is chairman, announces that it has not strictly adhered to the rules laid down in administering the work, 'but has many times exercised its discretionary powers and provided for the alleviation of suffering and want even in situations not contemplated by the act.' The committee also points out that the sick benefit payments in the aggregate provided for 22,956 days, or sixty-two years, nine months and twenty days' time."

RELATIONS WITH OTHER OFFICIALS

In an organization as large as the Public Service Corporation news of real value to the public and the company may easily be overlooked by officials who are busy with other things than publicity. The same thing happens in all public utility corporations, large or small. It is the publicity man's particular business to see that these opportunities do not go to waste; he keeps in touch with all departments all the time—something that very few officials are supposed to do. That the Public Service Corporation has a clear conception of the possibilities of the right kind of a publicity man, his work and its relation to the corporation's aims as a whole is shown by the fact that its publicity representative is a member of the executive committee on which the railway, gas and electric companies are represented. In that position he knows things in time to make good use of them; he can anticipate and advise in so far as publicity matters are concerned. He is not kept on the outside of affairs and limited as are so many publicity men to the "canned goods" that might as well be given out by an office boy if they are to go out at all.

RELATIONS WITH THE PUBLIC

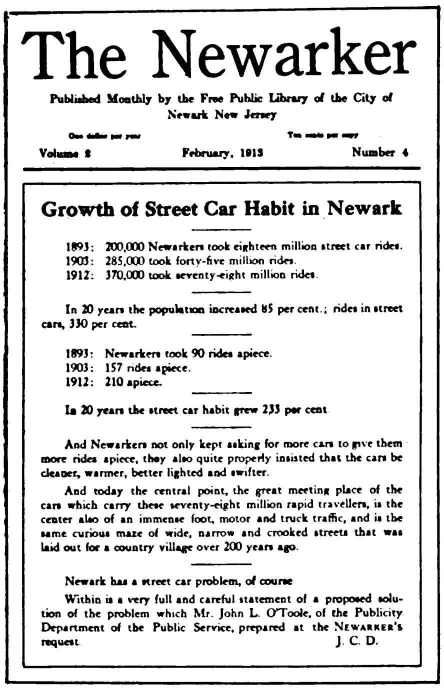
Not all of the publicity man's work is with or for the newspapers. There are commercial bodies, improvement associations and civic clubs to keep informed; there are complaints from individuals to answer, and these go to Mr. O'Toole's desk and receive prompt attention; there are innumerable questions to answer from all sorts of sources, and where sore spots develop there is need for a presentment of the company's explanation, perhaps to a section of a community, perhaps to an individual. All of this work is done by one man and a stenographer, aided by the telephone exchange that covers every point on the Public Service system. Incidentally it may be mentioned that anybody anywhere in Public Service territory can reach the company's main office by telephone without any further cost than a local call.

No complaint is too trifling or from too humble a source to receive attention. If a rider complains of incivility or poor service or what not, his letter is first acknowledged, with the promise that the matter will be investigated. Then this investigation is really made, and the result promptly communicated to the complainant. If it has been found that the company or one of its employees is at fault, this is acknowledged, and the patron is told what has been or will be done to correct the fault. Aside from specific good results from this policy, the conviction is generally established that it is worth while to make a complaint, and that the corporation not only welcomes complaints, but what is more important, acts on them. Of course, the real or supposed grounds for complaint cannot always be removed, but at least the receipt of a complaint gives an opportunity to explain the reasons for a condition that may be objected to, and the opportunity is valuable; it results in removing soreness that if unknown or ignored might develop into serious trouble.

The publicity department does not wait for complaints to come in. It goes out and looks for them. It may find them in the press, which is carefully watched, or on the street or among the members of local associations. The latter often ask the publicity man to address them, and such occasions afford a splendid opportunity not only for educational work but for establishing a personal relation that counts for future good understanding. If a neighborhood club or association starts a complaint about some feature of service, an opportunity for the railway company to be heard will be sought by the publicity man. "Sometimes I have to listen to pretty hard knocks at these meetings," Mr. O'Toole says, "but the discussions are usually productive of some good."

ONE INSTANCE OF PUBLICITY WORK

Quite recently the Public Service Corporation worked out the plans for a four-million-dollar trolley terminal in the heart of Newark, which made necessary legislative and municipal action and for which public support was highly desirable. The way in which this project was introduced is representative not so much of publicity work in general as of the consciousness that the way to get good will is to take the trouble to explain. Acting along these lines, there was prepared a full story of the terminal project, with pictures, maps and plans. This was given to the newspapers subject to release the day when the plans were presented to the city authorities for consideration. The result was thoroughly adequate and favorable announcements in the press. These were followed up by President McCarter, who gave what amounted to an illustrated public lecture on the terminal plans before the Board of Trade. Later this exposition was repeated at a public meeting arranged by the Board of Works of the city. As a means of more permanent publicity than the newspapers afforded, an elaborate illustrated article was prepared for a publication, *The Newarker,* issued by the Public Library. The result of this effort is that there is virtually no opposition to the terminal project, mainly because people know what it is. The prospect is that the company will get what it wants, the public will get an improvement of great value to it, and everybody will be happy, largely because publicity made the corporation's plans understood in advance.



The Newarker

Published Monthly by the Free Public Library of the City of Newark New Jersey

One dollar per year Ten cents per copy

Volume 2 February, 1913 Number 4

Growth of Street Car Habit in Newark

1893: 200,000 Newarkers took eighteen million street car rides.
1903: 285,000 took forty-five million rides.
1912: 370,000 took seventy-eight million rides.

In 20 years the population increased 85 per cent.; rides in street cars, 330 per cent.

1893: Newarkers took 90 rides apiece.
1903: 157 rides apiece.
1912: 210 apiece.

In 20 years the street car habit grew 233 per cent

And Newarkers not only kept asking for more cars to give them more rides apiece, they also quite properly insisted that the cars be cleaner, warmer, better lighted and swifter.

And today the central point, the great meeting place of the cars which carry these seventy-eight million rapid travellers, is the center also of an immense foot, motor and truck traffic, and is the same curious maze of wide, narrow and crooked streets that was laid out for a country village over 200 years ago.

Newark has a street car problem, of course

Within is a very full and careful statement of a proposed solution of the problem which Mr. John L. O'Toole, of the Publicity Department of the Public Service, prepared at the NEWARKER'S request. J. C. D.

Public Service Publicity—Front Cover of Library Paper Containing Story on New Terminal

THE RESULTS

What are the tangible results of the publicity work as a whole? Obviously, the corporation is measurably satisfied with the results or the work would not be continued and have an increasingly important place in the organization. More definitely speaking, the publicity work has lessened senseless and uninformed criticism; it has replaced misinformation by facts; it has created the habit of seeking information, always easily obtained, instead of printing unfounded rumors; it has convinced most people and most newspapers that the corporation is trying to do the right thing by those it serves, and that there is a reason, other than indifference on the part of the company, even for the things that nobody likes about the operation of an electric railway. Criticism and attack have not been stopped. It would be a miracle if any company could please 2,000,000 people, but publicity has resulted in keeping criticism down to what may be called the normal level of human dissatisfaction with anything that so vitally concerns the public as do light, heat and transportation. The corporation has not been nor does it seek to be placed in a position where it can give poor service or endeavor to get more than its due without bringing down anathemas on its head. It has succeeded in creating an atmosphere and an attitude on the part of the public which secures it a fair hearing and a square deal most of the time, and which tends to establish the feeling that the corporation is progressive and ably managed—a very different situation from that in which the public utility is always assumed to be in the wrong and its shortcomings attributed to incompetency or worse causes.

This is all that publicity can do, but this accomplishment makes it worth much more than it costs.

MACHINERY EXHIBITS AT THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION

Rapid progress is being made in the construction of the main exhibit buildings at the Panama-Pacific International Exposition at San Francisco. The first of the buildings is now completed and five other structures are under way. There will be fourteen main exhibit buildings all told, and contracts will be let upon the remainder to bring all to completion by July, 1914. Work upon the Machinery Building, the largest of the exhibit group, was begun early in the year and the framing of the main portion of the structure is partly completed. This will permit the complete installation of exhibits by the opening date, Feb. 20, 1915. The Exposition management plans a record not only in construction but by presenting a finished spectacle on the opening day.

The department of machinery exhibits is thoroughly organized and filings for exhibit space have been received to an extent that assures a display commensurate with the importance of the industry. Early applications are especially welcomed by the Panama-Pacific management and will facilitate the proper grouping of the exhibits and the perfection of other arrangements essential to the interests of exhibitors as well as to the Exposition.

For the information of exhibitors the following brief data have been forwarded by the Exposition company:

The Machinery Building will have nearly 8 acres of floor space. In addition there will be an auxiliary structure to be known as the Gas and Fuels Building. Electrical machinery, instead of being placed in a separate building, will be located in the Machinery Building and classed under the general heading of machinery. All parts of the building will be served by adequate crane facilities. Electric current, alternating and direct, gas and water, will be available in any portion of the building; compressed air and steam will be provided in a section adjacent to the Gas and Fuels Building. General illumination is to be provided by the Exposition company, but a nominal charge will be made to exhibitors for other utilities service they desire. Special rates for power will be made to exhibitors who use it to show machinery in motion.

The floor of the Machinery Building is designed for a load of 200 lb. per square foot. The soil conditions will permit adequate foundations for heavy machinery to be readily constructed. No charge will be made for space.

The management urges that concerns and individuals desiring to participate lose no time in getting into touch with the Exposition company and filing applications for space.

Copies of the rules and regulations, documents as to the classification of exhibits, blank applications for space and other information prepared for the guidance of exhibitors will be promptly forwarded on request to the Panama-Pacific International Exposition Company, San Francisco.

Report on Chicago Conditions

A Summary of the Report of the Board of Supervising Engineers Just Published, Discussing Financial Statistics, Improvements in Method of Welding Rail Joints, Proper Location of Carhouses and Fire Insurance of Railway Properties

The Board of Supervising Engineers, Chicago Traction, has issued its fourth annual report covering the year ended Jan. 31, 1911. In the introduction the board says that the results of operations, considered in connection with the increasing complexity of operation in the central business district and the correspondingly greater difficulty of providing proper service for railway patrons, "lend additional emphasis to the insistent demands for immediate progress toward improved rapid transit facilities and the unification of the operating properties."

The cost of the rehabilitation work at the close of the year stood as follows:

TABLE I—SUMMARY OF REHABILITATION VALUES TO JAN. 31, 1911

Company	T. V. C. Valuation	Rehabilitation Value to Date	Total Capital Value to Date
Chicago City Railway	$21,000,000	$20,000,243.27	$41,000,243.27
Chicago Railways	29,000,000	35,295,927.25	64,295,927.25
Calumet & South Chicago Railway	5,000,000	2,888,012.75	7,888,012.75
Southern Street Railway	775,000	735,963.72	1,510,963.72
Chicago Consolidated Traction Co. (within the city limits)	....	*3,930,684.51	*3,930,684.51
	$55,775,000	$62,850,831.50	$118,625,831.50
North and West Side Systems:			
Chicago Railways, including Chicago Consolidated Traction Co.	$29,000,000	$39,226,611.76	$68,226,611.76
South Side Systems:			
Chicago City Railway, †Southern Street Railway and Calumet & South Chicago Railway	26,775,000	23,624,219.74	50,399,219.74
	$55,775,000	$62,850,831.50	$118,625,831.50

*Consolidated lines within the city limits at "rehabilitation value" purchased by Chicago Railways as an extension to its property.

†Southern and Calumet lines operated by the Chicago City Railway under ordinance agreement.

The expenditures of the board amounted to $282,164 for the year as compared with $301,278 for the year previous, or a total to date for the four years' work of $980,667. For the four years' operation the engineering and supervision of such construction work, represented by $62,850,831 capital value, average 1.56 per cent, which is slightly reduced from the previous year. If to this be added the engineering expenses of the individual companies, the total per cent expenditure incurred in supervising the rehabilitation of the Chicago traction systems under the terms of the ordinances will be obtained, which at the end of the fiscal year covered in the report was 1.95 per cent of the total cost of the work.

STATISTICS

The chapter devoted to the review of statistics says in part:

"Earnings have rapidly increased during the past three years, and for the year 1910 increased $2,323,000, making the total gross receipts for the year $25,156,000. This is an increase of 10.2 per cent. Operating expenses, not including taxes, decreased during this period from 66.5 to 62.2 per cent, showing clearly the result of rehabilitation in promoting efficient operation. Total operating expenses, including taxes and a small portion of renewals, were fixed by ordinance at 70 per cent during the rehabilitation period. Since the closing of the rehabilitation period of the City Railway in April, 1910, this total operating ratio has decreased.

"The maintenance account stands at practically the same level of actual cost as in 1907, naturally resulting in decreasing per cent expenditure. This reduction from 14.4 to 10 per cent reflects the effect of improved physical condition of the properties.

"While the actual cost of power and car operation has increased with the growth of traffic, the percentage cost is lower than in any previous year. Taxes stand as in 1909.

"The city's share in traction earnings has progressively decreased from year to year (likewise the companies' share), owing to the purely temporary condition that capital invested is increasing twice as fast as the earnings, due to rehabilitation. Thus, increasing interest charge on this growing investment overbalanced the growth in divisible net receipts during 1907, 1908 and 1909, but during the past year, with the cessation of active rehabilitation on the City Railway lines, the divisible net receipts began to grow and the earnings will henceforth increase much more rapidly than the investment or the interest thereon. The total income to the public in the form of the city's share and taxes has increased from $2,000,000 to $2,700,000 per year, or practically 11 per cent of the gross income during the past four fiscal years. Within the same period the total return to the companies has increased from about $4,000,000 to $6,620,000 annually, corresponding to 26.3 per cent of the gross receipts. In the future the companies' increase in returns should be largely a matter of increase in the net earnings, owing to the relatively slow increase in capital account as compared with the past.

"Maintenance still requires an expenditure of about 10 per cent of the gross receipts, which is considerably in excess of the amount contemplated by the ordinances (6 per cent). However, this 6 per cent represents the minimum to be expended, additional maintenance being compulsory if deemed necessary by the board.

"The power account stands practically stationary at 11 per cent. Damages have increased slightly, to 7.8 per cent, and general expenses have decreased to about 4 per cent.

"The major operating account—operation of cars, including platform expenses, carhouse service, etc.—shows a continued decrease to 28½ per cent. This decrease is largely due to the more efficient operation possible after completion of rehabilitation. While work was being conducted with torn-up streets and diverted routes, operation could hardly be maintained with the same degree of efficiency as with the new and unobstructed permanent way.

"Capitalization has increased to $118,625,831 since 1906, including three new properties valued at $9,705,684—the Consolidated, Calumet and Southern properties. The gross increase of about $68,600,000 is equivalent to $17,150,000 per year; or, deducting the original values of the above properties, the net increase in capital value due to rehabilitation work and betterment on all properties was about $58,900,000. This is equivalent to a net annual increase of $14,725,000, or of 16.6 per cent on a mean value of $88,450,000 for all the properties now under the supervision of the board for the four years of the reconstruction ended Jan. 31, 1911.

"Since 1907, inclusive, all properties have earned a total of $87,231,254, with an average annual increase of $2,110,845, or 9.6 per cent. Thus it appears that the investment has increased nearly twice as fast as the earnings.

"The public has received in direct cash payments for city's share and taxes $9,372,052, or an average of $2,343,019 per year. Of this amount the citizens of Chicago received 63.3 per cent direct in city's 55 per cent, and 93.8 per cent including the portion of the taxes, 83 per cent, that went to city corporate, school, park, lake shore protection, Sanitary District and town government, the balance going to county and state government for taxes.

"The companies have retained out of operation a total of $21,017,562 in interest and operating share. The latter amount aggregates about 23 per cent of the total gross receipts, which is applicable to the companies' outstanding capitalization.

"The respective returns to company and the public in per cent on capital value, as defined by the ordinance, stand as follows for the year 1910: Traction companies (including interest), 5.585 per cent; return to the public (including taxes), 2.295 per cent; total (including interest and taxes), 7.88 per cent."

TRACK CONSTRUCTION

The portion of the report devoted to track and roadway gives considerable space to a new type of track construction known as No. 2-B. The other previous standard sections were described in the ELECTRIC RAILWAY JOURNAL of Oct. 5, 1912. On the new section and on improvements made in the process of electric welding, the report says in part:

"A new type of track, which in foundation is the same as type 2-A, was designed during the year to permit the use of a 7-in. 91-lb. T-rail. This type was called type 2-B. Approximately 3 miles of this type of construction was placed on Grand Avenue, between Sixtieth and Seventy-second Avenues, in the territory of the Chicago Railways Company. The pavement was granite and the blocks between gages were headed under the rail, set in cement and sand, and grouted. This type was constructed in order to obtain comparative data for T and girder rail on the same type of foundation, as well as to determine the wearing value of granite pavement when used with T-rail.

ELECTRIC WELDING

"A continued improvement in the process of electric welding, which has been employed throughout the city on nearly all of the rehabilitated track, is reflected in the record of rail joint failures for the past year. At the end of the fiscal year 1910, 61,700 joints had been welded, which will have been increased to about 100,000 at the end of the 1911 fiscal year. The results for the past four years have been recorded in Table II.

"The improvement inaugurated after the first year's experience has continued, and it will be of interest to record briefly several apparent reasons therefor:

"(1) The general conditions which exist in the rewelding of any large rehabilitated property are that, as a rule, construction work begins on the outskirts and progresses toward the business center, so as to introduce the minimum interference with traffic. In the early Chicago work the extremely poor conditions of the existing track return made it difficult or impossible to draw from the trolley system sufficient energy for welding under normal conditions, which resulted in taking two or three times the amount of time to make the weld that would have been the case if the normal voltage could have been maintained.

"(2) The standard 129-lb. rail, adopted for Chicago, was considerably heavier than sections previously handled in rewelding processes, and it was developed that the additional metal in the head of the rail interfered somewhat with the capacity of the welding transformer, apparently due to magnetic stray currents flowing through it. Under the abovementioned condition of low trolley voltage, this interference rendered effective work difficult.

"(3) The carbon content of the Chicago rail was somewhat higher than usual, it being the practice to use a higher carbon with a heavy section rail than is customary with light sections. The welding difficulties apparently increase with the increase in percentage of carbon.

"Soon after the extensive failures began to develop, experiments were begun by the welding company, resulting as follows:

"(1) By the use of a flux, a more perfect metallic weld was produced than without fluxing, and the strength and uniformity of the welds increased by two or three times in many cases. The use of this flux began with the 1908 work.

"(2) By applying pressure gradually during welding and keeping the weld under compression in the jaws of the machine until the metal had set, a much tougher weld was produced.

"(3) The size of joint bars was increased, as a number of failures had occurred through the bar section, but owing to the excessive power required for a satisfactory weld, the dimensions were reduced to 1 1/16 by 3½ in."

TABLE II—SUMMARY RECORD OF ELECTRIC-WELDED RAIL JOINTS BY YEARLY GROUPS

		Year Joints Originally Welded			
		1907	1908	1909	1910
1907	Welds	8,281	....	....	....
	Breaks	417	....	....	....
	Per cent	5.04	....	....	....
1908	Welds	8,297	18,371	....	....
	Breaks	119	297	....	....
	Per cent	1.43	1.62	....	....
Total to 1909	Welds	8,297	18,371	....	....
	Breaks	536	297	....	....
	Per cent	6.46	1.62	....	....
1909	Welds	8,299	18,380	21,716	....
	Breaks	92	91	104	....
	Per cent	1.11	0.50	0.48	....
Total to 1910	Welds	8,299	18,380	21,716	....
	Breaks	628	388	104	....
	Per cent	7.57	2.11	0.48	....
1910	Welds	8,320	18,413	21,734	13,233
	Breaks	82	113	213	35
	Per cent	0.99	0.61	0.98	0.26
Total to 1911	Welds	8,320	18,413	21,734	13,233
	Breaks	710	501	317	35
	Per cent	8.53	2.72	1.46	0.26

BUILDINGS AND FIXTURES

In discussing this subject the board takes up the question of open storage, carhouse location and insurance. It refers to the arguments in favor of open and closed storage and says that while closed storage has been employed the board has authorized the trial of two open storage yards. One is at Forty-eighth and North Avenues, where one inclosed bay has been constructed along the lines of closed carhouses, but the construction of the remaining bays has been stopped at the track level so as to afford the open storage yard. At the same time the erection of a superstructure in the future is easily possible should open storage prove undesirable. At Lincoln and Wrightwood Avenues the yard is inclosed by a brick wall and has a frontage similar to a carhouse front with entrance openings provided with rolling doors. This unusual feature has been adopted partly because the frontage of the property would be marred by an open yard and partly because owing to the densely built up neighborhood the demands for fire protection necessitate the complete inclosure of the open storage area. The storage yard is paved with wooden blocks.

In discussing carhouse locations the report says that while the carhouse should be located so as to reduce the dead revenue mileage to the lowest possible point, three considerations should be borne in mind: (1) In order best to serve the all-day cars, the carhouse should be located directly at the outer extremity of the route; (2) in order to best serve the rush-hour cars, the storage yard should be located reasonably near the center of the city, and (3) as the size of the city increases these opposing conditions become greater. Hence the board recommends a zone system of carhouses with the limits of the two zones tentatively located at the 4-mile and 7-mile circles respectively but varying widely for individual lines. This plan contemplates the housing of equipment operated continuously throughout the day in the outer zone buildings, while those of the inner zone could be used to good advantage for housing during the daytime extra rush-hour equipment originating in the carhouses of the outer zone, as well as housing the cross-town cars. The report continues:

"This plan admirably facilitates the working out of a further extension of this zone system of operation. Owing to the large percentage of short-haul riders out of the total surface traffic, it occurs that a very large proportion of the extra rush-hour cars are not required to run to the extreme end of the route, but by switching back after the load has been dropped, more extra rush-hour trips may be accomplished and correspondingly better service may be given to the majority of riders with the same amount of equipment and expense of operation. Thus long thoroughfares intersected by numerous heavy transfer lines may have from two to four short runs superimposed upon the through run. This is in effect scientifically grading the service according to the traffic occurring along the route.

"It will now be evident that the carhouses of the inner zone will admirably fit into such a scheme of 'zone operation' which may ultimately be developed to cover the entire system. This would be especially advantageous in the event that all lines of the city are co-ordinated under one management. At the present time this plan could be only partially carried out. There are, however, eight carhouses approximating the inner zone—3 to 4 miles—and six approximating the outer or terminal zone—6 to 9 miles."

FIRE INSURANCE

The report also shows the record of expenditures of all companies by years for fire insurance. Thus while the total payments have increased from $122,000 to $169,000 in four years, the insurable property values have increased from $18,000,000 to $35,000,000. Expressing this in per cent of capital value, the insurance expenditures of all companies have progressively decreased from 0.727 per cent in 1907 to 0.486 per cent in 1910, or to 49 cents per $100 value.

The report continues:

"The major part of this reduction has resulted from the use of fireproof construction in carhouses, but there still remain some buildings upon which it was thought that insurance premiums could be reduced, and the use of the automatic sprinkler system was investigated for this purpose in connection with car shops. The first installation considered was at the shops of the Chicago City Railway, at Seventy-eighth Street and Vincennes Road, which plant is located adjacent to the carhouse buildings. The then existing rate on this plant was an average of 1.15 per cent for the entire group of buildings.

"With the installation of automatic sprinklers for the car shops, the premium rate as proposed by the Chicago Board of Fire Underwriters was reduced to 0.41 per cent, a difference of 0.74 per cent, or 74 cents per $100 insurance value. Deducting all fixed charges on the sprinkler system installation, including 6 per cent per year for depreciation, the net annual saving by the Chicago Underwriters' rate would be $2,200 per year, which amounts to 6.3 per cent return on a total investment of $35,000 for a sprinkler system, or, considering both depreciation and net saving, the total result will be that the system will pay for itself on the above rates in about seven years. If lower rates are obtainable on the structures protected by sprinklers, this net saving will appear to all the better advantage than shown here.

"It should be clearly understood that the use of automatic sprinklers has been considered here only in connection with non-fireproof and semi-fireproof shop structures. The advantage of using sprinklers in carhouses as now constructed by the Chicago traction companies is a matter of some question. With the subdivision of the present carhouses into bays limited to a capacity of about thirty cars each, the fire risk has been greatly reduced: consequently, the rates thereon are now so low that the further protection offered by the installation of a sprinkler system in such carhouses will not result in sufficient reduction in insurance rates to cover the fixed charges on the cost of installation, together with the maintenance thereon, i. e., allowing for interest and depreciation of the investment as well as operating costs. It will here be recognized that the installation of sprinklers in fireproof carhouses is purely a question of fire rates and entirely independent of the question whether additional protection is desirable to limit further possible destruction of cars. Under the present Chicago conditions, where the loss of an entire bay of cars would represent but a small part of the entire equipment available (until destroyed equipment could be replaced), it is clear that the question of rates is the controlling one, whereas in a small system of limited car equipment, the conditions might be exactly reversed."

Table III—Insurance Expenditures, Corporate Property

	Fiscal Year			
	1907	1908	1909	1910
Insurable capital value, Jan. 31 of previous year:*				
C. C. Ry.†	$9,296,353	$12,788,631	$14,918,542	$15,899,317
C. Rys.	8,948,479	9,505,550	12,757,021	16,949,991
C. & S. C. Ry.	....	1,536,002	1,571,267	1,819,254
All companies	$18,244,832	$23,830,183	$29,246,830	$34,668,562
Insurance premiums paid for fiscal year shown:				
C. C. Ry.	$63,337	$66,662	$76,725	$71,115
C. Rys.	69,329	68,621	80,400	88,384
C. & S. C. Ry.	......	10,101	10,238	9,077
All companies	$132,666	$145,384	$167,363	$168,576
Per cent of capital value:				
C. C. Ry.	.681	.521	.514	.447
C. Rys.	.774	.722	.630	.521
C. & S. C. Ry.	....	.657	.651	.499
All companies	.727	.610	.572	.486

*Insurable items only. †Including Southern Street Railway.

IMPROVEMENTS AT SAN DIEGO, CAL.

The San Diego Electric Railway has made some improvements in the type of the center-entrance car which was described by H. McNutt, superintendent of motive power San Diego Electric Railway, in the Electric Railway Journal for Sept. 21, 1912. All of the cars of the company are half open and half closed, as this type of car can be used in California throughout the year. Originally all were of the "California" type, in which the closed section is at the center and the ends of the car are open. The recent center-entrance cars in San Diego have the closed section at one end and the open section at the other, with an open platform 5 ft. 7 in. in length in the center of the car.

The principal change made in the latest center-entrance car of the company as compared with the car described in the issue of Sept. 21 is that the center entrance is no longer in a well. Instead, the floor on each side of the center entrance is at an incline of ⅜ in. to the foot. This incline is carried as far as the bolster, beyond which the floor of the car is level. The floor of the center entrance is 35 in. above the head of the rail and is reached by three steps, the lowest being 15 in., the second 10 in. and the upper 10 in. The car is double-ended and has an entrance on each side, and both sets of steps are folding. The entrance is protected by gates 4 ft. 6 in. high.

The car has five lamp circuits of five lamps each and is wired so that one lamp of each circuit is over the center entrance. In this way, if one circuit goes out through injury to the filament of one lamp the illumination of the step is not seriously impaired.

NEW SHOPS

The company is now building some new repair shops which have several novel features. One of these is the use on the main floor of hard-wood planking. This might be considered too expensive in the East, but the company is using a Mexican oak which is only slightly more expensive in San Diego than soft wood. The hard-wood floor has all the advantages of a soft-wood floor so far as the workmen are concerned, as it is very easy on the feet. At the same time it is practically no less liable to injury from being dented than a brick or concrete floor. The shops will be well equipped with cranes and have an inside elevator for carrying apparatus to the armature room upstairs. Another interesting feature is that the washroom has no door so that it is always open to the inspection of the shop foreman.

Proceedings of Iowa Street & Interurban Railway Association Convention

At the Meeting in Waterloo Extended Discussions Took Place in Connection with the Different Papers Presented of Which Two Were Published in Last Week's Issue—With the Account of the Proceedings the Papers on Interurban Terminals, Selection of Trainmen and Effective Shop Equipment Are Published

The tenth annual convention of the Iowa Street & Interurban Railway Association was held at Waterloo, Ia., April 24 and 25. The first session opened with President Cass presiding and approximately sixty members and guests in attendance.

SELECTION AND INSTRUCTION OF TRAINMEN

Following the reading of the minutes and the report of the secretary and treasurer, a paper on "The Selection and Instruction of Trainmen," by D. C. Bell, trainmaster Cedar Rapids & Iowa City Railway Company, Cedar Rapids, Ia., was read. This paper is published elsewhere in this issue. At the close of the reading of this paper President Cass emphasized the importance of the subject at hand, not only from an operating standpoint, but because the class of men desirable for trainmen was becoming very scarce. This being true, in a great many cases, the employment agent is forced to accept men of lower average intelligence than would be necessary if the labor market were plentiful.

R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, advised the association that the method of employing and instructing trainmen on his road was practically the same as that described by Mr. Bell. It required, however, that each employee should give his record for the previous ten years, and if the man was accepted he had to take a course of instruction extending over a period of twelve days without pay. Another point wherein his methods of employment differed from those described in Mr. Bell's paper was that the men were broken in for a particular position. The superintendent of transportation, when employing a man, after a preliminary examination, would suggest that he apply for a position either as a motorman or a conductor. If a few days later it should be found that the man was better fitted for the other job his course of instruction was changed accordingly. The duties of the motorman and conductor, in his opinion, were very dissimilar and required two distinct types of men. Before any applicant was accepted for instruction in the train service he was advised that he would be required to take the twelve-day course of instruction without pay and that he must serve on the extra list for an indefinite period at a pay averaging approximately $50 per month. If he was not financially able to tide himself over this period of no pay and the short hours of employment as an extra man, he was not accepted for service. It was customary on the Omaha & Council Bluffs Street Railway to pay the instructor $2 for each of his pupils.

E. L. Kirk, general manager Sioux City Service Company, stated that his company employed and instructed its men in a way somewhat similar to that described in the paper except that at the close of the instruction period the men received a list of questions to answer in writing. He also said that the men seldom interchanged the position of motorman and conductor, owing to the dissimilar character of the work.

C. F. Hewitt, vice-president and general manager Des Moines City Railway, said that his employment agent did not fix any definite period for which each applicant must give an account of previous service. It might be any length, depending on the man's reply. A hard and fast rule as to how much stress to lay on a man's previous service was undesirable. Each applicant should be examined carefully as regards his qualifications for either a motorman or conductor, and if there was any question as to his past record it should be thoroughly investigated. Mr. Hewitt also said that he did not pay the students or the instructors on his road, but he thought that better results would be obtained if they received extra pay for this work. A certain number of motormen and conductors were appointed as regular instructors, and during the course of instuction the students were transferred from one line to another until they had become familiar with each of the different runs. The division superintendent followed each student's course of instruction carefully and finally passed upon his fitness for service. If he failed to meet the requirements of the different instructors, he was questioned closely, and if he was thought to have the possibilities of a good man he was sent back for additional instructions. Mr. Hewitt said that interurban trainmen were required to pass a standard steam road examination before they were accepted for service, and for either the position of motorman or conductor experienced men were considered desirable.

Continuing the discussion, Mr. Leussler added that on the Omaha & Council Bluffs Railway, in addition to investigating a man's past record of employment, the company required him to furnish to it a statement of his finances. If he was deeply in debt, due to improvidence on his part, he was not accepted for service. Experience with men of this character had demonstrated that they were not only undesirable for train service, but that the company was put to considerable trouble by different creditors in their effort to collect the debts.

At this point the discussion turned to employees' welfare and benefit associations. Mr. Hewitt stated that his company advanced to the superintendent of transportation $100 which he was authorized to use in relieving the distress of employees. He would investigate the merits of each case before he advanced any money. Each loan was collected by deduction from the man's wages when he was able to pay it back. This method of assisting trainmen brought the superintendent much closer to his men and thus encouraged an esprit de corps.

President Cass said that his company had organized a relief association to which the company contributed liberally. This association was under the control of a board of directors, consisting of three trainmen and two officials of the company. It held meetings weekly, one in the afternoon for the night men and one in the evening for the day men. At each meeting the business of the association was first transacted and then the program turned to a discussion of operating problems, the superintendent or trainmaster presiding, so that all questions might be correctly answered. From time to time papers were presented, discussing mechanical and operating problems of especial interest to the trainmen.

PREVENTION OF ACCIDENTS

Continuing the regular program, Arthur G. Rippey, claim attorney Des Moines City Railway, read his paper entitled "Successful Methods of Preventing Accidents." This paper was published in abstract last week. The points embodied in Mr. Rippey's discussion of this subject developed considerable debate. Accident prevention campaigns were first taken up, and President Cass, in emphasizing the importance of this subject, briefly described a systematic campaign recently conducted by his company. A large number of blotters of different designs setting forth common forms of accidents and hints for safety, either through pictures or concisely worded sentences, were distributed each week to all the schools in all the cities touched by the Waterloo, Cedar Falls & Northern road. In addition to the blotter distribution, car cards were placed in both the interurban and city cars in the most conspicuous location, and advertising space was purchased in the local paper. The campaign was pushed vigorously for a period of fifteen weeks, and in addition to the printed matter slides were prepared for a number of the picture shows in the different towns along the line, depicting common forms of accident and hints for safety. This campaign finally was closed by a contest in which the company offered the school children prizes for the twenty best rules for preventing accidents. In order to give each child an equal chance to win a prize, the contestants were divided into three groups, depending on their school grades. One of the requirements of the contest was that the papers should be written at home. The purpose of this was to encourage the parents to assist the children in the preparation of their answers. At the time the contest was closed the company had received over 600 papers, and the intense interest of the public in the contest resulted in its receiving considerable publicity from the local papers.

Mr. Hewitt stated that his company had under way a campaign somewhat similar to that described by President Cass and expected to continue it, closing with a contest of some kind. In emphasizing the importance of the different points brought out in Mr. Rippey's paper, he said that the recommendations were not based on theory but had produced tangible results in actual service. In closing he said that accident prevention was a channel of saving which electric roads could not ignore. In the past it was regarded as inevitable, the problem being one of obtaining a release for the smallest cash payment. Now there appeared to be a general awakening throughout the country, and vigorous accident prevention campaigns were being conducted.

As evidence of tangible results possible to obtain from a vigorous accident prevention campaign, Mr. Leussler stated that previous to conducting one his company paid out for accidents an average of 4.76 per cent of the gross receipts, or approximately $100,000 a year. After the campaign, which included a series of lectures and instructions to employees and the public, this amount was reduced to 2.75 per cent. Advertising space was purchased in the newspapers, and upon request the superintendent of schools lectured to the school children on the subject of accident prevention. Women were instructed through the Young Women's Christian Association how to alight from cars, and the probation officers made a special effort to prevent newsboys and other children from attempting to steal rides on the cars. Mr. Leussler also emphasized the importance of "eternal vigilance."

Continuing his discussion of other points brought out in Mr. Rippey's paper, he took up the question of near-side and far-side stops. He said that his company had been requested to adopt the former, but as it was largely a question of convenience to the public it was submitted to popular vote, resulting in approximately eight votes to one for the far-side stop. Previous to submitting the question at issue to the public, Mr. Leussler made a careful analysis of collisions on his road from the records of several years. Out of a total of 138 accidents, sixty occurred between street intersections, sixty-eight at intersections where the car had not been signaled to stop and ten where there was a possibility that the near-side stop would have eliminated the accident. He said, however, that the near-side stop was not a positive guarantee that these ten collisions would have been eliminated, as there was as much chance of accident from a car increasing its speed as from its decreasing it across a crossing. To substantiate his argument he referred to the result of the discussion at a meeting of the Pacific Coast Claim Agents' Association, which finally concluded that there were few arguments for the near-side as against the far-side stop. Mr. Leussler added that he believed that inclosed platforms would reduce accidents slightly but would materially retard the schedules.

Replying to Mr. Leussler, Mr. Hewitt stated that although his road had not adopted the near-side stop, it was being seriously considered. He did not believe that the question of near-side and far-side stop should be left entirely with the public, as the question of convenience must be weighed against the prevention of accidents at street crossings. There was no doubt in his mind that the ten collisions referred to by Mr. Leussler would have been eliminated had the near-side stop been adopted. In support of his argument he presented the mechanical proposition that it was easier to stop an accelerating car than one which was being slowed down. The near-side stop also gave the motorman ample time to view the ground and control the movement of his car according to the conditions presented. As to the question of retarding schedules, he said that while this might be true, the amount of delay was not worth consideration. Again, if the delay was a consideration, it was more than offset by the resulting reduction in boarding and alighting accidents. In support of this statement he said that 50 per cent of all the accidents on the Des Moines Street Railway were of this character. The adoption of a closed vestibule and folding step had reduced this proportion to less than 23 per cent.

H. E. Weeks, secretary Tri-City Railway & Light Company, stated that about the first of the present year the city of Davenport passed an ordinance requiring all cars to stop on the near side. The order became effective, and the change was made without friction with the public. In fact, it had proved so satisfactory that Moline and Rock Island, Ill., also served by this property, had adopted a similar ordinance.

The discussion of this paper was concluded by statements from a number of other managers concerning the reduction in money paid out for claims resulting from both the near-side stop and inclosed platforms. Although no definite conclusion was reached as a result of this discussion, it was evident that both the near-side stop and the inclosed platform received the support of the majority of the members. Just before this session adjourned the president appointed a nominating committee to select a director for the ensuing five years. He also announced that the Waterloo, Cedar Falls & Northern Railroad Company would run a two-car inspection train over its lines, and all members were invited to make the trip.

FRIDAY MORNING SESSION

The first paper on the program at the Friday morning session was presented by F. J. Hanlon, general manager Mason City & Clear Lake Railroad, and was entitled "Interurban Terminals." This paper is published in abstract in another column.

INTERURBAN TERMINALS

In the discussion following the reading of this paper, which was of particular interest to the Iowa interurban roads, the question of proper procedure in objecting to the proposed elimination of Rule 5 of the per diem agreement effective in the American Railway Association was raised. This rule permits a switching line to reclaim from delivery time a certain number of days free of the per diem charge Mr. Hewitt suggested that it would be a good idea for interurban roads to present some form of organized exception to the proposed elimination of this rule so far as short lines were concerned. It appears that the only remedy for short lines to pursue if Rule 5 is rescinded is to withdraw from the per diem agreement. At the conclusion of the discussion it was recommended that all the electric lines give the American Railway Association notice of withdrawal if any change is made in Rule 5 affecting short-line reclaim.

POWER COSTS

Continuing the regular program, John J. Lichter, consulting engineer, St. Louis, Mo., and B. W. Gilbert, superintendent of power stations, Omaha & Council Bluffs Street Railway, presented their paper entitled "Modern Methods of Reducing Generating Costs." Mr. Gilbert read the paper, which was published in abstract last week. It was followed by brief discussion. Mr. Hewitt raised the question of the proper method of setting boilers, particularly as to the kind of mortar to use in the brickwork. Mr. Gilbert replied that in his station the boilers were in steel-case settings with 16-in. walls of firebrick and 2 in. of vitrified asbestos next to the sheet metal. The outside course of firebrick was laid in pure cement mortar and the inside course in fireclay. In recommending the quality of mortar to use, Mr. Gilbert stated that the cement setting was not entirely satisfactory for horizontal boilers but appeared to give good results with vertical boilers. He recommended a mixture of lime and cement for brickwork in the former.

SHOP EQUIPMENT

The next paper on the program was presented by G. A. Mills, electrical engineer Waterloo, Cedar Falls & Northern Railway, entitled "Effective Shop Equipment for Reducing Maintenance of Equipment." This paper dealt with the problems particularly applicable to the small street and interurban railroad shops, where shop economy did not warrant the purchase of a full line of machine tools. C. M. Feist, master mechanic Sioux City Service Company, stated that he believed that the most flexible and economical hoist equipment would be found in a 9-ft. range air hoist. This may be used for handling all equipment parts, and the range is such as to permit repair parts to be elevated from the pit-floor level to the floor of a car. He also recommended grinding cast-steel wheels, stating that he was obtaining from 50,000 to 100,000 miles before scrapping. M. M. Lloyd, master mechanic Des Moines City Railway, raised the question of the most economical and safe method of oiling armature bearings. In reply, John Sutherland, master mechanic Tri-City Railway, stated that he used felt packed with waste. The felt was renovated from time to time as required, and the waste was repacked every ten days. This method of lubricating armature bearings was giving him 25,000 to 35,000 miles. He also said that he was obtaining 70,000 miles with plain caps allowing 3/64-in. clearance when bolted down tight to the motor frame. These boxes are made of steel, babbitt-lined.

Mr. Hewitt then raised the question of truing wheels without removing them from the trucks. He stated that he had been unable to obtain an absolutely true periphery without removing the wheels and placing them in a rigid bearing. In reply to his inquiry, O. S. Lamb, superintendent of the Waterloo, Cedar Falls & Northern Railway, stated that grinding in trucks had been accomplished successfully by the use of emery brakeshoes. As much as 100,000 miles had been obtained from chilled wheels which had had flat spots removed by the emery brakeshoe process. He also stated that the Lincoln Traction Company, Lincoln, Neb., had mounted on its wheel lathe an emery shoe attachment which was fed against the wheel by hand screws. It also was said that steel wheels were being ground in several shops with good results.

CONCLUDING BUSINESS

At this point the discussion closed, and President Cass advised the association of the status of legislative matters of peculiar interest to it. He then called for the report of the nominating committee, which unanimously recommended C. F. Hewitt, vice-president and general manager Des Moines City Railway Company, as director for the five-year term. This nomination was confirmed. After brief discussion the association unanimously voted to hold the 1914 convention at Cedar Rapids, Ia., which also is the convention city selected by the Iowa Electrical Association At the close of the open sessions of this association the board of directors held an executive meeting. C. D. Cass was re-elected president, C. F. Hewitt was elected vice-president, succeeding F. J. Hanlon, and H. E. Weeks was re-elected secretary and treasurer.

As has been the custom in years past, the Iowa Electrical Association held its meetings during the same week as the Iowa Street & Interurban Railway Association. In connection with the conventions held by these two associations a number of manufacturers exhibited on the first floor of the Citizens' Gas & Electric Company's building, the upper floors of which were used for the convention sessions.

INTERURBAN TERMINALS

BY J. F. HANLON, GENERAL MANAGER MASON CITY & CLEAR LAKE RAILROAD COMPANY

The subject of interurban terminals is as broad as the entire field of electric railroading and in this paper will be treated only as applicable to the interurbans of Iowa, which are all single-track lines doing a general freight business in about the same manner as steam lines. Many of the electric railways have worked into the freight business gradually, and their terminals represent the development of a department rather than what is now conceded to be a governing factor of the feasibility of the construction of country lines. The city line was originally the basis of the system, and the terminals and loops were provided to care properly for routing and loading of purely street car business. Later, when the interurban was projected, perhaps a blind siding was constructed with a small room cut off where baggage and express could be stored for a few hours until it could be loaded into the regular passenger cars. Then came the modern interurban terminal.

Ordinarily there is no interurban line built until a city has attained considerable growth and delivery tracks can be advantageously located only by buying expensive property, and it is here where the business must be accurately gaged to avoid investments which cannot be realized upon. On the other hand, freight and passenger stations easy of access will bring to the interurban line much business which they would otherwise lose. It is very easy for a shipping clerk loading a dray or a car for a steam line to include the comparatively few stations on the interurban line in his multitude of steam road deliveries, and in his hurry he is likely to follow the path of least resistance. In this case the more frequent deliveries and the closer personal service combined with fewer claims and the quicker return of his trucks are to be considered in connection with the well located and designed terminal.

With a fair amount of car-load freight, it is bad practice to attempt to handle it on the tracks used for passenger cars on account of the excessive delays to the passenger equipment, which are a distinct handicap to both passenger and freight business. Combination passenger and freight stations should be built with the main line to be used for loading passenger trains and the house track at the rear of the station. This will enable freight trains to work without loss of time and prevent any delay to passengers.

Yards which are filled with cinders present a good appearance and permit easy hauling of heavy loads in any kind of weather. It is surprising to find what little work it takes to keep them clean and how much assistance teamsters will give if they understand that the premises are always going to be neat.

Special attention should be given to securing ground such as will provide locations for coal sheds. These sites should be rented for such a sum as will return 5 per cent or 6 per cent on the amount invested in the property. No free sites are necessary as this is a relic of the days when land was donated to railroad companies in greater amounts than it was thought ever could be used. Special attention should also be given to the preparation of the lease so that responsibility of the company will be minimized in case of destruction of the buildings or contents by fire or accident, and the lease should provide for a termination for various reasons, such as non-use, abuse of the premises, etc. Even items such as paint of a certain color and the maintenance of the building in good repair and well painted should be included.

Tracks to private industries, such as lumber yards, manufacturing plants, wholesale houses and the like, should be paid for by the beneficiary—that is, the owner of the plant. There is no reason for the railroad company paying the drayage for the manufacturer, which is what free trackage amounts to.

Interurban terminals should provide that high-speed cars should run as much as possible on private right-of-way, to the end that their time may compare favorably with that of the steam roads. Frequent service will get lots of business, but in this day of extra-fare trains, time is an essential feature of interurban operation. If you are handling freight, you need the traveling man on your cars, not alone for the money he pays you for his fare, but because he is practically forced to see your freight facilities and will be inclined to route his shipments over your line if he sees that you are in position to give him service. We have a small card which our interurban conductors hand each traveling man, when collecting his fare, explaining our freight arrangements and asking him to route his sales via the interurban line. The card shows the proper routing from all the jobbing centers, and, the traveling man being on a trip to solicit business himself, it makes a strong personal appeal to him.

Many a line spends as much time in getting in and out of the large towns through which it passes as it does on the many miles between them. I think there is good reason to invest in separate tracks and high-speed right-of-way in these instances, with a few stops at prominent points in the city. This question has reached the stage in Los Angeles where an elevated track is being advocated to avoid the surface delays to interurban trains.

No good is accomplished by attempting to reach all the prominent places in a city by interurban service. The steam road delivers passengers only at its station at a location nearly always requiring street car or bus transportation to the business section, and an interurban delivery to any good point in the business district should be amply sufficient.

No mention has been made of stock yards and elevators inasmuch as these have disappeared from cities of any size. Stock yards, of course, must be located where they will not become a nuisance unless all the revenue secured is spent in cleaning them. The site should be well away from dwellings and should have good natural drainage. It should be remembered that stock revenue is comparatively low per car as a special movement is frequently required and the car is hauled empty one way. With the interest charge on the investment, the cost of maintenance and the necessity for an adequate water supply, both in the yards and for wetting down shipments, the business brought by stock yards is of doubtful value at many stations.

No doubt, good, adequate and convenient terminals will secure interurban lines additional business, but an investment of this kind must be made only after a careful estimate of the cost of property necessary to be acquired and the improvements to be placed thereon. The profit on the additional business that can be secured by the traffic department then should be set against the interest, depreciation and maintenance on the proposed investment, and if the balance is on the right side the project may be undertaken. In many instances sentiment and pride determine whether terminals shall be built, and perhaps it is more to this than anything else that we owe some of our magnificent terminals in the United States.

Iowa has not as yet developed its interurban field sufficiently to present many serious problems in this line, although the obstacles in the case of the Iowa & Illinois Railway at Davenport are well known and appreciated by those of us who have seen them. In that case it was necessary to riprap the bank of the Mississippi River for a long distance and use portions of two steam lines to gain entrance to yard room. By this means the business of one of the most highly developed manufacturing cities of the State became available to the interurban railway and will, in my judgment, amply repay the company for its foresight and confidence in undertaking a work of such magnitude.

A notable example of planning terminals for the future is in evidence in our convention city, Waterloo. No interurban official should leave here without a thorough inspection of the development of the yardage of the Waterloo, Cedar Falls & Northern Railway. Nearly all of its freight lines are ideally located on private rights-of-way and the belt lines offer especially advantageous locations for manufacturing purposes. In fact, nothing has made possible the marvelous growth of Waterloo so much as its interurban line and terminal facilities.

The first and last word in terminal planning is to secure adequate transfer tracks with every steam line entering the city. In addition to business to and from points on your own line, there is always a considerable amount of transfer business between the steam lines and the steam lines are usually glad to give this movement to the interurban lines on account of their ability to handle it promptly and smoothly.

SELECTION AND INSTRUCTION OF TRAINMEN

BY D. C. BELL, TRAINMASTER CEDAR RAPIDS & IOWA CITY RAILWAY COMPANY

The selection of trainmen is a matter that probably all companies handle in very much the same manner. We require a man to fill out a regular form of application blank, which calls for his name, place and date of his birth, etc., and he then refers to three persons for recommendations as to character and ability, giving name, address and nature of business of each of the three.

We follow up these references with a regular form of blank and it may be that experience has taught the street and interurban railway companies that this is a wise and necessary precaution to take before employing a trainman, but personally I do not give much consideration to the statements made in application or reference blanks if such statements conflict with my judgment of the man after interviewing him personally.

A personal interview with the applicant is certainly most desirable, and I invariably follow this rule in selecting men, as in my opinion the impressions received at this interview are of far more value than the information received from the reference blanks. I think you will agree with me that there are few men who could not refer to three or more persons who would state that the applicant was well qualified for the position for which he had applied, and unless persons referred to were personally known to me, I do not think much value should be placed upon the information received, except those references received from steam, street and interurban railway companies.

Some men who have come to our road with the best kind of recommendations have not made good workmen, while, on the other hand, we have hired some upon questionable recommendations who have proved to be exceptionally good men.

Before leaving this subject I wish to add that I believe that the official directly in charge of the men should be allowed to make his own selections; that his superiors should not employ men and send them to him, as he loses a good deal of control over them if they feel that they are not accountable to him but are responsible to some one higher up.

After applicant has been selected, we send him to our company surgeon and if he passes a satisfactory examination he receives a regular form of permit to receive instruction from a regularly assigned city car conductor. When the conductor to whom he has been assigned certifies in the permit that he is qualified and returns it to the trainmaster's office it is placed in a file envelope, which is kept for each employee in the train service, and which contains his application blank, references, his permits, receipt for equipment issued him and all other matters pertaining to his record. He then receives a second permit identical with the first, but to another city car conductor, which gives him the benefit of both day and night instruction.

He is then placed in service as a city car conductor and such work as he is entitled to by his seniority is given to him. After he is thus qualified, he immediately receives permits for instruction as city car motorman in the same manner as for conductor.

Employees qualifying for city car conductors and motormen do not receive instructions other than those necessary to operate cars before being allowed to begin work. They receive no pay while being instructed, but the average time required for instructing conductors does not exceed two days and that for motormen four days.

It may seem that we start our men to work with undue haste, but as a man can learn the rudiments in that length of time, and as he could not possibly become a proficient workman in less than three months, we feel that we may as well allow him to begin earning money as quickly as possible. The principles of the work, such as learning the names and locations of the streets, time of cars, making out trip reports and, in the motorman's case, learning to start and stop his car and feed it up properly, can be mastered in that length of time.

All of our men are required to qualify as conductors and motormen on city cars. This we do in order to keep our list of extra men reduced to a number that will insure them having reasonably regular work, either as conductors or motormen.

Our interurban conductors and motormen are promoted from the city car service but not until they have had freight train experience. Those who have not had such experience before being employed by our company are assigned as brakemen on our freight trains. This gives them an opportunity to become familiar with the line, the handling of trains by train orders, location of signals and switches, stations and local stops, also with the significance of the different rules as applied to actual working conditions.

We allow a man to qualify as either conductor or motorman in interurban service, but not for both. When we wish to add to the interurban lists of either conductors or motormen we call in the oldest man desiring to qualify for that branch and give him an examination upon the book of rules and time card. This proving satisfactory, we give him permits to be instructed by two regular interurban men, who sign his permits as soon as he is, in their opinion, properly qualified.

Our instructions for interurban conductors and motormen are given in actual service under the direction of regularly assigned trainmen.

Our motormen are not expected to have a very thorough mechanical knowledge of the equipment used, but as they are expected to replace trolley poles, lubricate the different bearings on trucks and motors and to be able to take care of controller and headlight troubles, they are instructed along these lines. However, before being assigned they are examined by the master mechanic.

These instructions cover a period of from one to four months, the employee choosing his time as is most convenient for him in connection with his other work. He receives no pay for time spent in receiving instructions.

A new feature recently added is a school of instructions conducted by the company's attorney and physician. It is our intention to educate the trainmen to ascertain in case of an accident the exact information required by the attorney for his complete understanding of the case. In this connection the men are instructed to exercise such precautions as will avoid accidents.

Our surgeon's talks are intended to inform the men how best to handle accidents when medical aid is not present, what doctors to call in case he is not available and any other information of value to the employee. We have had but one meeting of this kind, so far, but expect to have them at stated intervals in the future.

We intend also to test the ability of our men to estimate speed, but have not as yet determined just how such tests will be made.

EFFECTIVE SHOP EQUIPMENT FOR REDUCING MAINTENANCE OF EQUIPMENT

BY G. A. MILLS, ELECTRICAL ENGINEER WATERLOO, CEDAR FALLS & NORTHERN RAILWAY COMPANY

No other part of a street railway or interurban property is so critically judged by the public as the rolling stock, although this part of the complete equipment of an electric railway system usually represents only a fraction of the total investment. The public is in such close daily contact with the cars that it is justly interested in their condition. New equipment cannot be supplied every few years, but cars in service can be kept in good condition and repair, thus presenting an outward sign of prosperity to the public.

This part of their equipment is directly in the hands of the shop department. No other department in a railway organization needs so efficient a force of employees. Labor alone constitutes from 40 to 60 per cent of the average repairs on a city railway property and from 30 to 50 per cent of the necessary repairs on an interurban property. The size of the force and number of sub-departments, of course, depends upon the number of cars operated. The general manager or superintendent can give only a limited portion of his time at the shop department; hence this very important work must be intrusted to a master mechanic or shop foreman, upon whom the efficiency and financial showing made by the department depend.

In attempting to compete with the car maintenance costs shown by very large shops the master mechanic of the small or medium-sized shop is working at a disadvantage. He has to develop men who can be changed efficiently from one class of work to something entirely different. Generally he lacks modern machinery and sometimes is even compelled to use machines which have been discarded by the larger shops as out of date. He has to modernize these machines as much as possible and to devise attachments to make them do work never contemplated by their original designer. Yet, despite these handicaps, it is possible for the wide-awake master mechanic to keep his costs down to those of the larger shops if the proper methods are followed.

The properties represented in this convention have from a dozen cars to a few hundred to maintain. They consist of street railways, interurban roads and a combination of both classes of service. No two shops, perhaps, have the same line of machinery or shop methods. These shops are the outcome of a very rapid growth experienced in the past few years which has not only changed the railway equipment, in general for the better, but has changed the methods of maintenance. For these reasons, in considering the subject assigned to this paper the writer has taken up cost-reducing and labor-saving devices which the medium-sized shop can use in connection with its present shop machinery at a small additional cost, also simple home-made devices which any shop can make to increase the efficiency of the maintenance work.

While discussing effective shop machinery, electric railway men should not overlook the importance of proper inspection and its relation to maintenance, because we all know that "an ounce of prevention is worth a pound of cure." An efficient inspection system will locate the small faults before the equipment fails in service. This will greatly assist the small shop with a limited equipment as well as give more mileage per failure. It is not the purpose of this paper to discuss inspection, but it is indirectly a great assistance in reducing the work in the shop department. On our own system proper inspection is no doubt greatly responsible for the obtaining of 3700 miles per car per month for local service and 8300 miles per car per month for our interurban cars.

REMOVAL OF TRUCKS FROM CAR BODIES

One of the greatest problems of the medium-sized shop is the handling of car bodies for the removal of trucks, the dismantling of the trucks and motors and the transfer of these heavy parts to the shop machines where they are to be repaired. If an armature is to be repaired and box-frame motors are used, the truck must be taken from under the car body, the motor must be removed from the truck and the armature from the motor. With inadequate equipment this operation may cost, in labor alone, from $8 to $14. With modern machinery the expense should be between $2 and $4. Whenever there is much of this work to do, an overhead electrically operated traveling crane will prove most advantageous. An air hoist has a lower first cost and will effectively handle this work. These air hoists should be provided with trolleys running on overhead tracks so that the heavy parts may be transported from the pit tracks to the place of repair. Where this distance is great, shop hand-trucks can be used. The use of a chain hoist for this heavy work involves much time and labor, but such a hoist has its place where the amount of work to be done does not warrant the expense of the power hoist. In some shops the handling of car bodies is accomplished by four screw jacks, two on each side of the pit. The jacks are connected by bevel gearing which is driven by a motor. This device cuts the labor charge to a very small amount. The removal of trucks from interurban cars where the rear steps and pilot in front interfere is greatly assisted by the installation of a truck turntable on the pit track. The car body need be raised only a few inches, when the truck on the turntable can be turned 90 deg. and run out to the side of the car for stripping.

Our shop department has a portable crane of our own manufacture which is used in handling heavy material in and about the shops as well as out on the road. An old steam-coach truck was equipped with a 10-lb. boom and a 11-ft. mast. The mast is controlled by means of a ⅝-in. steel cable, operated by a winch. The crane is used in the shop in stripping and assembling motors and trucks. In the yard it is used to unload new motors, barrels of oil and other heavy material. The truck is equipped with drawbars and can be taken out on the road when heavy lifting may be required.

WHEEL HANDLING

Wheel removal is another place where labor-saving devices may be used. The wheel pit should be equipped with an air hoist of the plunger type. This hoist will reduce the cost of the labor 50 per cent and the time from a half day to a couple of hours. This same hoist, when equipped with a removal saddle, will reduce the time and labor for removing armatures in split-frame motors. However, armatures can be handled in the pit effectively with a quick-acting hand jack mounted upon a truck. This last method is used in our own shops with excellent results.

Steel wheels can be re-formed by being turned in a lathe or ground with a grinder, but a cast wheel can only be ground. Where a road has only a few steel wheels in service and is short of lathe equipment, a two-in-one lathe will perhaps be the best investment, since this type of lathe can be used for regular lathe work when not used for wheel turning. A good wheel grinder can be installed for about one-half of the first cost of the lathe described, but it will not turn out such rapid work. The grinder, however, will true up either kind of wheel. From three to four hours are required to grind a cast wheel after it has run about 50,000 miles. It will then have about 20,000 more miles of service. This mileage varies greatly with the different properties. Some shops use motor-driven pit grinders which will true the wheel without requiring its removal from the car.

MISCELLANEOUS EQUIPMENT

A bolt cutter will be found useful to reduce the cost of rebuilding trucks and frames. Many times bolts are scrapped on account of a few damaged threads which can be corrected in the bolt cutter in less time than would be required to go to the stock room for a new bolt. This same machine can be provided with an attachment for cutting pipe threads.

A simple device for pressing bearings in and out of the housing, devised in our own shop, consists of a 12-in. x 12-in. air-brake cylinder, controlled with a straight air-brake valve and mounted with a table below the piston. Bearings are pressed in and out of the housing in a few seconds' time with no breakage. With hand methods a half hour or more was required for this work, and in many cases the sleeve was broken.

The trolley pole is not an expensive part of a car equipment, but it is often bent and dented, sometimes after only a few hundred miles of service. To keep the cost of repairs below the first cost of the pole, it must be a small part of a dollar. This is accomplished by the use of two simple machines. The first is a set of rollers similar to those used in a tin shop and properly shaped for the size of pole used. The bent pole is passed through these rollers which do the straightening. The second machine removes the dents. The machine consists of two dies, shaped to fit the pole. The dies are parted by a spring. The dented place in the pole is placed under the dies, which are brought together by means of a sledge applied by the operator. This device will renew several badly damaged poles before the cost of a new pole is reached. This is a small item, but a few pennies will make a dollar, and a dollar will pay the interest and depreciation on a ten-dollar investment, which would pay the first cost of this device.

The handling of babbitt metal for bearings in some shops will cost as high as 10 cents per lb. for labor only. Properly heated mandrels and special heating devices for the babbitt will obtain results. Where gas is not available gasoline tools of special design, which will be accepted by the Fire Underwriters, can be used.

The removal of underhung air compressors is accomplished economically by the use of a long hand-truck. This is placed under the car and over the track pit, which is covered with pit planks. This truck should be a little longer than the width of the car body and have a set of rings on each end for attachment to the overhead crane or air hoists. When a compressor is to be removed, the truck is hoisted up to the compressor, which is disconnected from the car and thus transferred to the truck. The truck with the compressor is then lowered and taken to the repair bench. When an extra compressor is available a compressor change can be made with this truck in about thirty minutes, the old compressor being removed and the new one connected with but one lifting of the truck.

The woodworking and blacksmith departments should receive as careful attention with respect to labor-saving tools as the machine shop. Special machinery for turning out special work will greatly reduce the maintenance cost. Wherever possible power-driven tools which will reduce the labor and time will increase the efficiency of these departments.

Car-cleaning maintenance may be held to a low figure by properly designed horses and well-drained pits, the latter where car washing is employed. The same care should be carried into the body erection and paint shops.

ELECTRICAL MAINTENANCE

The electrical maintenance is one of the largest items which the repair shop has to handle. Electrical faults are not so easily found as mechanical faults, and special testing sets are required to locate trouble effectively. The air hose is very useful for cleaning the motors and controllers from carbon dust and dirt, which are enemies to electrical insulation.

When a car is received in the shop for repairs the armature and fields should be first inspected and tested by an electrical inspector, who should determine whether these parts are to be rewound or only repaired. These tests should be made with alternating current. Most shops are not provided with alternating current, but it can easily be obtained in sufficient quantities for this testing work from a home-made inverted rotary converter. A small two-pole, 500-volt d. c. motor of about 1500 r.p.m. can be supplied with two slip-rings. This will supply 350 volts alternating current. A ten-to-one ratio transformer can be built from old transformer iron and wire on hand. Taps in the secondary should be brought out so as to give a wide range of test voltage. The transformer should be mounted on a truck so as to be portable. The converter a. c. voltage should be wired to different points around the shop and thus serve for all of the testing work. An armature test yoke and field-testing sets are as easily constructed. With a set of this kind all weak insulation in cables, controller stands and motors can be checked in the shop. After some experience with the tester it will be found possible to eliminate practically all electrical failures and send the equipment out from the shop with a knowledge of its exact condition.

Almost every shop in the country is now slotting commutators. There are many slotters on the market and many home-made ones. Our own shop force has equipped a small motor with a saw, and it is arranged so that it can be attached to the carriage of the lathe in which the armature has been placed for the returning of the commutator. With this device a GE-80 motor can be slotted in about twenty minutes. Maintenance work on armatures can be reduced still more by arranging one lathe so that banding, turning and slotting may be accomplished with one handling of the armature.

SWEDISH ELECTRIFICATION PLANS

It is announced that the Swedish government has worked out plans for the electrical operation of lines in addition to the Kiruna-Riksgränsen ore-carrying line described in the Electric Railway Journal for May 6, 1911, and Jan. 4 1913. This line is north of the Polar Circle. The proposed electrifications cover the southern trunk lines between Stockholm and Gothenburg and Stockholm and Malmö. It is proposed to operate the Gothenburg line from the government's hydroelectric plant at Trollhättan and also from a plant under way at Motala. The Malmö line is to be supplied from the latter station and also from a private station at Ligan. The third electrification would be that of the Gothenburg-Malmö line, for which energy would be transmitted from the Trollhättan and Ligan stations. The estimated cost of these electrifications is figured at approximately $25,000,000, of which $18,250,000 will be required for the overhead line, transformer stations and locomotives and the remainder for the completion of the hydroelectric plants.

COMMUNICATIONS

THE FORTHCOMING CENSUS REPORT

Department of Commerce, Bureau of the Census
Washington, April 24, 1913.

To the Editors:

The schedules have been mailed to all establishments covered by the census of electrical industries. Of these industries electric railways are in some respects the most important, and the schedule for them is the most elaborate and technical.

The preparation of the lists of establishments and mailing of the schedules has required during the past two or three weeks the services of about twenty-seven clerks, and a number of clerks have been engaged on the inquiry since the first of the year.

We are in hope of collecting a much larger proportion of the returns by mail than were collected in this manner at the census of 1907. The census of electrical industries for 1907 required the services of a large field force, and the total expenses of the field were approximately $61,000. The number of agents that can be employed in the collection of statistics of this character is limited, and it requires a number of months for them to cover the entire United States. Therefore, if the companies will make the reports to the Census Bureau promptly by mail, it will enable the office to compile and publish the statistics at a much earlier date than is possible by the employment of special agents to collect the returns.

The records of this office show that 2600 operating and 304 non-operating electric railway schedules were sent from which reports of some character must be secured. It is probable that some of these companies have gone out of existence, but a statement to that effect must be obtained before the canvass is closed.

In addition to the field force approximating sixty-five agents, there will be employed in the office from forty to fifty clerks during the greater part of the year 1913. These clerks and agents, of course, will collect the reports and tabulate the statistics not only for the railways but for central stations, telephone and telegraph systems. The office is already in receipt of 15,580 reports from telephone companies, and if the electric railway companies respond as promptly as the telephone companies have, it is hoped that the statistics for this important branch of electrical industries will be sufficiently complete to enable the office to publish a preliminary statement during the latter part of 1913, or in January, 1914.

W. M. Steuart,
Chief Statistician for Manufactures.

NEW YORK CENTRAL LOCOMOTIVE RATING

Minneapolis, Minn., April 26, 1913.

To the Editors:

Railroad motor ratings promulgated by the leading American electrical manufacturers seem to be on a peculiar basis, as shown by your recent articles on the Pennsylvania and the New York Central railroad locomotives.

The Pennsylvania locomotive is called a 4000-hp unit, yet the rating of the two motors on the one-hour A.I.E.E. basis, with natural ventilation, according to the manufacturer, with a voltage of 600, is nearer 2000 hp; and this corresponds to 2700 amp per locomotive, or to a tractive effort with full fields of 25,000 lb. at 31.5 m.p.h.; or, on normal field, to 15,000 lb. at 51 m.p.h. With 650 volts, according to a paper presented by George Gibbs before the International Railway Congress of 1910, the hourly rating of the locomotive is 2500 hp.

The New York Central locomotive of 1913 is now stated to have 50 per cent greater capacity than the 1906 unit, which is rated 3050 amp at 600 volts, or 2200 hp per unit.

The locomotive of 1913 is without doubt an improvement over the older type, in the following:

Weight is reduced from 115 to 100 tons.

Weight on drivers increased from 71 to 100 tons.

Total weight per driver axle decreased from 35,500 lb. to 25,000 lb.

Dead weight per driver axle decreased from 13,000 lb. to 6400 lb.

The New York Central locomotive of 1913 has eight motors, and the capacity of each is given as 325 amp with 600 volts, which at 93.6 per cent (estimated) efficiency gives a one-hour rating of 244 hp, or of 1944 hp for the locomotive. This agrees with the manufacturer's rating, with 36-in. drivers, of 13,500 lb. tractive effort at 54 m.p.h., which is only 1944 hp, and this is 16 per cent less than the published rating of the old locomotives. Either the new locomotives are much underrated or the old locomotives are much overrated.

The data presented in the *General Electric Review* of May, 1913, page 324, are that the continuous rating is 9500 lb. at 60 m.p.h., which is exactly 1520 hp. Other data in the same paragraph give the continuous rating as 250 amp with 600 volts, which at a high efficiency would make the continuous rating of eight motors, or the whole locomotive, about 1520.

Forced draft is used on the motors of the 1913 locomotive, the sides and bottom of the motors being of sheet iron as in the old locomotive, but forced draft, if used on the old units, would raise the continuous rating from about 53 per cent of the one-hour rating to about 80 per cent of the one-hour rating of 2200 hp, or to 1760 hp.

The data presented by the G. E. publication bureau, for this 1913 locomotive are that the new locomotive is designed to exert sufficient tractive effort to haul a 1000-ton train at 60 m.p.h. Railroads do not yet run passenger trains of this tonnage, or freight trains at 60 m.p.h., and the requirements are both interesting and peculiar. A 1000-ton train at 60 m.p.h. requiring a tractive effort, including the locomotive, of about 12 lb. per ton involves a horse-power of about 1944, or the one-hour rating. The New York Central run, from the Grand Central Terminal to Croton, is only 34 miles and with a few stops can be easily made in one hour.

EDWARD P. BURCH,
Consulting Engineer.

HEARINGS ON HEATING VESTIBULES AND AIR-BRAKE EQUIPMENT

At a recent hearing before the Massachusetts Railroad Commission upon a petition of street railway employees to require companies to equip their cars with vestibule heaters, air brakes and wind shields, Paul Winsor, chief engineer of motive power and rolling stock Boston Elevated Railway, presented testimony in opposition to the proposed changes and submitted data bearing upon the probable cost of installing such apparatus. Before Mr. Winsor took the stand Arthur A. Ballantine, of counsel for the company, said that in the Boston district few cars operate on runs of more than from forty-five minutes to an hour from the carhouses and touched upon the practice of freely interchanging open and closed cars according to the variation in weather conditions. He contended that it is undesirable to make over the older rolling stock and that it could be done only at excessive cost.

Mr. Winsor said that since 1901 the Boston Elevated has purchased no cars without air brakes and that no single-truck cars have been purchased for service since 1900. It now has 1387 double-truck open and box cars and 1479 single-truck cars without air brakes. The estimated cost of equipping these cars with air brakes is $350 for air-brake apparatus and installation, with $100 extra for changes in the trucks and brake rigging. Most of the trucks will not stand the air-brake equipment. To provide all the company's cars with air brakes would cost $1,288,700. All but 125 of these hand-brake cars were purchased prior to 1900.

Regarding the cost of heating vestibules, Mr. Winsor said that, taking as a basis a 300-watt heater with an estimated cost of $3 each for installation and a price of $7, the first cost per car with one in each vestibule would be $20. The power requirements call for about 0.33 kw per heater at the generating plant, and as the cost of power stations, transmission lines, substations and feeders at Boston is $175 per kw the first cost per heater would be about $58 plus the heater investment, or $68 in round numbers for one heater and about $136 per car with two heaters in each case. The company's interest, taxes and depreciation charges amount to 11½ per cent to-day, and there would be a fixed charge of $2.30 yearly on the investment in two heaters and a fixed charge of $13.16 for the power station and distributing equipment, or a total charge for interest, taxes and depreciation of $15.46 per car per year. The operating cost, taken at five months in the year and twelve hours per day, would be $7.58 per year per car, making a total operating and fixed expense of $23.04 per car. The total capital expense on the heaters would be $290,783 and the total yearly cost without allowing for maintenance would be $49,444. The estimated cost of putting glass wind shields on the cars not equipped with vestibules would be $75 per car. It would be necessary to provide a drop window outside the dasher, and the total capital cost would be $106,650. The total cost of complying with the petitioners' requests would be $623,150 for air brakes for double-truck cars, $665,550 for air brakes for single-truck cars, $290,783 for heaters and $106,650 for glass shields, or a total for the three items of $1,686,133, giving a total annual cost on the Boston Elevated system alone of $193,905 exclusive of maintenance. In response to a question of Chairman McLeod, Mr. Winsor stated that about 20 per cent of the capital investment in power plant and equipment represents the money required to provide for car-heating service.

For the Bay State Street Railway Company, its counsel, Bentley W. Warren, said that requirements of a capital nature bear heavily upon street railways in Massachusetts. Forty-one companies in the State, covering one-third the mileage, pay dividends of only 4 per cent or less per year, and of these about thirty companies pay no dividends at present. The practical result of any capital expenditures under such conditions is to impair the service. C. F. Bancroft, superintendent of motive power and machinery Bay State Street Railway, said the estimated cost of equipping cars now having only hand brakes with air brakes would be $350 per car. The annual cost of maintenance of an air-brake car is about $30 a year greater than for a hand-brake car. No single-truck cars have been bought for five years. The cost of wind shields would be about $50 per end. Mr. Bancroft said that the expense would be increased on the Bay State lines because the regular cars are equipped with curved dashers with the headlight in the middle of the dasher. The change could not conveniently be made in the company shops. It would be necessary to drop down the wind shield on the outside of the dasher and box in the shield in some way by a kind of false dasher. The glass could not be dropped down inside the present dashboard on account of the hand brake, and changes in the fenders would also be necessary. The estimated cost of heaters for the vestibules is $22 per car, and the power station capacity would also have to be increased. E. J. Dickson, manager of the Springfield (Mass.) Street Railway, and Howard F. Eaton, manager of the Brockton & Plymouth Street Railway, also spoke against the petition.

LONDON LETTER

(From Our Regular Correspondent)

The ten new cars which have been constructed for the Leicester Corporation by the International P-A-Y-E Tramcar Company, Ltd., have been put into service. The occasion was made one of some formality, the Mayor and his wife accompanied by various members of the Town Council, traveling in the first prepayment car which was run. There was a reception at the Grand Hotel, at which the system was eulogized by the Mayor and aldermen.

The Lancashire & Yorkshire Railway has opened its electric train service to Ormskirk, completing the through electrified system from Liverpool to Ormskirk. Only a limited number of trains are running, but when the new battery station at Ormskirk is erected a full service of express and limited electric trains will be introduced.

The tramway receipts of the London County Council for the year ended March 31, 1913, were £2,180,735, as compared with £2,292,301 for the previous year, a decline of £111,566. Recent records, however, show a great improvement as mentioned in this letter last month. Meanwhile the system continues to be extended. The opening of tramways in Bishopsgate, by which through running will be possible as far as Epping Forest, is announced. The reconstruction and electrification of the horse tramway from Dalston Junction to Mare Street, Hackney, has been completed. The Council suffered from two breakdowns recently at the Greenwich generating station, one some weeks ago, when the tramway service was held up for an hour, and another more recently, when the entire system was held up for two and a half hours, not a car over the whole area served by the Council being able to move during that time. The stoppage occurred just before 9 o'clock in the morning, one of the busiest times during the twenty-four hours. The official statement attributed the second suspension to a short-circuit which partially destroyed the switchboard.

The Birmingham tramways have had a most successful year, having carried about 132,000,000 passengers, an increase of more than 24,000,000 over the previous year. The receipts for the year were £573,072, as against £422,620 for the previous year, an increase of £150,452. It is not expected, however, that the amount applied for the relief of rates will be greater than last year, as concessions in the way of cheaper fares have been given to the public which approximate about £70,000 or £80,000. Meanwhile, many of the improvements sanctioned by Parliament are being carried out, which, when finished, will make the tramway system in Birmingham a much more efficient one than ever before. A sub-committee has been appointed to consider various projects for the extension of the tramways. The most important question which the committee has to decide, however, is the linking up of the various lines in the center of the city, as Birmingham is a city of "dead" ends.

The private bill committee of the House of Commons has been considering the bill of the Southport Corporation, which seeks power to establish a trackless trolley system on the esplanade and promenade, and also to run motor omnibuses. The committee has approved the part of the bill relating to the trackless trolley system, but has refused to pass the preamble of the clause relating to the buses.

The Manchester tramways committee is still deeply concerned with the problem of traffic congestion. Notwithstanding the recommendation made to it by various other committees that it should send the general manager of the tramways, the city surveyor, the chief constable and others to visit other large cities in Great Britain and abroad, and report the result so as to enable the committees which are concerned to make a complete joint report and recommendations on the subject to the City Council, the Council has recently sent the committee back to England for advice on the problem. This seems doubtful economy as many other European cities have had to face the same difficulties as exist in Manchester. The committee is gathering statistics as to the traffic density. The interim report issued recently shows that crowding decreased following the substitution of a through route scheme for the old method of bringing cars into the center of the city to "dead" ends. The question is a difficult one, and it is apparent that no remedy will be effective that does not deal with the whole of the congested area, including the streets where the tramcars are not responsible for the congestion. Many of the most congested places are some distance from the busy tramcar routes but have a direct effect on them, showing that any remedial scheme must be of a general character and not apply only to tramways.

The Metropolitan Electric Tramways, Ltd., which operates in the northern portion of London, reports earnings of £518,025 for the year, but the directors state that the profit decreased £24,347. This is attributed to the motor-omnibus competition, which necessitated an increase in the car services. The receipts per car mile dropped from 10.59d. to 9.63d. It is anticipated that the alliance with the London General Omnibus Company will bring about the co-ordination of the omnibus and tramway services in the company's area and a consequent improvement in the company's revenue. The ordinary dividend for 1912 was only 5½ per cent for the year, against 6 per cent for 1911. The purchase by the London County Council of the company's tramway between Finsbury Park and Manor House was completed in August, 1912, at which time through-running arrangements went into effect. The satisfactory results obtained from the first through service worked jointly by the London County Council and the company have led to a further agreement, under the terms of which through running will be extended to all routes of the Council and the company converging at Manor House junction. The scheme for the consolidation of the company's interests with those of the London United Tramways, Ltd., particulars of which were issued to the shareholders, became binding in December, 1912, most of the holders of each class of shares having accepted the offer to exchange their holdings for shares and debenture stock in the London & Suburban Traction Company, Ltd. Under the terms of the scheme the company had sold to the London & Suburban Company its entire interest in the share capital of the Tramways (M. E. T.) Omnibus Company, Ltd. The directors anticipate that the consolidation of the two tramways will effect substantial economies in administration and a reduction of working expenses. The company is promoting a bill in the present session of Parliament to authorize the installation of the railless traction system over a route connecting the company's tramways in Wood Green and Tottenham with the light railways belonging to the Walthamstow Urban District Council. The new system will, if sanctioned by Parliament, take the place of the light railway authorized by the Tottenham-Walthamstow Light Railways order of 1906 and will open up a new area which is not served by the company's system.

A bill promoted by the City & South London Underground Railway to authorize important developments is pending before a select committee of the House of Lords. The main object of the measure is to secure authority to increase the size of the company's tunnel.

A select commitee of the House of Lords is considering the Metropolitan Railway bill, a measure which has been promoted for the purpose of vesting in the Metropolitan Railway the undertaking of the Great Northern & City Railway, the underground tube which runs from Moorgate Street to Finsbury Park. The second object of the bill is to secure authority to construct two small underground railways, which might be described as an extension of the Great Northern & City Railway from Moorgate Street to Lothbury, so as to reach further into the heart of the city. It is also proposed to make a further extension, so as to connect with the City & Waterloo Railway at a point in Queen Victoria Street. The plan will afford connection between railways running north and those running south.

The Chesterfield Corporation railless traction bill is at present before a Parliamentary committee. The object of the bill is to give the corporation authority to run trolley cars and omnibuses over certain routes which radiate from the borough into the adjoining districts. The plan is to test the routes for the railless traction before putting up posts and overhead wires. After traffic has been developed in this way, the trolley system will be put into force and the motor buses taken off. Along certain routes no powers are being asked for trackless trolleys but only for motor omnibuses, as it has been discovered that along these particular routes the putting up of posts for the trackless trolleys would interfere with the trunk wires of the post office.

A. C. S.

News of Electric Railways

Hearing on Pennsylvania Utilities Bill

The joint general judicial committee of the Legislature of Pennsylvania held a hearing April 29 in the Senate caucus room on the public utilities commission bill as amended in committee. Representatives of the city of Pittsburgh and the steam, electric, telephone and milling interests spoke on the amended measure, which was defended by Attorney-General Bell and Dean Lewis of the University of Pennsylvania Law School, sponsors for the bill. Among those who appeared against the bill in its present shape were Mayor Magee of Pittsburgh, City Solicitor Bown of Pittsburgh and E. H. Davis, general manager of the Williamsport Passenger Railway, who was also spokesman for the Pennsylvania Street Railway Association.

City Solicitor Bown supported the amendments to the measure advocated by Mayor Magee. He maintained that these amendments were absolutely essential for the creation of a commission in the public interest. He contended that such public service corporations as subways, elevated railroads and inclined planes could not be properly regulated under the bill as it stood; that no attempt was made to regulate holding companies; that the terms of the commissioners (ten years) were too long; that the switching problem in Pittsburgh could not be handled under the present bill, and that the important question of regulating securities issued was not properly cared for in the bill. In the original bill drafted by the executive committee of the Republican state convention this regulation of security issues was entirely omitted for the reason that the subject was covered in a separate bill known as the "blue sky law." The present composite measure left it optional to the corporation issuing the securities whether or not it would apply to the commission for its approval. Then again, Mr. Bown claimed, the purposes for which the securities were issued were not limited by the act nor was the corporation required to apply the proceeds of securities issued as the commission may direct. Finally no limitation whatever was imposed on holding companies. Mr. Bown also opposed the provisions to enable public utilities to build their lines through municipalities without municipal consent and requiring the consent of the commission to any contract entered into between a public utility corporation and a municipality.

Mr. Davis spoke briefly on the features of the bill permitting municipally controlled corporations to compete with existing corporations, empowering the commission to compel street railway extensions and providing for the joint use of facilities by different corporations. He cited the new Lehigh River bridge of the Lehigh Valley Transit Company as an illustration of the hardship that would be inflicted upon that company under such provision. Mr. Davis held that the enforcement of such mandates by the commission would operate quite seriously against the earning power of small electric railway systems throughout the State.

Others who spoke included George Stuart Patterson, representing the Pennsylvania Railroad, and Ralph S. Morris, one of the men who drafted the Democratic state platform bill. Mr. Patterson recommended a provision for a certain distribution of the cost of eliminating grade crossings between a municipality, a railway and the State on a basis of 50 per cent for the railway and 25 per cent each for the State and municipality. He predicted that such a distribution would reduce the number of grade crossings in the State 50 per cent within the next twenty-five years.

Dean Lewis took issue with former Attorney General Hensel when the latter contended that a public utilities corporation franchise should possess a certain valuation in fixing the rates to be charged the public by such corporation. He held that while a corporation should have a proper return the franchise is given by the State solely that the corporation may be in a position to render public service; therefore there should be no value attached to the gift from the State. In this contention Attorney-General Bell agreed with Dean Lewis. Mr. Hensel also spoke against the provision in the bill permitting the opening of branch offices of the commission in Pittsburgh and Philadelphia, holding that but one headquarters should be maintained, namely at Harrisburg. In a brief filed by Dean Lewis with the committee, he discussed in detail why these important amendments demanded by the corporations should not go into the bill.

Among the 126 amendments to the bill which will shortly be reported to the House are these: making corporations operating under municipal lease subject to the authority of the commission; likewise corporations operating street railways "above" or "below" any street or highway; requiring street railways to arrange schedules to provide quick and convenient transfer of passengers to other lines; requiring through connections to be established between lines doing an electric railway freight business; requiring "reasonable" fare zones and rates; requiring railroads to grant "milling in transit" privileges; giving shippers the right to designate routes; specifically requiring the transfer privilege on street railways; giving the commission distinct power over the system of accounting and service of the lessee of a municipally owned public utility, "subject to the terms of the contract or lease"; providing that the commission must institute action for violation of its orders within two years; prohibiting any commissioner from either holding another state or municipal office or from being a candidate for any public office during his term. Under the amended bill the present commission would go out of office on July 1, 1913, and the new commission would organize Oct. 1 and begin business Jan. 1, 1914.

Safety Measures Adopted by Public Service Commission

The Public Service Commission for the First District of New York adopted an order on April 25 requiring all public-service corporations within its jurisdiction using steam and electrical apparatus to employ certain safety appliances and take certain precautionary measures to protect their employees against injury by contact with live wires, etc. There were thirty-nine companies represented at the hearings on the measure, and while the importance of safeguarding employees was recognized by all, there was no unanimity in the practices of the various companies. Accordingly the appliances and measures recommended by the electrical engineer of the commission were prescribed. These are as follows:

1. All high-tension-switch compartments shall so far as their construction will permit be so inclosed as to make it impossible, except when necessarily opening the compartments, for employees to come in contact with electrically charged parts either from or above the floor level.

2. All exposed high-tension cables in generating stations or substations shall be inclosed by screens or otherwise protected.

3. There shall be posted in conspicuous places in all the generating stations and substations diagrams describing and showing the relative location of wires and cables (except light and signal wires) and the switches, etc., controlling them, and all such wires, cables and connections shall be so tagged and numbered that they may be readily identified.

4. All machines for the generation of electricity or connected with such generation shall be so protected by railings and gratings as to safeguard operators and others from coming in contact with moving or electrically charged parts.

5. There shall be at least two operators on duty in rotary converter stations delivering energy at 500 volts or higher when the same are in operation.

6. All water-level glasses or gage glasses on tanks, standpipes or other storage receivers under pressure shall be protected by screens to prevent injury from bursting glass.

7. Test cocks on water columns shall be fitted with extension rods or chains so as to be operative from the boiler-room floor level.

8. All stop valves on steam boilers shall be of the automatic self-closing type.

9. Outlets of all safety valves shall be vertical.

10. All furnace doors on hand-fired boilers shall be fitted with latches or catches to prevent them from being blown open.

11. All moving parts of stokers shall be so protected, wherever possible, as to prevent accidental contact with such moving parts.

12. All large main cut-out stop valves shall be provided with means whereby the same may be closed from the boiler-room or engine-room floor or other remote point.

13. All large steam units shall be fitted with automatic self-closing valves.

14. All high-speed engines shall be fitted with automatic safety stops.

15. Elevator wells shall be properly and substantially inclosed, secured or guarded and shall be provided with proper traps and automatic doors in or at all elevator ways, so as to furnish substantial covering when closed and to open and close by action of the elevator when descending or ascending.

16. All openings in floors shall be roped off or protected by railings when left unguarded, and in addition a red light shall be displayed in the immediate vicinity when the location is unlighted or poorly lighted.

17. All stairways shall be provided with safety treads, kept free from oil and water, and be properly protected with hand rails.

18. Shafting running along or passing through floors shall be housed or screened or otherwise properly guarded.

19. All belting shall be inclosed or otherwise protected wherever accidental contact is possible.

20. Gear-case covers completely inclosing the gears shall be fitted to all machine tools and be kept in place when such tools are being used.

21. Set screws and keys in exposed positions on moving machinery and shafting shall be countersunk or otherwise properly protected.

22. Buzz saws and band saws shall be protected so as to prevent accidental contact with saw blades.

23. Grinding and emery wheels shall be properly guarded and equipped with hoods and exhaust pipes to draw off finely powdered material.

24. Guard glasses shall be provided for employees and used by them when engaged upon any work causing chips or fragments to fly, and wire screens of a portable or permanent type shall be set up on workbenches or around employees engaged in chipping.

25. A sufficient number of pails of clean dry sand must be kept in all generating stations, substations, auxiliary and switching stations.

26. Generating stations, substations, auxiliary and switching stations shall be provided with a sufficient number of chemical fire extinguishers of such a type that the contents cannot act as an electrical conductor. No other extinguishers shall be kept for use unless conspicuously labeled that they are not to be used until circuit has been killed.

27. All generating stations, substations, auxiliary and switching stations and shops shall be provided with a first-aid or emergency kit.

28. Provisions shall be made whereby pulmotors will be available in case of accidents.

Cleveland Railway Preparing to Oppose Fare Reduction

At a meeting of the directors of the Cleveland (Ohio) Railway on April 26, 1913, it was decided to oppose the order of the city of Cleveland reducing the rate of fare to 3 cents cash or two tickets for 5 cents, with 1 cent for a transfer, which was to go into effect on May 1. The company will also insist upon its demand for an increase in the operating and maintenance allowances and will take issue with Mayor Baker's intimation of extravagance in the operation of the property. These matters will all be brought before the board of arbitration on which C. N. Duffy, Milwaukee, will represent the company.

At the regular meeting of the City Council of Cleveland on April 28, 1913, A. B. DuPont, former head of the Municipal Traction Company, Cleveland, was chosen to represent the city on the board of arbitration which is to take up the differences between the company and the city administration. C. N. Duffy, Milwaukee, the company's representative, arranged to meet Mr. DuPont on April 30, 1913, to consider the selection of the third member of the board. The questions to come before the board follow:

The right of the company to exceed operating and maintenance allowances.

The right of the company to make arbitrary charges against the operating allowances for the accumulation of accident and insurance reserves.

Whether the interest fund is now more or less than $700,000 and whether the fare shall be reduced to 3 cents cash, with two tickets for 5 cents and 1 cent for a transfer.

The disposition of $189,300 of stock, once owned by the Municipal Traction Company and now held in trust by Horace E. Andrews.

The disposal of $323,000 held by the company as surplus of underlying corporations.

Whether disused equipment shall be scrapped and paid off at once from the maintenance and renewal fund or whether the cost shall be distributed over ten years.

Whether allowances for operation and maintenance shall be increased.

Several of these questions have been injected into the controversy by the city since the fact became apparent that differences relating to the reduction of fare and allowances for operation and maintenance would have to be submitted to arbitration.

The report of operation for March shows an actual deficit of $1,734, due to deficits of $27,241 and $25,865 in the operating and maintenance funds respectively. Notwithstanding this, $51,372 was added to the interest fund, which is now $614,000, according to the company's figures. The operating deficit amounts to $285,000 and the maintenance deficit to $349,000.

The directors have voted to accept a franchise for an extension from the St. Clair line into Gordon Park and have approved the expenditure of $79,000 on improvements to the St. Clair Avenue carhouse and shop.

Resolution Introduced to Create Street Railway Commission in Detroit

According to the members of the Detroit charter commission the proposed commission form of government for that city will probably not be adopted. Most of the members of the commission, it is said, favor amendments to the present form in preference to an entirely new form of government.

On April 23 Lawrence Cameron Hull addressed the commission, on invitation. He explained the German form of government which the commission form would follow, but he said this cannot be adopted complete in this country because of partisan training.

Commissioner Burton has introduced the following plan for the creation of a street railway commission:

"The Common Council shall provide for a commission of not less than three and not more than five members, to be designated the Street Railway Commission.

"The commission, in the name of the city, may purchase, equip and maintain any or all of the present street railways, or may build and maintain new railways. Until an arrangement is made with the present system to vest the title in the city, the commission shall have power to fix the rates of fare and determine the running of lines and extensions.

"The commission shall make plans for subways or elevated roads for street cars as it may deem proper, and shall construct the same whenever proper funds for that purpose are provided.

"The commission shall have such other powers and perform such other duties as the Council shall from time to time prescribe.

"The members of the commission shall receive such salaries as the Council may, in advance of their appointment, prescribe.

"The members of the commission shall be appointed by the Mayor for the time being, and the term of office shall be coterminous with the office of the Mayor appointing them, but such commissioner shall retain office until his successor has been appointed and entered upon the duties of his office."

Corporation Counsel Lawson has expressed the opinion that the resolution adopted by the City Council on Dec. 3, 1912, providing for the creation of a charter commission may be amended by resolution and the amount to be used for expenses may be increased in that way from $500 to $5,000.

On April 23 the board of estimators engaged in making up the city budget voted to place an item of $250,000 in the list for the purpose of building an electric railway on Junction Avenue, on which storage battery cars are to be operated. This was done at the request of Mayor Marx, who is anxious to have the city furnish cross-town service on that thoroughfare. Representatives of the Merkle Gas-Electric Company of Canada have asked the Mayor to allow them to demonstrate one of their cars on the tracks in Detroit.

Terms Proposed for Extensions in Akron

A. B. DuPont, Cleveland, is preparing two agreements between the city of Akron and the Northern Ohio Traction & Light Company relating to extensions of track which the city has demanded. Both will be presented to the City Council and a selection will be made of such parts of each as may be desirable. In both will be inserted a condition that if the extensions pay a profit above a certain rate of interest on the investment the surplus shall be turned over to the city, but the city must also guarantee a certain rate of return on the investment.

The platform men of the Northern Ohio Traction & Light Company have refused the offer of the company to increase their wages 1 cent and 2 cents an hour, making the minimum 22 cents and the maximum 27 cents. The men on the Cleveland-Akron division receive 27 cents an hour except for the time they are within the Cleveland limits, when they are really employees of the Cleveland Railway and receive the same wages as are paid on the local lines, 20 cents an hour. They argue that they should receive 29 cents an hour for their full time. The men demand 25 cents an hour for the first year and 30 cents thereafter. The company's scale increases 1 cent a year to the fourth year, when it increases 2 cents, maxing the maximum 27 cents. The company has since formulated a new schedule for its platform men which is said to be satisfactory.

The company recently closed a contract with the B. F. Goodrich Company, rubber manufacturer, to furnish power aggregating 4500 hp in addition to that generated by its own plant.

Subway Construction Payments in New York

The Public Service Commission for the First District of New York has entered into an agreement with the Interborough Rapid Transit Company upon the annual estimates of the amounts of money to be provided by the company under Contract No. 3 of the dual system agreement. The estimates agreed upon are as follows: For the period from the signing of the contracts, March 19, 1913, to Dec. 31, 1913, $18,000,000; for the year 1914, $20,000,000; for the year 1915, $20,000,000; for the year 1916, $19,260,000. Under the contract the company is to contribute $58,000,000 toward the cost of construction of new city-owned subways and $22,000,000 for equipment. This is on the assumption that the total cost of construction will be $116,000,000, the underlying idea of the contract being that the city shall contribute one-half and the company one-half. Proper provisions are made for adjusting the difference if the cost of construction shall fall below $116,000,000. Inasmuch as the city has already expended about $30,000,000 on lines to be operated by the Interborough company, it is understood that the company will provide an amount out of its total contribution until its expenditures equal those of the city, when contributions will proceed half and half by both parties.

The Interborough Rapid Transit Company has deposited with the Comptroller of the city of New York $1,000,000 in securities, as provided in the security chapter of the dual system contracts. The Public Service Commission gave its approval to the schedule of this security, which consists of two notes of the city of New York for $500,000 each, dated Feb. 27, 1913, and payable on June 2, 1913. The notes were given by the city to the company for a loan of $1,000,000 in anticipation of the issue of corporate stock for various municipal purposes. It is understood that the company will purchase an equal amount of this corporate stock when it is offered for sale and will then substitute the stock for the notes as the deposit required under the subway contract.

Railroad Valuation Board Named by I. C. C.

The Interstate Commerce Commission on April 30, 1913, announced the members of the board of engineers, five in number, who will appraise the physical properties of the railroads of the United States under the law passed by Congress. They are:

R. A. Thompson, employed in railway valuation work by the California State Railroad Commission, and formerly engaged in similar work with the Texas Railway Commission.

Prof. W. D. Pence, chief engineer of the Wisconsin Railroad and Tax Commission and an expert in railroad valuation.

J. S. Worley, Kansas City, Mo., a consulting engineer with experience in railway valuation work.

Howard M. Jones, Nashville, Tenn., a consulting engineer in valuation work and a specialist in bridge engineering.

E. F. Wendt, Pittsburgh, Pa., president of the American Society of Civil Engineers, who is in charge of the engineering work of the Pittsburgh & Lake Erie Railroad.

The board of engineers will meet in a few days to determine the rules which shall govern the valuation.

Dedication of Buildings at the University of Illinois

On May 8 and 9, at Urbana, Ill., there will take place a formal dedication of the new Transportation Building and the locomotive and mining laboratories of the University of Illinois. This will mark a step in the extraordinary growth which has characterized the forty-five years' life of the university, during which time the original faculty of four professors has increased to more than 500 members and the student body from fifty to more than 5000.

As Illinois is the second among the states of the Union in its mileage of railway tracks, the trustees have considered it important that the activities of the university shall embrace such lines of instruction and research as will best prepare men for positions of responsibility in the railway service, and to this end the School of Railway Engineering and Administration was established in 1906. Its functions are to combine certain courses offered by different colleges of the university so as to provide training of a highly scientific character for those who wish to prepare themselves for the engineering, equipment, financial, traffic or operating departments of either steam or electric railways.

The Transportation Building, which has been recently completed, is designed primarily to be occupied by the department of railway engineering. It contains offices, classrooms, drafting rooms, various laboratories, a departmental library and a students' reading room. The upper floors are temporarily assigned to the department of mining engineering and the department of general engineering drawing. Adjacent to this building are the locomotive laboratory and the mining laboratory, the plan for the group of buildings of which these constitute a part providing also for a railway electrical laboratory and a railway museum.

As a part of the dedicatory exercises there will be a number of addresses by prominent speakers, among them being the following: Samuel Insull, president Commonwealth Edison Company, Chicago; J. G. Pangborn, special representative of the Baltimore & Ohio Railroad, Baltimore; John Hays Hammond, mining engineer, past-president American Institute of Mining Engineers, New York; W. B. McKinley, president Illinois Traction System, Champaign, Ill.; Charles B. Moore, vice-president Jacobs-Shupert United States Firebox Company, Chicago; G. R. Henderson, mechanical engineer Baldwin Locomotive Works, Philadelphia; D. F. Crawford, president American Railway Master Mechanics' Association, Pittsburgh, Pa.; Albert Reichmann, president Western Society of Engineers, Chicago, Ill.; T. H. Goodnow, president Western Railway Club, Chicago, Ill.; F. H. Clark, past-president Master Car Builders' Association, Baltimore, Md.; H. G. Hetzler, president Chicago

& Western Indiana Railway, Chicago, Ill.; W. L. Park, vice-president Illinois Central Railroad, Chicago, Ill.; Robert Quayle, general superintendent motive power Chicago & Northwestern Railroad, Chicago, Ill.; Samuel O. Dunn, editor *Railway Age Gazette*, Chicago, Ill.; H. E. Chubbuck, vice-president executive Illinois Traction System, Peoria, Ill.; C. B. Young, mechanical engineer Chicago, Burlington & Quincy Railroad, Chicago, Ill.; Isham Randolph, consulting engineer, Chicago, Ill.

The formal dedicatory exercises will be held on the afternoon of May 9, 1913, at which addresses will be made by Edward F. Dunne, Governor of the State of Illinois, and C. H. Markham, president Illinois Central Railroad.

Award in Toronto Expropriation Case

The following is the award of the Ontario Railway & Municipal Board in connection with the expropriation of the portion of the Toronto & York Radial Railway, Toronto, Ont., lying between Sunnyside and the Humber River, the whole containing 54,720 ft. of land, an old structure and the roadbed and equipment of the railway in that area:

For the carhouse site and Humber property	$38,254
For the railway within the city, construction, etc.	40,991
Total amount of award	$79,245
Estimated value by Toronto & York Radial Railway for the carhouse property	$137,031
Estimated value of the Humber property	11,812
Total value for the property alone	$148,843
Value estimated by the city for the whole of the carhouse and Humber property	$32,000

The value of the lands could not be agreed upon by the city and the railway, and appeal was made to the Ontario Railway & Municipal Board. Experts were called by the railway and the city, but they were $116,000 apart. The board appointed its own engineer to decide the value of the roadbed and the equipment. Upon this estimate the finding is made and the award given after much consideration and personal inquiry by Chairman McIntyre of the board and his colleagues. The company under the award gets $47,245 more than the city's estimated value but $68,598 less than it expected for the property alone. An appeal is probable.

Progress Program in Twin Cities

Horace Lowry, vice-president of the Twin City Rapid Transit Company, Minneapolis, Minn., in a letter to H. L. Moore, chairman of the street railway extension committee of the City Council, proposes important extensions of the company's lines for 1914 which will affect all parts of the city. Mr. Lowry said in part in his communication to the committee:

"We wish to submit to you the following proposition and trust that after due consideration by your committee you will recommend its acceptance by the City Council of Minneapolis. On account of the large volume of permanent improvements undertaken by our company for 1913, we respectfully request that no more lines (except those now ordered and accepted by our company) be ordered for construction during this year, and in consideration of this we submit the following offer for construction during the year 1914:

"Construct a line on Eleventh Street from Hawthorn Avenue to Fourth Avenue South, on Fourth Avenue South to Franklin Avenue, on Franklin Avenue to Minnehaha Avenue, on Minnehaha Avenue to Twenty-fifth Street, on Twenty-fifth Street to Thirty-sixth Avenue South and on Thirty-sixth Avenue South to Lake Street. The portion of this line now being operated as a single-track stub to be double-tracked and made a part of the proposed line on which cars will be operated from terminus to terminus.

"Extend the Twenty-eighth Avenue South line from Twenty-eighth Avenue on Fiftieth Street to Thirty-fourth Avenue South.

"Extend the Xerxes Avenue line from Xerxes Avenue and Fiftieth Street on Fiftieth Street to Penn Avenue South.

"Bring the Bobbinsdale line through to the city of Minneapolis from its present intersection with Crystal Lake Avenue, at the city limits, on Crystal Lake Avenue to Penn Avenue and Crystal Lake Avenue, thence into the city via the Twentieth Avenue North line.

"Extend the Oak Street Southeast line from its present terminus at Dartmouth and Superior Streets on Dartmouth Street to Lennox Street, thence on Lennox Street to Hamline Avenue.

"Referring to grade crossings our past experience shows that such busy crossings as those mentioned are not only extremely dangerous, but, furthermore, the traveling public is inconvenienced a great deal by poor service, which we are unable to control. Present conditions frequently show that poor service exists on account of railroad crossings causing irregular car spacing, when as a matter of fact there are sufficient cars on the line to give good service were it possible for us to keep them in place.

"It is our intention to work with the city to the very best of our ability and at all times to attempt to keep up with the growth and advancement of the city. We believe that the above proposition solves the situation at this time and sincerely trust that the city can see its way clear to accept it."

Large Increase in Assessment in New Orleans

The assessment committee of the Council Commission of New Orleans, La., has voted to assess the property of the New Orleans Railway & Light Company for 1913 at $23,576,944. The assessment against the company for 1912 was $17,170,261, making the increase for the year more than $6,400,000. In protesting against the proposed assessment the company said:

"For 1912 the assessment of the New Orleans Railway & Light Company was $17,170,261, equivalent to 7.29 per cent of the total assessment of the city. The board of assessors has placed the 1913 assessment of the company at $23,576,944. If this is 7.29 of the total city assessment, as was the case in 1912, it indicates that the total assessment amounts to $323,409,382 (nearly equal to the wealth of the city), as compared with $235,482,566 for 1912. It is not conceivable that the total city assessment for 1913 would be increased by $87,926,816, or 37.3 per cent over that of 1912, consequently the New Orleans Railway & Light Company has been discriminated against. The total assessments of the city of New Orleans and the assessments of the New Orleans Railway & Light Company from 1902 to 1912 were as follows:

	City Assessment	Railway Assessment
1902	$147,852,113	$9,216,934
1903	155,149,019	11,511,118
1904	158,584,194	12,073,742
1905	170,583,374	13,166,590
1906	204,585,967	14,448,557
1907	217,366,255	15,922,700
1908	223,549,246	15,091,197
1909	221,373,512	15,332,154
1910	230,846,187	15,510,902
1911	233,377,637	16,452,409
1912	235,564,586	17,170,261
1913	....	23,576,944
Per cent increase for period 1902 to 1912	59.5	86.0

"Based upon the increases above indicated, the assessment of the New Orleans Railway & Light Company for 1913 should not exceed $17,842,000. In addition to this, the company spent $552,000 in extensions of its property in 1912, 60 per cent of which would add only $319,200 to the assessment for 1912, if based upon property increase only.

"The citizens of New Orleans own approximately 52.89 per cent, par value, of the total securities of the American Cities Company and its subsidiary companies which are outstanding. The remaining 47.11 per cent, however, is not owned by people foreign to the interests of New Orleans, but is largely held in Louisiana and in the South. Regarding such stockholders as may be considered foreign, they are among the best friends the city of New Orleans has and have invested large amounts in industries other than public utilities here and in the South. This city and this section need foreign capital and cannot expect to compete with progressive communities if policies of this kind prevail. In fact, the wealth per capita of New Orleans is only about $1,000, as compared with approximately $1,500 for the remainder of the country. New Orleans has been at a disadvantage in comparison with other cities in rate of growth, but has had in offset a reputation for conservatism. We submit, that establishing this increase in assessment of $6,406,683, or 37.31 per cent, initiates a policy that will deter the investment of foreign capital which the city desperately needs."

Decision Affecting Creditors Not Parties to Reorganization

In a decision which it rendered on April 28, 1913, the United States Supreme Court laid down the general principle that a creditor of a corporation not a party to its reorganization may hold its successor for his debt. The court held the Northern Pacific Railway responsible for a judgment for $125,000 against the Northern Pacific Railroad, which it succeeded, despite the fact that the court expressly stated that no moral wrongdoing was to be found in the reorganization. The principle as laid down by Justice Lamar was stated as follows:

"Corporations insolvent or financially embarrassed often find it necessary to scale their debts and readjust their stock issues with an agreement to conduct the same business with the same property under a reorganization. This may be done in pursuance of a private contract between bondholders and stockholders, and though the corporation property is thereby transferred to a new company having the same shareholders, the transaction would be binding between the parties.

"But, of course, such a transfer by stockholders from themselves to themselves cannot defeat the claims of a nonassenting creditor. As against him, the sale is void in equity, regardless of the motive with which it was made. For if such contract reorganization was consummated in good faith and ignorance of the existence of the creditor, yet, when he appeared and established his debt, the subordinate interest of the old stockholders would still be subject to his claim in the hands of the reorganized company. There is no difference in principle if the reorganization, instead of being effectuated by private sale, is consummated by a master's deed under a consent decree."

Electrification of Canadian Northern Railway in Vancouver.—The Canadian Northern Railway proposes to build a tunnel 4½ miles long between Lytton Square and Main Street, Vancouver. The line will be electrified. It is expected that work will commence as soon as the False Creek operations are well under way and that it will be completed in two years.

More Storage Battery Cars in New York.—The New York (N. Y.) Railways has applied to the Public Service Commission for the First District of New York for permission to substitute storage battery cars for horse cars on the Metropolitan crosstown line running from Delancey Street and the Bowery through Spring Street, West Broadway and other streets to the Desbrosses Street ferry on the Hudson River.

Conference in Buffalo in Regard to Employees' Demands.—The committee representing the employees of the International Railway, Buffalo, N. Y., and the officers of the company met on April 28, 1913, to consider the demands of the men in accordance with the provisions of the agreement under which the men returned to work following the recent strike. After a brief session the meeting was adjourned until April 29. It was agreed at the meeting on April 28 that no statement would be given out in regard to the progress of the arbitration negotiations until after the meeting on April 29.

Franchise Negotiations in Saginaw.—A committee has been named by the Board of Trade of Saginaw, Mich., to frame a new ordinance in favor of the Saginaw-Bay City Railway which will be submitted to the directors of the board of trade, after which it will be recommended to the Common Council for adoption and submission to a vote of the people. Some 12 miles of new line are desired in the city, and the company in consideration of the construction of the extensions is said to desire a blanket franchise for thirty years. The franchises under which it now operates were granted for from sixteen to thirty years.

Plans of the Pittsburgh, Steubenville & Wheeling Railway.—W. E. Hildebrand, president of the Pittsburgh, Steubenville & Wheeling Railway, 1510 Arrott Building, Pittsburgh, Pa., has arranged for the construction of the proposed line between Pittsburgh and Wheeling. The line will be 52 miles long. It is proposed to charge a fare of 95 cents from Wheeling to the connection which the line will make with the Pittsburgh Railways, and it is hoped to make the run between the cities in two hours and twenty minutes. The survey for the line has been completed between Pittsburgh and Patterson Mills, which is 22 miles from Wheeling. The estimated cost of the road is $3,000,000.

Strike in Jamestown.—The employees of the Jamestown Street Railway and the Chautauqua Traction Company, Jamestown, N. Y., went on strike on May 1, 1913, following the refusal of the officers of the companies to reinstate two trainmen who were discharged recently for infractions of the rules, to grant an increase in wages and to recognize the union which has recently been organized among the men. A. N. Broadhead, president of the companies, is reported to have said that the increase in wages which has been demanded would amount to more than twice the present net earnings of the companies.

Progress on Providence Tunnel.—It is expected that the north arch of the East Side Tunnel through the hill from North Main Street to Thayer Street, Providence, R. I., for cars of the Rhode Island Company, will be completed by Aug. 15, 1913. This means that about 60 per cent of the work will have been done by that time. Heaton R. Robertson, who is in charge of the work for the Rhode Island Company, is reported to have expressed the opinion that the tunnel will be ready to be put in operation as a part of the street railway system by July, 1914. The work was begun on the tunnel on Nov. 13, 1912. Under the provision of the contract between the city and the Rhode Island Company all single-truck cars will be retired when the tunnel is finished.

New Franchise in Springfield, Ohio.—The American Railways, Philadelphia, Pa., which own the Springfield (Ohio) Railway, has accepted a franchise from the City Council of Springfield, to run for twenty-five years. By the terms of the grant the road is to be operated under the supervision of the city, which is to have the right to purchase the property any time after five years. Ten miles of extensions and the expenditure of $500,000 on improvements within three years are required. The fare is to remain at six tickets for 25 cents until the gross earnings reach $800,000 a year, when the fare is to be reduced to seven tickets for 25 cents. Differences respecting service, double-tracking and other matters are to be submitted to a board of arbitration of local men, whose decision is to be final.

Suburban Line at Seattle Offered to City.—A. K. Wylde, E. J. Sherman, George Gunther and H. C. Glenn, present owners of the Highland Park & Lake Burien Railway, in a communication to the Council of Seattle, Wash., have offered to transfer that portion of the railway within the city limits to the city free of all encumbrances on condition that the city maintain service so that property owners along the road who subscribed to the fund for the road's construction may have access to Seattle. The stipulation is that in case service is not maintained the line will revert to the original owners. They point out that approximately half the line, which originally cost $112,000, lies within the corporate limits. The offer has been referred to the city utilities committee, of which Councilman Oliver T. Erickson is chairman.

New Municipal Ownership Bill in Toronto.—Practically a new bill has been drafted to enable the city of Toronto to purchase the property of the Toronto Railway and Toronto Electric Light Company. Among the amendments proposed to the bill, it is provided that voting on the question of purchase shall only be by the electors entitled to vote on money by-laws under the municipal act. An important sub-section has been introduced to meet the objections of the Hydro-Electric Power Commission. It provides that any proposition submitted to the people must first be approved by the Lieutenant-Governor-in-Council and the Hydro-Electric Commission. The by-law to be submitted shall contain a synopsis of the proposal with the price to be paid to the company and the terms of payment. In case the property of the Toronto Electric Light Company is purchased by the city the control and management of the enterprise shall be intrusted to the Toronto electric commissioners having the control of the municipal electric light, heat and power works. Another clause prohibits the merger of the Toronto Electric Light finances and those of the civic hydroelectric system. Any debenture debt acquired under the act shall not be considered part of the general debenture debt of the city.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CONNECTICUT

The judiciary committee of the Legislature met recently to consider several bills relating to the Public Utilities Commission. The bill providing for the approval of the Public Utilities Commission of the securities of public service corporations was referred to the committee on incorporations. No action was taken on the bill giving the Public Utilities Commission power to fix rates.

IDAHO

Governor Haines has signed the bill creating a public utility and tax commission in Idaho. A measure modeled after the Kansas "blue sky" law has been passed and signed. The most important measure which failed of enactment was a workmen's compensation act. The two houses of the Legislature were unable to agree upon the form of law which should be passed. As a temporary solution of the question and by way of providing a permanent solution, the Governor was authorized to appoint a commission for the purpose of studying this question and of reporting a suitable bill to the next Legislature. It was provided that the commission be composed of one member of each house of the present Legislature, two representatives of labor and two of capital.

ILLINOIS

The Denvir bill, providing that street railway employees can be employed only ten hours a day and that in twelve consecutive hours, has been passed by the Senate. The Beall bill, stipulating that seats shall be provided for all passengers on common carriers except street surface cars, has been advanced to third reading in the Senate. Free individual drinking cups in sufficient numbers to supply all railroad passengers will be required if the Burns bill introduced in the House passes. Representative Frank Gillespie, Bloomington, has introduced a new corporation bill which provides for the organization of corporations with shares without par value and permits the ownership by Illinois corporations of shares of stock in other corporations with restrictions similar to those recommended by President Wilson for the bills recently enacted in New Jersey.

MINNESOTA.

The opinion prevails among the leaders in the House and Senate that there will be an extra session of the Legislature for the purpose of passing a public utilities bill. This session, however, may not be held until September or early in October. The trend of affairs since the Governor vetoed the Nolan bill and threatened an extra session indicates that no public utilities bill will be passed at the present session.

A resolution was offered in the House on April 23 for a committee of seven members independent of the Senate special committee to draft a public utilities bill and report to the next session.

NEW YORK

The Senate on April 30, 1913, passed the workmen's compensation bill which was favored by the State insurance department. Two bills were pending. One was introduced by Senator Foley and the other by Senator Murtaugh. The Foley bill was indorsed by the State insurance department. The Murtaugh bill had the support of the State Federation of Labor. The Foley bill allows employers to insure with casualty companies. The rates of compensation are a little higher in the Murtaugh bill than in the Foley measure. The Blauvelt bill, a companion to the Foley measure, providing for the formation of mutual insurance companies to provide security for the payment of compensation awards, has been passed by the Senate.

A bill has been passed by the Assembly which would compel the railways in New York City which operate horse cars to discontinue the operation of their lines with horses after Jan. 1, 1914. The bill contains the following provision to permit the companies to capitalize the expenditure involved in the change of power: "Any such corporation is hereby authorized to issue stock, bonds, notes or other evidence of indebtedness sufficient to cover the complete cost of the new cars and other changes in plant and equipment made necessary by the provisions of this act."

The Yard bill permitting the construction of an electric railway on the Albany Post Road from Hastings to Ossining has been passed by the Senate.

It is said that Governor Sulzer will veto the "blue sky" bill introduced by Assembyman Goldberg, which creates a commission composed of the Governor, the Lieutenant-Governor and the Comptroller to pass on securities before they are placed on the market.

Governor Sulzer is said to have emergency messages ready urging the passage of the bill for the repeal of the Long Sault charter, under which a syndicate holds water concessions on the St. Lawrence River.

The Senate finance committee on April 30, 1913, reported favorably a resolution providing for the final adjournment of the Legislature on May 3. It was expected that the adjournment resolution would be sent to the Assembly on May 1, 1913, for concurrence.

OHIO

At a meeting of the conference committee of the Ohio Legislature on April 25 the Snyder bill, authorizing the creation of indeterminate permits for public utility corporations and their exchange for term franchises, was modified and will be reported to both houses for action at the final session. The measure was opposed by J. C. Martin and D. L. Gaskill, representing the Ohio Electric Light Association, and Joseph G. Heintzman, representing the Union Gas & Electric Company, Cincinnati. They asked that it be made to apply only to street railways, union terminal companies and interurban railways, on the ground that other forms of utility companies are not ready to accept the conditions. Those who favor the measure declared that the bill was permissive and that no company need subject itself to the requirements unless it so desired. The present law, it was asserted, had not been disturbed in any way. Opponents insisted, however, that the bill is so arranged that it will really compel the acceptance of indeterminate permits, and it was requested that it be made to apply only to Cincinnati and Cleveland. This is the last measure necessary to enable Mayor Hunt of Cincinnati to carry out his plan of settlement with the Cincinnati Traction Company.

The redrafted Snyder bill, providing for the exchange of franchises for a fixed term for indeterminate grants, did not meet the approval of the House. A new conference committee was named and instructed to make the bill apply only to those utility companies which took advantage of the Rogers law, allowing the granting of fifty-year franchises. The committee reported a bill that applies only to conditions in Cincinnati and this was adopted by both House and Senate just before final adjournment. The measure is before Governor Cox.

RHODE ISLAND

The failure of the Legislature to act upon the request of the Boston & Providence Interurban Electric Railroad for a charter to do business in Rhode Island has raised the question of the future of the proposed road. The promoters had received an extension of time until Dec. 31, 1913, by the State of Massachusetts in which to file their certificate of incorporation, but when this grant was made it was generally believed that little difficulty would be encountered in obtaining the charter on the Rhode Island end of the line. Several hearings were held by the corporation committee of the Rhode Island House, but the bill was allowed to die in committee. As the Rhode Island Legislature has adjourned sine die the company cannot obtain a charter in Rhode Island this year. The Massachusetts Legislature is still in session and counsel for the road are considering another appeal to that body for a further extension of time so as to make it possible to take up the matter with the Rhode Island Assembly of 1914. Many of the privileges which were at first asked by the company in its application in Rhode Island were waived in the final hearings on the bill. In its final form the charter authorized the company to do little more than construct and operate an electric railway between Boston and Providence.

WISCONSIN

The Jennings bill to prevent the overcrowding of street cars has been killed by the refusal of the Senate committee on corporations to concur in the measure after it had passed the House. The measure would have authorized the Railroad Commission to order companies to put on extra cars and would have allowed unseated passengers to ride free of charge.

PROGRAMS OF ASSOCIATION MEETINGS

New York Electric Railway Association

At a meeting of the executive committee of the New York Electric Railway Association held at the office of the American Electric Railway Association, New York, on May 2 it was decided to hold the annual meeting of the New York association at Brighton Beach, Brooklyn, on June 24 and 25. The members of the executive committee who were present at the meeting in New York were: President, W. H. Collins; vice-presidents, Frank Hedley and Stuart Wilder; also Charles H. Smith, Albany; James F. Hamilton, Schenectady, and J. P. Barnes, Syracuse. Others present at the meeting were Charles C. Dietz, secretary New York Electric Railway Association; H. C. Donecker, secretary American Electric Railway Association, and W. O. Wood, president New York & Queens County Traction Company.

President Collins appointed two committees as follows: Committee on arrangements for the annual outing: J. H. Pardee, (chairman), Frank Hedley, J. K. Choate, C. C. Castle, Stuart Wilder, Samuel Trawick and Charles R. Ellicott; entertainment committee: J. P. Barnes (chairman), C. R. Ellicott, R. M. Colt, H. N. Ransom and C. E. Barry. The program for the annual meeting will be announced later.

Southwestern Electrical & Gas Association

The following tentative program has been announced for the meeting of the Southwestern Electrical & Gas Association which is to be held at Galveston, Tex., on May 21, 22, 23 and 24, 1913:

MAY 21

10 a. m.—Meeting of the executive committee.

11 a. m.—Street railway session. Papers: "Concrete Track Construction" and "The Use of Traffic Charts for Rush Service."

2 p. m.—Street railway session. Papers: "Old and New Ideas in Car Design" and "Street Railway Planning in Growing Cities."

11 a. m.—Parallel sessions for gas members. Papers: "The Use of the Electric Pyrometer in Gas Making" and "The Trimming of Gas Appliance Show Windows." The gas question box.

2 p. m.—Parallel sessions for gas members. Papers: "The Commercial Department in the Gas Business" and "High-Pressure Gas Distributors." The gas question box.

MAY 22

9.30 a. m.—Light and power session. Papers: "Erection and Protection of High-Tension Lines and Apparatus" and "Oil Engines for Light and Power Plants in Small Towns and Cities."

2 p. m.—Light and power and gas and water sessions. Papers: "Economical Operating of Light and Power Plants in the Small Town" and "The Proper Basing of Rates by Light, Power, Gas and Water Public Utilities in Texas."

MAY 23

9.30 a. m.—General session. Papers: "Fire 'Prevention' as Fire Protection" and "The Purification of Feed Water for Steam Boilers." Report of secretary on the work accomplished and the future value of the secretary's office.

2.30 p. m.—Supply men's session and entertainment.

9.30 a. m.—Parallel session for accountants. Paper: "The Necessity of a Standard System of Accounting for the Small and Medium-Sized Public Utilities of Texas." This subject will be discussed by speakers to be announced later. Exhibition, comparison and discussion of forms brought by members.

MAY 24

9.30 a. m.—Association session, unfinished business, reports of standing committees, reports of temporary committees, nomination and election of officers and standing committees for 1913-14. Meeting of new officers and new executive committees.

Financial and Corporate

Stock and Money Markets

April 30, 1913.

There was little in the way of advance as the result of to-day's trading on the New York Stock Exchange. Many of the issues which were without international support showed weakness. New York, New Haven & Hartford Railroad declined four points. The other railroad issues, except Canadian Pacific, were also weak. Interborough-Metropolitan preferred opened at 51, but sold off despite the dividend announcement. Rates in the money market to-day were: Call, 2½@3 per cent; sixty days, 3@3½ per cent; ninety days, 3¾@4 per cent; four months, 4@4½ per cent; five months, 4¼@4¾ per cent.

Trading in the Philadelphia market to-day was dull. Philadelphia Rapid Transit trust certificates and Tonopah Belmont were the weakest features.

The tone of the Chicago market to-day was firm, but the market was narrow and the volume of transactions was small.

The feature of the Boston market to-day was Boston Elevated Railway. This issue sold off 3¾ points. The sales in Boston Elevated Railway totaled 396 shares.

The Baltimore market to-day was narrow and dull.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 23	April 30
American Brake Shoe & Foundry (common)	92	95
American Brake Shoe & Foundry (preferred)	130½	132
American Cities Company (common)	37¼	37¼
American Cities Company (preferred)	70½	*70½
American Light & Traction Company (common)	365	355
American Light & Traction Company (preferred)	105	105
American Railways Company	38	38
Aurora, Elgin & Chicago Railroad (common)	42	42
Aurora, Elgin & Chicago Railroad (preferred)	85	84½
Boston Elevated Railway	96¾	93
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	a66	a66
Boston & Worcester Electric Companies (common)	8	a8
Boston & Worcester Electric Companies (preferred)	a43	43
Brooklyn Rapid Transit Company	90⅝	87¾
Capital Traction Company, Washington	122¾	122¼
Chicago City Railways	150	*150
Chicago Elevated Railways (common)	25	*25
Chicago Elevated Railways (preferred)	85	*85
Chicago Railways, ptcptg., ctf. 1	91	*91
Chicago Railways, ptcptg., ctf. 2	21¾	*21¾
Chicago Railways, ptcptg., ctf. 3	7½	*7½
Chicago Railways, ptcptg., ctf. 4	3½	*3½
Cincinnati Street Railway	112	112½
Cleveland Railway	103	103
Cleveland, Southwestern & Columbus Ry. (common)	*5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred)	*30	*30
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	69½
Columbus Railway (preferred)	82½	82½
Denver & Northwestern Railway	*108	*108
Detroit United Railway	72½	a76
General Electric Company	140¼	137½
Georgia Railway & Electric Company (common)	*120	119⅛
Georgia Railway & Electric Company (preferred)	83¾	83
Interborough Metropolitan Company (common)	16⅝	14½
Interborough Metropolitan Company (preferred)	57⅝	48⅞
International Traction Company (common)	*35	*35
International Traction Company (preferred)	*95	*95
Kansas City Railway & Light Company (common)	15	*15
Kansas City Railway & Light Company (preferred)	*30	*30
Lake Shore Electric Railway (common)	*6½	*6½
Lake Shore Electric Railway (1st preferred)	*91	*91
Lake Shore Electric Railway (2d preferred)	*25½	*25½
Manhattan Railway	128¾	127
Massachusetts Electric Companies (common)	a17¾	16½
Massachusetts Electric Companies (preferred)	75½	74½
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*25¾	*25¾
North American Company	76	75
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	44	43½
Philadelphia Company, Pittsburgh (preferred)	39¾	39
Philadelphia Rapid Transit Company	25¼	24
Portland Railway, Light & Power Company	*67	*67
Public Service Corporation	113	114
Third Avenue Railway, New York	35	33½
Toledo Railways & Light Company	a12	a12
Twin City Rapid Transit Co., Minneapolis (common)	105	103
Union Traction Company of Indiana (common)	*4½	*4½
Union Traction Company of Indiana (1st preferred)	*81	*81
Union Traction Company of Indiana (2d preferred)	*34	*34
United Rys. & Electric Company (Baltimore)	26½	26¼
United Rys. Inv. Company (common)	26½	24
United Rys. Inv. Company (preferred)	48	44
Virginia Railway & Power Company (common)	51¾	50
Virginia Railway & Power Company (preferred)	93	90
Washington Ry. & Electric Company (common)	93	91
Washington Ry. & Electric Company (preferred)	92½	91
West End Street Railway, Boston (common)	75½	75
West End Street Railway, Boston (preferred)	a95	95
Westinghouse Elec. & Mfg. Company	64¼	61
Westinghouse Elec. & Mfg. Company (1st preferred)	117½	117½

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*Last sale. aAsked.

ANNUAL REPORTS

Washington, Baltimore & Annapolis Electric Railroad

The report of the operations of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., for the year ended Dec. 31, 1912, follows:

Summary of Operations

Gross operating revenue	$778,287
Operating expenses	388,956
Net operating revenue	$389,331
Miscellaneous income	6,306
Gross income	$395,637
Deductions from income (taxes and interest)	271,536
Net income	**$124,101**

George T. Bishop, the president, says in part:

"The net total expenditure for additions and betterments for the year was $73,030. The track, roadway, ditches, culverts and bridges are in first-class condition and during the year there was a total of 9700 tie renewals made. The overhead system, including the transmission line and the trolley, which is of the catenary type, has been well maintained and is in good condition.

"During the year an automatic block signal system of the track-circuit type was installed on the Eastern division between Naval Academy Junction and Annapolis, a distance of 13.8 miles. This signal system was installed by the Union Switch & Signal Company, New York. All of the switches are connected in with the signal system and are equipped with circuit controllers so arranged as to hold to 'stop' all signals governing the block in which the switch is located when the points are not correctly set for the main line. These signals govern all trains operated in either direction over this division.

"Substations have been well maintained; the equipment generally has received careful attention and is in excellent condition. There are substations at Baltimore, Naval Academy Junction, Annapolis, Ardmore and Bennings. Power is purchased from the Potomac Electric Power Company, Washington, D. C., and the Bennings substation, which is a transformer station, is located alongside the Potomac power station. The equipment consists of two banks of transformers—each bank containing three 800-kw transformers. There is also one spare 800-kw transformer. Your directors have recently authorized an expenditure of $6,000 for two additional transformers to insure against possible interruption in service due to breakdown or other causes. Arrangements were made to have this additional equipment installed prior to inauguration day, March 4, 1913.

"The Naval Academy Junction substation has a battery of two boilers which are used to heat the substation and carhouse, also to operate a 1500-gal.-per-minute fire pump. Your board recently authorized an expenditure of $3,893 for the installation of an electrically driven fire pump, which has been installed and is now in operation. This installation will permit of the boilers being shut down for about seven months during the summer season, thereby economizing in the consumption of fuel during that period.

"On account of the growth in the freight and express business four new express cars were purchased. Three of these have been equipped with control without motors, for trailer service, and the fourth is being equipped with GE-205 75-hp motors. This car will be used by the American Express Company for handling express matter over your line. All cars and equipment have been well maintained and are in good condition.

"The total miles operated on power purchased from the Potomac Electric Power Company was 1,861,348, not including operation on the tracks of the Washington Railway & Electric Company or the joint tracks of the United Railway & Electric Company, Baltimore. The total consumption from this source was 6,896,950 kw-hr. Power consumed per car mile was 3.70 kw-hr.

"In June, 1912, a contract was entered into with the American Express Company for a period of ten years giving that company the right to operate an express service between Washington, Baltimore, Annapolis and all points on our line. The company now reaches Baltimore over the New York Central lines and the Western Maryland Railroad. The new arrangement enables the company to reach the capital of the United States and the capital of Maryland, also to make Southern connections. The American Express Company operates in all upon 58,000 miles of lines in the United States and Canada with offices and agents in all principal cities.

"The company's property is well insured under a liberal policy at the rate of 40 cents for three years per $100, being the equivalent of 13½ cents per year.

"Three per cent of the gross operating revenue has been credited to 'reserve for injuries and damages.' The balance in the reserve account as of Dec. 31, 1912, namely, $36,242, is invested in your company's bonds to the extent of $35,711, the balance, $530, being covered by cash in the treasury. The disbursements in payment of accident claims, suits and judgments amounted to 0.28 per cent of the gross operating revenue.

"On account of the increasing growth of the package freight business and the business handled in connection with the American Express Company, the terminal facilities at Lombard Street freight station, Baltimore, were inadequate, and the directors authorized the expenditure of $38,030 for the purchase of property immediately in the rear of the present Lombard Street terminal, fronting on West Pratt Street. This property was recently acquired and may well be considered the best freight terminal location in Baltimore, as it is right in the heart of the wholesale district with entrances from two of the most prominent streets. Plans are now under way for the construction of a freight house and this work will be completed the coming summer.

"Since the company started to operate direct to the Treasury building, Washington, it has had a waiting room and ticket office at 1424 New York Avenue. This is a small narrow room in the Evans Building, midway in the block between Fourteenth and Fifteenth Streets, Northwest. It could not be considered a desirable location, but was the only vacant space then available. The directors recently authorized the lease of three storerooms in the Bond Building, located at the corner of Fourteenth Street, Northwest, and New York Avenue, one of the most prominent corners in Washington. These rooms have been remodeled and made into one large waiting room, with an entrance into the basement where toilet and package rooms are located. The advantage of this new terminal from an advertising standpoint is very important.

"In May of this year a new steamboat line known as the Eastern Shore Development Steamship Company inaugurated a service between Annapolis and points on the eastern shore of Maryland. This service now enables Washingtonians to reach the eastern shore by the most direct route via 'the Electric Line' to Annapolis and thence across Chesapeake Bay, thereby saving five hours, as it was formerly necessary to come to Baltimore and there take a steamer for the eastern shore. It also enables residents of Baltimore to take an electric train in the heart of the business and shopping district of Baltimore and make direct connection with the steamer. We are now operating under a traffic arrangement and sell through tickets from Washington and Baltimore in connection with this new line. At Claiborne boats connect with the Baltimore, Chesapeake & Atlantic Railway, which operates to Ocean City, Md., on the Atlantic coast."

General Electric Company

The report of the General Electric Company for the year ended Dec. 31, 1912, has just been made public. The profit and loss statement and balance sheet are presented herewith.

The report says that the competition referred to in last year's report has continued to increase in severity, with the result that the percentage of profit realized from the sales of apparatus has diminished materially. The total number of employees is more than 60,000. The orders received during the year are in excess of those of last year. There has been an expenditure of $539,956 for patents and patent expenses, but, as has been the custom in previous years, this expense has been charged to profit and loss. The additions to real estate, buildings and patterns, furnishings and fixtures during the year amounted to $6,968,975, of which two-thirds was written off. The report does not contain any statement of technical improvements made during the year as has been customary in the past. The condensed profit and loss statement follows:

Sales billed		$89,182,185
Less cost of sales		81,074,192
		$8,107,993
Interest and discount, royalties and sundry profits	$1,292,224	
Income from securities owned	1,241,256	
From increase in value of securities of companies owned, due to the increase in the surplus of those companies for the year; and profit on securities sold	2,469,348	
	$5,002,829	
Interest and discount on debenture bonds	532,087	
		4,470,742
		$12,578,736
Dividends paid		6,213,173
Net surplus for the year		$6,365,562
Surplus at Jan. 1, 1912		29,019,892
		$35,385,454
Less stock dividend		23,354,310
Surplus at Dec. 31, 1912		$12,031,144

The condensed balance sheet as of Dec. 31, 1912, follows:

ASSETS

Patents, franchises and good-will			$1
Cash			13,507,225
Stocks and bonds		$23,325,070	
Notes and accounts receivable		26,950,244	
Due from affiliated companies		4,099,062	
Installation work in progress		686,480	
		$55,060,858	
Merchandise inventories:			
At factories	$31,851,689		
At district offices, in transit, etc.	4,090,622		
Consignments	1,300,506		
		37,242,818	
			92,303,677
Factory plants (including all lands, buildings and machinery)		$24,556,110	
Real estate, buildings, warehouses, etc. (other than factory plants)		1,575,447	
Furniture and fixtures (other than in factories)		3	
			26,131,560
			$131,942,464

LIABILITIES

Debenture bonds:		
5 per cent series of 1892	$35,000	
3½ per cent series of 1902	2,047,000	
5 per cent series of 1907	211,000	
5 per cent series of 1912	10,000,000	
		$12,293,000
Accounts payable	$4,140,699	
Accrued taxes	265,444	
Advance payments on contracts	257,336	
Accrued interest on debentures	197,543	
Dividend payable Jan. 15, 1913	1,555,294	
		6,416,319
Capital stock issued		101,202,000
Surplus:		
At Jan. 1, 1912	$29,019,892	
Added during year	**6,365,562**	
	$35,385,454	
Less stock dividend	23,354,310	
		12,031,144
		$131,942,464

Statement on Accounts of Chicago Railways

A report made to the board of directors of the Chicago Railways Company by Henry A. Blair, chairman of the board, on April 23 has been sent by direction of the board to each holder of participation certificates. The report was sent together with the financial statement showing the results of operation for the fiscal year ended Jan. 31, 1913. Mr. Blair's letter enters into various questions affecting the company which are now matters of controversy in Chicago and says in part:

"The company's profit on the sale of first mortgage bonds in the amount of $41,550,000 and the 15 per cent allowed on construction expenditures was $5,496,734. In marketing the bonds it had to allow a discount of $3,486,850. Therefore the profit of the company to date has been $5,496,734 less $3,486,850, or $2,009,884. As relating to the profits of the company, the 15 per cent allowed, $5,496,734, has been disposed of as follows: credited to interest and discount, $3,676,781. The balance has been used to write down the excess value of the property carried on the books over the city valuation.

"While the funded debt of the company on Feb. 1, 1908, was $38,199,347, the price at which the city under the ordinance was entitled to purchase the property as of the same date was only $32,589,047. In other words, the excess of the net funded debt over the amount at which the city was then entitled to purchase was $5,610,300. In acquiring the property of the Chicago Consolidated Traction Company, it was necessary, in order to obtain complete title, to issue and deliver mortgage bonds in the amount of $6,843,000, which was an addition to the original excess of $5,610,300. These two sums, together with other items, have been reduced by payments and by application of the sinking fund provision, so that the total excess of funded debt over the amount at which the city could have purchased on Feb. 1, 1913, is $9,955,003.

"As shown by the report, the total net income of the company for the last fiscal year, after deducting operating expenses and taxes, funds contributed to renewals and 5 per cent upon the valuation at which the city is entitled to purchase the property, was $2,569,825, but under the terms of the ordinance the city was entitled to receive 55 per cent of this net income, or $1,413,404, while the company had to be content with 45 per cent thereof, or $1,156,421.

"It will be readily perceived that the 5 per cent on the valuation retained by the company is insufficient to pay all the interest on its funded debt by the interest upon the above-mentioned excess of $9,955,003, to say nothing of (1) $250,000 necessary every year to be applied to the sinking fund in redemption of consolidated mortgage bonds, or (2) various non-partnership expenses—that is to say, expenses not recognized by the city in the settlement of accounts with it. All of these expenses are necessarily paid out of the company's 45 per cent of the divisible net receipts.

"In this connection some criticism has been made upon the item in the non-partnership account of $120,573, corporate expenses and adjustments. This item embraces in substance $33,639, representing the expenditures to trust companies for commissions, paying interest on bonds, trustee's fees, certifying bonds, expenses for engraving bonds, traveling expenses and similar corporate expenses; the remainder, viz., $86,934, is the interest accruing to the joint account with the city on daily cash balances as prescribed by the ordinance.

"The inference has been made that cash items in the balance sheet indicated possession by the company of large amounts of funds which might be devoted to dividends. These critics forget that these cash items include the city's share of undivided net receipts, amounts attributable to reserve funds, accrued sinking fund, accrued interest and accrued taxes.

"Some criticism has been made upon the fact that the amount declared as dividends by the company has not been received in full by the certificate holders entitled to dividends.

"In accordance with the agreement entered into as of August, 1907, however, the depositaries, upon the receipt of the dividends from the company, deducted (1) their own compensation, (2) the fees of the registrars and transfer agents and (3) the fee of the Chicago Title & Trust Company as trustee of the stock, and the remainder was made the subject of distribution to the participation certificate holders according to the terms of the agreement."

A committee of holders of certificates has been formed as a protective committee and has propounded a series of questions to Mr. Blair, and the foregoing statement is intended as an answer to some of the queries of this committee.

The movement of the committee representing the holders of participating certificates has led to a similar attack in the City Council. That body passed resolutions on April 28, by a vote of forty-two to fifteen, ordering the suspension of negotiations for a merger of the elevated and surface lines until an investigation shall have been made of the relations between the surface companies and the city.

The action of the City Council was based in part on charges made in a suit filed in the Circuit Court on April 28 by James B. Hogarth, who was formerly superintendent of the Chicago Railways Company. The bill filed by Mr. Hogarth asks for an accounting from various interests which are concerned in the negotiations now under way for a merger of the properties.

At the same session of the Council at which it was decided to discontinue negotiations for a merger until an investigation of the charges presented could be made a message was read from Mayor Harrison urging a settlement of the traction situation.

Merger of Michigan and Ohio Properties Proposed

Plans have been formulated for the acquisition of the property of the Union Railway, Gas & Electric Company, Rockford, Ill., the Michigan Railways Company and the Springfield (Ohio) Light Company by the Commonwealth Power, Railway & Light Company, Saginaw, Mich. It is proposed to increase the capital stock of the Commonwealth Power, Railway & Light Company to $31,500,000, of which $16,000,000 is to be preferred stock, and to issue $7,500,000 of additional bonds to provide the funds for extensions and improvements. A special meeting of the stockholders of the Commonwealth Power, Railway & Light Company will be held in Portland, Maine, on May 15, to authorize the increase in the capital stock of the company and to ratify the proposed exchange of securities.

W. A. Foote, Jackson, Mich., who, with representatives of E. W. Clark & Company, Philadelphia, and Hodenpyl, Hardy & Company, New York, arranged the details of the plan, says that a majority of the stockholders of the Commonwealth Power, Railway & Light Company also had large holdings in the three other companies, and that the merger of interests was planned to centralize control, reduce expenditures and provide funds for the extension of interurban electric railways owned by the companies.

The Union Railway, Gas & Electric Company controls and operates various gas, electric and railway companies in Indiana, Illinois and Wisconsin. The Michigan Railways Company controls water power privileges in Michigan on the Manistee River and is constructing interurban railways between Grand Rapids and Kalamazoo, Battle Creek and Allegan, and Kalamazoo and South Haven. The Springfield Light Company controls the electric light, power and heating business in Springfield, Ohio.

Consolidation of Columbus Subsidiaries Approved

The Ohio Public Service Commission on April 22 approved the plan to consolidate all the companies operated under lease by the Columbus Railway & Light Company, Columbus, Ohio, into one corporation. The matter will now be submitted to the stockholders for their approval. The Columbus Railway, Light & Power Company, hereafter to be the owning company, is to issue $9,226,000 of stock in addition to its present outstanding capital of $957,400, which it issued as the Columbus Traction Company, for the purpose of buying the stocks of the Columbus Edison Company, the Columbus Railway and the Columbus Light, Heat & Power Company. There will be preferred stock series A, paying 6 per cent; series B, paying 5 per cent, and common. The Columbus Railway will receive $3,500,000 of the new 5 per cent preferred stock for its outstanding $3,500,000 of 5 per cent preferred and $3,500,000 common for its outstanding junior stock in a like sum. The Columbus Edison Company will receive $750,000 of 6 per cent preferred and a like amount of 5 per cent preferred for its common stock to the same amount. The Columbus Light, Heat & Power Company will receive $413,040 of 6 per cent preferred for 80 per cent of its present outstanding preferred, $103,250 of 5 per cent preferred for the remainder of its preferred and $210,000 for its outstanding common stock.

It is understood that an application will be filed with the commission shortly to purchase the leases, rights and other assets of the Columbus Railway & Light Company, capitalized at $5,000,000. A considerable part of the assets of this company consists of stock of the underlying companies which has been turned over in consideration of improvements and extensions to the properties. If the purchase of the Columbus Railway & Light Company is not approved, it is said that the company will continue to operate the properties under lease. The only difference is that there will be one underlying company instead of four, as in the past.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—Ninety per cent of the preferred stock of the Cleveland, Southwestern & Columbus Railway has assented in writing to the new financial plan, according to announcement made after the special meeting of the stockholders, which was adjourned until April 28.

Ocean Shore Railroad, San Francisco, Cal.—The Railroad Commission of California has decided to suspend for the present action on the application of the Ocean Shore Railroad to issue $700,000 of 6 per cent bonds and pledge them as collateral to secure a loan of $250,000 to be negotiated with the Union Trust Company, San Francisco, Cal., to provide funds for improvements. The commission will withhold action until matters now before the courts affecting the company have been decided. It is reported that an assessment of $2.50 per share has been levied on the capital stock of the company.

Toledo Railways & Light Company, Toledo, Ohio.—On application of Barton Smith subpoenas were issued for Frank R. Coates, president of the Toledo Railways & Light Company, and the twenty-one directors recently chosen by the Doherty interests, at the hearing of the injunction case in the United States District Court at Toledo, April 22. The court instructed these men to bring with them all the correspondence relating to the company's business and their certificates of stock as evidence. Attorney Charles A. Frueauff, Frank Hafer, M. R. Bump, Mr. Coates and Barton Smith all appeared before the court. Albion E. Lang and W. E. Hutton have also been summoned as witnesses. H. L. Doherty & Company assumed control of the subsidiary companies of the Toledo Railways & Light Company on April 24. At special meetings of the stockholders officers to serve all the companies were chosen as follows: F. R. Coates, president; W. J. Marshall, vice-president; C. A. Murray, secretary and treasurer. These officers with A. Schwartz, engineer of the company, and F. J. Derge, in charge of the contract department, compose the board of directors. C. A. Murray is the new auditor of the Toledo Railways & Light Company. The companies over which these officers will preside are the Toledo & Western Railroad, Maumee Valley Railways & Light Company, Toledo, Ottawa Beach & Northern Railway, Adrian (Mich.) Street Railway, Interurban Station Company, Toledo Beach Company and Toledo Casino Company.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—The Annapolis Public Utilities Company has applied to the Public Service Commission of Maryland for permission to sell to the Washington, Baltimore & Annapolis Railroad $85,000 of its stock, in addition to the amount to be sold to the same interests named in its original application.

ELECTRIC RAILWAY MONTHLY EARNINGS

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$530,071	*$247,357	$287,714	$152,509	$130,205
1 "	"	'12	518,927	*269,039	249,888	138,787	111,101
12 "	"	'13	6,675,837	*3,304,478	3,371,359	1,791,038	1,580,321
12 "	"	'12	6,396,956	*3,099,841	3,297,115	1,537,538	1,759,577

PORTLAND (MAINE) RAILROAD

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$64,487	*$55,664	$8,823	$10.274	†$1,451
1 "	"	'12	62,100	*56,710	5,390	10,238	†4,848
12 "	"	'13	991,339	*696,854	294,485	123,249	171,236
12 "	"	'12	961,039	*720,706	240,333	113,210	127,123

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$95.736	*$54,665	$41,071	$20,053	$21,018
1 "	"	'12	91,701	*51,845	39,856	19,710	20,146
12 "	"	'13	1,188,656	*674,684	513,972	236,960	277,012
12 "	"	'12	1,119,413	*689,291	430,122	232,374	197,748

SAVANNAH (GA.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$62,404	*$45,006	$17,398	$17,392	$6
1 "	"	'12	56,440	*40,572	15,868	15,865	3
12 "	"	'13	762,456	*563,164	199,392	198,075	1,217
12 "	"	'12	706,363	*519,758	186,605	185,457	1,148

TAMPA (FLA.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$62,356	*$32,855	$29,501	$4,759	$24,742
1 "	"	'12	59,659	*30,703	29,057	4,675	24,382
12 "	"	'13	763,938	*399,173	364,755	54,084	310,681
12 "	"	'12	701,175	*380,811	320,365	59,102	261,263

UNION RAILWAY, GAS & ELECTRIC COMPANY, ROCKFORD, ILL.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$383,132	*$214,835	$168,297	$97,081	$71,216
1 "	"	'12	293,554	*177,554	116,000	65,564	50,436
12 "	"	'13	4,187,750	*2,417,586	1,770,164	1,023,370	746,794
12 "	"	'12	3,269,218	*1,881,043	1,388,275	756,496	631,799

VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$384,408	$193,467	$190,942	$124,057	$66,885
1 "	"	'12	357,350	188,346	169,003	118,558	50,446
8 "	"	'13	3,289,708	1,614,497	1,675,212	990,707	684,505
8 "	"	'12	3,100,070	1,621,094	1,478,976	945,237	533,739

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*Includes taxes. †Deficit.

Traffic and Transportation

From Kalamazoo to Indianapolis and Return

Officials of the Michigan United Traction Company recently completed a trip over the principal electric railways of Michigan, Indiana and Ohio in the private car "Michigan," of the Michigan company, covering a total of 1002 miles. In addition to the trip in their own car the officials journeyed from Indianapolis by steam railway to Springfield, Ill., and thence to Keokuk, Ia., where they viewed the water-power installation across the Mississippi River at that point. They were the guests of Vice-president Executive H. E. Chubbuck and officials of the Illinois Traction System on an inspection trip over that system to St. Louis. The party included J. F. Collins, vice-president and general manager; Frank Silliman, Jr., vice-president; W. A. Foote, director, and R. C. Taylor, superintendent of equipment. The car left Kalamazoo, Mich., over its own lines on April 16 and arrived in Indianapolis on April 18. The return trip from Indianapolis consumed two days. The itinerary and mileage follow:

	Miles
Going Trip:	
Kalamazoo to Jackson, Michigan United Traction Company	68
Jackson to Detroit, Detroit, Jackson & Chicago Railway	76
Detroit to Toledo, Detroit, Monroe & Toledo Short Line	57
Toledo to Findlay, Toledo, Bowling Green & Southern	51
Findlay to Lima, Western Ohio Railway	32
Lima to Fort Wayne, Ohio Electric Railway	65
Fort Wayne to Bluffton, Fort Wayne & Northern Indiana Traction Company	25
Bluffton to Anderson, Union Traction Company	61
Anderson to Indianapolis, Union Traction Company	38
Indianapolis to Brazil, T. H., I. & E. Railway	57
	530
Return Trip:	
Indianapolis to Richmond, T. H., I. & E. Railway	69
Richmond to Dayton, Ohio Electric Railway	40
Dayton to Piqua, Dayton & Troy Electric Railway	31
Piqua to Findlay, Western Ohio Electric Railway	80
Findlay to Toledo, Toledo, Bowling Green & Southern	51
Toledo to Detroit, Detroit, Monroe & Toledo Short Line	57
Detroit to Jackson, Detroit, Jackson & Chicago Railway	76
Jackson to Kalamazoo, Michigan United Traction Company	68
	472
Total mileage, round trip	1002

New Regulations to Eliminate Trouble with Passengers

The New York, New Haven & Hartford Railroad has issued revised rules and regulations for the government, guidance and information of the employees of the electric railways owned and operated by it, in which the safety first rule is repeatedly emphasized. Several pages of the book of rules are devoted to this subject, and the various regulations are devised to prevent accidents of all kinds. The importance of exercising constant care to prevent injuries, and in all cases of doubt to take the safe course, is impressed upon the employees above all other considerations. Two other rules and regulations upon which great stress is laid are politeness and the personal habits and appearance of the employees. Conductors and motormen are ordered to treat all passengers with politeness, to avoid difficulty and to exercise patience, forbearance and self-control under all conditions. They must not make threatening gestures, or use loud, uncivil or profane language, even under the greatest provocation. Their uniforms must be kept clean and neat in appearance. They are prohibited from drinking intoxicating liquors while on duty or to excess at any time. There are several other minor rules regarding personal habits, and ignorance of these rules is not accepted as an excuse for non-compliance with them. In fact, each employee is required to sign a statement to the effect that he has read the rules and regulations and that he agrees to abide by the same and to submit to the penalties prescribed for their violation. Employees are considered for promotion according to their faithful discharge of duties and any violation of rules is deemed sufficient for suspension or dismissal.

Company Publication in San Antonio.—The San Antonio (Tex.) Traction Company has begun the publication of the *Traction Magazine* for distribution among its patrons.

Near-Side Stops in Spokane.—The City Council of Spokane, Wash., has passed an ordinance requiring the electric railways which operate in Spokane to stop their cars on the near side of the street.

No Smoking Recommendation in New Jersey.—The Board of Public Utility Commissioners of New Jersey has recommended that the Public Service Railway, Newark, N. J., post notices in its carhouses addressed to its conductors to the effect that no smoking or carrying of lighted cigars, pipes or cigarettes will be permitted in the future on any car except those that have a special compartment for smokers.

Increase in Wages in Richmond, Ind.—The Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has increased the wages of trainmen on its lines in Richmond, Ind., formerly operated by the Richmond Street & Interurban Railway. Hereafter 1 cent more an hour will be paid men during their first year, and for each succeeding year after the first year for a period of five years the wages of trainmen will be advanced 2 cents an hour.

Hearing Continued in Wisconsin Fare Case.—The hearing before the Railroad Commission of Wisconsin in regard to the application of the Eastern Wisconsin Railway & Electric Company to amend its schedule of rates on its interurban line between Oshkosh and Omro has been continued until May 15. The first hearing was held April 25. The company desires to establish a straight rate of 2 cents a mile in place of its present 5-cent fare zone system.

Electric Railway Progress in Oklahoma City.—The *Oklahomian* in its issue of April 20, 1913, contained a short non-illustrated article dealing with the history and progress of the Oklahoma Railway, which was originally organized in February, 1902, as the Metropolitan Street Railway. The population of Oklahoma City at that time was about 14,000. The present population of the city is 68,000, an increase in the eleven years since 1902 of 54,000. The system was opened on Feb. 7, 1903, with 6¼ miles of track serving the downtown district and running northwest to University station and east to Stiles Park. At present the company is operating about 103 miles of track, 62 miles of which are within the limits of Oklahoma City. The remainder is divided between city lines operating outside the city limits and the interurban lines.

New York Railway's Contribution to Flood Fund.—On March 27 Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., sent a letter to Mayor Gaynor of New York informing him that the company would devote 5 per cent of its receipts from ticket sales on both the subway and elevated lines on Monday, March 31, as a contribution to the flood sufferers in the West. Monday was selected because normally it is the day of heaviest travel, and also because it is the day when many people buy tickets for the remainder of the week. The company made its contribution in this way so that all of its patrons could feel that part of their fares which they paid on that day would go to the flood sufferers. The result was that all records for ticket sales for a single day on the subway were broken—1,343,515 tickets being sold. On the elevated lines 1,087,715 tickets were purchased. In keeping with its offer a check for $6,073 was sent by the company to Mayor Gaynor to be added to the relief fund.

City Car Inspector for Providence.—The City Council of Providence, R. I., at its meeting on May 5, will probably be called on to pass an ordinance creating the office of car inspector for the city. The ordinance bears the recommendation of the committee on railroads. According to the provisions of the bill, the car inspector is to have general supervision over all electric, steam and other railroads with authority over time schedules and is directed to observe the failure of operating companies to conform to such schedules. The resolution asking for the creation of the position was presented in the Common Council on Jan. 6, 1913, by Councilman E. Merle Bixby and was referred to the railroad committee for investigation. Under the proposed plan the office will be under the jurisdiction of the city gas and electrical engineer, who is authorized to appoint the inspector and will have general supervision over his activities. It will also be the duty of the car inspector to observe the number of passengers carried on cars and to examine and note conditions pertaining to the cars or lines which he may consider to be unsafe or unsanitary. He will be required to see that the railroads observe the rules and regulations fixed for the use of city streets and that they comply with all the terms of their franchises.

Personal Mention

Mr. F. M. Millson has been appointed general purchasing agent of the Lincoln (Neb.) Traction Company.

Mr. O. P. Gothlin has been nominated by Governor Cox of Ohio to succeed himself as member of the Public Service Commission of Ohio and the appointment has been approved by the Ohio Senate.

Mr. F. D. Brown has resigned as manager of the Aberdeen (S. D.) Railway to become manager of the Huron Light & Power Company, which furnishes both gas and electricity to the city of Huron, S. D.

Mr. W. O. Vickery, who has been in the employ of the Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col., which is controlled by the Federal Light & Traction Company, has been appointed superintendent of the southwest division of the Federal Light & Traction Company.

Mr. W. F. Aid has resigned as engineer of maintenance of way of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to become connected with the engineering department of the Cleveland (Ohio) Railway. Mr. Aid's successor with the Cleveland, Painesville & Eastern Railroad has not yet been chosen.

Mr. P. C. Reinking. whose appointment as auditor of the Fort Wayne & Springfield Railway, Decatur, Ind., was noted in the ELECTRIC RAILWAY JOURNAL of April 26, 1913, has heretofore been employed by manufacturing concerns in different lines and in these positions he always made a specialty of bookkeeping and general systematizing.

Mr. E. Hengst, foreman of the Willoughby shop of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, has been appointed master mechanic of the company to succeed Mr. P. J. Wood, who as previously noted in the ELECTRIC RAILWAY JOURNAL has become connected with the Northern Ohio Traction & Light Company, Akron, Ohio.

Mr. Frederick L. Ray, superintendent of the power plant of the Louisville (Ky.) Railway, won the first prize of $75 offered by the educational committee of the National Association of Stationary Engineers in its recent prize competition. Mr. Ray was successful in the advanced classification of the committee, in which thirteen papers were submitted, all of exceptional merit. Mr. Ray is chairman of the education committee of the Kentucky branch, No. 1, of the National Association of Stationary Engineers.

Mr. Robert W. Perkins has been elected president of the Shore Line Electric Railway with headquarters at Norwich, Conn. Mr. Perkins has been treasurer and general manager of the Norwich & Westerly Traction Company since the reorganization of the company in July, 1911. The Pawcatuck Valley Street Railway, which operates in Westerly, R. I., and vicinity, and the Groton & Stonington Street Railway, which operates between Groton and Westerly along Long Island Sound, have been merged with the Norwich & Westerly Traction Company.

Mr. W. J. Wood, chairman of the Railroad Commission of Indiana, whose term of office expired on May 1, 1913, the date on which the utility act went into effect in that State, was formerly vice-president and counsel of the Louisville & Nashville Railroad. He was appointed a member of the Railroad Commission by Governor Hanley on the creation of the commission in 1905. Mr. Wood was made chairman of the commission to succeed Mr. Union B. Hunt and was reappointed to the commission by Governor Marshall in 1909. He championed the safety first movement on the railroads in Indiana and was instrumental in having the law changed so as to give the Railroad Commission of Indiana power to require the railroads to install block signals. Practically every railroad in Indiana organized a safety committee at the instance of the Railroad Commission.

Mr. Kinichi Iwai, of the municipal tramway department of the city of Osaka, Japan, is on a visit to the United States to study electric railway operation. Mr. Iwai was born and educated in Japan, but spent four years with the General Electric Company at its works in Schenectady, N. Y. Before coming to the United States on the present trip he visited Germany, Switzerland and England. He has lately been over the electric railways at Boston and expects to visit New York, Chicago, Philadelphia, Washington and possibly San Francisco and Seattle. The electric railway system in Osaka with which Mr. Iwai is connected operates 22 miles of double track. Part of the capital expended on the line was spent in the United States for material and equipment.

Mr. Edwin Fledderjohann, who resigned recently as auditor and general passenger and freight agent of the Fort Wayne & Springfield Railway, Decatur, Ind., has entered the employ of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., to take the student course of that company, after which he expects to return to electric railway work. As previously noted in the ELECTRIC RAILWAY JOURNAL, Mr. Fledderjohann has been succeeded with the Fort Wayne & Springfield Railway by Mr. Paul Reinking as auditor and by Mr. Albert Scheumann as general passenger and freight agent. Mr. Fledderjohann also had jurisdiction over the telephone and overhead work of the Fort Wayne & Springfield Railway. This work is now in charge of Mr. A. M. Henry.

Mr. L. B. Wickersham, who has been appointed chief electrical engineer of the Oregon Electric Railway and the United Railways, Portland, Ore., and the Spokane & Inland Empire Railroad, Spokane, Wash., as previously noted in the ELECTRIC RAILWAY JOURNAL, was graduated from Stanford University as an engineer. He served as electrical engineer for the Washburn-Moen Company at San Francisco and later became electrician for the Portland (Ore.) General Electric Company. He was appointed chief engineer of the so-called New York and Oregon syndicate, formed for the purpose of reporting on and developing water powers in the West. During his connection with this company Mr. Wickersham analyzed and reported on many of the principal water-power sites and projects on the Pacific Coast. He also served as superintendent and electrical engineer of the American Goldfields Company. Subsequently he was appointed chief engineer of the United Railways, Portland, Ore., and in addition thereto he was appointed chief engineer of the Oregon Electric Railway in 1910. On April 1, 1913, he was appointed chief electrical engineer of the Oregon Electric Railway, the United Railways of Portland and the Spokane & Inland Empire Railroad.

OBITUARY

Horatio A. Foster, who had charge of the appraisal work of J. G. White & Company, died of heart failure on April 27. Mr. Foster was born at Bustleton, Pa., on Jan. 12, 1858. In the fall of 1884 he entered the employ of the Daft Electrical Company and the following spring he was sent to Baltimore to electrify a short branch of the Baltimore Union Passenger Railway. Later he became connected with the Thomson-Houston Electric Company at Lynn, Mass., and in the fall of 1888 he was appointed superintendent of the East River Electric Light Company, New York. In July, 1891, he was appointed an expert for the United States Census office, and in 1893 he became associated with Prof. George Forbes, then electrical engineer of the Niagara Falls Power Company. Early in 1895 he joined the staff of the Cataract Construction Company, Niagara Falls. After some years of general practice as consulting engineer Mr. Foster was engaged by L. B. Stillwell in 1906 to rehabilitate the generating and distribution system of the United Railways & Electric Company, Baltimore. In 1898 he was retained by Bion J. Arnold and assisted in the appraisals of the property of the Metropolitan Street Railway, New York; the Detroit (Mich.) United Railway and the Southern California Edison Company, Los Angeles. Mr. Foster has since worked on the valuation of public utilities and studied traffic conditions and other matters pertaining to public service, being engaged in this work with J. G. White & Company at the time of his death. Mr. Foster was the author of the "Electrical Engineer's Pocket-Book" and "Valuation of Public Utilities," and he had contributed to the technical press. He was a member of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the Engineers' Club of New York and the Philadelphia Arts Club. He is survived by his widow, a son, his mother and two sisters.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Vinita (Okla.) Interurban Railway.**—Incorporated in Oklahoma to build an electric railway in Vinita. Capital stock, $10,000. Incorporators: J. T. Ratcliff, M. T. Knight, Seymour Riddle, John A. Wise and Paul F. Mackey, all of Vinita.

***Willapa Bay & Eastern Railroad, Centralia, Wash.**—Incorporated in Washington to build a 51-mile electric railway from Centralia to Willapa Harbor. Capital stock, $2,000,000. Incorporators: W. H. Bogle, F. Merritt and C. P. Bissett.

***Charleston, Parkersburg & Northern Railroad, Parkersburg, W. Va.**—Incorporated in West Virginia to build an interurban railway from Charleston to Parkersburg. Capital stock, $100,000. Incorporators: K. B. Stephenson, Parkersburg; H. M. Fowler, E. R. Reidl, J. E. Fowler and A. H. Geiger, Washington, D. C.

Milwaukee (Wis.) Traction Company.—Application for a charter has been made in Wisconsin by this company to build an electric railway in Milwaukee. It is understood one of the first projects in view is the construction of a line connecting with the line now operated by The Milwaukee Electric Railway & Light Company on Third Street and Green Bay Avenue. Capital stock, $10,000. Incorporators: L. F. Wagner, N. C. Schulz and H. A. Schmidt.

***Pigeon Valley Railway, Pigeon Falls, Wis.**—Incorporated in Wisconsin to build an interurban railway from Pigeon Falls to Hay Creek, a distance of 20 miles. The incorporators include H. A. M. Steem, T. R. Kittleson, Niels Hagen, Ole A. Olson, B. M. Slettland and G. H. Neprud.

FRANCHISES

Pine Bluff, Ark.—The Little Rock, Pine Bluff & Eastern Traction Company has asked the Council for a franchise in Pine Bluff.

South San Francisco, Cal.—The South San Francisco Railroad & Power Company has received a franchise from the Council for a line along Walker, Swift and Grand Avenues in San Francisco.

Jacksonville, Fla.—The Jacksonville Electric Company has received an extension of time on its franchise in which to build the extensions on Market Street and Hogan Street in Jacksonville.

Freeport, Ill.—The Freeport Railway & Light Company will ask the Supervisors for franchises through Freeport, Florence and Harlem.

Hillsboro, Ill.—The Springfield & Central Illinois Traction Company has asked the Council for a franchise in Hillsboro.

Cedar Rapids, Ia.—The Cedar Rapids & Marion City Railway has asked the Council for a franchise on Second Street in Cedar Rapids.

Dubuque, Ia.—The Union Electric Company has received a twenty-five year franchise from the Council for the extension of a line on West Locust Street in Dubuque.

Muscatine, Ia.—The Davenport-Muscatine Railway, Davenport, has asked the Council for a franchise to extend its line to Roscoe Avenue in Muscatine.

Springfield, Mass.—The Springfield Street Railway has received a franchise from the Council for an extension of the double track in North Main Street through to the Chicopee line and for a turnout in Sumner Avenue near White Street in Springfield.

Saginaw, Mich.—The Saginaw-Bay City Railway is negotiating for a new franchise in Saginaw, as noted on page 825 of this issue of the Electric Railway Journal.

Niagara Falls, N. Y.—The International Railway will ask the Council for a franchise along Willow Avenue to its proposed new carhouse in Niagara Falls.

Cleveland, Ohio.—The Cleveland Railway has accepted a franchise from the Council for an extension from the St. Clair line into Gordon Park in Cleveland.

Springfield, Ohio.—The Springfield Railway has accepted a twenty-five year franchise from the Council in Springfield.

Dunnville, Ont.—The Niagara Falls, Welland & Dunnville Electric Railway has received a year's extension of time on its franchise in Dunnville in which to earn the bonus voted by the ratepayers some years ago. The company expects to complete its line to St. Anns before fall and will connnect with the Toronto, Hamilton & Buffalo Railway at St. Anns. [E. R. J., Dec. 21, '12.]

Allentown, Pa.—A franchise has been granted the Lehigh Valley Transit Company by the Borough of Hatfield for its main street. This gives the company almost the entire right of way for its new double-track line from Lansdale to Souderton. Bids for this 14-mile line have been invited and construction work will commence this summer. The new double-track line will be 1 mile shorter than the old line, but more substantially built for fast service, thus permitting the cutting of fifteen minutes from the present schedule of two hours and fifteen minutes between Allentown and Philadelphia. The new bridge at this point will also permit of a further reduction in schedule time, which it is planned to reduce to one hour and forty minutes as against the steam railway's one hour and forty-eight minutes.

Chattanooga, Tenn.—J. W. Adams, representing the East Tennessee Traction Company, has received a franchise from the Bradley County Court for a line from Chattanooga to enter Cleveland over any route which the company may decide upon. This 30-mile railway will connect Cleveland and Chattanooga. [E. R. J., March 23, '13.]

Tacoma, Wash.—The City Council has been asked to grant a franchise for an electric railway over certain streets in Tacoma.

TRACK AND ROADWAY

Birmingham & Chattanooga Railroad, Birmingham, Ala.—Preliminary arrangements have been completed and construction will be begun by this company during the summer on its line between Chattanooga, Tenn., and Birmingham, Ala., via Oneonta and Boaz. W. W. Shortridge, secretary. [E. R. J., Dec. 28, '12.]

***Eureka, Cal.**—Richard H. Tingley, Rufus R. Wilson and associates are considering plans to build an electric railway from the vicinity of Korbel to the Eel River Valley towns.

Los Angeles (Cal.) Railway.—Surveys have been completed by this company for its Fifty-fourth Street extension to connect with the new carhouse in the southwest section of Los Angeles.

Pacific Electric Railway, Los Angeles, Cal.—Work will be begun at once by this company on its line from Long Beach to Bay City.

Modesto & Empire Traction Company, Modesto, Cal.—This company, which now operates a 5-mile line between Modesto and Empire, is prepared to begin the construction on an extension from Empire to Waterford, a distance of 8 miles.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—This company will soon build a 5½-mile branch line. Material for the extension has been purchased.

Mexico & San Diego Railway, San Diego, Cal.—This company will place in operation on May 10 its 3¼-mile railway between South San Diego and Imperial Beach. Its repair shops are located in Imperial Beach. The company will operate two Beach-Edison storage battery cars. Capital stock authorized, $216,000; issued, $35,000. Officers: E. S. Babcock, president; R. B. Talbot, vice-president, purchasing agent and engineer; L. M. Brown, secretary, and A. L. Goodrich, treasurer, all of San Diego. [E. R. J., March 29, '13.]

Geary Street Municipal Railway, San Francisco, Cal.—The contract for the construction of the roadbed of this municipal line from Geary Street and Thirty-third Avenue in San Francisco to the beach has been awarded by the Board of Public Works to the Healy-Tibbitts Company. The route has been graded.

Santa Barbara & Suburban Railway, Santa Barbara, Cal.—This company is asked to consider plans to extend its Haley Street line to Miramar.

***Fort Myers, Fla.**—A company has been organized with a capital stock of $350,000 to construct a 13-mile railway to extend from the Deep Lake orange groves to a point in Allens River, 1 mile above Everglade. Gasoline motor cars will be operated. W. G. Langford, Fort Myers, is interested.

Carolina & Georgia Railway, Augusta, Ga.—This company has awarded the contract to Michael P. McGrath, Worcester, Mass., for the construction of this 75-mile line between Augusta and Columbia. The railway will be so constructed that either electric or steam trains will operate over it. The capital stock of the company will be increased from $100,000 to $2,500,000, of which $500,000 will be preferred stock. A bond issue of $2,000,000 has been authorized. James P. Jackson, Augusta, president. [E. R. J., Dec. 7, '12.]

Rome Railway & Light Company, Rome, Ga.—During the summer this company expects to build an extension on the east side in Rome.

Lewiston-Clarkston Valley Railway, Lewiston, Idaho.—This company will begin work about July 1 on its 18-mile line to connect Lewiston, Idaho, with Clarkston and Asotin, Wash. The power station will be located at Clarkston and power will be purchased from the Lewiston-Clarkston Improvement Company. The company will operate eighteen cars. Officers: F. L. Sturm, Lewiston, president and general manager; J. B. Morris, vice-president; R. L. Sheppard, Lewiston, secretary and treasurer, and P. P. Oehler, Clarkston, chief engineer. [E. R. J., April 12, '13.]

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—This company has been asked to extend its line on Claim Street in Aurora.

Peoria, Canton & Galesburg Interurban Railway, Peoria, Ill.—Final surveys have been completed by this company and construction work will be begun in about a month. C. B. Coffeen, Peoria, chief engineer.

Springfield (Ill.) Consolidated Railway.—During the next four weeks this company expects to build a double track on Monroe Street from Eighth Street to Tenth Street in Springfield and will also relay a considerable amount of track.

Kankakee & Urbana Traction Company, Urbana, Ill.—It is reported that this company will begin work about June 1 on a line between Paxton and Rantoul.

Gary & Interurban Railway, Gary, Ind.—Announcement has been made by this company that within the next few days it will file notice of a bond issue of $2,000,000 to pay for the proposed extensions to Elkhart, Goshen and South Bend and for an extension of the main division to Fort Wayne.

Waterloo, Cedar Falls & Northern Railroad, Waterloo, Ia.—This company has placed an order for 30 miles of catenary line material with the Ohio Brass Company.

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—Contracts for the construction of the first 55 miles of the Paducah-Murray division of this company's line are now being awarded. Surveys have been made and right-of-way has been obtained through Lone Oak, Melber, Lowes, Fancy Farm, Mayfield, Sedalia and Lynn Grove.

Hagerstown (Md.) Electric Railway.—It is reported that this company is considering plans for an extension to Mont Alto, Pa., and eventually to Gettysburg.

***Trackless Transportation Company, Boston, Mass.**—This company has been organized in Massachusetts as a holding company and subsidiaries are to be formed to build and operate trackless trolleys in Massachusetts. The Boston and New York Stock Exchange house of I. M. Taylor & Company is interested.

Detroit (Mich.) United Railway.—This company has made an offer to extend its line from Romeo to Almont if it receives a private right-of-way.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—It is reported that this company plans to build a 17-mile extension from Brookside.

Kansas City, Lawrence & Topeka Electric Railroad, Kansas City, Mo.—Work will be begun within the next few weeks by this company on an extension to Lawrence, Kan. The company plans to secure the necessary power for this line from the municipal lighting plant of Kansas City.

***Kingston & Excelsior Springs Electric Railroad, Kingston, Mo.**—Surveys are being made by this company to build a 25-mile electric railway between Kingston, Lawson and Excelsior Springs. B. Boner, Kingston, president, and S. C. Rogers, Kingston, chief engineer.

St. John (N. B.) Suburban Railway.—Surveys have been begun by this company on its line in the suburbs of St. John. J. A. Jones, engineer. [E. R. J., April 5, '13.]

Atlantic Coast Electric Railway, Asbury Park, N. J.—During the next two weeks this company will award contracts to build 2010 ft. of double track through the camp ground at Sea Girt.

Trenton & Mercer County Traction Company, Trenton, N. J.—This company will rebuild about 4 miles of track. In Trenton it will weld electrically over 1000 joints and rebuild 2 miles of track with all new material, using treated ties laid on 4 in. of crushed-stone ballast on top of this and up to base of rail a concrete mixture paving of granite block. The company will lay Lorain 7-in. 103-426 rail. It will also rebuild, except rail, about 3 miles of suburban roadbed.

Hornell (N. Y.) Traction Company.—The work of replacing old ties and the laying of new track will soon be begun by this company on its lines in Hornell. The material for most of the work has been obtained.

Piedmont & Northern Railway, Charlotte, N. C.—The Catawba Springs township has voted $45,000 of bonds to induce this company to build a line from Mount Holly via Lucia, Lowesville and Triangle to Denver, N. C., a distance of about 18 miles.

Newbern-Ghent Railway, Newbern, N. C.—Work will soon be begun by this company on its extension to Trenton and Pollacksville.

Grand Forks (N. D.) Street Railway.—This company has awarded the contract to the Dinnie Brothers for the construction of its extension in Grand Forks.

Poland Street Railway, Youngstown, Ohio.—It is reported that this company has secured the necessary capital for the construction of its 4½-mile line and that grading will be begun within the next few weeks between Poland and Youngstown. George E. Rose is interested. [E. R. J., Feb. 1, '13.]

Norman Interurban Railway, Oklahoma City, Okla.—This company, which will be operated as a subsidiary of the Oklahoma Railway, has begun the construction of its 9-mile line between Oklahoma City, Moore, Norman, El Reno, Edmond and Britton. Contracts for rails and wire have been made and contracts will be let for the rest of the material. The company's repair shops will be located at Oklahoma City and power will be furnished by the Oklahoma Railway. Capital stock authorized, $200,000; capital stock issued, $150,000. Officers: George W. Knox, president; J. J. Johnson, vice-president; Charles Hoopes, secretary, and Henry Brauer, treasurer, all of Oklahoma City. [E. R. J., April 19, '13.]

***Tulsa, Okla.**—Plans are being made to build an electric railway between Tulsa and Kansas City. Among those interested are Herbert H. Clark, Kansas City, and R. S. Morely, Tulsa.

Lehigh Valley Transit Company, Allentown, Pa.—The entire right-of-way has been secured by this company for a double-track line from Lansdale to Souderton, a distance of 14 miles.

Easton (Pa.) Transit Company.—During the next few weeks this company expects to rebuild about 3000 ft. of track in Freemansburg and about 2000 ft. of new track in Easton.

Philadelphia & Garrettford Street Railway, Philadelphia, Pa.—It is reported that this company is considering plans to build a line from Collingdale to Folcroft and the Darby Creek.

Phoenixville, Valley Forge & Strafford Street Railway, Phoenixville, Pa.—Surveys have been begun by this company for the extension from Valley Forge to Bridgeport. An order has been placed with the Phoenix Bridge Company for the bridge over the Valley Creek and a contract has been awarded to Daniel E. O'Connell & Sons, Avondale, to build the concrete piers and abutments and erect the ironwork. An order for 15,000 cross ties has been placed with Bush & Company, Wilmington, Del.

Pottstown & Reading Street Railway, Pottstown, Pa.—This company has awarded the contract for the grading and masonry work for its extension from the township line below Sanatoga to the site of the new bridge over the Schuylkill River at Linfield to Steir, March & Company, Philadelphia.

Scranton & Binghamton Traction Company, Scranton, Pa.—During the next few weeks this company will award contracts to build 17 miles of new track from Nicholson to Montrose.

South Fork-Portage Railway, South Fork, Pa.—This company's line will be extended via Cassandra, Lilly and Cresson to Gallitzin as soon as the line between South Fork is completed. The company has secured the extension of its charter rights.

Regina (Sask.) Municipal Railway.—Construction work has been begun by this company on its line in Regina.

East Tennessee Traction Company, Nashville, Tenn.—The Bradley County Court has authorized the issuance of $15,000 in bonds for this company insuring the immediate construction of an electric line between Chattanooga and Cleveland, Tenn. Lewis M. Coleman is interested. [E. R. J., March 23, '13.]

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—This company plans to build 2 miles of new track during the year.

Eastern Texas Traction Company, Dallas, Tex.—More than 50 per cent of grading and bridge work has been completed by this company between Dallas and Rockwall.

***Houston, Tex.**—Work on the projected interurban railway from Houston through South Houston to La Porte will be begun during the summer, according to the statement of F. E. Ebersole, who recently purchased from A. F. Irwin the franchise and right-of-way for this 27-mile line.

***Seguin, Tex.**—F. C. Weinert and associates are considering plans to build an 18-mile electric railway between Seguin and Staples.

Southwestern Traction Company, Temple, Tex.—Surveys are being made by this company for its line between Temple, Belton, Georgetown, Austin, San Antonio and other points.

***Webb, Tex.**—Nathan Love, R. S. Payne, J. E. Bloomer and C. W. Duke are considering plans to build an electric railway between Webb, Dallas, Glen Rose and Mansfield.

Charlottesville & Albemarle Railway, Charlottesville, Va.—During the next sixty days this company will award contracts to build 2 miles of new track and two passing tracks in Charlottesville.

Wellsburg, Bethany & Washington Traction Company, Wellsburg, W. Va.—This company plans to repair its roadbed during the summer.

West Virginia Traction & Electric Company, Wheeling, W. Va.—During the next few weeks this company plans to do general repair work along its lines and at its carhouse in Wheeling.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by this company to build a new carhouse on the Kitsilano Indian reserve. The cost is estimated to be about $50,000.

Bakersfield & Kern Electric Railway, Bakersfield, Cal.—During the year this company plans to build a new carhouse in Bakersfield.

Springfield (Ill.) Consolidated Railway.—During the next four weeks this company expects to build a carhouse in Springfield. The structure will be 210 ft. x 60 ft. and of concrete and steel construction.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company is considering plans to build new freight terminals and a new passenger station in Cedar Falls.

Union Street Railway, New Bedford, Mass.—This company has sold its Durfee Street carhouse in New Bedford. The structure will be demolished.

United Traction Company, Albany, N. Y.—Among the improvements planned by this company in the near future will be the enlarging of its North Albany carhouses to house some new equipment.

Binghamton (N. Y.) Railway.—Plans are being prepared by this company to build a three-story brick freight station on its State Street property in Binghamton. The basement will be occupied as a storage room. On the first floor will be located the freight offices and rooms for handling the incoming and outgoing freight. The second floor will be used for crew rooms and lockers for the men, and the third floor will be fitted out as a clubroom for the employees.

Cleveland (Ohio) Railway.—The directors of this company have approved the expenditure of $79,000 on improvements to the St. Clair Avenue carhouse and repair shops in Cleveland.

Ottawa & Morrisburg Electric Railway, Ottawa, Ont.—Plans are being considered by this company to build a new terminal in Brockville.

POWER HOUSES AND SUBSTATIONS

Birmingham-Tuscaloosa Utilities Company, Birmingham, Ala.—This company has awarded a contract to the General Electric Company for the construction of its power plant at Tuscaloosa. The company is a subsidiary of the Birmingham, Ensley & Bessemer Railroad, which operates electric lines in and around Birmingham, and was organized to build an electric railway between Birmingham and Tuscaloosa.

Alabama Traction, Light & Power Company, Montgomery, Ala.—This company has awarded contracts aggregating $200,000 for electrical supplies, gates for locks and other equipment for the hydroelectric development it is making at Lock 12 on the Coosa River near Birmingham. This is the final series of contracts and the material will be delivered during the summer, the contracts being divided between the General Electric Company, the Westinghouse Electric & Manufacturing Company and the Pennsylvania Steel Company.

Pensacola (Fla.) Electric Railway.—Plans are being made by this company to build a concrete addition to its power house in the city of Pensacola, which will double the capacity of the plant.

Springfield (Ill.) Railway.—During the next four weeks this company will award contracts to build an addition to its power house in Springfield to be used for the superintendent and drafting office, machine shop and storage room. The structure will be about 30 ft. x 60 ft.

Berkshire Street Railway, Pittsfield, Mass.—Plans are being considered by this company to build a new substation 1 mile east of Worden's Corners in Pittsfield.

West Penn Traction & Water Power Company, Pittsburgh, Pa.—This company has awarded a contract to the John F. Gallagher Company to build an addition to its power plant at Forty-second Street, Wheeling, W. Va. The structure will be 63 ft. x 100 ft. and of brick and concrete construction. The cost is estimated to be $25,000.

Scranton & Binghamton Traction Company, Scranton, Pa.—During the next few weeks this company will award contracts to build an addition to the boiler room at its power plant in Dalton. It expects to purchase three new water-tube boilers for installation at the Dalton plant and one 150-kw turbo-generator for lighting purposes.

Charlottesville & Albemarle Railway, Charlottesville, Va.—During the next sixty days this company expects to build a new power plant with a capacity of 2000 hp. It expects to purchase three 400-hp high-pressure boilers, condensers, brick stack and pumps.

West Virginia Traction & Electric Company, Wheeling, W. Va.—During the next few weeks this company will do general repair work at its power house in Wheeling and plans are being considered to add new equipment in the near future.

Manufactures and Supplies

ROLLING STOCK

Montreal (Que.) Tramway, it is reported, will ask for bids for 100 double-deck cars.

Tri-State Railway & Electric Company, East Liverpool, Ohio, it is stated, will rebuild twenty-seven interurban cars.

East St. Louis & Suburban Railway, East St. Louis, Ill., is in the market for ten interurban cars and five city cars.

South Bethlehem & Saucon Street Railway, University Heights, Pa., expects to purchase ten railway motors, trucks and fenders.

Chicago, Peoria & St. Louis Railway, Chicago, Ill., has purchased four 70-ft. gasoline motor cars from the General Electric Company.

Wilmington-Southern Traction Company, Wilmington, Del., expects to purchase several additional Beach-Edison storage battery cars.

Manhattan City & Interurban Railway, Manhattan, Kan., will purchase several second-hand trail cars, also probably a few single-truck motor cars.

Los Angeles & San Diego Beach Railway, San Diego, Cal., has ordered three 41-ft. 10-in. Beach-Edison storage battery cars from the Federal Storage Battery Car Company.

Detroit (Mich.) United Railway, noted in the ELECTRIC RAILWAY JOURNAL of April 12, 1913, as contemplating the purchase of fifty trail cars, has made no plans for the immediate purchase of this equipment, though it intends to arrange for some of a design yet to be determined.

Seattle (Wash.) Municipal Street Railway has specified the following details for the twelve semi-convertible pay-within cars which are being built by the Cincinnati Car Company:

Seating capacity	48	Air brakes	Allis-Chalmers
Weight (car body only),	1650 lb.	Car trimmings	Dayton
Bolster centers, length,	23 ft. 1 in.	Control	West. HL
Length of body	31 ft. 1 in.	Couplers	Cincinnati
Length over vestibule	43 ft. 1 in.	Curtain fixtures	Forsyth
Width over sills	8 ft. 1½ in.	Curtain material	Pantasote
Width over all	8 ft. 7 in.	Destination signs,	Elec. Serv. S. Co.
Height, rail to sills	32⅜ in.	Gongs	Dayton
Sill to trolley base	8 ft. 3¼ in.	Hand brakes	Cincinnati
Body	wood	Headlights	Crouse-Hinds
Headlining	3/16-in. Agasote	Sanders	Cincinnati
Roof	turtle-back	Sash fixtures	Dayton
Underframe	composite	Seats	Hale & Kilburn
		Step treads	Mason
		Trolley retrievers	Earl
		Trucks	Standard 0-45
		Ventilators	Railway Util. Co.

TRADE NOTES

Wallace Supply Company, Chicago, Ill., has removed its New York office to the Woolworth Building, 233 Broadway, New York.

Seaboard Construction Company, Brooklyn, N. Y., has removed its main office to the Temple Bar Building, 44 Court Street, Brooklyn.

Westinghouse, Church, Kerr & Company, New York, N. Y., engineers, have removed their offices from 10 Bridge Street to 37 Wall Street, New York.

Indiana Car & Equipment Company, East Chicago, Ind., has been incorporated with a capital stock of $12,000 to handle railroad repair supplies. The incorporators are Lloyd J. Smith, P. H. Joyce and T. C. McCella.

Union Electric Company, Pittsburgh, Pa., has been appointed distributing agent in the Pittsburgh territory for the Sherwin-Williams insulating paints and varnishes and is now carrying a complete stock of this material in Pittsburgh.

Canadian Allis-Chalmers Company, Ltd., Toronto, Ont., has been incorporated in Ottawa with a capital stock of $500,000. It will take over the Allis-Chalmers-Bullock Company, of Montreal, Que., and will have headquarters at Toronto.

William B. Dickson has resigned as president of the International Steam Pump Company, New York, N. Y. William Guggenheim, chairman of the board of directors, will direct the affairs of the company until a successor to Mr. Dickson can be chosen.

C. Wadsworth, Detroit, Mich., has established an office at 961-3 Woodward Avenue, Detroit, with the intention of representing manufacturers of contractors' machinery and materials of construction, making more or less of a specialty of municipal equipment and supplies.

U. S. Metal & Manufacturing Company, New York, N. Y., has appointed E. R. Schoenberger, formerly connected with the Griffin Wheel Company, manager of its Western railroad department. Mr. Schoenberger will be located in the Western offices of the company in the McCormick Building, Chicago, Ill.

Western Electric Company, New York, N. Y., has appointed O. D. Street its assistant general sales manager and supervisor of the distributing houses. Mr. Street has been connected with the company since 1901, during which time he has served in various capacities. The Western Electric Company also announces the appointment of E. W. Rockafellow as assistant general sales manager and E. A. Hawkins as telephone sales manager.

Taylor-Wharton Iron & Steel Company, Philadelphia, Pa., has acquired the Tioga Steel & Iron Company, Philadelphia. The Tioga plant, in addition to its product of steel and iron forgings, will handle part of the foreign work of the Taylor-Wharton company. An important addition to the product will be forged manganese steel. Knox Taylor was elected president of the company, A. E. Borie, W. L. Wright and L. W. Jones were elected vice-presidents, and W. A. Ingram was elected secretary and treasurer.

Universal Trolley Wheel Company, Northampton, Mass., has elected Walter H. Hadley treasurer and general manager. The company has recently completed a new concrete factory in Northampton for the manufacture of the Universal trolley wheel and harp. This equipment is self-contained and is said to need no attention so far as lubrication is concerned until the center of the wheel is worn out. The special feature of the trolley head is the spring. It is not riveted to the harp, and can easily be removed from the trolley head and replaced if necessary. An illustrated article upon these devices appeared previously in the ELECTRIC RAILWAY JOURNAL. The factory will be equipped with new drill presses, lathes and automatic machinery.

Nachod Signal Company, Philadelphia, Pa., opened its new factory on May 1, 1913. This is an important step in the policy of the company, as the acquisition of this shop will greatly facilitate development and experimental work in order to utilize the latest advances in engineering. The plant is equipped with modern machine tools, as well as jigs and fixtures for manufacturing the signals interchangeably. The electrical testing equipment is very complete, and a separate section of the shop will be devoted exclusively to experimental work. The Nachod Signal Company will manufacture at the new factory its complete line of automatic signals controlled by trolley contactors for single and double track electric railways, highway crossing signals, car headway recorders and allied devices.

ADVERTISING LITERATURE

Joseph Dixon Crucible Company, Jersey City, N. J., has lately printed a pocket pamphlet entitled "Graphite for the Boiler." This publication enumerates the advantages of graphite for fighting scale, shows several methods of applying it and presents the commendations of those who have had experience with the graphite manufactured by this company for boiler maintenance.

Charles N. Wood Company, Boston, Mass., sales agent, has issued a sixteen-page catalog which fully describes and illustrates Chapman automatic signals for electric railways, manufactured by the Electric Railway Signal Company. This apparatus is designed especially for signaling single-track urban, suburban and interurban railways where speed doese not exceed 30 miles per hour. Two types of the signal are made—the single-car or absolute block signal and the multiple or car-counting signal.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MAY 10, 1913 No 19

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.

Chicago Office............................1570 Old Colony Building
Philadelphia Office........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8100 *copies are printed.*

GOOD ENGLISH IN RULES AND ANNOUNCEMENTS

Too much stress cannot be laid upon the desirability of clear expression in the statement of any rule which a railway company issues to its employees or in any announcement which it may make to the public. The rules especially are an instance where the clearness and conciseness of the language used are most important. They are to be obeyed literally, and their wording must almost be memorized by those who are to be governed by them. Yet it is not uncommon to find a rule so loosely expressed that its meaning is obscure, and it is still more common to find the idea embodied in a great many more words than are absolutely necessary. Another fault often found in a code of rules is that the individual rules are expressed in a variety of ways—sometimes in the imperative, as "You must not do so and so"; again in the indirect imperative, as "Motormen are not allowed to do so and so," and so on through the entire range of injunctions. If these forms were intended to convey the idea that various degrees of importance should be attached to the rules thus differently expressed, there would be some reason for the condition. But this is not usually the case. The facts, in most instances, are that the rules have been compiled at different times by different people, and as each had a predilection for some one method of expression he would write certain rules without regard to the others in the code. This, however, is a minor fault compared with ambiguity or redundancy. The best masters of English are those who can express their ideas so simply and clearly that their meaning will easily be understood, and those who are asked to read any written or printed production have the right to demand that the language employed shall be such that the meaning is obvious to those able to understand the subject discussed. In the compilation of rules the direct form of address is the simplest and most easily understood and remembered, and it should be the one followed.

FULL VALUE FROM COMMUTATING-POLE MOTORS

Ever since the introduction of the commutating-pole motor the voltage of d.c. railway systems has been creeping upward until, as in the case of the Hamburg rapid transit system, a potential of 800 volts per motor is looked upon as a matter of course. One may say that this tendency is most advantageous both going and returning, inasmuch as an increase in the line tension from 500 volts to 800 volts saves distribution copper and decreases electrolysis troubles because of the proportional reduction in amperage. The benefits due to higher voltage can be readily obtained by those who are using commutating-pole equipment exclusively, but it is an open question whether many opportunities exist for obtaining the full benefit of newer motors on systems which are operating a large proportion of non-interpole machines. It is conceivable, however, that such a change could be brought about gradually by placing all new motors on specific lines instead of using them at random. Thus they might be applied with the greatest opportunities for economy on suburban extensions which have independent feeder systems and which are not long enough to justify the greater first cost of 1200-volt equipment. The principal expense in adding from 200 to 300 volts to the line potential would be the installation of higher voltage rotary converters, for, as a rule, the line insulation on most railways has an ample margin of safety. In many cases the chief objection from the power station standpoint to double-voltage operation would lie in the necessity for the installation of two sets of busbars and the operation of one or more rotaries or d.c. generators at the higher voltage. This in turn would make it somewhat more difficult to distribute energy and rolling stock in accordance with varying requirements. Nevertheless, a study of conditions on some individual systems may show that if the peak load occurs simultaneously on all routes nothing would be risked by the operation of two sets of lines which are electrically distinct.

POWER PLANT LOCATION AND FLOODS

The number of power plants that were compelled to suspend operation in Ohio and Indiana during the recent flood was comparatively large. The facts that the floods reached a height previously unknown in many districts and that the circumstance was responsible for the damage done to power equipment and the consequent interruption in service show that reasonable precautions had been taken to prevent damage by water. The conditions against which the companies will have to protect themselves in the future, however, are those that may develop from a repetition of the extraordinary floods of 1913. After this experience to serve as a guide, the locations for future power-house construction will be selected more carefully with this danger in mind. It will probably be found expedient by some of the companies to introduce as a permanent measure of precaution a modification of some of the temporary measures of relief and protection that were adopted under the emergency conditions which existed in the spring of 1913. The slow rate at which the water rose in certain localities permitted the completion of plans for protection and the construction of temporary walls, but in most of the cities the rush of water came so suddenly that there was no time to plan or to construct such barriers. An illustration of the steps to which the floods have led is found in the announcement that a committee has been appointed to consider the practicability of the construction of a retaining wall about a section of Louisville which is devoted to industrial purposes and in which the Campbell Street power plant of the Louisville Railway is located. All feasible measures of protection should be adopted for existing structures, and more cognizance should be taken of the danger of floods in the location of new stations. Equipment that has been soaked by water can be restored to a state of operating efficiency, but the traffic that was not carried during the period of suspension of operation is lost, and its absence leaves an unfilled gap in the gross earnings of the property.

SECURING LOWER PURCHASE PRICES FOR EMPLOYEES

Great interest has been aroused by the plan of the Interborough Rapid Transit Company to sell groceries and meats to its employees at practically cost prices and also in the cost-of-living study which has been made by the electric railway companies in Philadelphia and Milwaukee with the ultimate view of aiding the employee in a similar way. To those who are acquainted with the extensive co-operative stores in England and Scotland it has always been a source of wonder that the co-operative store idea has not reached greater development in this country. In the United Kingdom in 1906, for example, there were more than 1400 such stores with nearly 2,500,000 members, over $160,000,000 capital and sales exceeding $310,000,000. The efforts to establish similar movements here have been less successful. One reason for this perhaps has been the greater development here of the department store. Nevertheless, in any system of competitive selling, whether by department store or otherwise, the overhead expenses must be considerable, and where any large body of consumers can be brought into co-operative action in their purchases, either because they happen to be engaged in the same line of work or for any other reason, a considerable saving should be shown. This is especially the case where the store caters to only one line of trade and so can keep the amount of stock which it has to carry at a minimum.

Besides the company store and the consumers' co-operative store, another way is available for reducing the cost of living. This method is to arrange with selected tradesmen that the members of the consumers' association shall receive specific discounts on their purchases. A promising beginning along these lines has just been made by the Philadelphia Rapid Transit Company. As announced elsewhere in this issue, contracts have already been made by that company with an important department store and a leading coal dealer for reduced prices to employees of the company, and other businesses will be added as rapidly as their standing and concessions are approved. A conspicuous feature of the Philadelphia scheme is that the purchases will have to be made by means of a coupon ticket book which is issued only to members of the Co-operative Beneficial Association, now numbering about 7500 persons. The discount is not given by the tradesmen to the individual customer direct but to the association as a body, and the latter in turn sells the books at 8 per cent less than the actual purchasing value which is printed on the tickets. Among the merits of the cash coupon book are that the benefits can be confined to members of the co-operative association, that the buyer receives a substantial uniform discount for any kind of purchase and that the merchant is furnished with a simple way of checking all sales from this source. An earlier and highly successful example of this system of co-operative buying is furnished by the benefit association which numbers 9750 of the 12,400 employees of the Berlin (Germany) Street Railway. The weekly official organ of this association publishes a list of more than 250 establishments which give discounts of 5 per cent to 10 per cent. The businesses listed include every kind of food and clothing, candy, tobacco, druggists' supplies, lighting fixtures, fuel, hardware, liquors, house furnishings, musical instruments, optical supplies, jewelry and dental service. Even an undertaker, who offers a discount of 10 per cent, is included. Further, by special arrangement with a number of theaters, members of the association can secure tickets at half price.

Advantages of the Berlin and Philadelphia scheme are that the railway company is relieved of all the responsibility of purchases or sales except for the restaurants at carhouses, that any desired variety of stores can be listed, and that long trips by buyers are avoided by increasing the number of each kind of business establishment as desired. A discount of 5 per cent or 10 per cent may not seem a great concession, but as a matter of fact, many storekeepers, such as grocers, have to do business in accordance with the old motto of "quick sales and small profits." On the other hand, some of the advantages of the co-operative store are lost. Under such an arrangement as that at Berlin and Philadelphia the customers never know how near to cost price they are paying for their goods as they do when the real co-operative plan is followed. Moreover, the tradesmen can afford to make a discount to members of the society only because of some real or fancied benefit, such as increased patronage, and this means that similar contracts will not be made with competitors in the same shopping territory. The fact that all business is on a cash basis is, however, a consideration.

When a co-operative store is located at a carhouse, with no charges for rent, heat and light, its prices to the employee ought to be less than those of any private shopkeeper, no matter how slight his profits. It can easily be seen, however, that complications will grow with any increase in the variety of goods handled, and probably the simplest plan is to confine the supplies at first to standard groceries. In any case, the management ought to be in the hands of specialists. The proprietor of a private store always has the incentive which exists when business is conducted for a profit, and he will naturally aim to adjust his prices so as to make the most money from his entire sales, independent of the extent of his profit on individual articles. Unless the co-operative store possesses the same skill of marketing and selling, its prices may be higher than those in the private store and it may do less to make its store attractive than its private competitor. Indeed, most of the wrecks of co-operative efforts in the past have been due to unskilful management rather than to any defect in the principle of co-operative buying and selling.

THE SAN FRANCISCO REPORT

The report of Mr. Arnold on San Francisco, an abstract of which is published in our issue of this week, is primarily an analysis of operating and physical conditions and also contains a definite recommendation for a resettlement ordinance involving gradual decapitalization of the intangible value of the street railway property. At the same time, the situation there described is one which may occur in other cities where there are limited franchises, so that it possesses much more than local interest.

In San Francisco, as in other cities, Mr. Arnold has sought to perfect a fair basis under which the city and the company could meet, settle their differences and work out a satisfactory method for co-operative development rather than to continue hostile relations in the future. The plan offered as a foundation for a resettlement ordinance is somewhat similar to the one included in the 1907 Chicago ordinances but possesses some material modifications. The most important of these is the provision for the gradual decapitalization of the intangible value which, in the case of San Francisco, as elsewhere, is a part of the total present value of the property. We believe the rapidity of the rate at which the city's share compounds in the proposed resettlement will be surprising even to many who are familiar with other bases of resettlement. According to the diagrams in which the probable earnings are charted, the rate is so high that a change of $5,000,000 in initial intangible allowed makes a difference of only two years in the period of ultimate recapture of the property by the city. This is true also in spite of the fact that the sinking funds are not excessive and the provisions of the renewal fund are such as always to insure ready cash for necessary expenditures. We note that in his discussion on this part of the report Mr. Arnold expresses the explicit opinion that a street railway should be regarded as a continuing investment and that non-physical value cannot be avoided in the organization and construction of any property, whether private or municipal. These are conclusions on fundamental points that need a wider recognition than they have yet had, and in view of the widespread absence of public opinion upon the truth of this condition they cannot be emphasized too strongly. Still another interesting feature of the report is the recommendation of the Philadelphia plan for the compensation of labor upon the basis of a fixed percentage of the gross receipts, although the percentage recommended in this case is different from that in Philadelphia.

The situation which will have to be overcome in San Francisco before a satisfactory settlement of the transportation problem can be worked out is unusually complex. That it is of such a nature is due in part to the past differences between the company and the city which have hampered the development of both. It has resulted in the adoption of clauses in the last city charter which make it practically impossible, in the opinion of both Mr. Arnold and the railway company, for the company to make extensions. It also has been followed by the actual establishment, although as yet on a small scale, of a competitive municipal railway system.

Under the political conditions which exist on the Pacific Coast the policy of the municipal operation of street railways seems at present to be in the ascendant, but by the inexorable logic of figures Mr. Arnold has shown that even under the present liberal debt limit of San Francisco a purely municipal railway line cannot be built there with sufficient rapidity to take care, at all adequately, of the needs of the city for transportation, even if all of the credit available by increased assessments should be devoted to that one object. In the meantime, the company possesses certain legal rights and cannot be dispossessed from its occupancy of the streets. Hence, unless some settlement is made, the increasing population around the Golden Gate will locate in the cities across the bay and in the southern part of the peninsula on which San Francisco is located, instead of within the city limits.

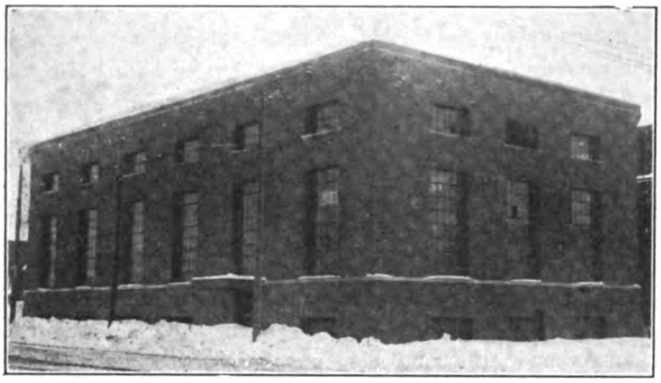
For these reasons the situation is acute for both the railway company and the city, but, in a sense, it is of greater immediate concern to the city than the company. If the proposed settlement is made, the company will have to make great sacrifices, but for the present at least it is in possession of the main arteries of travel, and it can make the most of them while the last shred of its legal rights to their possession remains. But the interests of the city are suffering severely and will continue to suffer in even greater ratio from the lack of adequate transportation facilities, and the Exposition grounds still remain practically isolated from the residential sections.

Charter Amendment 34 was defeated at the election in San Francisco last December by only a comparatively small vote, but with the new light which the citizens now have on the subject and the necessity which they must feel to settle the transportation question before the opening of the Exposition in 1915, another election might result differently. The Far West is looking forward to great industrial development after the opening of the Panama Canal because the canal will render that section of the country far more easily accessible to the labor markets in Europe than at present. But labor is not the only element in industrial development. It must be combined with capital, and a reputation in San Francisco or elsewhere on the Pacific Coast of demagogism in politics and of a spirit inimical to capital will defeat many of the benefits expected in that section of the country from the opening of the canal. All considerations, therefore, point to the desirability on the part of the city of an early settlement of this question, and we believe that in San Francisco, as in other cities, a constructive policy as regards the public utility corporations within its borders will produce results which will be far more beneficial to municipal growth than one of antagonism and competition.

New Substations in Buffalo

The Increasing Power Requirements of the International Railway Company Have Involved the Construction of Two Substations of Modern Design—A Description of the Building Design and the Arrangement of Equipment Is Given

In Buffalo an improved service has resulted in a considerable growth of traffic, and, as new cars are being added to the equipment, the power requirements have been increasing at a comparatively rapid rate. To meet this increased demand the International Railway Company has built and recently placed in commission two new substations, one on Fillmore Street and another on Broadway. Both of these have been designed with the utmost regard for efficiency and capacity and they represent thoroughly modern developments in substation arrangement.



Buffalo Substation—Exterior View from Broadway

The substations are designed so that their capacities may be easily increased, the plan being to utilize the older types of rotary converter owned by the company for as long as is commercially profitable, after which they are to be replaced with larger machines. The buildings are, in addition, designed to permit extension at any time when this becomes necessary. The Broadway substation is the most recently constructed of the two, and, as the plants are substantially similar, the description of this station will serve to show the trend of this branch of engineering practice on the Buffalo street railway system.

BUILDING DESIGN

The Broadway substation is located on the south side of Broadway 3¼ miles from the business section of the city. It is 89 ft. 5 in. long, 48 ft. 6 in. wide and 33 ft. 8 in. high above the grade line. The walls are of shale brick faced with Orchard Park Devonshire brick, which is laid with open joints and trimmed in conformity with current style in substation architecture. The wall incloses a steel frame supporting steel roof trusses on which a concrete roof is carried. The brick wall is 17 in. thick and rests on a 26-in. concrete basement wall. On the north and south sides of the building are liberal window spaces fitted with steel frame sashes. On the south side is a large opening closed with a rolling steel door. The entrance doorway is small, is located on the ground level and is protected by an ornamental marquise.

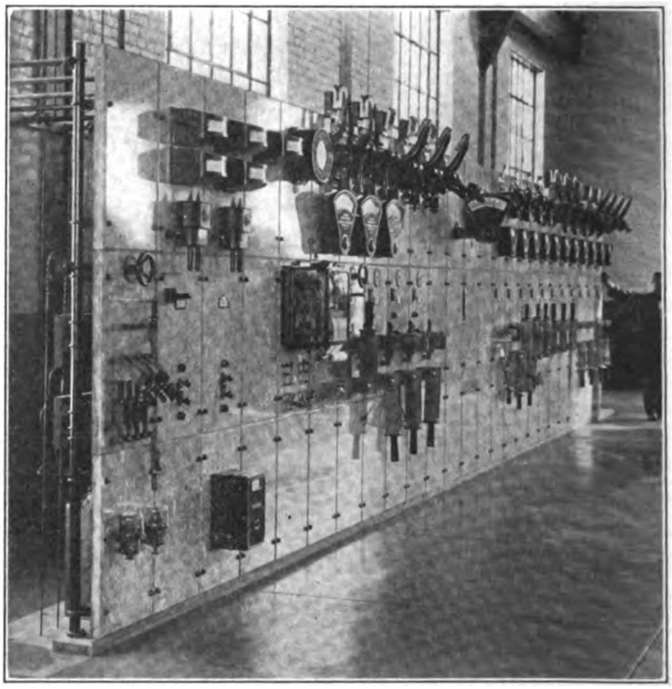
The interior of the building is divided into two stories, the main floor and the basement. On the main floor are three 400-kw, three-phase rotary converters and two 1000-kw, six-phase converters, with the necessary transformers for reducing the line voltage of 11,000 to 430. On this floor are also the high-tension busbars and switches in fireproof compartments and a complete low-tension switchboard. This floor is served by a 15-ton Whiting crane with hand-operated hoist. The cable hoist is long enough to reach to the basement floor through an opening in one corner of the building.

In the basement are the fans for supplying cooling air to the transformers and to the reactance coils for the small converters, a storage battery for the high-tension switch control and for emergency lighting, the negative busbars, an air compressor and the usual toilet and storerooms.

ARRANGEMENT OF EQUIPMENT

It will be noted from the drawings that the converters are arranged in a row along the center of the room. The northerly two are General Electric interpole six-phase machines of the latest type. They operate at 500 r.p.m. and are provided with a mechanism for raising the d-c. brushes. The remaining three converters, which are of 400-kw capacity, have seen service for a number of years, although they are still in excellent condition. They are three-phase machines, non-interpole, and they also have a speed of 500 r.p.m. These two types of rotary, operating side by side, afford an interesting contrast of design and construction. They are of almost exactly the same diameter, although the older machines occupy somewhat less floor space. Ultimately the small rotaries will be replaced by larger ones and the floor openings have been made large enough for 1000-kw machines. A part of the opening for each small rotary has been temporarily filled with a concrete slab by the simple method shown in the accompanying illustration.

Immediately back of each rotary is its transformer equipment. For each of the large machines a 1050-kva, three-phase air-cooled General Electric transformer is provided. These reduce the voltage from 11,000 to 430, and each contains 15 per cent of reactance. They require 1¼ oz. air pressure for ventilation. The smaller rotaries have three transformers each of a combined capacity of 450 kva. The floor has been arranged to accommodate 1050-kva transformers by temporarily blocking up part of each opening.



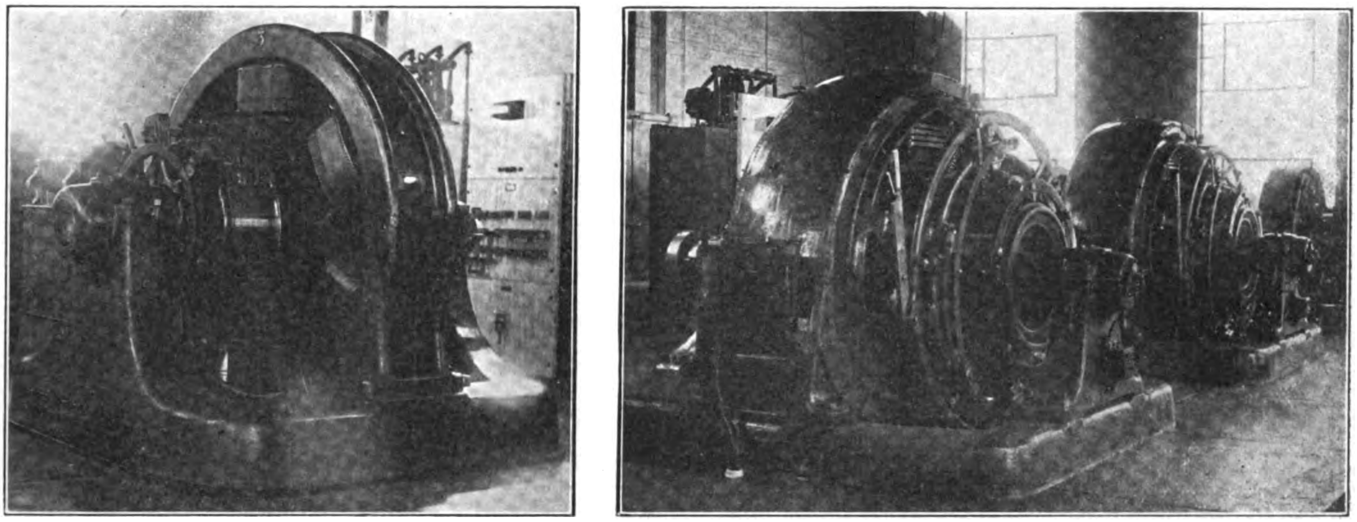
Buffalo Substation—Main Switchboard

The booster set consists of a 300-hp, 600-volt motor driving at each end a 100-kw, 250-volt generator. While somewhat inefficient, this is at present the only available means for giving satisfactory voltage on two long feeders supplying Depew and Lancaster.

HIGH-TENSION SWITCHING APPARATUS

The high-tension busbars are located along the west wall in compartments consisting of brick walls and horizontal partitions of litholite. The busbars are made of flat copper 2 in. x ¼ in. in section, and they are mounted on porcelain insulators one above the other. In the wall compartments are also three remote-control, motor-operated, high-tension oil switches of the General Electric H3 type, provided with mechanical locks to prevent them from closing accidentally. These switches connect the busbars with the high-tension cables. Switches of the same type for making connections to the transformers are placed in a row of brick chambers separated by a 3½-ft. passage from the busbar chambers. There is a set of three disconnecting switches for each cable and there is also a set for each converter. The usual busbar disconnecting switches are used in addition. The busbar and switch compartments present a very neat appearance, being constructed of Kittanning vitrified brick having a light salmon color and laid very close.

Near each transformer is a low-tension a.c. starting panel with one-third and two-thirds voltage taps. Each panel contains an a.c. ammeter, an oil-switch control switch, a triple-pole, double-throw 800-amp starting switch, a similar 2000-amp starting switch and an overload relay.



Buffalo Substation—Views of 400-kw Rotary and 1000-kw Rotary Taken on the Same Scale to Show Their Approximately Equal Size

LOW-TENSION SWITCHBOARD

The low-tension switchboard comprises twenty-four panels arranged in a continuous row on one side of the station. The board is made of blue Vermont marble and is of standard General Electric Company construction. The arrangements and contents of the panels are as follows:

No. 1, utility panel; contains battery ammeter and rheostat operating mechanism for switch-control battery, ten small switches for lights, air compressor, etc., bell alarm relay and low-voltage relay controlling emergency lights from small battery.

No. 2, three-phase incoming line panel; contains ammeter, power-factor meter, control switch for oil switch, potential receptacle, overload relay and transfer switch for cutting secondaries of current transformers into meter circuit.

No. 3, same as No. 2 except that an indicating wattmeter takes the place of the power-factor meter and that a watthour meter is added.

Nos. 4 and 5, blank for future a.c. cables, but the former has an a.c. voltmeter mounted upon it.

Nos. 5 to 9, d.c. rotary panels; each contains circuit breaker, ammeter and shunt, rheostat-operating mechanism, potential receptacle, oil-switch control switch for opening oil switch only, 3000-amp machine switch, 200-amp lighting switch.

Nos. 10 to 13, blank for future converters and for battery booster.

No. 14, d.c. motor panel; contains circuit breaker, ammeter and shunt, 800-amp switch, starting switch and potential receptacle.

Nos. 15 and 16, line booster panels; each contains circuit breaker, ammeter and shunt, potential receptacle, single-pole, double-throw 1200-amp switch, single-pole and single-throw 1200-amp switch.

No. 17, d.c. feeder panel, 1200-amp capacity; contains circuit breaker, ammeter and shunt potential receptacle and 1200-amp switch.

Nos. 18 to 24, d.c. feeder panels, 2000-amp capacity; each contains same equipment as No. 17 except that the instruments are of larger capacity.

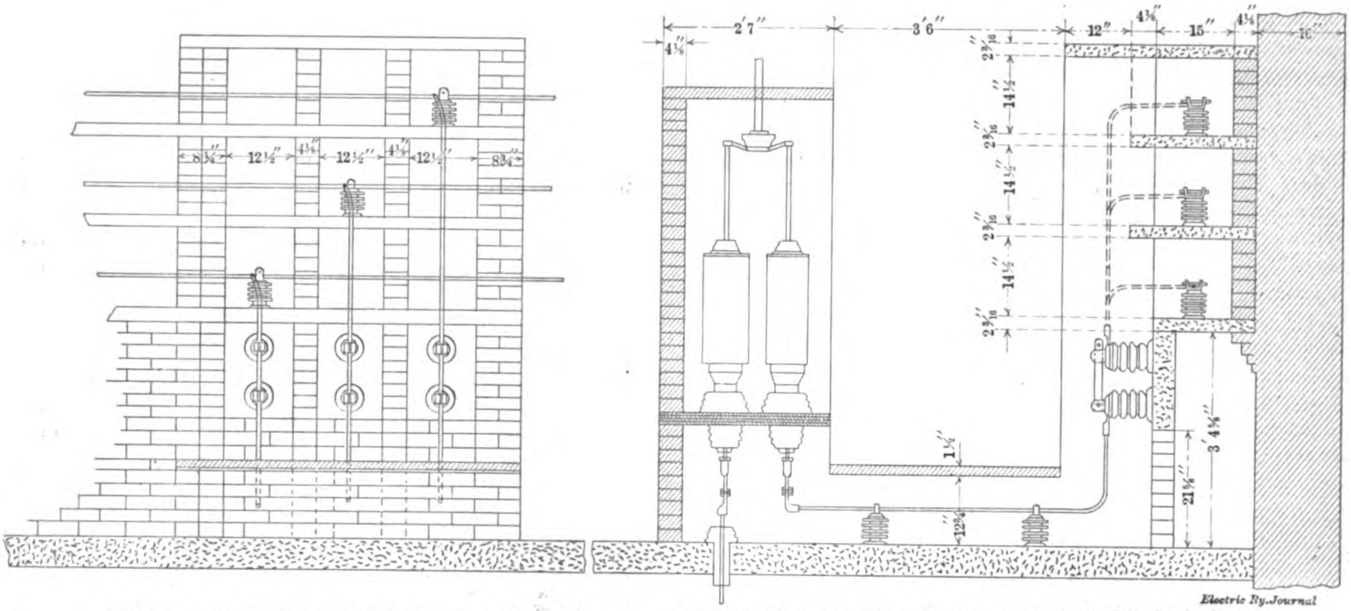
LIGHTING AND WIRING

The main floor is lighted with General Electric inclosed-arc lamps placed close to the ceiling and hung in KZ cut-outs. They can thus be lowered for trimming. This provision for trimming is found to be a great improvement over fixed suspension of the lamps requiring trimming from the crane, for in a one-man station trimming by the old method is likely to result in delay in replacing circuit breakers and also involves danger of accident to the operator. Ten arc lamps are used for lighting the main floor, and in addition there are two clusters of three 16-cp incandescent lamps for emergency use. The latter are automatically thrown into circuit with the storage battery when the alternating-current supply fails, switching being done with an automatic relay located on the northerly panel of the low-tension switchboard described above. The basement is lighted with incandescent lamps. All of the wiring for the control and lighting circuits, as well as for the light power circuits, is placed in iron conduit in the concrete floor, resulting in a very neat appearance.

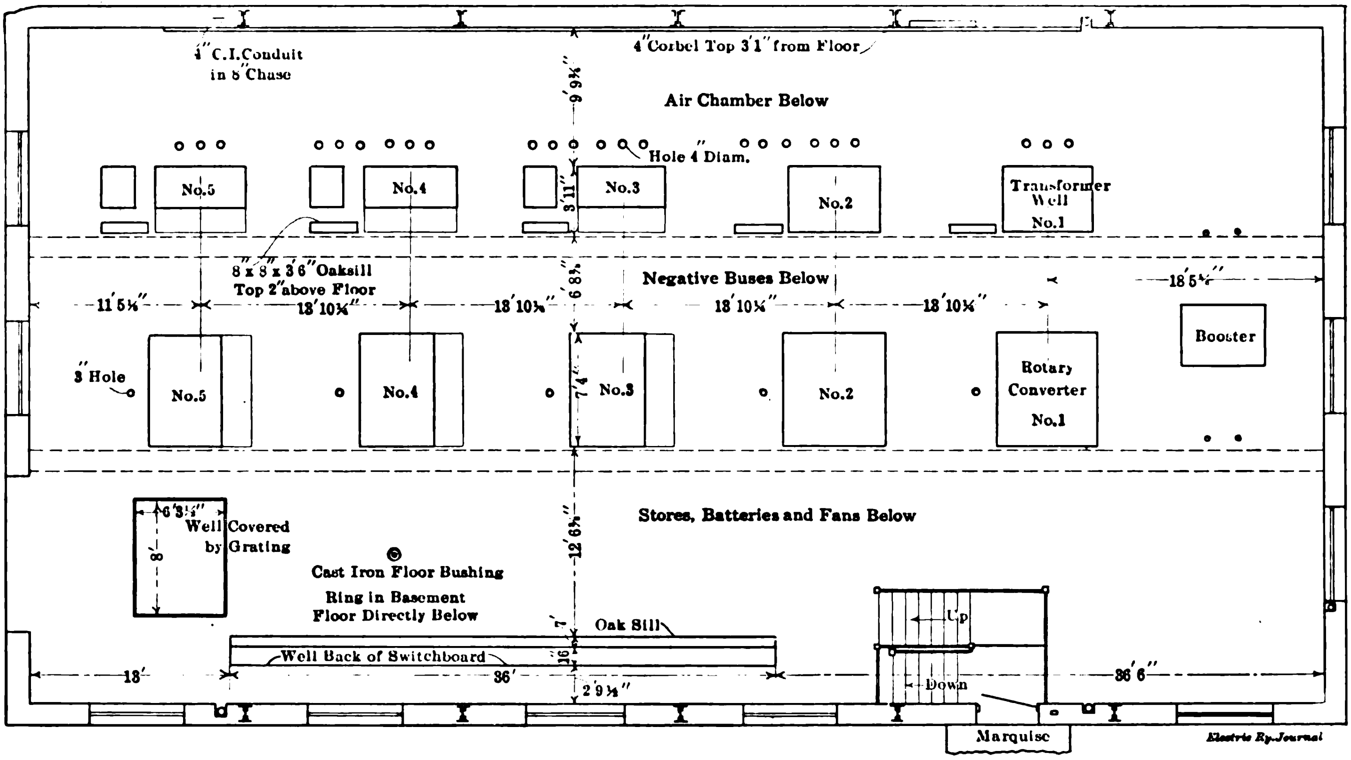
SPECIAL FEATURES ON MAIN FLOOR

Among the special features which attract the eye of the visitor on the main floor, two deserve special mention. Near the southeast corner is a removable grating in the floor about 6 ft. x 8 ft. in size. The grating is of 1½-in. x 2½-in. mesh and made of ⅛-in. x 3-in. iron, riveted together in a ½-in. x 3-in. iron frame. This opening permits apparatus to be lowered into the basement and at the same time it serves as a ventilator for the main room. It connects with the fan room in the basement and as it is near the large steel door, which will be kept open in summer, it provides the basement with cool air in that season.

Another feature is an arrangement for using the crane for drawing machinery into the building. This consists of a 3-in. iron bushing placed in the floor opposite the large doorway and about 24 ft. from it. The bushing is mounted on one of the floor beams and is braced in the direction of the doorway with 8-in. I-beams riveted to the floor framing. Directly below this bushing in the basement floor is a heavy iron ring 12 in. in diameter linked with an I-bolt which is molded into a concrete foundation. When a heavy piece of apparatus is to be unloaded from a dray, a pulley block is attached to it and a chain is hooked into the basement ring, passed through the floor bushing and the pulley block on the piece to be moved and then attached to the crane hook. An enormous force is thus made available to pull a load on rollers into the building, where it can be picked up by the crane.


8¾"
12½"
4½"
12½"
4½"
12½"
8¾"
2'7"
3'6"
4½"
12"
4½"
15"
4½"
16"
2⅜"
14½"
2⅜"
14½"
2⅜"
14½"
2⅜"
1½"
3'4½"
21½"
12½"
Electric Ry. Journal

Buffalo Substation—Elevation and Cross-Section of High-Tension Bus Compartment at Oil Switches


4" C.I. Conduit in 8" Chase
4" Corbel Top 3'1" from Floor
9'9¾"
Air Chamber Below
Hole 4" Diam.
No.5
No.4
No.3
No.2
Transformer Well No.1
3'11"
8"x8"x3'6" Oaksill Top 2" above Floor
6'8¾"
Negative Buses Below
11'5¾"
13'10¾"
13'10¾"
13'10¾"
13'10¾"
18'5¾"
Booster
3" Hole
No.5
No.4
No.3
No.2
Rotary Converter No.1
7'4"
6'3½"
8'
Well Covered by Grating
12'6¾"
Stores, Batteries and Fans Below
Cast Iron Floor Bushing
Ring in Basement Floor Directly Below
Oak Sill
Well Back of Switchboard
7'
16"
13'
36'
2'9¾"
36'6"
Up
Down
Marquise
Electric Ry. Journal

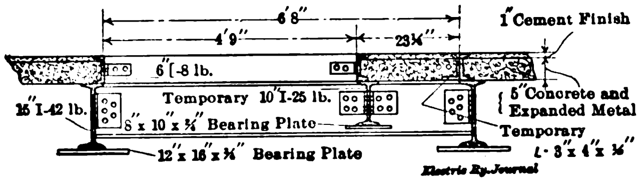
Buffalo Substation—First-Floor Plan of Broadway Substation, Showing General Arrangement of Equipment

BASEMENT LAY-OUT

The basement is divided into three nearly equal longitudinal compartments with 16-in. concrete walls. These walls form the main supports for the rotaries and transformers on the main floor. The westerly space is the air chamber into which the transformer cases open directly. In the floor are two openings which serve as air passages from the fans surrounded by 6-in. x 6-in. concrete curbs. Overhead are the high-tension cable connections with the series transformers for current measurement. In the east wall are five groups of six ducts, each to accommodate the low-tension cables from the transformers. On these low-tension cables are series transformers, one to each group.

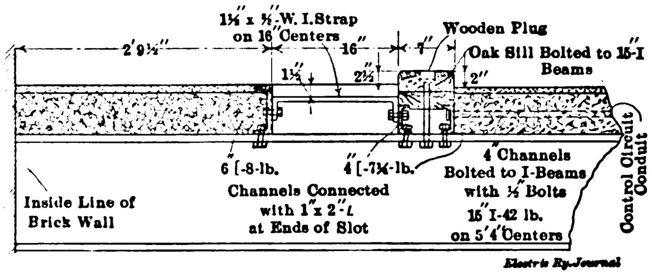
The middle compartment of the basement contains reactance coils for the small rotaries. These coils are mounted on brackets on the west wall near the low-tension ducts.

As but three ducts are needed for the cables of the small converters, two of the remaining openings are plugged and the third is connected by a tin pipe with the corresponding reactance coil case to provide cooling air. Overhead are the large negative busbars connected to the outside through eight ducts molded in the north wall and the inductive shunts for the interpoles of the new rotaries. On the east wall of the middle compartment is a row of ducts placed 7½ ft. from the floor through which the d.c. cables are led to the low-tension switchboard. At the south end of this compartment is an air-lock passage into the air chamber. Beneath the floor are the air passages connecting the fans with the air chamber.


6'8"
4'9"
23¼"
1" Cement Finish
6" [-8 lb.
Temporary 10" I-25 lb.
15" I-42 lb.
8" x 10" x ¾" Bearing Plate
5" Concrete and Expanded Metal
Temporary L-3" x 4" x ⅜"
12" x 16" x ¾" Bearing Plate
Electric Ry. Journal

Buffalo Substation—Floor Framing at 400-kw Converter Wells

The east basement compartment contains a large storeroom provided with lockers, a convenient toilet room, storage battery room, a fireproof compartment under the stairs and a large fan room. The storage battery room contains sixty-two type 7-D cells made by the Electric Storage Battery Company. These supply current for the control and emergency lighting circuits. The battery room is connected by a large duct with the air chamber and by another with the outside air, thus insuring excellent ventilation. In the fan room are two 70-in. American Blower Company fans driven by 20-hp induction motors. In the southeast corner is a General Electric air compressor, type CP-27, used for cleaning purposes and operated from the low-tension switchboard. In the east wall are the feeder ducts connecting with the outside conduits. Near these outlets are the electrolytic lightning arresters, two in series for each feeder.


1¼" x ⅜" W. I. Strap on 16" Centers
Wooden Plug
Oak Sill Bolted to 15-I Beams
2'9½"
16"
1¼"
2½"
2"
6 [-8-lb.
4 [-7¼-lb.
4" Channels Bolted to I-Beams with ½" Bolts
15" I-42 lb. on 5'4" Centers
Channels Connected with 1" x 2"-L at Ends of Slot
Inside Line of Brick Wall
Control Circuit Conduit
Electric Ry. Journal

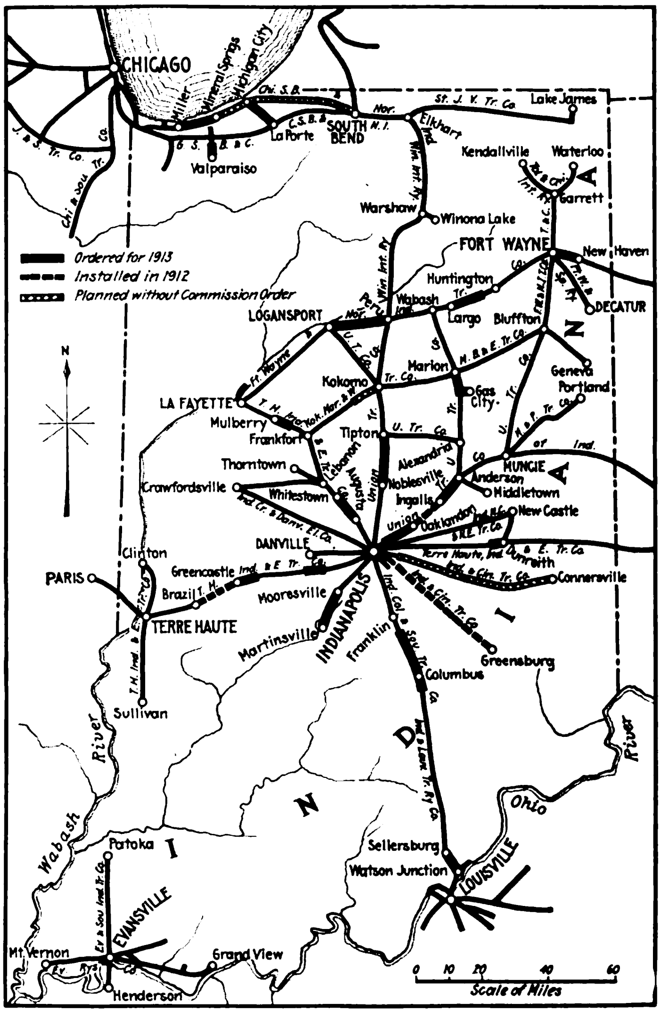
Buffalo Substation—Section Through Switchboard Slot

The floor of the basement is well drained, and it, as well as the main floor, is treated with "cemkote" floor paint.

INDIANA BLOCK SIGNALS

All but one of the contracts for block signaling on electric lines in Indiana as ordered by the Railroad Commission of that State have been placed. The first instalment of these contracts was closed as reported in the Electric Railway Journal of March 15, 1913. This included approximately 32 miles on the Terre Haute, Indianapolis & Eastern, 33 miles on the Union Traction Company of Indiana, 5 miles on the Kokomo, Marion & Western, and two long sections aggregating 25 miles on the Fort Wayne & Northern Indiana. All of these contracts went to the General Ralway Signal Company and the standard light signals manufactured by this company are to be installed on all four railways.

The remaining contracts have just been placed with the Union Switch & Signal Company and include 11.6 miles on the Chicago, Lake Shore & South Bend Railway, as ordered by the commission, and 43 additional miles, making solid blocking between Gary and South Bend. The Chicago, South Bend & Northern Indiana Railway has also contracted for 9.6 miles, the Indianapolis & Columbus Southern Traction Company for 21.9 miles, and the Louisville & Northern Railway & Lighting Company for 3.5 miles. At present the only contract not yet closed for the block signals which were ordered by the commission is the one for the Ohio Electric Railway. This contract includes 4.7 miles between the city limits of Fort Wayne and New Haven on the Fort Wayne-Lima line.


CHICAGO
SOUTH BEND
La Porte
Valparaiso
Lake James
Elkhart
Kendallville
Waterloo
Garrett
Warsaw
Winona Lake
FORT WAYNE
New Haven
Huntington
Wabash
LOGANSPORT
Largo
Bluffton
DECATUR
Marion
Kokomo
Gas City
Geneva
Portland
LA FAYETTE
Mulberry
Frankfort
Tipton
Alexandria
Thorntown
Crawfordsville
Whitestown
Noblesville
Ingalls
Anderson
MUNCIE
Middletown
New Castle
DANVILLE
Oakland
Clinton
PARIS
Greencastle
Brazil
Mooresville
Knightstown
Cambridge City
Connersville
TERRE HAUTE
Martinsville
INDIANAPOLIS
Franklin
Greensburg
Columbus
Sullivan
Sellersburg
Watson Junction
LOUISVILLE
Patoka
EVANSVILLE
Mt. Vernon
Henderson
Grand View
Wabash River
Ohio River
I N D I A N A
N
Ordered for 1913
Installed in 1912
Planned without Commission Order
0 10 20 40 60
Scale of Miles

Indiana Signals—Map Showing Protected Sections of Track, Existing, Ordered and Proposed

In addition to the other contracts the Indianapolis & Columbus Southern Traction Company and the Louisville & Northern Railway and Lighting Company are considering the installation of block signals on the entire line between Indianapolis and Louisville. Proposals already have been requested which will include 36.8 miles on the Indianapolis, Columbus & Southern Traction Company's line and 21.5 miles on the Louisville & Northern Railway and Lighting Company's line. The Indianapolis & Cincinnati Traction Company also has under consideration the installation of signals for the 55 miles of track between Indianapolis and Connorsville. These will probably be of the Simmen type. M. H. Hovey, Madison, Wis., has been retained as consulting engineer by all the companies contracting for signal installations under the order of the Railroad Commission and he will also have supervision over the additional installations which in total include approximately 250 miles of both light and semaphore types of signals.

Final Report on San Francisco

This Report Recommends a Resettlement Plan by Which the Intangible Values of the Existing Railway Property Will Be Decapitalized and Outlines Principles Considered Desirable in City Railway Franchises—An Analysis of the Financial and Operating Records in San Francisco Is Included

The concluding report of B. J. Arnold on transportation conditions in San Francisco was presented to the Mayor and Board of Supervisors the latter part of April. It includes the preliminary reports already presented in the ELECTRIC RAILWAY JOURNAL and also contains recommendations for a resettlement franchise plan, operating records and other matter. The volume contains over 500 pages, fifty-seven tables and twenty-two plates.

In his general review the author points out the complicated nature of the transportation situation in San Francisco. While the climatic conditions are ideal, the rugged topography has resulted in the isolation of the local districts. It is only by the welding together of these sections and the adoption of a broad transportation policy that it will be possible to secure "one city, one fare, universal transfers, centralized operation, minimum investment and finally municipal ownership, if the city's present policy continues to prevail." But the city has lacked an appreciation of these problems, and the utilities have failed to keep pace with the city's rapid growth. The effects of the present situation, according to the report, are "complicated franchises, impossible charter provisions, unexercised regulative powers, uncertain stability of investment, deferred rehabilitation of property, curtailment of service and lack of confidence in present and future. In the meantime, surrounding communities are capitalizing this uncertainty, assisted by concessions in fare and time of transit denied to San Francisco's logical outlet—the Peninsula—through lack of adequate transit facilities. The obvious and only certain remedy lies now within the power of the city by grasping its opportunities before it is too late and effecting a solution not piecemeal, but based upon the broader lines of effort indicated in this report."

TABLE I—SHOWING COMPARATIVE RESULTS OF THE SEVERAL RESETTLEMENT PLANS

	Plan 1. Based on Presenc Distribution of Income	Plan 2. Optional Use of City's Share	Plan 3. Full Share to City	Plan 4. Full Share to City	Plan 5. Labor Guaranteed Fixed Percentage of Gross Receipts	Plan 6. Based on Fixed Percentage of Income. No Guaranteed Return to Company on Investment	Year 1911
			Distribution of Residual Net Income—1914				
Labor, per cent	30	30	20	10	..*	..	....
Service, per cent	30	35	40	50	55	..	....
City, per cent	5						
Company, per cent	35	35	40	40	45	..	....
			Distribution of Profits				
Labor	$268,500	$268,500	$179,000	$89,500	$200,000*	....	....
Service	$268,500	$313,250	$358,000	$447,500	$492,000	....	....
City	$44,750						
Company	$313,250	$313,250	$358,000	$358,000	$403,000	....	....
			Probable Distribution of Income				
Labor	$2,913,000	$2,913,000	$2,823,000	$2,734,000	$2,844,000	$2,844,000	
Per cent of income	30.7	30.7	29.8	28.9	30.0	30.0	30.0
†Service	$3,502,000	$3,234,000	$3,234,000	$3,234,000	$3,034,000	$3,034,000	
Per cent of income	36.9	34.1	34.1	34.1	32.0	32.0	30.0
City and State	$519,000	$787,000	$832,000	$921,000	$966,000	$758,000	
Per cent of income	5.5	8.3	8.8	9.7	10.2	8.0	5.0
Company	$2,262,000	$2,262,000	$2,307,000	$2,307,000	$2,352,000	$2,560,000	
Per cent of income	23.9	23.9	24.3	24.3	24.8	27.0	30.3
Sinking fund	$284,000	$284,000	$284,000	$284,000	$284,000	$284,000	
Per cent of income	3.0	3.0	3.0	3.0	3.0	3.0	4.7
Total income	$9,480,000	$9,480,000	$9,480,000	$9,480,000	$9,480,000	$9,480,000	

ASSUMPTIONS.—(1) Date of resettlement, Dec. 31, 1913. (2) Initial "agreed capital value" of $35,000,000, including an initial tangible value of $21,000.000 (representing the probable depreciated value of the physical property of the railway company). (3) Net receipts for 1914 to be 30 per cent of the gross receipts, or $2,844,000 (remaining after deducting from gross receipts operating expenses, including maintenance, renewals, insurance, taxes, sinking fund for decapitalizing depreciation and the amortization annuity of 3 per cent of the gross receipts). (4) Company to receive a 5 per cent return on agreed capital invested under the assumption that investment increases at the rate of $3 for each additional $1 earned. At the end of the first year, 1914, this capital investment is $38,983.000 and the interest return $1,949,000. The residual net income is $895.000. which is the difference between net receipts and the company's fixed return.

* Labor's share being a fixed percentage of income, the benefits accruing will be the difference between actual labor expenses and 30 per cent of the gross receipts. The average yearly percentage increase in labor expense for the past three years was about 2 per cent. Estimating more conservatively at 3 per cent, the share accruing to labor for the year 1914 should be about $200,000.

† Includes reserves for renewals, depreciation, insurance and accidents.

Previous reports have shown that the bonding capacity of the city is far too small to permit the construction of the necessary street railway extensions on a municipal ownership basis. The minimum needs of the immediate future are 72 miles of track, exclusive of tunnels, and the most pressing of these immediate needs are transportation facilities to the Exposition site. The present service capacity to the Exposition is barely one-third of that necessary, with only one line in any sense adequate for maximum service, and that line terminates more than a mile from the site for the Exposition. At the same time the company is embarrassed in arranging for new capital for extensions by the very short franchise term which it has under the present charter and the city's declared policy of municipal ownership. Briefly, Mr. Arnold recommends a resettlement franchise upon terms somewhat different from those in Chicago. By them arrangements would be made to retire all intangible values in the property during the first franchise period and to deliver the complete property with all extensions into the hands of the city at the end of the second period at practically half price. Or, the city's share, if allowed to compound, could automatically recapture the entire property unaided within perhaps thirty years. Incidentally, the interests of labor would be conserved by the provision of a benefit reserve fund insuring employees against disability and also a bonus for meritorious service.

PLAN OF FRANCHISE PROCEDURE

The plan recommended is a resubmission to popular vote of Charter Amendment 34 (see ELECTRIC RAILWAY JOURNAL for Dec. 7, 1912, page 1150) and the establishment of a public service commission to act in an advisory capacity to the Board of Supervisors. Such a plan, it is believed, should be welcomed by the company, because after seventeen years the franchises for approximately two-thirds of its mileage will expire and during that time the company can hardly earn enough to amortize its present funded debt.

ANALYSIS OF VARIOUS PROFIT-SHARING METHODS

The provisions of Charter Amendment 34 may be worked out in various ways. The report says, in part:

"In order to interpret the provisions of Charter Amendment 34 in concrete terms, a number of profit-sharing plans have been worked out in approximate figures showing the possibilities of the future. These are all based upon an indeterminate franchise of twenty years, with a possible extension to forty years if the city does not then elect to purchase. All elements of initial intangible value in the agreed purchase price are to be decapitalized by a sinking fund within the first franchise period out of the company's share in earnings, leaving only tangible property to be purchased by the city at its then depreciated value. These decapitalized values would include depreciation at date of settlement as well as all depreciation which accrues subsequent to the end of the rehabilitation period represented by the difference between the cost of producing the property new and the best condition in which it is practicable to maintain it. If still operating the property during the next twenty years, the company is to decapitalize tangible values representing fixed structures in the streets and real estate actually used and useful in operating the road, and in addition, all depreciation which takes place in all new property added after the expiration of the first twenty-year period as well as that which takes place after that date on the old property up to the date of purchase by the city. This total depreciation will be the difference between the cost of the property new and the best condition in which it is practicable to maintain it, all of which will amount to practically half of the investment. Ordinary operating upkeep of the property consisting of minor repairs is to be treated as maintenance, and all shrinkage in values through depreciation or inadequacy is to be provided for by a renewal fund, both maintenance and renewals to be met out of earnings, so that the property may thus be maintained permanently in good operating condition (75 per cent of cost new or thereabouts).

"Table I shows possible methods of distribution of net income by various profit-sharing plans, ranging from the practical 'Chicago plan' to those approaching more or less the ideal. All plans presuppose an agreed capital valuation of the property with a 5 per cent return thereon practically guaranteed to the company as a prior claim on net income; the residual net income in excess of this return to be distributed between the various participants in the profit-sharing plan proposed. For the purposes of this analysis, the operating expenses including maintenance, renewals and sinking fund for decapitalizing depreciation, are fixed at 62 per cent of the gross receipts excluding, or 67 per cent including, taxes and licenses, with 3 per cent of the gross receipts reserved for amortization during the first twenty years (based upon the smaller initial intangible value or 4 per cent upon the larger) and 3 per cent during the succeeding twenty years. This leaves 30 per cent and 29 per cent respectively available from the annual income for fixed charges, contingency fund and profit during the first period and 30 per cent for the second period, from which after deducting 5 per cent interest on the agreed capital invested in the property, there remains what is herein termed residual net income.

STATEMENT OF VARIOUS PLANS

"Plan 1 assumes the 1911 distribution of the company's income as a basis of participation in the residual net income, which results in profit-sharing between labor, company, city and service. Operating labor, including the wages of every employee receiving $1,500 per annum or under, gets 30 per cent, the company 35 per cent, the city 5 per cent and service 30 per cent. In the share for service all elements of the operating expenses, except operating labor as above defined, may be regarded as service rendered to the public. As the business becomes more profitable, a bonus share would thus be available for increased service. This, however, might lead to excess service which would not be warranted under existing powers of regulation in view of the more pressing demands for extensions and decapitalization. Or it might encourage the company to curtail operating expenses in order to force expenditures from this share for this purpose.

"Plan 2 'pools' the shares accruing to the city and to service respectively, in order to give the city the option of either increased service, decapitalization, extensions, or other purposes. The shares to labor and the company remain the same as in Plan 1.

"Plans 3 and 4 gradually modify the respective shares to labor, city and company in a direction affording the city greater purchasing power. However, Plans 1, 2, 3 and 4 provide a bonus for labor out of residual net income, instead of this bonus being charged to operation where labor expenses properly belong. Under present conditions these plans would result in an unwarrantable diversion of revenue from extensions and decapitalization more urgently needed.

"Plan 5, which I recommend, includes only the city and company as direct participants in residual profits, the former receiving 55 per cent and the latter 45 per cent. But provision is also made for labor sharing indirectly and probably more remuneratively than in Plans 3 and 4 by fixing the per cent of income accruing to all operating labor—in this case 30 per cent—the difference between this fixed per cent and actual wages paid to be distributed in the form of a benefit fund insuring employees against disabilities, and also in the form of a bonus and merit system. The advantage to be derived results from increasing car speeds, more efficient routing and earnings increasing faster than expenses of car operation. This incorporates in the present 'Chicago plan' the bonus principle, which has been put into effect with success in Philadelphia, and, it is believed, secures for labor a valuable form of insurance which, taken in connection with the relatively high wages paid in San Francisco, should be regarded as an ample share under present conditions.[*]

"Plan 6 does not involve profit-sharing, but rather a distribution of income arbitrarily fixed for the remaining franchise period (presumably subject to mutually agreed adjustment from time to time). Under the distribution assumed the city receives 8 per cent of the total income, labor 30 per cent, service (as defined in Plan 1) 32 per cent and the company 30 per cent, out of which it must provide fixed charges, the amortization and contingency reserve funds and profits. While possibly practicable, it is much less flexible than the previous ones, and does not guarantee the company any return upon its investment, however small.

ULTIMATE FINANCIAL RESULTS

"In Figs. 1, 2 and 3 the operations of these various plans are worked out graphically so as to show: (1) capital investment in property, (2) purchase price to city, (3) date of recapture of property. The initial capital values shown in these diagrams were selected for purposes of illustration only and should not be interpreted as an attempt to place a value upon the property. On the assumption that the depreciated or present value of the physical property is about $21,000,000 and that about $7,000,000 should be expended, within the next few years, to bring it up to its assumed 'cost to reproduce new value' of $28,000,000, the diagrams shown on page 846 have been prepared. After refinancing United Railroads 4's to 5's the resulting present bonded debt would be $33,650,000. Under Charter Amendment 34 all sinking fund accruals must be deducted from the purchase price, thus arriving at a total of $28,000,000 as an assumed value, not including any intangible value except depreciation.

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[*] "In Philadelphia the fixing of trainmen's share alone at 22 per cent of the gross receipts, or the same as the trainmen received for the year immediately preceding the date of its adoption, has resulted not only in benefit reserve but also increased wages."

"That portion of the 'intangible value'† of the property represented by franchise value is the earning power of unexpired franchises and is usually understood to be the summation of all residual net income from the operating property accruing to the company from year to year, with interest compounded to expiration. But from this gross value would have to be deducted eventually all unfunded debt remaining at maturity not covered by salvage value, thus giving an amount the present value of which would represent the franchise value portion of the capital value as of to-day, which franchise value would be more or less affected by the right of the State to regulate rates. Conservative estimates based upon, first, a minimum, and, second, a maximum rate of probable residual net earnings indicate that this intangible value might lie between $7,000,000 and $12,000,000. However, if unimpaired earning power and normal expansion of the system are assumed, these values might lie between $14,000,000 and $20,000,000. While this condition particularly applies to a resettlement plan, which would be most favorable for the city's recapture of the property, it would in all probability be too optimistic for the case in which no such resettlement could be effected and the company decided to continue the operation of the present system unextended, with the minimum possible expenditures for maintenance, betterments and service. In this case, the company would strive to the utmost to 'earn out' even with less total annual income, leaving only a run-down property with little salvage for the city to condemn at the expiration of the franchise. Obviously this situation would be aggravated by the extension of the municipal system.

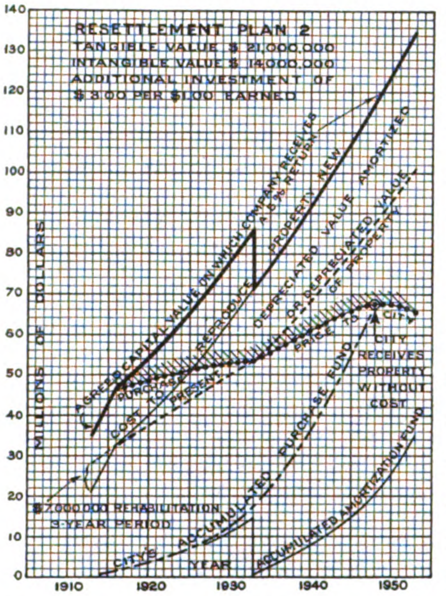

Fig. 1—San Francisco Report—Resettlement Plan No. 2

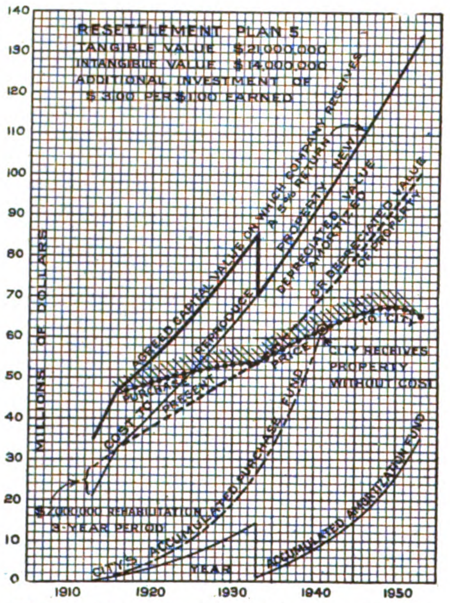

Fig. 2—San Francisco Report—Resettlement Plan No. 5

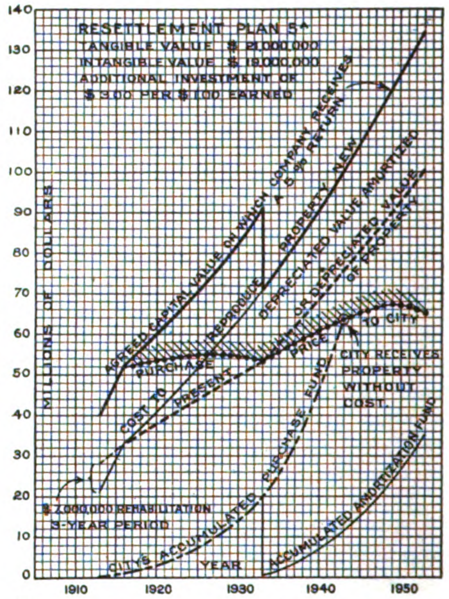

Fig. 3—San Francisco Report—Resettlement Plan No. 5A

"Fig. 1 is based on profit-sharing resettlement Plan 2, that is to say, upon a definite apportionment of net income —35 per cent to city, 30 per cent to labor, and to company 35 per cent, in addition to 5 per cent prior return on 'agreed capital value' (shown by full line). The assumptions made in this diagram are: date of settlement, Dec. 31, 1913; depreciated value of property, $21,000,000; initial intangible value, $14,000,000, all to be amortized at the end of twenty years, including $7,000,000 rehabilitation work which is to be capitalized and completed in three years; future investment to increase $3 for each additional $1 earned. The purchase price to the city at any date is shown by the dotted line, and the intangible values to be amortized are indicated by the distance (shaded) between 'purchase price and investment' (full black) curves, which values include depreciation accrued both prior to the resettlement and after the completion of rehabilitation. The city's share, if allowed to accumulate at 5 per cent, should suffice to equal the purchase price by 1947, and thus automatically recapture the entire property to the city without cost by acquiring the underlying securities covering these depreciated values, i. e., the actual value of physical property producing the service.

"The plan shown in Fig. 2 differs from that shown in Fig. 1 in that profit sharing in the residual net income exists only between city and company, the former receiving 55 per cent and the latter 45 per cent. This increase in the city's share over that of Plan 2 enables the city, if it allows its share to accumulate at 5 per cent interest, to take over the property without cost by 1941, six years earlier than in Plan 2. In both cases an annual reserve of 3 per cent of gross receipts (at 5 per cent interest) will suffice to amortize all initial intangible values allowed (except depreciation). After the first twenty years initial value is retired, and this fund starts anew for amortizing part of the physical value. A further fund is necessary for amortizing depreciation (except expenditures for rehabilitation) requiring 4 per cent of the gross receipts for twenty years and thereafter a sufficient amount to cover permanent shrinkage in value through depreciation.

"If we assume a higher initial 'capital value'—say $40,000,000—a larger amortization fund becomes necessary to enable the company to retire the greater intangible value as required. Moreover, the purchase date will be deferred until 1943—about two years. This condition is illustrated in Fig. 3. In this plan, which is a modification of Plan 5 shown in Fig. 2, the profit sharing in the residual net income between city and company is the same as in Plan 5, Fig. 2, but the initial intangible value is increased from $14,000,000 to $19,000,000, which requires an amortizing annuity of 4 per cent of the gross receipts for the first twenty years in order to decapitalize this value by 1933.

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†"Such intangible values other than franchise values are known as development expenses, and usually consist of preliminary technical expense, legal expenses during formation of the company not connected with construction expense, cost of consolidation and reorganizations, sometimes a reasonable promoter's profit, supersession of equipment due to the rapid advance of the art, reconstruction due to unforeseen contingencies, brokerage, discount or premiums on securities, and losses during early operation. All of these and franchise value, if any, should eventually be amortized and eliminated from that value of the property upon which the public should be finally expected to pay a reasonable rate of return, although it is fair that the company should have time to earn and pay to itself this amortization fund out of the earnings of the railway."

Owing to this increased intangible value, the agreed 'capital value' is also increased and the residual net income decreased, so that the property reverts to the city two years later than in Plan 5, or in 1943, but four years earlier than in Plan 2. In all these plans the property is assumed to be maintained 75 per cent good throughout the second twenty-year period, i. e., with not more than 25 per cent permanent depreciation.

"It will be noted that in all cases both the amortization and purchase funds increase so rapidly during the later years that the actual amount of initial intangible value has relatively little effect on the date of recapture, whereas within the next few years following the adoption of such a plan it would be of greatest importance in case the city desired to acquire the property.

"These studies assume no necessity for progressively retiring capital represented by intangible value within the first twenty-year franchise period—that is, that all bonds purchased for the sinking fund are held to maturity. If the serial plan of retirement is adopted, this will simply result in a higher sinking fund and a later date of ultimate recapture. In any such resettlement plan the city may obtain the greatest advantage by utilizing its full share in a cumulative fund for recapture. On the other hand, if the city applied its share to the building of extensions without further bond issue, it would realize only a partial return on this non-interest-bearing investment in these extensions as compared to a full return on these same extensions if financed by the city through the purchase of the company's bonds.

TABLE II—ANALYSIS OF RESETTLEMENT PLAN 5

Assume, for the purposes of illustration only, the following values for the property:

Initial tangible value $21,000,000

Initial agreed capital value.............................. 35,000,000

Per Cent Distribution of Income

Year	Operation Less Taxes	Company's Total Share—5 Per Cent Return on (B) and 45 Per Cent of Residual Net	Company's Net Share, 5 Per Cent Return on (B)	City and State	City's 55 Per Cent Share of Residual Net
1914	62.0	24.8	20.6	10.2	5.2
1920	62.0	25.0	20.8	10.1	5.1
1925	62.0	24.2	19.5	10.7	5.7
1930	62.0	23.7	18.7	11.2	6.2
1935	62.0	21.9	15.2	13.1	8.1
1940	62.0	21.9	15.2	13.1	8.1
1945	62.0	21.9	15.2	13.1	8.1
1950	62.0	21.9	15.2	13.1	8.1

Per Cent Return on Investment.

(A) Actual investment or cost to reproduce property new.

(B) Agreed capital value.

Year	Net Receipts 30 Per Cent of Gross Receipts		Company's Total Share—5 Per Cent Return on (B) and 45 Per Cent of Residual Net		Company's Net Share, 5 Per Cent Return on (B)		City and State		City's 55 Per Cent Share of Residual Net	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
1914	11.4	7.3	9.4	6.0	7.8	5.0	3.9	2.5	2.0	1.26
1920	9.7	7.2	8.1	6.0	6.7	5.0	3.2	2.4	1.6	1.22
1925	9.8	7.7	7.9	6.2	6.4	5.0	3.5	2.7	1.9	1.47
1930	9.8	8.0	7.8	6.4	6.1	5.0	3.7	3.0	2.0	1.67
1935	9.9	...	7.2	...	5.0	...	4.3	...	2.7	....
1940	9.9	...	7.2	...	5.0	...	4.3	...	2.7	....
1945	9.9	...	7.2	...	5.0	...	4.3	...	2.7	....
1950	9.9	...	7.2	...	5.0	...	4.3	...	2.7	....

"If an investment ratio of $3.50 to $1 additional earned were established for future investment in the property, this would result in deferring the date of recapture shown in Fig. 2 by about four years—i. e., to 1945—and in Fig. 3 by about five years, or 1948.

RETURN ON INVESTMENT

"The estimated returns (Table II) indicate that the extended property would be able to earn a rate of return on the probable tangible value approximating 10 per cent in 1930, or 8 per cent on the agreed 'capital value'; that the company would receive a return of over 7 per cent on tangible value, and that the city would derive in cash return, exclusive of taxes, as high as 2 per cent on tangible value.

CONCLUSIONS

"In the foregoing I have attempted to show that only through a resettlement will the city be able, in all probability, to extricate itself from the embarrassment of inadequate purchasing power which limits its ability to expand its traction system and the company from the curtailment of its earnings due to expiring franchises. By means of this indeterminate, profit-sharing franchise, the great essentials will be secured: (1) continuous, adequate equipment and service; (2) extensions as required; (3) ultimate municipal ownership.

"I see no danger to the city of San Francisco in such a co-operative measure if carried out through a proper administrative body, and I believe that such a measure would represent the greatest step that has yet been taken in the solution of municipal transportation problems. I therefore most urgently recommend the resubmission of the necessary charter amendment and the negotiation of a resettlement franchise.

"And, finally, I desire to state that the longer the citizens of San Francisco delay meeting this situation squarely, with sound business judgment, the more crucial will become the chaos into which the city is drifting in its utility affairs. The ten years' traction war in Chicago and its solution in the form of the resettlement ordinances of 1907 form a striking example for every municipality confronted with these municipal problems."

ANALYSIS OF FINANCIAL AND OPERATING RECORDS

After a discussion of service and routing in which the report considers methods for relieving lower Market Street and recommends methods of re-routing, the subject of rolling stock is taken up, and the report recommends a narrower car and a narrower devil-strip. The purpose of this recommendation is to permit two lines of vehicles between the car and the curb instead of one as at present. These changes could be introduced, of course, only gradually in extensions and rehabilitation work.

Considerable space is then given to an analysis of the financial and operating records of the company. The report says that in this work no attempt was made completely to audit and examine the internal details of finance, the stability of the sinking fund and the integrity of the profit and loss account, "but rather to examine the financial machinery with reference to its efficiency for perpetuating a railway property able to render adequate service and provide the general stability of the true investment." An abstract of the general summary of the author's analysis of the company's financial and operating records follows:

"The transportation business in San Francisco as a whole is unusually profitable, due to very short haul and high riding habit. It should net over 6 per cent on $40,000,000, or 10 per cent upon a more conservative investment figure of $25,000,000, even with an operating ratio as high as 70 per cent, i.e., including all proper charges against income as discussed and recommended herein.

"The net income in 1911 totaled 6.8 per cent on the $40,000,000 bonded debt, while the average interest rate actually paid on $47,454,000 first lien securities was 4.84 per cent, including dividends on $5,000,000 first preferred stock (none has been paid on preferred and common since 1906). The property has averaged a net income of 3 per cent on a total capitalization of $80,000,000 since the consolidation. But under present conditions this excess capitalization cannot hope to earn a return as contemplated in the reorganization plan, except to result in such poor service as to defeat the purpose of such a move.

"The present corporate organization, as a means of unifying some twenty scattered competitive properties, is justifiable from an economic standpoint in the production of maximum service at minimum expense. But with no preparation for grave contingencies such as an ever-possible strike, the developments of late years have resulted in depreciation of securities and the forced issuance of high-rate loans or the equivalent superimposing of preference securities. This capital shortage resulting from depreciation accruing prior to the fire is distinctly due to the company's failure to provide out of income of profitable years adequate reserves for this purpose in the form of cash or negotiable assets. Losses in earnings from the fire and strike aggregated nearly $5,000,000 for the period covered by these two disasters and resulted in an annual setback of at least $1,000,000. Of this total loss at least two-thirds is due to the strike alone. The property loss, with the exception of track and overhead in certain parts of the city, was practically covered by insurance.

"Since the consolidation of 1902 the company has expended about $10,000,000 for 'betterments' and some additions to property (excluding bond discount), but approximately half of this has been capitalized. Future betterments should be financed out of income without increased capitalization until the property has caught up with itself in the matter of deferred renewals due to depreciation, obsolescence or inadequacy. Extensions and additions may justly be capitalized. But the only way of increasing the value and stability of the business is to build up the property out of earnings, thus gradually reducing the intangible elements.

"An average depreciation reserve of 3 per cent has been maintained since the consolidation. None was charged off between 1906 and 1909. The rate of 6 per cent of the gross earnings per annum now established (1910, 1911) may be fair for the property under normal conditions, if enough is spent upon maintenance, and should be continued on a cumulative basis. But a higher reserve will be necessary for some years—probably 8 per cent—until the property is reclaimed from its present run-down condition. A depreciation and renewals reserve should be always available as cash or quick assets and charged against income as a more or less fixed element of the operating account.

"The annual appropriation for maintenance (repairs and upkeep) has remained practically constant at about 12 per cent for ten years, except for 1906-7. Owing to increased efficiency resulting from consolidation of departments, the equipment is in better condition now than at any time since the fire, but the poor condition of the track and roadway requires additional maintenance and renewal. A total appropriation of 12 per cent represents probably the minimum for this system for the next few years, in addition to 6 per cent minimum depreciation reserve. This total of 18 per cent for these two items, I believe, is ample, but the division, if any is made, should be different, i.e., maintenance about 10 per cent and renewals about 8 per cent.

"The sinking fund on United Railroads 4's was established on about the usual basis for a long-term franchise but is correspondingly inadequate for short terms unless franchise extensions could practically be guaranteed. Under existing conditions, a sinking fund retiring nearly 50 per cent of the debt is needed—sufficient at least to retire the fixed property in the streets that would either revert to the city at maturity or be sold on a salvage basis. The United Railroads 4's sinking fund will retire only about one-third of the entire issue at maturity, assuming its investment entirely in these same bonds at market value.* The retirement by this method is exceedingly advantageous, as the present price secures about a 6 per cent interest rate to the credit of the fund. The sinking fund on the Market Street Railway 5's (1924) can retire only about one-sixth of the issue at maturity, provided there be no further increase in outstanding bonds of this series, $10,000,000 of which are yet unissued.

"Net income over and above interest has decreased by one-half since 1902, owing to an increase in both operating expenses and fixed charges, principally the latter; likewise, the balance available over sinking fund due to increased annuities. The so-called 'surplus' available for dividends decreased from 15.5 per cent to 4.5 per cent and was about sufficient in 1911 to carry the first preferred stock, assuming depreciation charged against earnings in the usual manner.†

"The net operating ratio, now 54.5 per cent (or 65.7 per cent including taxes and depreciation), is about the same as ten years ago, although it had decreased to 45.7 per cent in 1906. It now again shows a tendency toward decrease. With the increased maintenance and car service necessary, an operating ratio of 70 per cent may very probably have to be considered as a future standard, if any substantial share in the earnings is to come to the city through a re-settlement. Thus, with 18 per cent maintenance and depreciation and the balance (difference between 65.7 per cent and 70 per cent, or 4.3 per cent) available for the city's share and a possible bonus to employees, the business for 1911 would have paid 6.3 per cent return to the company on its outstanding bonded debt of $40,000,000.

"The cost of power in San Francisco is high, partly on account of the power consumed on steep grades, but also by reason of a high-priced contract for power forced upon the company after the fire and strike. However, the company is now purchasing its supply at a rate probably as reasonable as it could produce it for in its own power house and is using this power efficiently under the prevailing conditions.

"Taxes in per cent of gross have been reduced materially since 1902 and also since 1910 by reason of the corporation tax law which went into effect at that time. While the total proportion of taxes is considerably less than Eastern companies are called upon to bear, the city itself receives less than 1 per cent directly. It thus appears that a more substantial city's share in the transportation business of San Francisco, whether taken in the form of revenue, increased service or otherwise, is not unreasonable.

"The relative platform expense, in per cent of gross earnings, is comparatively low at the present time, 17.85 per cent, and is decreasing, due to increased speed and density of travel. This has been accomplished with a cost per car hour considerably higher than in any of the Eastern cities and exceeded only in one instance on the Coast. While this indicates effective construction of time schedules for trainmen, it is also true that the service at the present time is probably at a minimum, and with the increase in car mileage now required, the platform expense will have to be increased unless a corresponding saving from re-routing can be effected. The average wage has been increasing yearly since 1908 and is now the same as before the fire, 26.9 cents per hour.

"The time schedule for trainmen has been worked out for an average operating day of ten hours. In spite of the short-time demands of the rush hours, only 5.6 per cent of the men are paid for less than nine hours, and 22.4 per cent work over eleven hours. There is no minimum wage. It is apparent that any material reduction of the hours of labor, fixing of maximum time limit, or of a full day's pay for short-time service would necessarily result in a large increase in platform expense. Thus the present charter wage scale if adopted by or if forced upon the company would probably increase this expense by one-half, which is practically out of the question with a fixed 5-cent fare.

"The accident account expense from injuries and damages is extremely low—under 3½ per cent, as compared with 5 to 8 per cent in Eastern cities. This undoubtedly reflects to a certain degree the excellent climatic conditions from a railway operating standpoint as well as good maintenance and operation.

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*"However, the deed of trust does not specifically state that investments be made at market price when below par. And it is understood provisions in other of the underlying sinking funds are also loosely drawn."

†"Theoretically, it is not proper to consider this sinking fund annuity as surplus available for dividends until the funded debt retirable by these annuities is actually canceled and the liability removed. Although every dollar of annuity eventually releases a credit equity of $1 in the form of capital asset, the net result of the operation of the sinking fund is simply to transfer gradually an equivalent equity in the property from the bondholders to the stockholders. And until this transfer is consummated dividends cannot properly be declared on surplus created from sinking fund except as scrip or stock dividends that may be realized at maturity. Until the original liabilities are retired the equivalent equity does not appear and never represents cash assets. The borrowing of money to pay such equivalent dividends is questionable policy under present conditions."

"A condition greatly favoring the company is the comparatively small seasonal variation in travel as compared with Eastern cities. This, in addition to the uniform climate, relieves the company of the capital burden of carrying additional summer equipment for use during only a part of the year. Obviously, this condition should make it possible for the company to render correspondingly better service.

"The average revenue fare or unit of income has remained practically constant at 4.97 cents. Some dilution arises from school tickets, passes and free transportation to certain municipal employees. The average income per total passenger is reduced by transfers to 3.47 cents, but this fact has no material bearing upon the earning capacity of a system holding a practical monopoly, for the reason that every fare is retained in full wherever it may originate in the system. Nearly half of the revenue passengers avail themselves of the transfer privileges, which are very liberal, in fact could be very properly curtailed in some respects without discommoding honest patrons, in order to prevent 'loop riding.'"

SUPPPLEMENTARY DISCUSSION OF RECORDS

In the detailed discussion of the financial records the report discusses the true earning capacity of the property and urges the necessity of considering depreciation as an actual cash reserve out of income. This means, the report explains, that unless corresponding credits were properly available for the stockholders from sources other than actual income, these excess dividend declarations could not have been founded upon true earning capacity of the operating property.

The report then commends the condition of the car maintenance, but considers the track and roadway maintenance as abnormally low although increased from $630 per mile of track in 1903 to $1,100 per mile in 1911. It believes that the appropriation for track and roadway will have to be increased to at least 5 per cent of the gross earnings, which in 1911 would have amounted to $1,500 a mile, or 1.6 cents per car mile; that the way and structures depreciation should amount to 6 per cent of the gross earnings, or about $1,800 per mile of track, and that the total cost of maintenance should be 12½ per cent of the gross earnings until the property is built up.

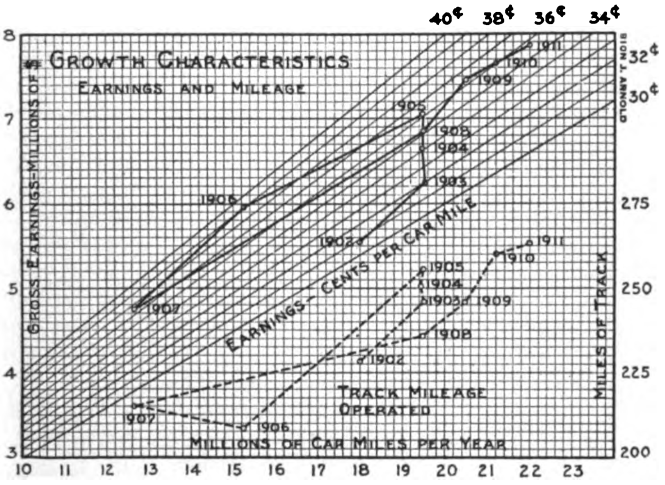

Fig. 4—San Francisco Report—Growth Characteristics

Platform wages have continuously decreased from 23 per cent in 1901 to 17.85 per cent in 1911, although an increase in the average wage per man has occurred since 1908. The average wage is now the same as before the fire, 26.9 cents per hour, with a maximum of 33 cents after eight years' service.

The high earnings of the property of $30,000 per mile of single track is attributed partly to the fact that the system has not been extended to keep pace with the population and partly to the exceptionally high riding habit in San Francisco, which results in 1911 in earnings of over $18 per capita for the United Railroads alone, or, including all systems, about $20 per capita.

Fig. 4 shows the growth characteristics of the earnings and mileage. In this diagram one point indicates for each year the earnings, car mileage and also earnings per car mile (the latter being shown by the diagonal reference lines). The direct rise from 1903-5 shows that the earnings increased while the car mileage remained practically the same. From 1908 on, earnings and car mileage have increased proportionately—i.e., practically following the diagonal of 36 cents per car mile. Both should increase proportionately, unless a radical change in size of equipment should take place. In each of the two respective periods noted—1903-5 and 1908-11—practically the same character of equipment was operated. Similarly, track mileage has shown erratic growth as compared with car mileage operated.

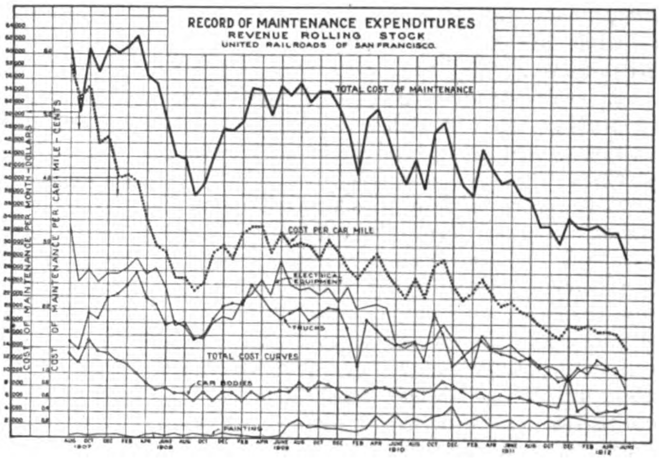

Fig. 5—San Francisco Report—Car Maintenance Costs

CONDITION OF PHYSICAL PROPERTY

A chapter is devoted to this subject. Referring to the maintenance record, the report says that while there has been a decrease in car maintenance amounting to 40 per cent in two years there has been an increase of 10 per cent in mileage, making an equivalent saving of more than 50 per cent. This has not been done at the expense of the rolling stock, which is in good condition. Armature removals per car mile have decreased 12 per cent, and their cost has decreased 30 per cent. The car miles per pull-in have increased 75 per cent. On the other hand, the track needs extensive repairs. Fig. 5 shows a record of car maintenance expenditures from August, 1907, to date.

ANALYSIS OF THE ESSENTIALS OF A FRANCHISE

The report says that Charter Amendment 34, as an enabling act, contemplated that individual franchises should conform to a general franchise ordinance drawn under its provisions. Following is an abstract of some of the essential requirements which, in Mr. Arnold's judgment, should be incorporated in such ordinances. The general premises assumed in the recommendations are: ultimate municipal ownership but unified operation with a uniform fare and universal transfers; gradual acquisition and ultimate recapture of complete property assisted by decapitalization; underlying property considered as a continuing investment; municipal control of service, equipment, operation and audit; profit-sharing plan with compulsory extensions proportionate to earnings.

NEW OR ORIGINAL FRANCHISES

In new or original franchises in San Francisco the report lays down the following as essentials:

"1. Indeterminate form of franchise with continuing option for recapture by city by assuming underlying debts not exceeding depreciated value of physical property at date of purchase; surrender of present determinate franchises obligates the city to regrant on the indeterminate plan under agreed conditions specified therein.

"2. City bonds to be acceptable to company for part or entire payment, secured by the general credit of the city or by the earnings on the property.

"3. Adherence to the present length of franchise term—twenty-five years; extension to a maximum total period of forty years permissible in the event franchise is not recalled by the city purchasing or finding a purchaser for the property.

"4. Utility bonds covering underlying debt to be permitted to mature between these two periods under guaranteed assumption of underlying debt by the city at any prior purchase.*

"5. Corporation fully to decapitalize out of earnings during its franchise term all elements of intangible value, depreciated or otherwise permanently extinguished, and a proportion (increasing with the length of the term) of the tangible value.

"6. Recapture proceedings to include an arbitrated valuation of property, or else an agreed value; the chief arbitrator in case of disagreement to be selected by the State Railroad Commission, or finally by the Supreme Court.

"7. Purchase price at any time to include 'present value' of property and plant (including such intangible elements as interest during construction, early losses, brokerage or bond discount and a graduated purchase bonus) minus values retired by sinking fund or accruals thereto; indeterminate franchises disregard franchise value, good will, going value, etc.

"8. If city exercises its option to purchase during franchise term, company to receive a bonus decreasing from a maximum of 20 per cent above the cost of producing the property new as governed by the terms of the franchise by equal yearly steps to zero at expiration, less the amount accumulated in the amortization fund to date of purchase, at which date the city will also receive, without cost, the amount then accumulated in the renewal fund, care being taken by the city at the time of granting the ordinance to see that suitable maintenance and renewal funds are established sufficient to maintain and keep the property in first-class condition; the initial bonus to be increased to 25 per cent and similarly decreased if the property is re-sold or leased to private owners or operators.

"9. Sinking funds to be in the hands of a qualified trustee and invested by him in company bonds at market price when below par (when above par, subject to call at stated premiums) or in other safe investments.

"10. Extensions, their necessity and reasonableness, to be determined and certified to by the commission when the operation of such extensions would fall within the limit of a reasonable return on the entire investment.

"11. Rental value of extensions built by the city to be determined by the commission, such extensions to be maintained by the operator.

"12. Appraised value of equipment provided by the company (cars, overhead and underground transmission) to be assumed by the city as part of an extension acquired, provided that it be adequate for the service and in good operating condition.

"13. Short extension and connecting franchises to be granted upon certification by the commission without referendum.

"14. All extension franchises to expire simultaneously with connecting franchises; conditions and obligations of extension franchises to conform in general with those of connecting lines, except where specifically exempted.

"15. Validity of franchise grants to be contingent upon the completion of construction work contemplated thereunder within three years (or less in some cases) and with continuous operation thereafter under conditions specified.

"16. Modification of obsolete conditions and unreasonable obligations imposed in original grants, or exemptions from percentage franchise taxes or other conditions in the case of non-paying extensions, to be permitted when necessary at the discretion of the commission.

"17. Income from extensions to be assumed as that proportion of the total earnings of the route connecting therewith which the car mileage over the extension bears to the total car mileage of such connecting route; this mileage to be determined from official schedules filed with the commission. Operating expenses to be averaged over the entire mileage of the system.

"18. Fixed conditions, such as income distribution, except the divisions to city, company and labor as fixed in the ordinance, reserves, type of motive power, routing, headway, and other variables, to be readjusted from time to time with the consent of the supervisors upon proper verification of the necessity therefor by the commission.

19. Distribution of income to be applied in the following order: (1) direct operating expenses* and taxes; (2) reserve for renewals to cover permanent shrinkage due to normal wear, depreciation, obsolescence, inadequacy, etc.; (3) reasonable interest return on investment (or in the case of resettlement franchises, a basic return on 'agreed capital value'); (4) amortization fund for decapitalization of intangible and tangible investment; (5) contingent reserve fund for providing for lean years and other emergencies;† (6) balance or residual net to be shared by company and possibly by city, with some provision for employees' bonus, pension and disability fund.

"20. In order to avoid delays and brokerage, and upon authorization by the commission, cash reserve funds for renewals or amortization (but not accident fund) may be used temporarily to meet unexpected, unavoidable or extraordinary demands for money necessary to place the railway property in operating condition as it existed prior to any accident caused by earthquake, fire or other acts of God, and provided further that the commission shall at the time such loans are made see that ample security is provided for the safe return to the amortization fund of all the money so borrowed from said fund, and to the renewal fund the amount expended out of said fund in excess of the actual accrued depreciation (to the date of the accident) of the property destroyed. The difference between the original cost of the property destroyed and the accrued depreciation (to the date of the accident) plus salvage shall be taken from the contingent reserve fund (5) defined in the next preceding paragraph of this chapter, and in case said fund (5) is not sufficient to meet the loss, the difference between said loss and the amount in said fund (5) shall be taken from amortization fund (4) described in the same paragraph.

"21. No franchise or property acquired thereunder to be sold, leased or otherwise disposed of without the city's consent and recommendation by the commission.

"22. Forfeiture of franchise to be the penalty for substantial failure or refusal to comply with conditions therein not due to causes beyond the company's control, this penalty to involve recapture of both franchise and property by the city without cost, subject to court decision.

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*"Bonded investment might be limited to not over 75 per cent of the reproduction value of the property new, balance to be made up by issues of preferred stock, carrying a sufficiently high return rate to bring the price near par: subsequent issues to cover possible extensions to be financed on the same basis or else the difference between bonds and total cost to be made up out of earnings from time to time."

*"Including maintenance and insurance but excluding taxes and depreciation."

†"This fund should be accumulated monthly by appropriating a comparatively small percentage of the gross receipts, and when it reaches a certain maximum amount as agreed in the franchise, all additions to it thereafter above this amount can then be used at the discretion of the board of control for any or all of the following purposes: (a) to improve service, (b) to reduce capitalization, (c) to reduce fares, or (d) to be divided between city and company upon an agreed basis."

"23. On final expiration of franchise, all fixed property in the streets then to revert to the city except additions made by order of the commission during the last five years and except unamortized renewals and betterments during this period; these to be purchased by the city at an agreed or arbitrated value.

"24. City to have power of entry and supervision of audit of all company's property and books, the commission to conduct such supervision of finances, operation, service and equipment as it deems necessary for the protection of both public and investors.

"25. Profit-sharing with the city to be voluntary with company, in lieu of which a proportionate return to the city is to be secured through franchise taxes on gross receipts, the franchise to be awarded to the highest bidder.

"26. Right-of-way to be maintained in such condition as not to damage abutting pavement; franchise obligations in this regard to be construed in such a manner that the right-of-way paving may be in at least as good condition as the street paving; in default of which the city may order repairs at the expense of the grantee, after reasonable notification.

"27. Company to be relieved of special obligations constituting a drain upon income not properly a direct charge thereto, such as street lighting, free transportation, etc.

"28. Company to be assured protection against avoidable obstruction of its rights-of-way through adequate enforcement of traffic-regulating ordinances.

"29. Impounding of reserve funds, established for and accruing to the benefit of the city in the decapitalization of property, to be provided against in the event of receivership proceedings.

"30. Wages and conditions of labor to be adjusted from time to time through the mediation of the commission as arbitrator or automatically through the disbursement of the employees' benefit fund.

"31. Exemption clause to be incorporated permitting resettlement of existing franchises under specific conditions subject to the approval of the commission and the voters"

RESETTLEMENT FRANCHISES

For resettlement franchises the author makes some supplemental recommendations based upon the theory that in its present municipal railway system the city will follow a policy of co-operative development rather than competition, with the object of ultimate incorporation of the municipal railway into a unified system through purchase or lapse of existing franchises.

In regard to the present company, its recognized capital investment for resettlement purposes is to be the appraised depreciated value of operative property at the date of appraisal plus full value of betterments and additions made between date of appraisal and date of settlement (if these dates are within one year of each other, but if more, depreciation on said betterments and extensions to be deducted) and including such initial intangible values as reasonably represent the then (date of settlement) present value of franchise earning power, considering the property operated to expiration under reasonable conditions of up-keep, service and return on investment. The purchase price to the city at any time is to be the value thus obtained, less the reserve fund accruals, plus the percentage as described in paragraph 8 on the previous page under "New or Original Franchises."

It is also proposed that the company shall decapitalize out of earnings all initial agreed intangible values, plus permanent shrinkage in value due to depreciation, during the first franchise period of twenty years. Thereafter it is to decapitalize depreciation and all value represented by fixed structures in the streets and real estate used in the operation of the road, provided, however, that the company shall have the right to purchase said real estate, at the value which is fixed in the appraisal upon which the ordinance was based.

GENERAL DISCUSSION OF FRANCHISE PROVISIONS

The report warns the city that apparently it has no power to compel the present company to make extensions. Therefore, if adequate service is maintained the United Railroads may continue to operate to the end of its franchise term without making any extensions. In fact, under the present onerous conditions of the present charter provisions it is practically debarred from making any extensions.

LIMITED FRANCHISE TERM

In discussing this subject the report says that: "Although a franchise term limited to twenty or twenty-five years is desirable from some points of view, it must be recognized that there are definite limitations to the company's ability to retire its invested capital within such short periods. The necessary investment will be at least $3, and possibly over $4, per dollar of annual income. Therefore, with the fare fixed and a minimum operating ratio, the per cent of income that may be diverted to sinking fund is limited. To retire $100 in twenty-five years requires an annuity of $2.74 when earning 3 per cent and $2.10 when earning 5 per cent, compounded. Therefore a reserve representing from 6 to 11 per cent of the income would be necessary to retire the capital alone, neglecting entirely the reserve of 6 or 8 per cent necessary for depreciation and 10 or 12 per cent for maintenance. For complete retirement in sixteen years (that is, by 1929) from 13 to 20 per cent of the income would have to be reserved. These figures represent the practical limitations that prevent the investment of capital in short-time franchises unless some provision be made for the city to assume at the termination of the franchise the underlying funded debt representing actual property in the streets, or in lieu thereof automatically to extend the franchise term for a sufficient period to permit of the property paying for itself with a reasonable sinking fund. It would then be possible, within a comparatively short franchise term, for a railway company to decapitalize all that portion of its investment representing intangible value or property extinguished through depreciation or inadequacy.

DECAPITALIZATION

"The city charter permits municipal bond issues running for seventy-five years with sinking-fund payments deferred for eighteen years, thus leaving fifty-seven years for actual decapitalization. And even with a revenue-producing investment such as water works, it is the practice to decapitalize by long-term bonds.

"A street railway should be regarded as a continuing investment, as distinct from a property operated to extinction such as an investment based on coal-mining rights. And any plan of operating to extinction a permanent utility, revenue-producing, as with a short-term franchise, is preposterous from an economic standpoint, especially under the limitations of a 5-cent fare. For it is evident that any utility, similar to the United Railroads property, once established must continue operation irrespective of ownership.

"This fact has been recognized in Charter Amendment 34, wherein it becomes the first duty of a private utility to decapitalize out of earnings within twenty years such original intangible values as bond discounts, interest during construction, early losses, promoters' profits and all permanent shrinkage in values due to wear and obsolescence, leaving a residual 'present value' representing probably 75 per cent of the reproduction value new. After the cycle of life of the longest lived part of the property has been reached, this condition may then be maintained permanently by proper expenditures for repairs, renewals, and extensions, and will suffice for a high-grade operative growing property."

PROVISIONS FOR LABOR

The provisions for admitting labor into the profit-sharing plan contemplated in Charter Amendment 34 "recognize the fact that the present unrest and enormous economic losses from strikes may be mitigated or entirely removed by establishing a bonus for labor in the form of a benefit fund for sickness, accident, death, old age or other disabilities, and also for a bonus to be distributed among the employees for faithful and meritorious service, as determined by a merit system of discipline. Such a plan is now in operation in Philadelphia, by which labor is practically guaranteed a minimum wage during lean years and participates in the profits of good years in addition to an insurance fund against disability. This plan has been improved upon herein by including not only trainmen but all employees receiving a wage of $1,500 per annum or under.

"With a flexible fare it would of course be possible to pay any rate of wages within reason, but with a fixed fare the limitations of the income and necessary expenditures place an absolute limitation upon wages as well as upon all other expenditures necessary to produce a unit of service.

"The present charter fixes the condition of municipal employment, irrespective of the conditions of service, at a minimum wage of $3 for an eight-hour working day and overtime at an advanced rate of 50 per cent. But for private companies an additional burden is imposed by limiting the maximum day's work to ten hours' total elapsed time. Under the above-named conditions of riding habit, this wage scale becomes unquestionably prohibitive and has been so recognized in Amendment 34 on the ground that the riding habit of the people cannot be reorganized by any kind of legislation.

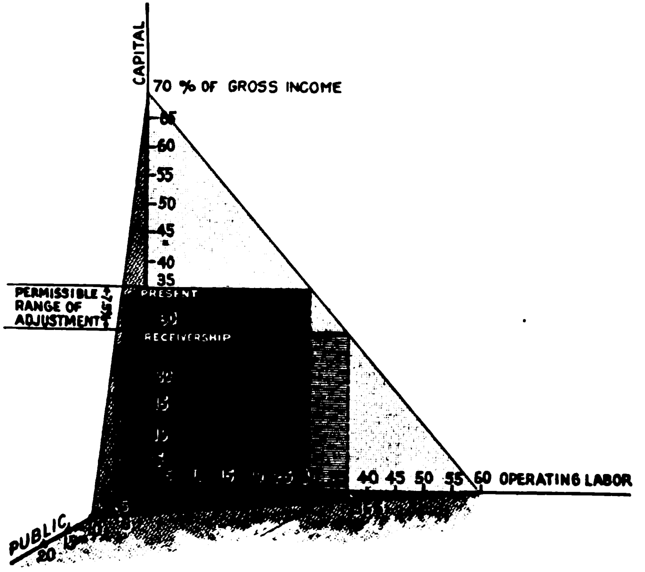

Fig. 6—San Francisco Report—Graph Showing Proportional Return to City, Company and Labor

DISTRIBUTION OF RETURN

"The present situation may best be appreciated from the diagram of income distribution, Fig. 6, showing the possibilities of varying the return to the company, labor and city respectively. During the calendar year 1911 income was distributed thus:

	Per Cent
Company received in fixed charges	35
Labor received in wages	30
City and State received in taxes	5
Public received in service (other operating expenses)	30
Total	100

Deducting 5 per cent from the company's share for sinking fund, equal parts of the income were shared by labor, company and public; or, including taxes, the public received the largest share in actual return from operation of the property.

From the income distribution graph, Fig. 6,* the effect of reducing the company's return by increasing proportionately those of labor and public will be clear, together with the permissible range of increase before the company is thrown into a receivership. This range is comparatively small, 7½ per cent, which corresponds to a reduction of only about 2 per cent in return upon actual investment. This graph simply illustrates the fixed elements of a profit-sharing plan, which to be effective must be based upon a fair distribution.

VIEWPOINTS OF PRIVATE OPERATORS

Mr. Arnold adds: "From my studies on this subject in San Francisco and other cities, I believe the following conditions should be acceptable by enlightened railway executives in a resettlement plan such as proposed herein:

"1. Decapitalization of intangible values (including the depreciated value represented by the difference between the cost of the property new and the best condition in which it can be maintained) out of earnings during a twenty-five-year franchise term and within forty years, at least so much of the property as is represented by fixed structures in the public streets as well as the depreciated value above noted; city, if it purchases, to assume the underlying funded debt (not exceeding the value of the physical property); corporation to accept city bonds in part or total payment therefor.

"2. Equalization of franchise term for both extensions and trunk lines; future extensions to be initiated by the company or city as required by district development so far as permitted by the net earnings necessary for recovering the investment during the franchise term; company to continue operation under an indeterminate franchise until bonds mature if city does not elect to purchase the property before.

"3. Ordinary minor franchises for extensions to be passed upon by the Public Utilities Commission in order to save expense and delays; trunk-line franchises only to be submitted to referendum; possible dividing line to be drawn whereby all franchises involving construction expenditures in excess of $75,000 or $100,000 should be voted upon.

"4. Higher money rates and consequent return on investment becomes necessary if the city follows a policy of destructive competition; a regulated monopoly is preferable, whether or not ultimate municipal ownership is contemplated.

"5. Profit-sharing plan acceptable, except one involving property interests of employees which would give legal title to interest in property without corresponding financial responsibility; discipline is imperative, and an employees' bonus fund based upon the merit system (including an insurance fund for disabilities and contingencies) would be more satisfactory.

"6. The ideal municipal ownership plan favored; city to own the property and lease to the highest bidder, who operates, maintains and renews it out of earnings; unearned increments in physical value thus accrue to the city in the form of higher rental values.

"7. In case no commission is created, the city may very properly have direct representation in the directorate of the operating companies, to the extent of one-third of the voting power, in order to protect its share in the residual income of the property under a profit-sharing plan."

An announcement made recently to the effect that the Pittsburgh, Cincinnati, Chicago & St. Louis Railway will cease the operation of "dinky" trains between Louisville, Ky., and Jeffersonville, Ind., retaining only its service to New Albany, indicates that the traffic is practically in the control of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, which operate electric railways between the three cities. It is conceded that the electric railways have practically driven the steam road, originally the only means of communication, out of the business as a suburban carrier.

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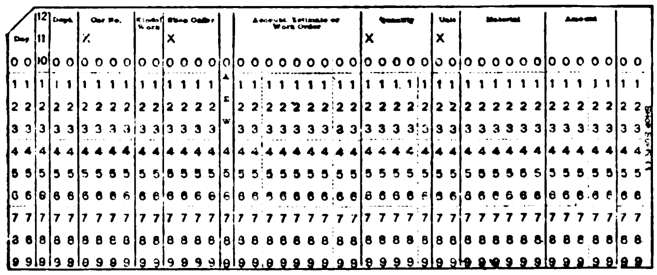
*The graph, Fig. 6, may be more easily understood if the reader will consider the left-hand side of the tetrahedron illustrated to be folded back so as to be in the same plane as the right-hand side. The diagram then becomes a plane triangle, whose base equals its height. In any triangle possessing this relation the sum of the base and height of any rectangle inscribed within the triangle is equal to the height of the triangle; hence the sum of the base and height of any inscribed rectangle is equal to the sum of the base and height of any other inscribed rectangle.—[EDS.]

TABULATING STATISTICS AND ACCOUNTS BY MACHINERY

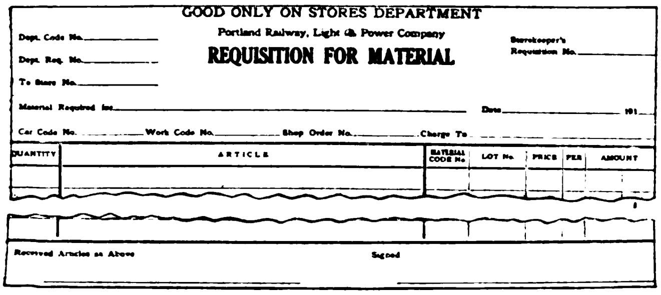
The Portland Railway, Light & Power Company, Portland, Ore., has adopted the Hollerith tabulating machine to a large number of uses in tabulating electric railway and light accounts and statistics. This machine was originally devised for use in tabulating statistics for the Census Bureau, and its general principles in connection with that work have received some publicity. Briefly, when applied by the Census Bureau, the record of each individual was stamped in a card by a series of punch-holes. These cards were then put into sorting and tabulating machines which would count the cards and give the totals for each kind of punch-hole on the cards or for any combination of them.



Mechanical Tabulation—Card Used for Recording Data of Shop Supplies

For some time the Portland Railway, Light & Power Company has been using this system of cards in its electric lighting and power accounts, and by this means it has been able easily and rapidly to determine at any time the total number of its different classes of customers, the rates paid by them, the service taken by them, etc. Recently, however, the company has also been using the same system to tabulate its electric railway statistics and accounts, and it has experienced equally satisfactory results.

One application of the system has been to the shop accounts. For this purpose two cards are employed, one for the labor account, the other for the supplies or material account. Both cards are shown by engravings. To illustrate their use better, the corresponding "requisition for material" and "shop time card" are also reproduced. These two latter forms are filled out in the usual way, the headings of the different columns on each being self-explanatory. At the end of the day these forms are sent to the tabulating department, where the information on each is transferred to a Hollerith card, which has columns for the date, department, car, code number (or class of car), kind of work (also shown by a code number), account order, etc. In the case of the labor card, a code number has also been adopted for each employee. This appears on the labor card. The company does not need to use the entire space on either of these Hollerith cards for records, so that the two last columns of figures on the supplies card and the eight last columns of figures on the labor card have no significance.



GOOD ONLY ON STORES DEPARTMENT

Portland Railway, Light & Power Company

REQUISITION FOR MATERIAL

Dept. Code No.________

Dept. Req. No.________

To Store No.________

Storekeeper's Requisition No.________

Material Required for________ Date________191__

Car Code No.________ Work Code No.________ Shop Order No.________ Charge To________

QUANTITY	ARTICLE	MATERIAL CODE No.	LOT No.	PRICE	PER	AMOUNT

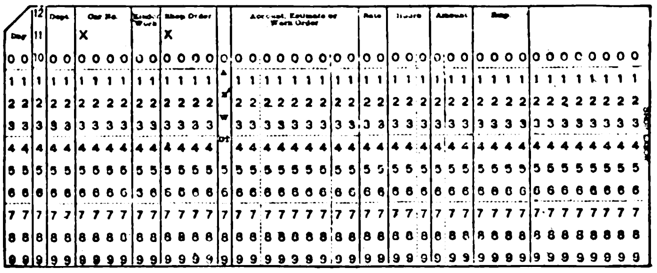
Received Articles as Above________ Signed________

Mechanical Tabulation—Requisition for Material

The work of transferring these records to the cards is slight and can be done very rapidly by a bright young woman after a little training. The company used 70,000 of these cards a month in all of its departments, yet the entire force required in the recording and tabulating department is only about half a dozen clerks. Without the machines it would require a force of about seventy-five clerks to obtain the information now derived by this system.

THE USES OF THE CARDS

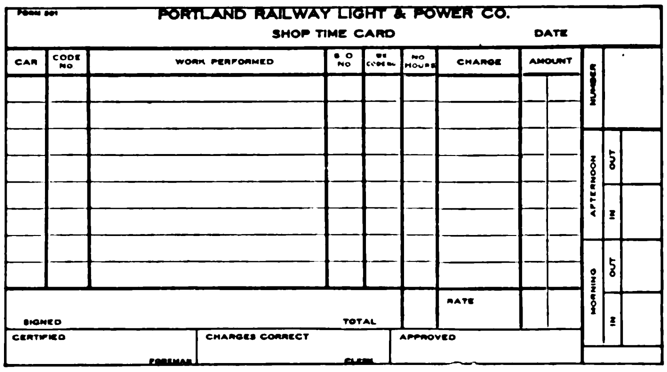
A glance at the heads of the columns on these cards will readily disclose some of the uses to which they can be put, but the full significance and value of the plan can be grasped only by following out a few of the groupings possible. Thus by setting the sorting machine to sort the cards by car numbers the aggregate shop cost in labor and material during any given time for each car can be determined automatically and quickly. Or if the cost of any particular kind of work, like winding field coils, is desired, that can also be obtained by running the cards through the machine again and setting it to catch and record that particular kind of work. Set in still another way the number of hours spent by any individual employee upon any particular class of work or upon all kinds of work can be obtained. Again, the company finds the system very useful in checking its pay-rolls by departments, and it also gets thereby a daily check by totals of the different shop orders. Indeed, it would be difficult to place a limit on the possibilities of this system of tabulation.



Mechanical Tabulation—Card Used for Recording Data of Shop Labor

APPLICATION OF ACCIDENT STATISTICS

Another application of the system is to the tabulation of accident statistics. The same general method is followed as with the shop accounts; that is to say, a Hollerith card is punched out to correspond to each accident report. A fac-simile of this accident card is not reproduced in this article because it is similar to the two cards already described except in the headings for the columns. These headings are: accident number, month, division, class, line, type of car, fender, responsibility, service, location, settlement, expense. These cards, like the others illustrated, are capable of being sorted by the machine in any way desired. Thus the machine will show promptly the cost during any particular month or during twelve months for boarding accidents with each type of car used or for collisions with pedestrians with any particular type of fender. As yet the company has



FORM 501

PORTLAND RAILWAY LIGHT & POWER CO.

SHOP TIME CARD DATE

CAR	CODE NO	WORK PERFORMED	S. O. NO	WE CODE No.	NO HOURS	CHARGE	AMOUNT

SIGNED TOTAL RATE

CERTIFIED FOREMAN

CHARGES CORRECT CLERK

APPROVED

NUMBER

AFTERNOON OUT IN

MORNING OUT IN

Mechanical Tabulation—Shop Time Card

not used the system so long in its railway work as in its lighting and power departments, but so far as the system has been applied to railway statistics it has been found very convenient and economical.

HEARING ON ILLINOIS BILL LIMITING HOURS OF LABOR

A bill limiting the hours of work of trainmen on street and interurban roads to ten hours within twelve consecutive hours has been introduced in the Illinois Legislature. If enacted, the measure will take effect July 1, 1913. Representatives of fifty-two electric railway companies in the State of Illinois attended a hearing on the bill before the House committee on labor at Springfield, Ill., on April 30. The principal argument against it was made by L. A. Busby, president of the Chicago City Railway, who showed that it conflicted with the terms of the accepted existing contract in Chicago and, if enacted into law, would have a serious effect.

Mr. Busby said that the proposed legislation directly affected every citizen of Illinois, investments aggregating several hundreds of millions of dollars and upward of 30,000 employees. Speaking directly for the companies which he represented—the Chicago City Railway, the Calumet & South Chicago Railway and the Chicago & Interurban Traction Company—he directed the attention of the committee to the fact that the investment represented exceeded $60,000,000 and that it affected more than 5000 employees and a population of over 2,500,000.

Mr. Busby then outlined the history of the recent arbitration in Chicago as regards wages, saying that the question as originally submitted to the board included working hours, but the board found this subject and that of wages to be so closely allied that it suggested that the parties should first agree upon the hours of service and the board would then consider wages. This plan was adopted, and the agreement reached was in substance as follows: Twenty-seven and one-half per cent of all runs should be straight time; 52½ per cent of all swing runs should be completed within fifteen consecutive hours; the remaining 20 per cent of swing runs should be completed within sixteen consecutive hours. The company was to have one year within which to readjust its schedule. With the working hours so fixed, the board proceeded to determine the wage scale, and the award was announced on March 29, 1913, resulting in an increase of about 2 cents per hour, or a cash increase in wages during the period of the contract of approximately $1,400,000.

Mr. Busby pointed out that this agreement by its express terms is in force and effective from August 1, 1912, to June 1, 1915, and is therefore in force at the present time, applying to all surface lines in the city of Chicago. Notwithstanding this, the Amalgamated Association had now gone to the Legislature and renewed its original demands in a more drastic form than ever, asking that the service be limited to ten hours and that this service be performed within twelve consecutive hours.

Mr. Busby then said that in Chicago the rush service in the morning began at 5.30 a. m. and lasted until 8 a. m., while the evening rush hours were from 4.30 p. m. until 7 p. m. During these hours it was necessary to have every available man and every car in service. It was impossible to cover the morning and evening rush-hour periods within twelve consecutive hours. The inevitable result of the act, if passed, under the existing contract requiring the payment of a minimum of nine hours, would be that the Chicago City Railway would probably have to employ 25 per cent more men than it actually needed and that the schedules would necessarily be so arranged that practically one-third of the men would be receiving nine hours' pay for four or five hours' work. Mr. Busby then called upon the representatives of the Amalgamated Association to explain how in good faith, after signing the contract, such a request could be brought before the Legislature without an express provision in the act that all existing contracts should be fully protected. Mr. Busby in conclusion offered to open the books of his company to the committee, if it desired to investigate the effect financially of the act upon the company, and to give any other information which the committee might deem necessary in reaching an equitable solution of this question.

A sub-committee was appointed which has the matter under consideration and will hold further hearings.

MEETING ON MAY 5

A hearing on the hours of labor bill was held on May 5 by the sub-committee.

L. A. Busby, president Chicago City Railway, said that he did not wish to complete his argument against the bill until a table that was in course of preparation could be finished. This table would show the number of accidents as compared with the number of hours of work of trainmen during a period of a number of years, demonstrating that accidents to passengers were not increased by the number of hours that trainmen were on duty.

W. W. Gurley, general counsel Chicago Railways Company, then made an extended argument against the bill. He said that the situation existing in Chicago was not of the making of the companies. The conditions were imposed upon them. Operations were conducted under the ordinances of 1907, which constituted the laws the companies must observe, and so they had no discretion as to their duties or obligations. The first duty was to transport passengers when they wanted to be transported and not when the companies wanted to carry them. Statistics showed that in the rush hours the Chicago Railways Company had 53 per cent of the entire twenty-four-hour traffic. The hours in which this proportion of the traffic was handled were from 6 to 9 a. m. and from 4:30 to 7 p. m. This interval of thirteen hours, with the work of getting the cars ready for operation and of getting them in after the expiration of this period, together with a considerable amount of traffic before 6 a. m. and after 7 p. m., constituted the normal working day of the railway company. The statisticians of the company said that it was impossible to consider practical efficient operation on less than a spread of sixteen hours, and this was embodied in the last agreement with the men. Those facts were inexorable. If a company was to observe the conditions of the proposed law, the only possible way would be to employ an enormous additional number of men. Statistics showed that it would require 24 per cent more men. This meant an increase in the wage scale of the Chicago Railways Company of $750,000 a year. That spelled bankruptcy for the company, and Mr. Gurley thought that any serious pushing of the bill was not in the interest of the men. If it could be demonstrated that a company without inflated capitalization could not live under the law, then there must be something wrong with the law.

Mr. Gurley then explained the arrangement by which the capital stock of the company, nominal in amount, is deposited with a trustee and made the basis of issue of four series of participating certificates. The payments on series one were two years in arrears, and series two, three and four had never received any dividend payment. The sums the company had expended for rehabilitation were so large that had their extent ever been realized in advance no banker on earth would have been willing to finance the property. Over $46,000,000 had been expended on rehabilitation and acquisitions of property in a period of five years, and still only 90 per cent of the work of rehabilitation was completed. It was thought in the beginning that an expenditure of $12,000,000 to $20,000,000 would be sufficient. The ordinance required the reservation of funds for renewals and damages, and it was necessary to comply with these provisions. The average daily working time per man was 9.45 hours under the present schedule. The company had been using every endeavor to make the conditions as tolerable as the facts permitted. None of the conditions, however, was intolerable; and while the work of the trainmen was hard, no body of men in Chicago were more robust.

Williston Fish, general manager Chicago Railways Company, pointed out advantages enjoyed by the employees in Chicago as compared with those in other cities and emphasized the importance of the matter to the public as well as to the company and the employees. In Chicago there had been an increase from 188 rides per capita in 1892 to 315 in 1913. There was a normal increase every year of from five to ten rides per capita in a large city. The people, therefore, were vitally interested, and nothing should be done to lessen the effectiveness of the transportation facilities a company was able to provide. The Chicago Railways Company was operated as cheaply as a road of its kind could be operated. The maintenance expenditures had been kept at a low point, but they would be larger in later years. In the year ended Jan. 31, 1913, 23.48 per cent of all the income received by the company, or 23.96 per cent of the passenger receipts, had been paid to trainmen. In connection with his talk Mr. Fish mentioned the 5-cent fare which he said the companies had been retaining, although they had been giving more to the public right along in larger and better cars, better tracks and transfers, while the employees had received higher wages.

B. I. Budd, president Chicago Elevated Railways, showed charts indicating the rapid development and decline of the peak load on that system. Another chart, also presented, showed the number of cars in service during each hour of the twenty-four hours of the day. This diagram also showed the number of men in service, because the company had one man to a car. If the proposed law went into effect and the runs were changed as a consequence, Mr. Budd said that the results would be to the detriment of the operating conditions and the service rendered the public. Men would be deprived of an opportunity to do work that they desired to do in connection with picnics, excursions and special service of that character.

M. J. Feron, general superintendent of transportation Chicago Elevated Railways, stated that many of his men preferred swing runs, as they had gardens or wanted for other reasons to have time during the middle of the day. He also showed that the problem was to find work for the extra men so as to hold them for the rush-hour service.

E. C. Faber, vice-president and general manager Aurora, Elgin & Chicago Railroad, said that the rush-hour service on the third-rail division of that company was somewhat similar to that of the Chicago elevated and surface companies. At present twenty-one extra men were employed on the third-rail division, but under the proposed law it would be necessary to employ 110 extra men in order to give the same service. On the Fox River division thirty-two extra men were required now, while it would be necessary to employ 160 extra men to comply with the proposed law. Mr. Faber also stated that the company had a great many extra runs on Saturday, Sunday and holidays, and it was necessary frequently to use all of the regular men for one or two hours extra in order to accommodate the traffic at such times. The operation of the law would make it necessary for the company to employ 270 extra men, and it would be impossible to secure them for the wages that could be allowed, so that the public would suffer because of inadequate service.

J. R. Blackhall, general manager Chicago & Joliet Electric Railway, said that if the bill was passed the extra men employed by that company could not live on the wages they would receive. The company could not afford to pay men for a nine-hour day and get three hours' work from them. The company had extra traffic on Sundays and holidays, and it would be impossible to maintain a force sufficient to handle the excursions on those days in addition to the regular business. During the arguments on the subject of the bill no suggestions had been made to show how the companies could make provision for the increased wages without an increase of burden. The Chicago & Joliet Electric Railway was operated at a loss and had been operated continuously under these conditions for years. In the early days of street railways the companies gave very little for a 5-cent fare, but for the ride that they did give then they received a full 5-cent fare, while now they gave more and better service and did not receive a full 5-cent fare because of the transfer privileges. The average fare now on the Chicago & Joliet Electric Railway was 3.8 cents.

F. W. Bull, of counsel for the Chicago & Milwaukee Electric Railroad, also argued against the bill.

The sub-committee will hold further hearings on the bill.

PLAN FOR CO-OPERATIVE BUYING IN PHILADELPHIA

Bulletin No. 15 just published by the Philadelphia Rapid Transit Company contains an outline of the steps the road is taking in establishing co-operative buying for the benefit of its trainmen.

The organization having most to do with co-operative work in the Philadelphia Rapid Transit Company is the Co-operative Beneficial Association, formed as of Nov. 1, 1912, a body of employees comprising a membership of about 7500. Membership in the association is entirely optional with the employee and is open to all males between the ages of eighteen and forty-five years after they have been six months in the service. The cost amounts to 50 cents initiation fee and 25 cents per month dues; the company contributes an amount equal to this and in addition pays all the expenses of the association.

Since the formation of this body the question of co-operative buying has been one much discussed, and finally on April 22 the report of an investigating sub-committee was unanimously approved by the co-operative committee, which is composed of representatives from the association and from the management. As a result of this, contracts have now been closed by the Co-operative Beneficial Association with Strawbridge & Clothier, one of the largest department stores of Philadelphia, and with the George B. Newton Coal Company, one of the largest coal dealers, whereby these firms will give to all members of the association a special discount on all purchases.

The contracts call for a special discount on the net selling price of all goods purchased. In the case of the department store the discount will apply to special sales as well as goods sold in the regular way so that members will in every case receive the full benefit of the contract.

The members may select their purchases before announcing that they intend to use the co-operative buying plan, thus insuring that the price and quality of the goods will be the same as those offered regular cash customers.

The contract with the coal dealer calls for the highest grade of coal, each ton to be full weight, 2240 lb. This firm will deliver the coal without extra charge to any part of Philadelphia, Willow Grove or Folsom at the lowest retail price prevailing at the time the coal is purchased. The association members can, by the use of this co-operative buying plan, make a substantial saving on every ton of coal over the price they have formerly paid.

To make the details of buying under this plan as simple as possible, the Co-operative Beneficial Association will sell to members cash coupons at reduced prices from the face or purchasing value. Books of cash coupons will be issued in the following denominations:

Purchasing Value	Cost to Members	Saving
$2.50	$2.30	$0.20
5.00	4.60	0.40
10.00	9.20	0.80

The coupons will be arranged in the books in one long strip, each coupon representing 1 cent. When purchases are made the face value of coupons equivalent to the amount of the purchase will be detached and accepted by the seller in payment of the goods Under this plan purchases of any amount can be made by the owner of the book or members of his family.

The coupons will be numbered both forward and backward in the book, thus making it a simple matter to figure the correct amount to be surrendered for the purchase.

These books of cash coupons will be on sale at all depots and at the office of the Co-operative Beneficial Association. The cost of unused coupons will be returned to the purchaser, if he so desires, on application at the office of the association.

The merchants receiving these cash coupons in payment for goods supplied will forward them to the Co-operative Beneficial Association, accompanied by monthly bills for the amounts represented by the face value of the coupons, less the fixed discount as per the contract with the individual firm.

The fact that the contracts thus far have been made with representative firms is quite indicative of distinct progress in the direction of securing to the men the benefits of co-operative buying. Several applications from other merchants desiring to come in on this plan have been received, and it is expected that dealers in groceries, meats and other necessaries of life will be added to the list as rapidly as their applications can be favorably acted upon.

The contracts mentioned above were made with the Co-operative Beneficial Association, the Philadelphia Rapid Transit Company guaranteeing the bills for goods supplied under this arrangement. The money received from the sale of cash coupons will be placed in the bank to the credit of the association and will be checked out as the monthly bills of the firms, accompanied by the cash coupons, are rendered.

The printing of the books of cash coupons is now being undertaken, and an announcement is soon expected as to the exact date when they will be placed on sale and the co-operative buying plan made effective.

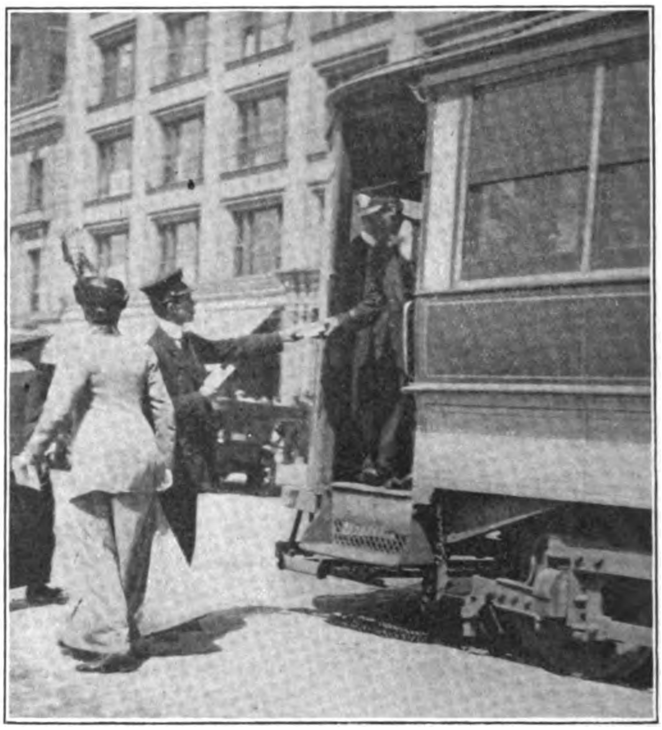
SUBWAY PASSENGER REFERENDUM AT BOSTON

In connection with an investigation of the desirability of changing the terminus of the Boylston Street subway from Park Street to Post Office Square, the Boston Transit Commission invited patrons of the Boston Elevated Railway Company using Boylston Street surface cars on May 1 to vote their preferences as a guide to its recommendations, following an order of the Massachusetts Senate requiring the commission to report upon the cost and desirability of the proposed change. By the route at present authorized the subway will have a station near the corner of Boylston and Tremont Streets, connecting there by transfer with the present Tremont Street subway. From Boylston to Park Street its tracks will follow the line of the latter.

A new terminal station is provided for at Park Street, with enlarged accommodation and provision for connection by transfer, if necessary, with through cars running in the Tremont Street subway to Scollay Square and the North Station, and also with the Cambridge tunnel and its extension under Winter and Summer Streets, connecting with the Washington Street tunnel, the South Station, the Atlantic Avenue elevated line and the lines to South Boston.

The route suggested as an alternative continues under Boylston to Washington Street, passing under the present Tremont Street subway and the Washington Street tunnel, with connections with both, and continues further under Essex, Chauncy, Arch and Milk Streets, with a terminal loop under the Boston Post Office. This route would have a station at Summer Street with connections with the Dorchester tunnel, but would delay the opening of the service about eighteen months.

Notices outlining the foregoing points in favor of each route were provided on May 1 on all inbound cars west of Copley Square, and upon their arrival at Exeter Street, all cars entering the downtown district were boarded by uniformed employees who distributed preferential ballots with perforated subdivisions indicating the choice of route aboard each car, the number of ballots distributed being based upon the approximate number of passengers on each cor at this point.



Boston Referendum—Supplying a Conductor with Subway Ballots

Immediately after the arrival of the cars at the Boylston and Park Street subway stations ballot collectors in uniform on the platforms and stairways gathered the slips from the alighting passengers. The voting was continued on May 3 and May 5, and will be announced by the commission next week in its report as a substantial expression of public opinion relative to the choice of routes. The Park Street terminal is in the heart of the shopping district and the Post Office Square terminal would be about in the center of the financial district.

HAND ONE OF THESE LEAVING THE CAR IN	TO COLLECTOR WHEN THE SUBWAY. ★ ★ ★
I prefer a Subway to Park Street	**I prefer a Subway to Post Office Sq.**

Boston Referendum—Form of Ballot on Choice of Subway Route

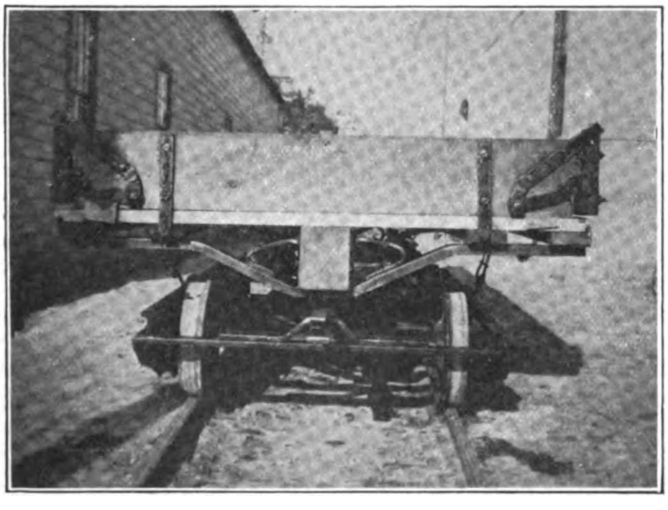
In the carhouse of the Sacramento Electric, Gas & Railway Company a "live-wire box" is posted just inside the door. The wording on the front of the box is as follows: "Please put in this box any information that will tend to produce Pacific Service; also any prospects that will lead to the obtaining of new business or the sale of appliances."

NOTES ON THE SANTA BARBARA & SUBURBAN ELECTRIC RAILWAY

The Santa Barbara & Southern Railway, with headquarters at Santa Barbara, Cal., is the successor of the Santa Barbara Consolidated Railroad. It is owned by the Southern California Edison Company of Los Angeles. Owing to the expiration of the franchises of the original company a new franchise was granted to the present company early in 1912. This franchise required that the gage should be changed from 3 ft. 6 in. to 4 ft. 8½ in.; that the rails should be not less than 60 lb. in weight and 6 in. in height; that the ties should be laid on 6 in. of broken stone; that the stone should extend 3 in. above the ties; that 6 in. of hydraulic cement concrete should be used above the sand and that the top dressing should be of 3 in. asphalt. Since reconstruction was commenced the City Council has permitted the thickness of the top dressing to be reduced to 1½ in. of asphaltum, and this is placed on 7 in. of concrete, which makes the distance from the top of the rail to the bottom of the substructure 18 in. The old track consisted of various types of T-rail ranging from 40 lb. to 60 lb. The new rail is of Pennsylvania Steel Company's high T-section No. 242 and was delivered in Santa Barbara in 60-ft. lengths at a cost of $54.40 per ton.

The management found that no ballast and construction cars fitted for carrying on the track construction were obtainable on the Pacific Coast, but fortunately the desired kinds of scrap iron and steel were easily secured from the city dump as there appears to be no market in this territory for such material. The company built the necessary flat cars and trucks, using old rails for the latter, and had the wheels cast in a local foundry. These construction cars hauled all material over the old narrow-gage tracks, which had been placed to one side and which were also retained for passenger service until the new road could be completed.

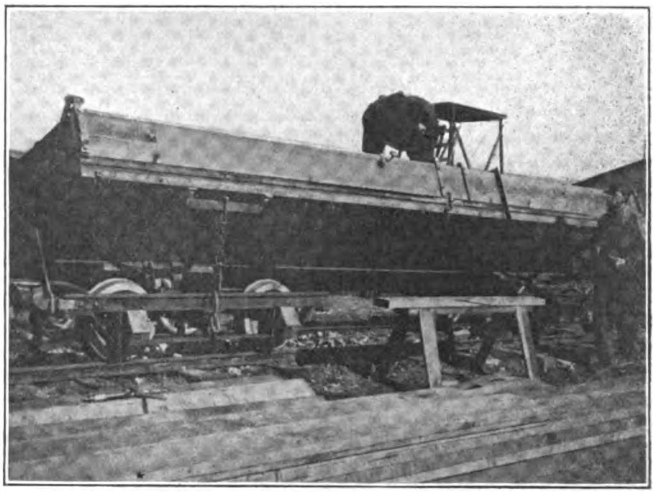
The construction cars were fitted with 20-in. diameter wheels to minimize the height of lift from the excavation to the floor. It will be noted that the flat cars for handling stone were made with a center sill which was pivoted on the king-pin center plate. Chains were attached to the truck frame to hold the body horizontal. Preliminary to dumping the load the chains on one side were unhooked, the material being dumped on the opposite side. This method of handling the stone permitted a saving of approximately 35 cents per cu. yd., as compared with shoveling.



Santa Barbara Reconstruction—Home-Made Dump Car with Single Center Sill

For concrete, the company used a sandstone from the nearest available quarry which is in Acton near Los Angeles. The concrete cost about $6 a cubic yard in place. A bituminous clay brick was used on both sides of the rail and is set in the green concrete directly behind the mixer. As it was immediately surfaced and grouted, the brick became an integral part of the concrete work. The concrete mixture was one part Portland cement, three parts sand and five parts broken stone.

The total amount of reconstruction and new construction was about 10 miles. The laborers were Mexicans, who when experienced performed about two-thirds as much labor per diem as a well-trained Italian track laborer in the East. These men received $2.25 for a nine-hour day. Despite many difficulties the work progressed at about 10 per cent less than the estimated cost of $249,000 for reconstruction, including the overhead line. The cost of the carhouse was estimated at $20,000. The work of reconstruction has been carried out under the direction of J. C. Brackenridge, formerly chief engineer Brooklyn Rapid Transit Company.



Santa Barbara Reconstruction—View of Home-Made Dump Car with Body Tilted

The company has ordered for delivery about June 1 from The J. G. Brill Company five center-entrance cars, 41 ft. over all, 8 ft. 6 in. wide. They are of the semi-convertible type, seat forty people and weigh 39,000 lb. The motors are of the latest Westinghouse design for stepless cars, affording a maximum motor clearance of 2¾ in. between the motor and the head of the rail when a 26-in. wheel is used.

THE SKIP-STOP IDEA IN DENVER

The Denver City Tramway Company has adopted the skip-stop plan on Colfax Avenue for its express cars to Aurora and Fairmont. This is said to be the first time in which suburban cars using city tracks have stopped to receive and discharge passengers at designated points only.

The company operates a fifteen-minute schedule to each suburban city, and the cars run over the city tracks for a distance of 1¾ miles, or about twenty-eight blocks. Previously these cars stopped at every corner if passengers desired to board or alight from them, and the plan for fewer stops was agitated by the commuters who live in these suburban cities. The company said it would agree to the plain if the commuters could demonstrate to the City Council that it was desirable. This was done at several hearings. At the same time the commuters requested that a similar "express" service with designated stops be put in force in the suburban towns through which the cars ran. The company agreed to do this and at its suggestion a committee composed of prominent representatives of the residents of the suburban districts selected different stopping points outside of the city limits which the company established. All stopping points are now designated by a red sign on the pole and marked "express." There are seven of these stops in the twenty-eight blocks which the interurban cars run between Broadway and the city limits, or one to every four blocks, the blocks averaging about 333 ft. in length. This express service is conducted only between 7 a. m. and 8 p. m. After that the suburban cars will stop at any corner to admit or discharge passengers. The time of the run to the suburban terminals has been cut down from one hour and fifteen minutes to one hour by this change.

The company also operates a local service on Colfax Avenue, the cars running only as far as the city limits, but the faster time made by the express cars has attracted to them a considerable number of local passengers, not only from the local line on Colfax Avenue, but from the local lines on parallel streets. This has led to a demand by both local and through passengers for the adoption of a skip-stop idea for the local cars also. The latter run on a three-minute headway during the greater part of the day. The company expressed a willingness to accede to this demand if it should appear general and should be approved by the city authorities. After a hearing the Board of Aldermen passed an ordinance authorizing the establishment of local stops at every other corner. The company is therefore planning to take a vote upon the desirability of the plan from the passengers on the line and will conduct such a vote in the near future. If the plan proposed is adopted, the local cars will stop at every other corner on the outgoing trip and at the alternate corners during the incoming trip.

MEETING OF THE COMMITTEE ON RULES

The consolidated committee on rules of the American Electric Railway Transportation & Traffic Association, which now combines the work of the former committees on city and on interurban rules, met in New York on Tuesday, May 6. At the meeting were present F. A. Boutelle, chairman; W. R. W. Griffin, general manager Tri-State Railway & Electric Company, vice-chairman; L. H. Palmer, New York; Edward Dana, superintendent of transportation Boston Elevated Railway Company, and B. J. Jones, general manager Ohio Electric Railway Company.

At the opening of the meeting Mr. Palmer reported, as chairman of the sub-committee appointed for the purpose of considering the expansion of the rules for prepayment cars so that they would include within their scope the recently developed cars of special design such as the near-side and center-entrance types. It was the opinion of the sub-committee that the development of new rules for each new type of car would necessitate a great and possibly increasing number of special sections for the standard code which in large part would be repetition of rules already existing. The sub-committee contended that the purpose of the standard rules would be better carried out by making the rules in the standard code general enough to cover all cases and avoiding the use of special sections altogether.

Upon the receipt of the approval on this procedure by the committee as a whole, the sub-committee on city rules presented its report in detail, which consisted in proposed changes in the latter part of the standard code commencing with the operating rules for conductors. This revision was taken up seriatim, each rule being discussed by the committee together with the changes suggested by the sub-committee. The outcome was that, by means of eighteen changes in nine rules, including some minor changes in diction for the purpose of standardizing the form of expression, the entire section devoted to special rules for prepayment cars, amounting to four pages of the standard rule book, was eliminated. The changes made a net reduction of eleven rules, thus providing a very appreciable means for effecting condensation of the standard code.

At the conclusion of this discussion the report of the sub-committee was approved, and the members, Messrs. Dana, Kummerlein and Palmer, were requested to continue their work along similar lines.

The first business of the afternoon session was a general discussion on ways and means for obtaining co-operation in the application of the standard code by the various sectional electric railway associations. It was finally decided, however, that in view of the possible changes required by the proposed plan of eliminating special rules from the standard code, it would be desirable to postpone till next year any effort which might be made toward this end.

A sub-committee was appointed to take up the work of harmonizing city and interurban rules and to report on any discrepancies in the two codes which might exist. The formal meeting then adjourned, the sub-committee on city rules stating that it would be able to complete its report for submission by mail to the whole committee on July 1. The sub-committee consisting of Messrs. Boutelle and Griffin which was appointed to consider the possibility of effecting a substantial agreement between the standard interurban code and the rules of the American Railway Association then took this matter in hand, the other members of the committee entering into the discussions. No formal report, however, was made by this sub-committee at this time.

A joint meeting of sub-committees from the rules committee and from the committee on signals was held in New York on Monday at which Messrs. Boutelle and Palmer, of the rules committee, and J. J. Doyle, general manager Washington, Baltimore & Annapolis Electric Railroad, and J. M. Waldron, signal engineer Interborough Rapid Transit Company, of the signal committee, were present. The combined sub-committees at this meeting made an investigation of the rules of various electric railways and steam railroads covering the operation of block signals in general. In addition to developing a list of standard definitions the sub-committees arranged to prepare a compilation of rules now in force from which to make a selection for use by the American Electric Railway Association and which will be presented for the approval of the association at the convention in October.

MEETING OF THE SUBJECTS COMMITTEE

The subjects committee of the American Electric Railway Association met in New York on Tuesday, May 6. At the meeting were present James D. Mortimer, president Milwaukee Electric Railway & Light Company, chairman; E. C. Foster, president Manchester Traction Light & Power Company; Calvert Townley, president Lackawanna & Wyoming Valley Rapid Transit Company; Martin Schreiber, engineer maintenance of way Public Service Corporation. At this meeting the committee took under consideration the matter of developing a program for the convention sessions of the American Association.

The committee made a tentative decision to arrange for the presentation of a number of papers on various subjects of interest in the electric railway field which were to be presented by prominent authorities in the different branches of the industry. In addition it was decided to arrange to have a series of written discussions upon these papers. Among the subjects which will be taken up it is expected that the following will be treated: Valuation; Relations of Carriers to the Developments of Territory Which They Serve; Relief of City Congestion; Electric Railway Securities from the Investor's Viewpoint; The Present Tendency of Public Utility Laws and Regulations; Profit Sharing with Employees.

COMMUNICATION

"ACCOUNTING VERSUS STATISTICS"

AMERICAN ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION
BOSTON, MASS., May 6, 1913.

To the Editors:

I note in your issue of May 3 an article by Milan V. Ayres, "Accounting Versus Statistics," in which he holds the American Electric Railway Accountants' Association in part responsible for what he calls "cunningly concealed pitfalls" in the standard classification of accounts. I do not wish to enter into any controversy upon this subject but feel it only right to call attention to the following facts:

The classification of operating expenses, as well as all other matters relative to electric railway accounting, is now being considered by a committee composed of certain members of the examining board of the Interstate Commerce Commission and the committee on a standard classification of accounts of the American Electric Railway Accountants' Association; the advisability of including under the head of "power" the maintenance of power plant buildings and the maintenance of power plant equipment is being seriously considered, and there seems every likelihood that this method will be adopted.

In regard to the power produced, after one knows the amount expended for power, is it not also necessary, in an exact comparison, to learn what the equipment of the companies consists of, whether it is of large or small units, whether of reciprocating engines or turbines, whether it produces alternating or direct current, whether it is a steam plant or a water-power plant?

The present classification is designed so that at a glance a person may know whether power is generated or purchased, and certainly a person cannot properly compare the power cost of a company which purchases power with one which produces power without knowing what elements were considered when the contract was made for the power purchased. This would be equally true in a comparison between two companies each of which purchases power. It is absolutely absurd to compare any items of accounts, and equally absurd to compare any statistics, without knowing the conditions.

Take as an illustration the question of maintenance of track; would anyone think of making a comparison of the expenses per car mile of one company with another without knowing what kind of track construction each company had, whether the tracks were in paved or unpaved streets or in private reservations, upon the surface or upon an elevated structure or in a subway or tunnel, the weight of rail, treated or untreated ties, driven or screwed spikes, gravel or concrete base, bolted or welded joints, amount of special work, etc., weight of cars used and miles run by the cars? Could any system of accounts be devised that would give all this information through charges made to operating expenses?

Mr. Ayres states that the cash expense for maintenance is a matter of fact and that the account should show what the actual expenditure was in a given period. If a depreciation reserve has been set up during a period of years to cover the extraordinary wear and tear of equipment and it becomes necessary to replace the equipment, is it not perfectly right to charge up the cost of this replacement against the sum set up for this specific purpose? And if this is done, how may it be charged to the maintenance account at the time the equipment is acquired, and if not so charged, how can it appear in the maintenance expenses for that year?

The Accountants' Association, in the article, is erroneously criticised about depreciation. Attention is called to Account 26, depreciation of way and structures, and Account 42, depreciation of equipment, in the classification adopted by the American Electric Railway Accountants' Association. Each of these accounts has no text but has the following note:

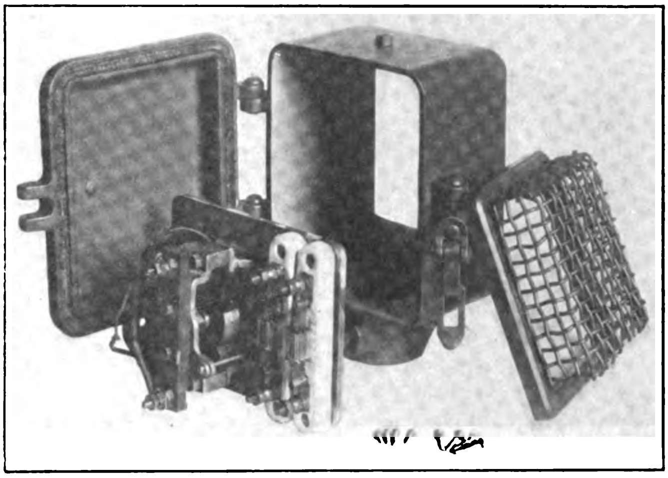
"Note: This account is provided in case such an account should be prescribed by any of the state commissions, and in such case there should be excluded charges for renewals from all the accounts affected by the introduction of this account. Such expenditures for renewals will then be charged direct to an appropriate replacement account, maintained by the prescribed charges to this account."

The association never has gone on record as approving of any depreciation account and has only provided *titles* that may be used where a company is compelled to set up such an account by the authorized state authorities.

H. L. WILSON,
Chairman of Committee on a Standard Classification of Accounts.

A THREE-POSITION SWITCH INDICATOR

The latest type of switch indicator to be developed by the Union Switch & Signal Company for indicating whether a train has entered the block within which the switch is located provides for three positions of the miniature semaphore blade with which it is equipped. The instrument, which is shown in the accompanying illustration, is operated by a "Z"-shaped armature which makes a partial rotation in a magnetic field and thus moves the semaphore blade to the position determined by the condition of the control circuit.



Three-Position Switch Indicator

Both armature and field cores are made of laminated iron. The case has been so designated that there is room above the mechanism for two lightning arresters and the bottom has been arranged for mounting the indicator on a post near the switch stand. The front may be equipped with a plain glass, wire glass or plain glass with a wire shield, the wire being cast into the frame which holds the glass in place. This frame, together with the mechanism, is secured to the case by screws which can be removed only from the inside of the case.

The door carries a projecting pocket on its lower edge which incloses the head of a set screw fastening the case to its support, and this makes it impossible to loosen the set screw and remove the instrument without first opening the door. The mechanism can be equipped with two front and two back non-independent contacts when desired.

The blade and miniature spectacle can be furnished in any standard design to suit conditions, and any degree of stroke can be had in the upper or lower, right-hand or left-hand quadrant. The mechanism is usually furnished to operate on 110 volts, 25 or 60 cycles, but can be wound for any voltage up to 220.

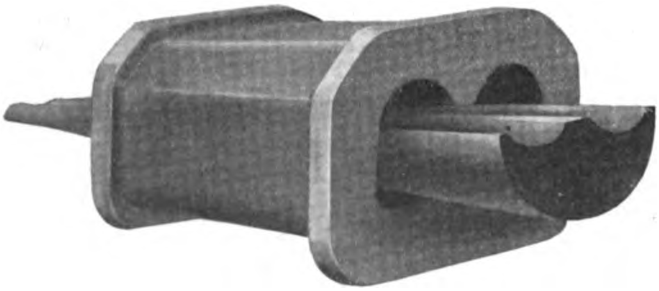
EXPERIENCES WITH BOLTLESS GUY CLAMPS

During the summer of 1912 the Peoria Railway Company built a number of extensions to existing lines and in a number of instances the construction had to be completed within a specified time. One of the problems most difficult of solution was that of organizing overhead line gangs to accomplish the work as scheduled, and in order to do it with the regular repair forces within the scheduled time and in a permanent manner the overhead department purchased a supply of boltless guy clamps. At the completion of the work it was found that the use of these clamps had greatly facilitated the work, and as a result of this experience boltless clamps have been adopted as standard for overhead lines in Peoria. As fast as repairs or renewals are required they are being placed on the lines.

Boltless Guy Clamp in Place on Cable

Primarily the boltless guy clamp was designed to eliminate the cumbersome, time-consuming process of attaching guy and span wires to poles and anchors. Since it has been in actual service numerous other advantages have been found which alone made its use worth while. The Matthews boltless guy clamp, which was the type used, is manufactured in two sizes, the "Giant," for guy strand 5/16 in. and 7/16 in. in size, and the "Baby," for use on ¼-in. and 5/16-in. strand. In principle the clamp is simple. It consists of a wedge grooved on one side and smooth on the other, which fits into a tapered sleeve with internal grooves on one side. These grooves on the wedge and sleeve when mated form for the strands a pair of channels which are gradually reduced in section as the wedge enters the sleeve.

To apply the clamp the span or guy strand is run through the sleeve, thence around the pole or through the eye of the anchor and back through the sleeve. The wedge is then inserted in the sleeve, and as it is driven tight it wedges the wire securely, the two sections of strand filling the grooves. The double groove in the sleeve and wedge permits clamping without deforming the strand, and as the tension in the strand comes as much from the section in direct line with the guy as from the one forming the stub end, the clamp can be set in either direction according to convenience in driving the wedge. The time required to apply the clamp after the slack has been taken up in the strand is almost negligible, most of it being consumed in attaching a short section of wire from the strand and giving this a few turns around the guy to make the connection neat in appearance.

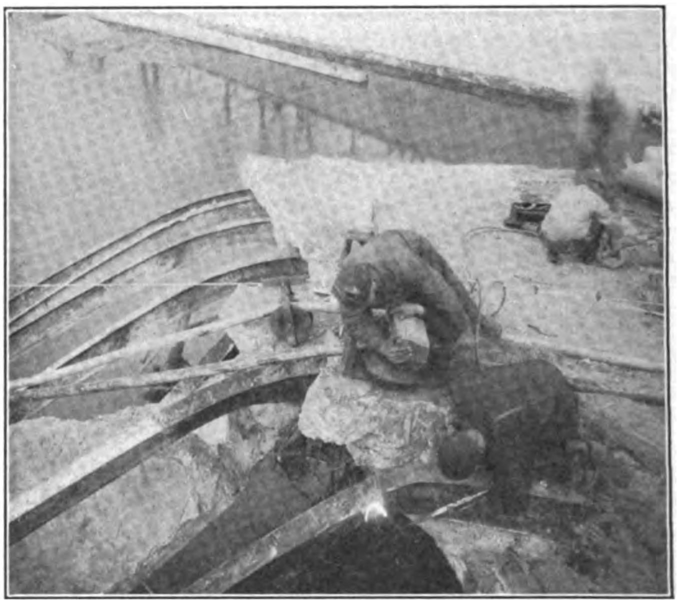


Boltless Guy Clamp—View Showing Double Slots and Wedge

Another advantage which developed through actual service on the Peoria Railway Company's lines is the ease with which sags may be taken up in new line while the poles are assuming a permanent set. This is accomplished by applying a "come-along" and small block and fall between the span wire and the pole and after the slack is taken up the wedge is removed, thus allowing the slack to pass through the sleeve. The wedge is then reinserted and driven tight.

OXY-ACETYLENE TORCH FOR CUTTING AWAY WRECKAGE

The labor-saving possibilities of the oxy-acetylene torch were strikingly demonstrated recently in Indianapolis when the Prest-O-Lite Company, maker of the well-known automobile lighting system, contracted to cut away steel wreckage from two of the bridges which were damaged in the recent disastrous flood at that city. The accompanying illustration shows the torch in operation at the Washington Street bridge of which photographs were published in the Electric Railway Journal for April 5, 1913, showing the flood at its height.



Cutting Away Floor Beams of Wrecked Bridge with Oxy-Acetylene Flame

By this means the entire work of cutting away the twisted mass of wreckage took only a little over three days and materially hastened the work of reconstruction. The procedure involved first heating the heavy girders and then directing a stream of pure oxygen against the hot metal. This caused the steel to burn quickly and fiercely, the average time consumed in cutting a girder being a little over five minutes. The portability of the equipment proved a great aid in the speedy removal of the steel wreckage.

The latest report of the Hungarian Ministry of Public Works shows that at the end of the year 1910 the street railways of Hungary had a total trackage of 206 miles, of which 158 miles were electrically operated. The electric lines had seven locomotives and 1012 motor cars. Fourteen of the twenty-seven systems were electrically operated with both steam and electricity. The five lines of Budapest alone, totaling 87 miles, carried 161,178,383 passengers. All of the companies, except one, were able to meet their fixed charges.

News of Electric Railways

Progress of Franchise Negotiations in Kansas City

The negotiations looking to the extension of the franchise of the Metropolitan Street Railway, Kansas City, Mo., have been suspended in order to afford the officers of the company and the receivers of the property an opportunity to confer in the East with financial interests in regard to the prospects for financing the property under the tentative terms which have been discussed by Mayor Jost and the receivers and officers of the company at the conferences which have been held in Kansas City. Mayor Jost is reported to have said recently:

"The latest conferences we have been holding on the franchise proposal have been fruitless. We have simply been discussing all over again the things we threshed out at the opening meetings at the City Hall. I have been attending these meetings the last few days in the expectation that I was to receive an answer to the terms I submitted as the basis on which I would undertake to work out with the receivers the details of a franchise. As I understand it, the receivers are to go back to the bankers with my restatement of my proposal and let me know whether or not they can refinance the property on the basic terms for a new grant that I have outlined. Any time they call me I will be ready to make more clear, if that is possible, the terms proposed."

The Mayor's terms as now stated are that the city will guarantee 6 per cent for the life of the grant on a valuation of $28,750,000 with the added capital necessary each year for extensions to meet the needs of increasing population, all surplus above that to go to an amortization fund to retire the obligations and leave the property free to the city at the end of thirty years. If the city should elect to take over the plant at the agreed valuation before the stockholders have had any return on the additional money put into the company, the added investment shall be taken care of in the purchase price.

Lee, Higginson & Company issued a circular to the holders of the consolidated mortgage bonds of the Metropolitan Street Railway, calling attention to the fact that the interest on these bonds would be paid on May 1. It was stated that since the appointment of the receivers the earnings of the company had shown no falling off, the interest on all obligations had been promptly met and the receivers reported that they had expended large sums from the surplus earnings in improvements on the property over and above the ordinary maintenance charges. The consolidated mortgage 5 per cent bonds matured May 1, 1913, but were declared due and payable by the protective committee last June because of the appointment of the receivers.

Strike in Roanoke

A strike was declared on the morning of May 1, 1913, by the union motormen and conductors of the Roanoke Railway & Electric Company, Roanoke, Va. The trouble dates back to an altercation on April 6 in one of the Roanoke cars between an employee off duty and the motorman of the car. The matter was carried by the company to court, but the evidence was so contradictory that the case was dismissed. It appeared from the evidence, which was corroborated by K. A. Hawley, assistant superintendent of construction for the Appalachian Power Company, Bluefield, Va., who was the only adult passenger on the car at the time of the dispute, that the man off duty used profane language on the car. As this was a violation of the rules of the company he was suspended, but the motorman was not disciplined.

The suspended employee was a member of the union, which claimed discrimination and asked that the question of suspension be arbitrated. A board of three members was first proposed, and then the Central Trades and Labor Council offered to submit the case to W. H. Lewis, general superintendent of motive power of the Norfolk & Western Railway. J. W. Hancock, general manager of the Roanoke Railway & Electric Company, said the fact that the man who had been disciplined was a union man had not entered into the case. The question involved was simply one of discipline and since the company was required by the courts to maintain order on its lines in the case of both passengers and employees, he considered that the company could not submit to arbitration a matter for which it was alone responsible.

Several conferences were held between the officers of the company and committees from the union, and on May 1 the members of the union were called out to enforce their demands. The company kept all its cars in operation during the day. It notified the strikers that the new men being engaged were employed permanently and that all former employees on strike not reporting within two days would be regarded as out of the service. Neither traffic nor business has been interfered with to any extent, and the situation at the end of the sixth day was practically unchanged. The Common Council of the city has appointed a committee to confer with the officials of the company with the object of bringing about a speedy settlement of the strike.

Mr. Mellen on the New Haven's Electric Railway Purchases

Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, testified on May 2, 1913, in the Interstate Commerce Commission investigation which is being conducted before Commissioner Prouty at Boston. In discussing the affairs of the New York, Westchester & Boston Railway at the request of Attorney Choate, his personal counsel, Mr. Mellen said in part:

"I have never been enthusiastic or at all optimistic as to the New York, Westchester & Boston Railway being a good investment in the present or immediate future, but people in whom I have greatest confidence thought it was wise and desirable. I yielded to their judgment. The reason for the purchase was that it was going to be extremely valuable in the future. My hesitation was because of the burden that I felt the New Haven was hardly justified in assuming against the time when the road could become a paying investment. It is one of the finest physical pieces of railroad in this country. Its operation at present indicates that it is barely earning its operating expenses. The New Haven is carrying the burden of lost interest upon the total investment. I believe that situation is going to improve constantly. The New York, Westchester & Boston Railway was opened too soon in one respect. It was built to connect with the subways in New York. The question in my mind is whether the enormous cost of that construction was justified in advance of the business to be done. It should be earning full operating expenses by June 1, and I think from that date it will be able to show a slight profit above expenses. With the completion of the subways in New York the earnings of the New York, Westchester & Boston Railway are going to be very much larger, but I have no expectation that in the immediate future the road will be able to show earnings on its full cost."

In explaining the purchase of the electric railways in Rhode Island by the New York, New Haven & Hartford, Mr. Mellen said:

"When we bought the Rhode Island Securities Company we made the best trade we could. We estimated the results from operation for a series of years. We could not see how it was possible for it to pay the interest upon the securities issued in payment. We had to go over that transaction for a long time and finally the security holders put up a guarantee fund of $1,200,000 in cash, which they estimated would meet the deficit until the time when the property became self-sustaining and able to pay 4 per cent upon the purchase price. Immediately after the purchase we were ushered into the panic of 1907-08, and the $1,200,000 which it was estimated would meet the deficit for something like six years was absorbed in eighteen months. The Rhode Island Company will probably return to the New Haven 3 per cent upon its total cost. I am assured by Vice-president Storrs, in charge of the electric railway system, that if there is no material change in business conditions for the year ending June 30, 1914, he will be able to declare a dividend to New Haven from all electric railways owned by New Haven—Berkshire, New York & Stamford, Westchester Street Railway, Connecticut Company and Rhode Island Company—the full 4 per cent upon their full cost and expense to the company up to the present time."

Asked to explain the situation with regard to the Connecticut Company, Mr. Mellen said:

"I am confident it will earn and pay the full 4 per cent upon its cost to date. The New Haven owns every share of its stock."

Mr. Mellen explained the difference in character of the electric railways and said that he had always regarded the electric railways as important adjuncts of the steam railroad system. They collect and distribute the business at the steam railroad stations and at the freight houses. They were bought on the basis of their income from passenger revenue and were developing a large freight revenue.

Referring to the electric railways in the Berkshires Mr. Mellen said:

"The Berkshire is a purely country trolley. It earns a deficit each year. This condition will be changed when connections with other lines, now planned, are made. Between $2,000,000 and $3,000,000 has been invested in the Berkshire, which is not yet earning a return."

Proposed Extension to Geary Street Municipal Railway

The public utilities committee of the Board of Supervisors of San Francisco, Cal., has filed a report with the board recommending that an election be called to authorize an issue of $3,500,000 of bonds to construct extensions to the municipal railway. City Attorney Long said that if the necessary ordinance providing for the bond election was passed without delay it would be possible to hold the election within sixty days. Chairman Vogelsang of the public utilities committee announced that such an ordinance would be introduced immediately. The extensions favored are those embraced in Combination 3 of City Engineer O'Shaughnessy's report, made to the Supervisors recently. Discussing the prospects for completing before the exposition the extensions which have been proposed to the Geary Street Municipal Railway, San Francisco, Cal., Thomas W. Ransom, in charge of street railway planning in the city engineer's office, said recently:

"If special funds—a matter of $15,000—are available instantly for the city engineer's office, so that plans and specifications may be prepared now, and if the people vote the $3,500,000 of bonds needed to construct and equip the street railroads ordered by the Supervisors, not one moment's time will be lost in carrying out the scheme. The exposition lines have been carefully planned, not as emergency factors, but as integral parts of the city's permanent municipal railway system.

"Four months will be required to prepare plans and specifications, so that contracts can be entered into for the construction of cars and carhouses and for the delivery of the material necessary for the construction of the roadbed, trolley feeders and overhead work.

"The Van Ness Avenue line will be commenced first; then the Potrero Avenue extension of the Van Ness Avenue line, and the remaining lines, as fast as material arrives.

"It is estimated that the Van Ness Avenue line can be completed within twelve months after contracts for the delivery of material are entered into, and the remaining lines, with the exception of the Church Street line, in sixteen months. This will make the time required for the construction of the Van Ness Avenue line sixteen months after the date upon which the preparation of plans and specifications is commenced, and, for the other lines, twenty months.

"These estimates are based upon the assumption that whatever tunnels may be decided upon will be completed at dates sufficiently early not to delay the construction of street railways through them; that no unnecessary delays will be permitted in the prosecution of the work; that the policy of the city in reference to the extent and type of construction will be decided upon before the preparation of plans and specifications is commenced, and, once decided upon, will be followed without change."

New York Rapid Transit Companies Protest Against Income Tax Provisions

James Quackenbush and Ralph Norton, representing the Interborough Rapid Transit Company, New York, N. Y., and George D. Yeomans, representing the Brooklyn (N. Y.) Rapid Transit Company, have been in Washington endeavoring to secure amendments to the pending income tax law. The income tax section of the Underwood tariff bill proposes to levy a 1 per cent tax on the net income of corporations. In order to prevent extraordinary allowances for fixed charges on capital, permission is given in estimating the income tax to deduct only the interest paid on the amount of indebtedness which does not exceed the paid-up capital stock. Bonds issued in excess of the paid-up capital are to be subject to the provisions of the bill. Both the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company are to have an unusual quantity of bonds outstanding, in view of new subway construction. The Interborough company has $35,000,000 of capital stock and is to issue $170,000,000 of bonds, while a subsidiary of the Brooklyn company will have only $2,000,000 stock, against $100,000,000 of bonds. Under these conditions the two companies will be liable respectively for $67,500 and $49,000 more tax than if they could deduct from gross income all the interest on bonds. New York City also will be affected by such a method of taxation of the companies, for all taxes assessed against the new lines in connection with or incident to operation are deducted from gross earnings before the half and half division takes place with the city, and the city would thereby lose half of the annual tax. Counsel for the companies suggested the following amendment:

"In case of corporations, joint stock companies or associations the purpose and amount of a portion of the whole of whose indebtedness has been approved by a board or commission or commissioner vested with the power by any State to make such approval, deduction shall be allowed for interest accrued and paid within the year on the amount of indebtedness so approved."

Provisions of the Cincinnati Settlement Act

The terms of the Snyder bill, passed by the Legislature of Ohio and providing for the exchange of franchises for indeterminate permits, have been explained in part as follows by Alfred Bettman, city solicitor of Cincinnati, who has taken an active part in the negotiations between the city and the Cincinnati Traction Company:

"The Snyder indeterminate permit bill drawn up by the Cincinnati city administration, as originally introduced, covered all forms of public utilities except telephones and railroads and telegraphs. In this shape it was passed by both houses. Owing to some question about one section of the bill it was agreed that the bill should be thrown into conference and to take interurban railways out of the bill because they are not, properly speaking, local public utilities. The General Assembly expressed its willingness to pass a bill relating solely to Cincinnati, so at the last minute the first section of the Snyder bill was amended so as to apply only to street railroads under the Rogers law. My impression is that the measure is constitutional and that it will make it possible to carry out the proposed street railway settlement in Cincinnati. The bill cannot go into effect until ninety days after the Governor signs it.

"The bill as passed authorizes the surrender of any franchise granted under the Rogers law and the substitution of an indeterminate permit, that is, a permit to operate a street railroad, subject to control of capitalization, fares, service and everything else by the municipality, through a local public utilities department, until the city purchases the street railroad at an agreed price, or at a price fixed by a court or the State Public Utilities Commission. Fares must be revised at the least every five years, and the privilege of purchase by the city may not be suspended for more than five years. Any ordinance of Council granting the permit and fixing the purchase price and fares or any other terms cannot go into effect until submitted to the electors of the city at a special or general election held not less than thirty days after the passage of the ordinance. As the law, under the initiative and referendum clause of the constitution, cannot go into effect for ninety days, that makes 120 days as the minimum possible time for submission of the ordinance to the people, assuming no delays or difficulties."

Storage Battery Cars to Replace Horses in New York

The hearing before the Public Service Commission for the First District of New York in regard to the application of the New York Railways to change the motive power from horses to storage battery on the Metropolitan crosstown line will be continued on May 12. At the hearing on May 5 all evidence was submitted, and it is expected that the approval of the commission will be granted as soon as counsel for the commission can check up the list of property owners' consents to the substitution of motive power. George Keegan, general superintendent of transportation of the New York Railways, said that the company desires to run storage battery center-entrance prepayment cars similar in design to the stepless car No. 5000 now operated on Broadway. The new cars will be of the single-truck type, 30 ft. in length, with a capacity of thirty-one persons. Particular attention was paid to the design of wheels guards to be used and Mr. Keegan said that the problem was being most carefully studied. The substitution of the new cars will necessitate minor changes at switches and curves.

The Belt Line Railway Corporation has received permission from the Public Service Commission for the First District to change its motive power on certain lines covered by its franchise from horse power to electricity contained in storage batteries. This company owns the Fifty-ninth Street crosstown line and the East and West belt lines in Manhattan, formerly the property of the Central Park, North & East River Railroad. The Fifty-ninth Street line is already electrified and operated by underground trolley. The company now proposes to use storage battery cars on the East and West belt lines.

Material Required for Japanese Line

According to United States Consul General Thomas Sammons, Yokohama, Japan, a large number of electric cars for use on the new double-track imperial Japanese government line between Yokohama and Tokyo will be required during the coming year. The construction of power houses and grading for the line was begun in February, 1911, and part of the undertaking will be completed in May or June. 1914. Communications regarding equipment for the line, commonly termed the "Keihin" line, may be addressed in English to the Imperial Japanese Railway Bureau, Tokyo, Japan.

Two depots are to be established for the new electric line, one at Osaki, between Shinagawa and O'mori near Tokyo, and the other at Takashimacho, between Kanagawa and Yokohama. With the completion of the station at Takashimacho, Hiranuma, the depot, being a part of the Yokohama service, will not be continued as a passenger station, but it will be used for freight only. Shimbashi station, Tokyo, will be continued for freight service only, and Tokyo passengers will take electric cars at any depots where it may be convenient to them. Thus the traffic between Tokyo and Yokohama will be carried on almost wholly by electric cars, while trains driven by steam locomotives for the Tokaido line will depart from Shinagawa, at Tokyo, the terminal station for the steam lines. These trains will operate through the Takashimacho station at Yokohama. The new station in front of the Imperial Palace at Tokyo is to be finished before the coronation ceremonies, about November, 1914. The government electric lines in Tokyo by that time will be operated through the center of Tokyo from Shinagawa to Uyeno.

Cleveland Arbitrators Meet to Choose Third Member

C. N. Duffy and A. B. DuPont, chosen to arbitrate the disputed points between the Cleveland (Ohio) Railway and the city, met on May 2, 1913, to discuss the selection of a third member. Several plans were suggested by both men for making the selection, but none of them was adopted. The third man must be selected within a few days or the duty of choosing will fall to Federal Judge Day under the terms of the franchise.

The refusal of the Cleveland Railway to extend the 3-cent fare to Newburg and Lindale, villages which have been annexed since the Tayler franchise was granted, has caused the city officials to decide to attempt to so amend the grant as to force the company to extend the low fare to all places that may be taken into the city in the future.

Changes in Personnel of Chicago Railways Company

A number of changes have been made in the transportation department of the Chicago (Ill.) Railways Company. Benjamin Phillips, heretofore assistant superintendent of transportation, has been made superintendent of transportation. Mr. Phillips has been in the employ of the company a number of years and was made assistant superintendent of transportation last year.

Charles Hamilton has been made assistant superintendent of transportation. Mr. Hamilton has been in the employ of the company a great many years and his last position was that of station superintendent.

F. P. Edinger, heretofore station superintendent at the limits station, has been appointed assistant superintendent of transportation.

Division inspectors have been appointed in charge of the three respective divisions of the company as follows: J. P. Hollmeyer becomes division inspector of the North division; W. B. Whitney becomes division inspector of the Northwest division; T. Eigelsbach is made division inspector of the West division.

P. D. Mollohan, formerly an inspector, has been appointed station superintendent at the limits station.

E. G. Wentzel has been made acting superintendent at the Armitage station.

Plan for Electrification Between Keokuk and Des Moines.—Officials of the Chicago, Rock Island & Pacific Railway have been approached by promoters of an interurban project, who desire to electrify the line of the company between Keokuk and Des Moines, Ia. This line extends from the main line at Des Moines in a southeasterly direction to Keokuk, and is a single-track road now operated by steam.

Reorganization of New Jersey Commission.—Capt. Ralph W. E. Donges has been appointed a member of the Board of Public Utility Commissioners of New Jersey to succeed Robert Williams. Mr. Donges has also been elected president of the board. The other two members of the board are Thomas J. Hillery and Prof. Winthrop M. Daniels. Alfred N. Barber, Trenton, and Frank H. Sommer, Newark, have been reappointed to the commission as secretary and counsel respectively.

Strike in Asheville Settled.—The strike of the motormen and conductors in the employ of the Asheville Power & Light Company, Asheville, N. C., has been settled. The strike was declared on April 26 and the men remained out for six days. The principal demand was for a considerable increase in wages. For the first day or two of the strike very few cars were run, but from then on the schedule was gradually increased until on May 2 the full complement of cars was again in service. The strike was settled by the company granting a small increase in wages to the men.

Joint Track Agreement in San Francisco.—The voters of San Francisco, Cal., have ratified the compromise agreement regarding the joint use of the tracks on lower Market street by the Geary Street Municipal Railway and the United Railroads. Thornwell Mullally, assistant to the president of the United Railroads, is reported to have said that the company will proceed at once in conjunction with the city to secure a dismissal of the suit now pending on appeal in the Supreme Court, as would have been done immediately after agreement was originally made, had not the referendum been invoked. The terms of the agreement have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Extension from Rushville, Ind., to Cincinnati, Ohio.—Elections have been held on the question of a subsidy to meet the expense of right-of-way for the proposed extension of the Indianapolis & Cincinnati Traction Company from

Rushville, Ind., to Cincinnati, Ohio. At the election held in Franklin County, Ohio, on April 8, 1913, the total vote was 1026 in favor of the proposition with 146 opposed. At the election held in Rush County, Ind., on March 12 the vote showed the following result: In favor, 1325; opposed, 356. Part of the right-of-way required by the company for this extension has been donated, and the balance will be provided by the subsidy to be furnished for this purpose by the counties benefited by the new railway facilities.

Bill Passed to Exempt Unions from Prosecution Under Sherman Law.—Three days' debate in the Senate ended on May 7, 1913, with the passage of the sundry civil bill, embodying provisions exempting labor unions from prosecution under the Sherman anti-trust act. The measure will have to return to the House for the consideration of an immaterial amendment, and will then be sent to the President. The measure, except for the one amendment, is identical with the one vetoed by President Taft because of its "vicious class legislation." Reference to the telegram of protest against this bill sent by the American Electric Railway Manufacturers' Association to President Wilson and the Senate was made in the ELECTRIC RAILWAY JOURNAL of May 3, 1913, page 802.

Circular About M. M. and M. C. B. Convention.—The Railway Supply Manufacturers' Association has issued an advance circular in regard to the general arrangements to be followed in the exhibit at the Master Mechanics and Master Car Builders' convention, which is to be held in Atlantic City June 11 to 18 on Young's Million Dollar Pier. The exhibit space will be ready for exhibitors from May 24 to June 7, depending on the location, and exhibitors must have exhibits complete not later than the night of June 10. Other details in regard to the exhibits are explained in the circular. The Pennsylvania Railroad will run a special train for the convention from Chicago to Atlantic City. It will leave Chicago at 3 p. m. on June 9 and will arrive at Atlantic City at 2 p. m. on June 10.

Expert for Buffalo in Connection with Terminal Electrification Proposal.—Acting upon the recommendation of Mayor Louis P. Fuhrmann, the Board of Aldermen of Buffalo, N. Y., on May 6, 1913, authorized the employment of an expert by the commissioner of public works to assist and advise the Common Council in the effort now being made to have the steam railroads which operate into Buffalo electrify their lines within the city limits. In a special message to the Council, Mayor Fuhrmann said: "I respectfully recommend that your honorable body authorize the commissioner of public works to secure forthwith the services of an engineering expert specially qualified to advise you concerning the railroad situation in this city and the practicability of electrical operation of all railroad lines within the limits of the municipality."

Trade Press Convention.—H. M. Swetland, president of the Federation of Trade Press Associations in the United States, has announced that the eighth annual convention will be held at the Hotel Astor, New York, on Sept. 18, 19 and 20, 1913. The federation includes the New York Trade Press Association, the New England Trade Press Association, the Chicago Trade Press Association, the St. Louis-Southwestern Trade Press Association, the Philadelphia Trade Press Association and a number of unaffiliated publications, the total membership being 236, representing over seventy-five different trades, industries and professions. Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums, under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising and authorities on modern merchandising methods will take part.

Omnibus Line Proposed for New York.—The Electric Coach Company, New York, N. Y., which was organized recently by George W. Loft, H. L. Joyce, George Mackay, Charles Berg, Harry B. James, president of the Brooklyn & Manhattan Ferry Company, and others, is preparing to apply to the Board of Estimate of New York City and the Public Service Commission of the First District for permission to operate omnibus lines in New York at a fare of 5 cents. According to Mr. Loft, the company will probably order 1000 electric omnibuses if the rights which it desires are granted by the city. Under a bill passed by the Legislature which has just adjourned the Board of Estimate is authorized to grant franchises for limited terms for stage lines, and to lay out routes for these lines just as it does for a subway or other transit routes. The bill under which the Board of Estimate received authority to make grants to stage lines was passed by the Assembly under an emergency message from Governor Sulzer and both he and Mayor Gaynor are expected to approve the bill. The coaches which the company proposes to operate will seat eighteen passengers, and two of the vehicles are now under construction in Philadelphia. The office of the Electric Coach Company is at 30 Church Street, New York.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

The Senate has passed the Waage bill limiting fares on elevated lines in Chicago to 5 cents. This does not affect suburban steam lines. The Senate has passed the Ettelson bill which re-enacted the old Muller law authorizing cities to own street railways. There were technical irregularities in the old act. The Hurburgh anti-pass law prohibiting the issuance of free transportation to any individual except those excepted by the federal law has been passed by the Senate. Senator Waage has introduced Senate bill No. 538, authorizing the public ownership of utilities. This measure is the same as House bill No. 506. Several bills have been introduced re-enacting the 2-cent-fare law now in effect in Illinois. Senate bill No. 496, by Canaday, and House bill No. 738, by Dickman, provide that interurban trains shall carry one motorman and one conductor who shall have no duties but operating the train. A penalty of from $100 to $1,000 is provided for violation. House bill No. 656 protects telephone lines from induction by electric transmission lines. No other electric lines may be placed within 6 ft. of a telephone line. A minimum fine of $50 is provided. Six months' time is given after the law is effective to make necessary changes.

Action on the Glackin public utilities bill, drafted by Mayor Carter Harrison of Chicago, was forestalled on April 30 by Senator Daly, Peoria, Ill., who raised the question of no quorum. Senator Glackin, who was presiding over the committee meeting, announced that the matter would have to go over. At the meeting of the committee on public utilities on April 30, Mayor Harrison announced his intention of drafting an amendment to the Glackin bill in accordance with the action taken previously by the City Council at Chicago. The Glackin bill, which was prepared in the office of Corporation Counsel Sexton of Chicago, under the direction of the Mayor, would create a State commission appointed by the Governor with authority over interurban utilities and a separate commission appointed by the Mayor with authority over the public service corporations which operate in Chicago. The amendment proposed by the Mayor would eliminate the Chicago commission and provide instead for the creation of a special body to investigate subjects at issue in Chicago and report to the City Council, which would have final power to regulate the utilities and rates in that city.

NEW YORK

The Legislature of New York adjourned on May 3 at 11 p. m. A total of 4073 bills was introduced in both houses during the sessions. This exceeds the record of 1912 by 42 per cent and the record of 1911 by 10 per cent. Of the bills introduced at the session 442 were enacted into law. Up to the time of adjournment only fifteen of the measures placed before the Governor had been vetoed. Two hundred and twenty-five measures were before the Governor for signature at that time. The most important action just before adjournment was the adoption in the Assembly of the Foley workmen's compensation bill. This measure is now before the Governor for signature. A division has been created in the department of conservation which is to undertake the development and distribution under State auspices of electric power generated from waters belonging to the State. The bills providing for the incorporation of the New York Stock Exchange and other exchanges and limiting the interest on call loans to 15 per cent were not enacted. The Goldberg blue-sky bill also was lost. The Governor withdrew the bill to double-the present tax on the transfer of stocks. The bill was passed broadening the responsibility of the Public Service Commissions by placing express companies and stage coach lines under their supervision. The Legislature enacted under an emergency message from Governor Sulzer the bill to extend the powers of the Board of Estimate of New York with regard to the right to issue franchises for bus lines, and the measure is now before the Governor and Mayor Gaynor.

OKLAHOMA

To define more clearly the powers of the Corporation Commission of Oklahoma, a bill prepared under the authorship of the secretary of the commission has been passed by the Legislature and signed by the Governor. This special statute gives the corporation commission "general supervision over all public utilities, with power to fix and establish rates and to prescribe rules, requirements and regulations affecting their services, operation and management and the conduct of their business." Although municipal plants of all kinds are explicitly excluded from coming under the provisions of the new law, the commission has with respect to privately owned utilities "full visitorial and inquisitorial power to examine such utilities and keep informed as to their general condition, their capitalization, rates, plants, equipments, apparatus and other property owned, leased, controlled or operated, the value of same, the management, conduct, operation, practices and service," with respect to the adequacy, security and accommodation afforded by their service as well as their compliance with the provisions of the act. The commission is also to have powers to specify accounting methods and to institute examinations, meter tests, etc. On the last day of the session an amendment was offered bringing municipal plants under the jurisdiction of the commission, but this failed by one vote.

PENNSYLVANIA

Present indications are that the General Assembly will not reach final adjournment before June 15, and perhaps not before July 1, as a majority of the important progressive measures bearing the indorsement of the Republican State Convention still repose in Senate committees. The House of Representatives has passed the Philadelphia subway enabling act by a vote of 171 to 1, and the bill has been returned to the Senate for concurrence in amendments made in the House. These amendments fix a time limit in which work on a contract must be commenced after a franchise has been granted, and also provide that Councils of Philadelphia shall have supervision over the letting of subcontracts.

The Senate bill extending for five years the time in which railroads and railways incorporated since 1903 may begin construction work has been placed on the postponed calendar in the House and is likely to remain there, it being considered a special privilege measure.

The House has passed three revenue-raising measures recommended by the State Tax Commission, one providing that the 4-mill tax now collected from owners of bonds and other obligations of corporations shall be collected direct from the corporations. Only a small part of this tax is now being collected under the present law. A bill repealing a law exempting savings funds from the 5-mill tax collectible from corporations was sent back to the ways and means committee of the House.

The third-class city commission government bill, which has passed the Senate, has been reported favorably to the House, with several minor amendments, one eliminating the clause making it optional whether a city of this class shall adopt this form of government. The measure carries the initiative and referendum features and would give third-class cities, similar to Harrisburg, more power over public service corporations.

It was expected that the public utilities bill would be reported from committee to the House during the week ended May 10.

The House has passed the bill providing for a constitutional amendment giving the initiative and referendum to the people. A similar bill providing for the recall was defeated by a vote of 107 to 78. The Governor has approved the semi-monthly pay bill, which affects electric and steam railways.

WISCONSIN

The bill introduced in January by Assemblyman Johnson relating to appeals to the state highway commission from the refusal of town boards to consent to the construction of electric lines on highways has been received from the Senate, concurred in and has been sent to the Governor for approval. The Assembly bill relating to the distribution of the street railway tax has been passed by the Assembly. Assembly Bill 232, to prevent the overcrowding of street cars, which was received from the committee on corporations of the Senate after being passed by the House, has been laid over by the Senate. A bill to amend the statutes relating to the acquiring of public utility properties by municipalities, making clearer the persons who are to be compensated by the municipalities, has been received from the Senate, concurred in and has been enrolled. Senate Bill 149, amending the statutes relating to appeals from decisions of the Railroad Commission, making the Dane County Circuit Court the initial court of appeal, has been received by the Assembly from the transportation committee and recommended for passage, after being passed by the Senate. Another Senate bill to amend the statutes relating to franchises of street railways has been recommended for non-concurrence in the House. A bill making changes in the time of purchase of street railways by municipalities is still in the House, where it does not seem likely to be concurred in.

PROGRAMS OF ASSOCIATION MEETINGS

Association of Railway Electrical Engineers.

The annual convention of the Association of Railway Electrical Engineers will be held at the Hotel La Salle, Chicago, Ill., Oct. 18 to 21, 1913, inclusive. The principal manufacturers of steam railroad electrical supplies will exhibit in the ballroom of the Hotel La Salle.

Central Electric Railway Association

Some of the plans for the next meeting of the Central Electric Railway Association have been completed. The hotel and arrangement committee is making arrangements for a trip by steamer to a lake port. This trip will extend through the Detroit River and St. Clair Flats and as far north as it is possible for the steamer to go and still make the return trip during the two days of the meeting. The business sessions in connection with the meeting will be held on the boat. It is announced that one of the best steamers on the Great Lakes will be chartered for this trip and that everything will be done that the committee can arrange to make the meeting enjoyable. The boat will start on Wednesday, June 25, and the meeting will be held commencing Thursday, June 26. Full information regarding the plans will be sent to the members of the association shortly.

American Society of Mechanical Engineers

The spring meeting of the American Society of Mechanical Engineers will be held at Baltimore, May 20 to 23, 1913. The headquarters of the society will be held at the Hotel Belvedere, where all of the official sessions and some of the social features will be held. Members and guests will be registered on May 20, and on the evening of that day there will be a reunion and informal reception. The business session will be opened at 9.30 a. m. on May 21. The program calls for the report on May 21 of the special committees on the myriawatt, involute gears, standardization of catalogs, code of ethics and national museum. During the sessions there will be a demonstration of the high-pressure fire service of Baltimore at the City Hall and an inspection of the pumping station. The session on the morning of May 22 will be devoted to the subject of fire protection. The program will be concluded with an excursion to Annapolis on May 23. After a reception at the State House by Governor Goldsborough the party will proceed to the Assembly Chamber, where Admiral H. I. Cone, engineer-in-chief of the bureau of steam engineering, U. S. N., will deliver an address upon the United States Experimental Station at Annapolis.

Financial and Corporate

Stock and Money Markets

May 7, 1913.

The market to-day on the New York Stock Exchange opened low, but recovered later. The best prices of the day were obtained near the close. Both Union Pacific and Southern Pacific at the opening fell to a new low figure for the present decline, but developed a better tendency later with a little buying. New York Central sold off to a new low record for the year. Interborough-Metropolitan sold off easily, showing a decline of 1¼ points in a few minutes. Rates in the money market to-day were: Call, 2¾@3 per cent; sixty days, 3½@3¾ per cent; ninety days and four months, 3¾@4 per cent; five and six months, 4@4½ per cent; nine and ten months, 4¾@5 per cent.

Trading in the Philadelphia market was light to-day, but the tone was stronger.

Commonwealth Edison and Chicago Railways series 2's were very weak on the Chicago stock exchange to-day.

Irregularity characterized the stock market in Boston during the greater part of the session to-day.

The transactions on the Baltimore exchange were well scattered to-day, but the volume of trading was light.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 30	May 7
American Brake Shoe & Foundry (common)	95	92
American Brake Shoe & Foundry (preferred)	132	130
American Cities Company (common)	37¾	37½
American Cities Company (preferred)	*70½	70⅛
American Light & Traction Company (common)	355	380
American Light & Traction Company (preferred)	105	106
American Railways Company	38	37¾
Aurora, Elgin & Chicago Railroad (common)	42	42
Aurora, Elgin & Chicago Railroad (preferred)	84½	84
Boston Elevated Railway	93	89½
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	a66	a66
Boston & Worcester Electric Companies (common)	a8	a8
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	87¾	89¾
Capital Traction Company, Washington	122¼	120¾
Chicago City Railways	*150	..
Chicago Elevated Railways (common)	*25	..
Chicago Elevated Railways (preferred)	*85	..
Chicago Railways, ptcptg., ctf. 1	*91	..
Chicago Railways, ptcptg., ctf. 2	*21¾	..
Chicago Railways, ptcptg., ctf. 3	*7½	..
Chicago Railways, ptcptg., ctf. 4	*3½	..
Cincinnati Street Railway	112½	115
Cleveland Railway	103	103¼
Cleveland, Southwestern & Columbus Ry. (common)	*5½	5½
Cleveland, Southwestern & Columbus Ry. (preferred)	*30	28¼
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	69½
Columbus Railway (preferred)	82½	82½
Denver & Northwestern Railway	*108	109
Detroit United Railway	a76	72
General Electric Company	137½	138½
Georgia Railway & Electric Company (common)	119⅛	119
Georgia Railway & Electric Company (preferred)	83	83¾
Interborough Metropolitan Company (common)	14½	14½
Interborough Metropolitan Company (preferred)	48⅞	50½
International Traction Company (common)	*35	40
International Traction Company (preferred)	*95	95
Kansas City Railway & Light Company (common)	*15	..
Kansas City Railway & Light Company (preferred)	*30	..
Lake Shore Electric Railway (common)	*6½	9
Lake Shore Electric Railway (1st preferred)	*91	91
Lake Shore Electric Railway (2d preferred)	*25½	25
Manhattan Railway	127	127
Massachusetts Electric Companies (common)	16½	16
Massachusetts Electric Companies (preferred)	74½	72½
Milwaukee Electric Railway & Light Co. (preferred)	*100	100
Norfolk Railway & Light Company	*25¾	26½
North American Company	75	75
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	43½	44
Philadelphia Company, Pittsburgh (preferred)	39	39½
Philadelphia Rapid Transit Company	24	23⅜
Portland Railway, Light & Power Company	*67	67½
Public Service Corporation	114	114
Third Avenue Railway, New York	33½	a34¼
Toledo Railways & Light Company	a12	12
Twin City Rapid Transit Co., Minneapolis (common)	103	103½
Union Traction Company of Indiana (common)	*4½	7½
Union Traction Company of Indiana (1st preferred)	*81	82
Union Traction Company of Indiana (2d preferred)	*34	32
United Rys. & Electric Company (Baltimore)	26¼	27
United Rys. Inv. Company (common)	24	23
United Rys. Inv. Company (preferred)	44	46
Virginia Railway & Power Company (common)	50	50
Virginia Railway & Power Company (preferred)	90	90
Washington Ry. & Electric Company (common)	91	91½
Washington Ry. & Electric Company (preferred)	91	91¾
West End Street Railway, Boston (common)	75	74
West End Street Railway, Boston (preferred)	95	90
Westinghouse Elec. & Mfg. Company	61	61
Westinghouse Elec. & Mfg. Company (1st preferred)	117½	105

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*Last sale. aAsked.

ANNUAL REPORT

Illinois Traction Company

The earnings of the Illinois Traction Company, Peoria, Ill., for the year ended Dec. 31, 1912, compared with those for the preceding year, are as follows:

	1911	1912
Earnings:		
Interurban lines	$2,864,793	$2,964,955
City lines	1,950,880	2,030,994
Gas	383,325	428,977
Electric	1,473,937	1,689,477
Heat	197,738	219,170
Miscellaneous	31,548	82,074
Total gross earnings	$6,902,221	$7,415,647
Total operating expenses and taxes	4,133,641	4,353,214
Net from operating	$2,768,580	$3,062,433

There was deducted from the net revenue for 1912 as shown above $1,075,968 for interest on bonds, etc., which left $1,086,464 available for dividends. After a deduction of 6 per cent dividends on the preferred stock, a net surplus of $741,917 was left for the year.

During the year there was expended for maintenance and renewals the sum of $1,168,670, which was 15.7 per cent of the gross receipts, as against $1,012,864, which was 14.7 per cent of the gross receipts of the preceding year. During the year there was also expended for improvements on the properties controlled by the company $1,106,420.

In a letter to the shareholders of the company signed by W. B. McKinley, president, and H. E. Chubbuck, vice-president executive, the following information was submitted by the board of directors:

"During the year the company has shown most satisfactory progress. The increase in the gross and net earnings and surplus are very gratifying. The results of the system for the year show an increase over the preceding year in gross revenue from operation of $513,426, or 7.43 per cent; an increase over the preceding year in net earnings from operation of $293,853, or 10.61 per cent; an increase over the preceding year in net surplus of $176,834, or 31.29 per cent.

"The net surplus of the system for the year after paying 6 per cent dividends on the company's preferred stock was $741,917, equivalent to 7.43 per cent upon the common stock of the company, as against 5.66 per cent for the preceding year. The surplus account therefore stood at Dec. 31, 1912, as follows:

Balance brought forward from 1911		$1,988,233
Net surplus for 1912		741,917
		$2,730,151
Appropriated for depreciation (in addition to $832,885 charged to operating account for maintenance, betterments and renewals)	$335,785	
Bond discount of controlled companies	43,482	379,268
Balance carried forward for 1912		$2,350,883

"The sleeping car service between Peoria, Springfield and St. Louis has shown a steady improvement and the receipts have increased 33 per cent over the previous year.

"The management has given much consideration during the year to the question of solving freight traffic problems, broadening the carload business and increasing terminal facilities by connection with steam railroads. A contract was entered into with the Wabash Railroad for a physical connection and general interchange at Decatur. This gives us a working arrangement now with all the steam roads in our territory that can be of benefit to us, except the Pennsylvania and New York Central lines. There should be a gradual increase in the freight traffic during 1913. During the year fifty box cars, seventy-five coal cars, five refrigerator cars and twenty-five cinder cars were purchased, made necessary by the increased freight business. Additional elevators have been built to be served by our lines and connections made with other industries, such as coal mines, brick yards, warehouses, etc.

"The protection in the operation of the trains afforded by the automatic electric block signals, and the feeling of safety imbued in the minds of the traveling public by these signals, have proved further the wisdom of their installation. The trackage between St. Louis and the cities of Granite City, Madison and Venice, including the St. Louis bridge, has been protected by the installation of a signal system early this year.

"A contract was made for the installation of a 5000-kw turbine unit at Venice, which additional capacity will be required to take care of the heavy power business to be secured in that territory.

"The several small properties acquired by the company this year comprise the Carlinville Utilities Company, serving gas and electricity to Carlinville, county seat of Macoupin County; the Georgetown Electric Company, serving electricity to Georgetown, Indianola, Vermilion Grove, Ridge Farm, Sidell and Chrisman, to be connected with the Danville plant by a transmission line; the electric plants at El Paso, Gridley and Chenoa, to be served by transmission line from Bloomington, and the Morton Light, Heat & Power Company, serving electricity to Morton and Tremont.

"The Illinois Traction System is furnishing forty-eight cities and villages with electric light and power.

"Late in the year a site was purchased at Peoria, near the business center of the city, on which next year will be erected a seven-story terminal and office building. At Champaign also a site, advantageously located, was acquired on which will be erected next year a three-story building for the Champaign offices of the company. The new freight house and office building at Springfield, remodeled for the company under a long-term lease, was occupied in the early summer by the operating officials at Springfield.

"The operating engineering department, a newly created department for the purpose of bringing about operating economies, has secured the results anticipated and will be continued on an enlarged basis.

"The relations between the management and the employees continue to be favorable and there have been no labor difficulties during the year. Contracts entered into between the employees and the company have been carefully observed both by the employees and the company, and the labor situation is very harmonious."

Accountants' Report on Railway Earnings in Toledo

There was a large increase in the gross receipts of the railway department of the Toledo Railways & Light Company, Toledo, Ohio, but the net earnings of the railway department of the company were $225,000 less in 1912 than in 1911, according to a report for the year filed with Mayor Whitlock by Nau, Rusk & Swearingen, expert accountants of Cleveland. The report shows also that 6,453,282 more revenue passengers were carried in 1912 than in 1911 and this increase is said to exceed the anticipated increase due to the natural growth of the city for ten years. The new low-fare arrangement is believed to be responsible for a large per cent of the increase. In 1912 43,653,159 pay passengers were carried while in 1911 the total was 37,199,877. The net earnings for 1912 were reduced greatly according to the report by the large increase in the operating expenses during the year. Operation cost the company more than $1,000,000, while the expense for operation in 1912 was $810,000. Net earnings per car mile have been reduced from 10.58 cents in 1909 to 5.70 cents in 1912.

A comparison of the gross earnings and operating expenses for the years 1909 to 1912 inclusive shows a reduction of $300,000 in the net savings of the company between the year 1909 and the year 1912. The gross earnings, however, were about $200,000 more in 1912 than in 1909. The tables for the four years are as follows:

1909—Gross earnings, $1,692,042; operating expenses, $685,129; maintenance, $237,214; net earnings, $733,698. Net earnings per car mile, 10.58 cents.

1910—Gross earnings, $1,819,506; operating expenses, $767,095; maintenance, $399,141; net earnings, $653,270. Net earnings per car mile, 9 cents.

1911—Gross earnings, $1,920,698; operating expenses, $810,216; maintenance, $449,281; net earnings, $661,200. Net earnings per car mile, 8.83 cents.

1912—Gross earnings, $1,895,317; operating expenses, $1,008,247; maintenance, $454,933; net earnings, $432,136. Net earnings per car mile, 5.70 cents.

The gross earnings include revenue received from passengers, suburban cars, rent on property owned by the company, advertising and miscellaneous sources.

The accountants were retained by the city that results of the low-fare arrangement which has prevailed during the year might be determined. A partial report, covering nine months on the fare schedule of 3 cents during the rush hours and six tickets for a quarter at all other times, was submitted some time ago by the experts. They were instructed to continue their investigation and make a report on the whole year's operations. The report presents only facts and figures. No conclusion as to rates of fare for profitable operation of the lines is given. An extended reference was made in the ELECTRIC RAILWAY JOURNAL of Feb. 8, 1913, page 263, to the report of Nau, Rusk & Swearingen on earnings in Toledo for the nine months during which the reduced fare was in effect.

Details of Merger of Ohio and Michigan Properties

The details have been made public in regard to the acquisition of the property of the Union Railway Gas & Electric Company, Rockford, Ill., the Michigan Railways Company and the Springfield (Ohio) Light Company by the Commonwealth Power, Railway & Light Company, Saginaw, Mich., which was noted in the ELECTRIC RAILWAY JOURNAL of May 3, 1913, page 830.

According to the banker's circular dated April 26, 1913, under a contract executed on April 15, the Commonwealth Power, Railway & Light Company agrees to deliver $7,500,000 five-year 6 per cent convertible bonds, $10,000,000 of preferred stock and $9,000,000 of common stock ($3,500,000 at this time, $2,500,000 on May 1, 1915, and $3,000,000 on May 1, 1916) in acquisition of (a) $7,125,000 cash, (b) $5,250,000 of preferred stock and $6,000,000 of common stock of the Union Railway, Gas & Electric Company, (c) $500,000 of preferred stock and $500,000 of common stock of the Springfield Light Company, and (d) $10,000,000 of common stock of the Michigan Railways Company.

The outstanding capitalization of the Commonwealth Power, Railway & Light Company after the issue of the new securities mentioned above will be: five-year 6 per cent convertible bonds, $7,500,000; 6 per cent preferred stock, $16,000,000; common stock issued and outstanding, $15,500,000; common stock to be issued May 1, 1915, $2,500,000, and common stock to be issued May 1, 1916, $3,000,000.

The terms proposed for the exchange of securities follow:

	Offered in Exchange	
	New Preferred	New Common
Commonwealth, preferred	100%—$6,000,000	10%— $600,000
Commonwealth, common		100%—12,000,000
Union, preferred	100%— 5,250,000	10%— 525,000
Union, common		100%— 6,000,000
Springfield, preferred	100%— 500,000	
Springfield, common		100%— 500,000
Michigan, common		20%— 2,000,000

	Or Optionally	
	New Preferred	New Common
Commonwealth, preferred		
Commonwealth, common	25%—$3,000,000	75%—$9,000,000
Union preferred		
Union, common	25%— 1,500,000	75%— 4,500,000
Springfield, preferred		
Springfield, common		
Michigan, common	(Deliverable May 1, 1915)	

Stocks are to be deposited under this plan on or before May 14, 1913. Stockholders of the Commonwealth company so depositing are entitled to subscribe at 95 and interest to the five-year 6 per cent convertible bonds to an amount not exceeding the even $100 next above 30 per cent of the par value of stock so deposited, and stockholders of the Union company to an amount not exceeding the even $100 above 20 per cent of the par value of the stock so deposited; and they will receive full allotment under such subscriptions.

The cash paid into the treasury under the contract in the amount of $7,125,000 will be disposed of as follows: $2,000,000 for retiring the note issue of the company maturing on June 10, 1913, and $3,600,000 for acquiring $2,100,000 of preferred stock and approximately $1,500,000 of notes of the Michigan Railways Company, leaving a remainder of $1,525,000 available for the purposes of the company.

The regular yearly requirements for improvements, betterments and extensions to the Commonwealth, Union and Springfield properties can be provided by the sale of bonds and preferred stocks of the underlying companies. In order to provide for the completing of the interurban lines from Grand Rapids to Kalamazoo, from Allegan to Battle Creek, and another hydroelectric plant on the Manistee River, it is proposed to sell a short-term note issue secured by the railway and the Manistee properties until such time as the new properties are in full operation, when a bond issue can be sold to better advantage than during construction.

Stability of Public Utilities

Henry L. Doherty & Company, New York, N. Y., issued a circular on April 23 to indicate the stability of public utility securities. It contains charts based on the operation of the gas and electric companies in most of the large cities in the United States, all of the steam railroads in the country and the large industrial companies whose securities are listed on the New York Stock Exchange and whose figures were available as far back as 1902. One chart shows the increases in outstanding securities of the three classes of companies during the period of ten years from 1902 to 1911 covered by the study. Another chart shows the relative increases and decreases in the net earnings of the same properties. This chart is similar to that published by Doherty & Company in December, 1911, but the figures have been extended since then to include the operations for the year 1911. Another chart shows the net earnings for the same group of companies per $100 of outstanding securities year by year, together with the average for the ten years.

The increase in outstanding securities of gas and electric companies from 1902 to 1911 was 110 per cent; it was about 54 per cent in the case of the steam railroads and about 17 per cent for the industrial properties. The net earnings of the gas and electric properties during this period increased about 100 per cent as compared with an increase of about 40 per cent for the steam railroads and a decrease of about 10 per cent for the industrials. The net earnings of gas and electric properties per $100 of outstanding securities decreased from $9 in 1902 to about $8.50 in 1911, and showed an average per year for this period of $8.45. The industrial companies decreased from about $8.75 in 1902 to about $7 in 1911 and their average for the period was $7.79 per year. The steam railroads decreased from more than 4 per cent to 4 per cent and showed an average of $4.25 per year for the period. The largest fluctuations in net earnings from year to year and in net earnings per $100 of outstanding securities were shown by the industrial properties.

A chart is also reproduced which was first published by Doherty & Company on Feb. 20, 1913, as an indication of the relative security of the different groups of properties. The average annual amount of securities in receivers' hands per $100 of outstanding securities for the various classes of properties during the period of thirty years from 1882 to 1911, inclusive, was as follows: Gas and electric companies, 37 cents; national banks, $1.93, of which 32 cents represented insolvent institutions and $1.61 banks that went into voluntary liquidation; railroads, $1.84; industrials, $2.07.

Another chart published in the circular combines the average net earnings per $100 of outstanding securities and the average results of receiverships of properties.

Proposed Merger of Chicago Surface Lines

The abrupt halt in the proceedings looking toward the merging of the surface and elevated systems of the city of Chicago was noted in the Electric Railway Journal for May 3, 1913. Negotiations for the merging of the two surface lines, without the elevated system, have been opened again. On May 1 Henry A. Blair and Ira M. Cobe, representing the Chicago Railways and the Chicago City Railway, respectively, were in conference concerning the merger of the surface lines.

Brantford (Ont.) Street Railway.—The action of the city of Brantford against the Brantford Street Railway to recover tax arrears amounting to $17,000 will be tried soon, and it is expected that the franchise under which the company now operates will be canceled. A proposition to take over the property will probably be submitted to ratepayers of Brantford before the end of the year.

Brooklyn (N. Y.) Rapid Transit Company.—Since June 30, 1912, the holders of $2,130,000 of the first refunding 4 per cent convertible bonds of the Brooklyn Rapid Transit Company have exercised their right to exchange the bonds for stock. Previous to June 30, 1912, only one bond for $1,000 had been converted. The time for conversion expires on July 1, 1914. The total issue of convertible bonds authorized is $150,000,000. About $38,000,000 of the bonds are outstanding, the balance being pledged as collateral, in the treasury or reserved to retire bonds of constituent companies.

Cleveland & Eastern Traction Company, Cleveland, Ohio.—The Cleveland & Eastern Traction Company has applied to the Public Service Commission of Ohio for authority to issue $54,000 of first mortgage bonds, together with $32,400 of preferred and $27,000 of common stock for improvements. It is the desire of the company to sell the bonds at 80 per cent, the bonds being accompanied by 60 per cent of preferred and 50 per cent of common stock.

Hartford & Springfield Street Railway, Warehouse Point, Conn.—This month the Hartford & Springfield Street Railway has omitted to declare the dividend usually paid on the $285,000 of 6 per cent non-cumulative preferred stock. In 1912 a 2 per cent dividend was paid semi-annually.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—The Indianapolis & Cincinnati Traction Company has acquired control of the Cincinnati & Westwood Railroad, a 5⅓-mile narrow-gage road extending from Westwood, on the boundary line of Cincinnati, to Brighton, within the corporate limits of the city. The purchase is made in the hope that the plan of Mayor Hunt to allow the interurban road to reach the heart of Cincinnati will go through. The Indianapolis & Cincinnati Traction Company's line extends from Indianapolis to Rushville and Connersville, 55 miles. It is stated that the company has secured nine-tenths of the right-of-way from Connersville to Harrison, on the Indiana-Ohio line, and about one-half of the right-of-way from Harrison to Miami, which is half-way to Westwood. The distance from Harrison to Rushville is about 64 miles.

Interborough Rapid Transit Company, New York, N. Y.—T. P. Shonts, president of the Interborough Rapid Transit Company, said on April 25, 1913, in discussing the raising of funds to fulfil the conditions of the subway contracts: "The Interborough Rapid Transit Company has delivered to Morgan & Company bonds covering the $15,000,000 which is this year's requirements for subway construction purposes in accordance with the agreement with the city. It also has the money on deposit to take up the $15,000,000 of notes which become due on May 1. The 5 per cent bonds of the Interborough Rapid Transit Company are subject to retirement on Nov. 1, and will be retired on or before that date, in accordance with the provisions of the mortgage. Inasmuch as the contract with the city was not signed until March 19, 1913, whereas it had been expected that the contract would be signed in the fall of 1912, the company arranged with the bankers in the interest of the company to change the annual requirement from the fiscal year to the calendar year. There has not been any delay or postponement in the Interborough company's financial plans. These financial plans cover not only financial requirements of the company for construction and equipment purposes, so far as the contract between the city and the company is concerned relative to subway matters, but also cover the requirements for construction and equipment purposes for the improvement of the elevated lines of the Manhattan Railway." The directors of the Interborough Rapid Transit Company declared an extra dividend of 2 per cent on April 30, 1913, payable out of the earnings from the elevated and subway lines. As the Interborough-Metropolitan Company owns about $34,000,000 out of the Interborough's $35,000,000 of stock, practically all of the extra payment, or about $680,000, will go to the holding company.

Joplin & Pittsburg Railway, Pittsburg, Kan.—The Public Service Commission of Missouri has approved the application of the Joplin & Pittsburg Railway for permission to issue $1,050,000 of 6 per cent refunding bonds.

Kansas City Railway & Light Company, Kansas City, Mo.—A member of the committee representing the first lien refunding 5 per cent gold bonds of the Kansas City Railways & Light Company, maturing on May 15, 1913, says that the deposits up to May 1 with the New York

Trust Company as depositary were very large. The time for deposits, however, is to be extended a certain number of days to be announced later in order to give others the privilege of turning in their holdings.

Lackawanna & Wyoming Valley Rapid Transit Company, Scranton, Pa.—Pursuant to a foreclosure decree by the United States District Court involving a mortgage and deed of trust made by the Lackawanna & Wyoming Valley Rapid Transit Company to the Standard Trust Company, New York, on May 1, 1903, there will be sold at public auction at the county court house in New York County at noon on May 29, 1913, bonds and stocks including the following: $2,512,000 principal amount 5 per cent fifty-year collateral trust gold bonds of the Lackawanna & Wyoming Valley Rapid Transit Company; $2,050,000 face value mortgage bonds and $748,750 capital stock of the Scranton & Northeastern Railroad; $1,250,000 mortgage bonds and $248,750 stock of the Central Valley Railroad; $1,600,000 mortgage bonds and $598,750 stock of the Lackawanna & Wyoming Valley Railroad; $750,000 mortgage bonds and $250,000 stock of the Wilkes-Barre Railroad; $850,000 mortgage bonds of the Lackawanna Tunnel Company, and other securities.

Lake View Traction Company, Memphis, Tenn.—The property of the Lake View Traction Company has been conveyed to the Memphis Street Railway in accordance with the terms of purchase reported in the ELECTRIC RAILWAY JOURNAL of March 29, 1913, page 604.

Massachusetts Consolidated Railways, Greenfield, Mass.—The following notice was issued under date of May 7, 1913, by D. P. Abercrombie, Jr., secretary and treasurer: "By vote of the trustees and of the shareholders of Massachusetts Northern Railways, and in accordance with the provisions of the agreement and declaration of trust, dated Nov. 16, 1911, the name by which the said trustees, in their collective capacity, are designated and under which they act has been changed to Massachusetts Consolidated Railways. Commencing with this date all the business of this association will be transacted under the name of Massachusetts Consolidated Railways."

Northern Massachusetts Street Railway, Athol, Mass.—The following notice was issued under date of May 1, 1913, by D. P. Abercrombie, Jr., clerk and treasurer: "By vote of the stockholders of the Athol & Orange Street Railway Company, and by the authority of the Board of Railroad Commissioners granted on April 15, 1913, the name of the company has been changed to Northern Massachusetts Street Railway Company, and the said change of name has now become effective by the issuance of a certificate to that effect by the Secretary of the Commonwealth, dated April 30, 1913. Commencing with this date all the business of the company will be transacted under the name of Northern Massachusetts Street Railway Company."

Ohio Electric Railway, Cincinnati, Ohio.—The Public Service Commission of Ohio has authorized the Ohio Electric Railway to issue 5 per cent second mortgage bonds to the amount of $3,500,000, to be sold for not less than 80. The proceeds derived from the sale of these bonds are to be used to rehabilitate the property damaged by the floods of March and April, 1913, construct additions and improvements and discharge certain indebtedness incurred by the company. The company is to call in shares of the common stock or certificates representing such shares of the aggregate value of $5,000,000, and cancel them. In case this reduction of outstanding capital stock is not made, the authority for the $3,500,000 bond issue is to be revoked by the commission.

Pekin & Petersburg Interurban Railway, Pekin, Ill.—A suit in foreclosure has been instituted by M. D. Conaghan, trustee, and Adam Saal, holder of a majority of the first mortgage and debenture bonds of the Pekin & Petersburg Interurban Railway, against that company, J. E. Melick, both as president of the company and as an individual; Mrs. J. E. Mellick, who claims ownership of part of the charging station; James E. Edds, owner of property on which the charging station is located, and the city of Pekin. A petition has also been filed for an injunction to restrain Mr. Melick from disposing of or transferring first mortgage bonds to the amount of $8,000 which he is believed to possess.

Toledo Railways & Light Company, Toledo, Ohio.—The hearing in the injunction suit of the Toledo Traction, Light & Power Company against Barton Smith and others was resumed before Judge Killits of the federal district court at Toledo, Ohio, on May 1. Mr. Smith appeared before the court on May 1. On May 3 W. E. Hutton, Cincinnati, former director of the Toledo Railways & Light Company and a member of the stockholders' reorganization committee, testified. Albion E. Lang, former president of the Toledo Railways & Light Company, questioned on May 3 in regard to the sale of the property of the Toledo Traction Company to the Toledo Railways & Light Company, referred Mr. Smith to the records for the information. The presentation of an affidavit from W. W. Miller completed the session on May 3.

Dividends Declared

Cape Breton Electric Company, Ltd., Sydney, N. S., $3, preferred; $3, common.

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, common and preferred.

Cumberland County Power & Light Company, Portland, Maine, quarterly, 1½ per cent, preferred.

Detroit (Mich.) United Railway, quarterly 1½ per cent.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, 1¼ per cent.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

JACKSONVILLE (FLA.) TRACTION COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	Feb.	'13	$49,555	*$33,670	$15,885	$10,819	$5,067
1 “	“	'12	45,912	*31,130	14,782	9,463	5,319
12 “	“	'13	566,126	*382,671	183,455	122,106	61,349
12 “	“	'12	563,600	*350,301	213,299	103,766	109,533
JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.							
1 mo.	Mar.	'13	$46,370	*$26,922	$19,448	$12,542	$6.906
1 “	“	'12	40,583	*25,403	15,180	12,923	2,257
12 “	“	'13	417,330	*242,306	175,124	112,875	62,249
12 “	“	'12	370,939	*215,785	155,154	116,236	38,918
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE							
1 mo.	Feb.	'13	$41,349	*$30,778	$10,571	$14,485	†$3,914
1 “	“	'12	37,213	*31,354	5,859	14,443	†8,584
12 “	“	'13	631,259	*388,870	242,589	173,146	69,443
12 “	“	'12	590,820	*367,832	222,988	168,909	54,079
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.							
1 mo.	Feb.	'13	$171,322	*$103,580	$67,742	$37.088	$30,654
1 “	“	'12	159,939	*98,685	61.254	34,813	26,441
12 “	“	'13	2,106,238	*1,205,393	900,845	439,359	461,486
12 “	“	'12	1,976,672	*1,140,826	835,846	407,336	428,510
NEW ORLEANS RAILWAY & LIGHT COMPANY, NEW ORLEANS, LA.							
1 mo.	Feb.	'13	$583,007	$298,852	$284,156	$191,332	$92,824
1 “	“	'12	561,705	283,377	278,328	182,515	95,813
3 “	“	'13	1,777,637	897,354	880,283	573,055	307,228
3 “	“	'12	1,730,710	864,367	866,343	548,566	317,778
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO							
1 mo.	Feb.	'13	$222,570	*$138,129	$84,441	$45,197	$39,244
1 “	“	'12	198,209	*119,556	78,654	43,821	34,833
2 “	“	'13	460,036	*280,379	179,657	89,868	89,789
2 “	“	'12	407,598	*242,091	165,507	87,646	77,861
NORTHERN TEXAS COMPANY, FORT WORTH, TEX.							
1 mo.	Feb.	'13	$142,784	*$84,318	$58,466	$24,646	$33,820
1 “	“	'12	113,488	*67,839	45,649	20,846	24,804
12 “	“	'13	1,862,411	*981,299	881,112	273,865	607,247
12 “	“	'12	1,617,961	*890,878	727,083	251,396	475,687
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.							
1 mo.	Feb.	'13	$24,372	*$15,490	$8,882	$7,323	$1,558
1 “	“	'12	22,930	*16,486	6,444	7,058	†614
12 “	“	'13	289,952	*190,593	99,359	86,880	12,479
12 “	“	'12	270,427	*170,424	100,003	82,121	17,882
PENSACOLA (FLA.) ELECTRIC COMPANY							
1 mo.	Feb.	'13	$22,506	*$14,113	$8,393	$6,369	$2,024
1 “	“	'12	23,015	*14,076	8,938	6,377	2,561
12 “	“	'13	288,976	*177,557	111,419	76,384	35,035
12 “	“	'12	287,303	*180,282	107,021	64,262	42,759
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.							
1 mo.	Feb.	'13	$655,734	*$409,552	$246,182	$167,095	$79,088
1 “	“	'12	661,206	*374,243	286,963	156,010	130,954
12 “	“	'13	8,289,230	*4,833,168	3,456,061	1,997,667	1,458,395

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*Includes taxes. †Deficits.

Traffic and Transportation

Recommendations in Regard to Service in Worcester

In an order issued on April 29, 1913, the Railroad Commission of Massachusetts, in the petition of E. H. Vaughan, city solicitor of Worcester, Mass., made the following recommendations to the Worcester Consolidated Street Railway:

"That the Worcester Consolidated Street Railway take immediate steps to provide sufficient power not only to operate, heat and light its present equipment properly, but to provide in advance for the future transportation needs of the territory it serves and to make adequate provision for the duplication of power facilities in order that the serious interruptions to traffic that occur from time to time may be obviated.

"That the Worcester Consolidated Street Railway take immediate steps to provide a sufficient number of cars to enable it to keep its equipment properly cleaned and repaired and provide a reasonable service during rush hours.

"That the Worcester Consolidated Street Railway provide proper facilities to enable its officers and employees to reach the various parts of its system promptly in cases of emergency."

With reference to the complaint made of irregularity in the operation of cars the board is of the opinion that when the above recommendations have been complied with the service rendered by the company in this respect will be materially improved.

The board made no recommendation with respect to the supplemental petition concerning the re-routing of cars in Worcester as it is of the opinion that this matter can be considered more intelligently when the improvements suggested have been carried out.

Henry C. Page, general manager of the company, says:

"We have already made provision to remedy every defect which the commissioners point out in their findings.

"We have taken care of our entire system on the north, leaving only Millbury and the Charlton City ends not actually cared for.

"The Millbury end will be taken care of by May 10, we expect, and a cross-country high-tension line from Millbury to Oxford is now being built, by which we can take care of Charlton City. This will give us Connecticut River power all over our system for the operation of our cars. In addition we have the present system in reserve.

"This Connecticut power will come over high-tension lines and will be transformed into power suitable for our use. Our engineers laid plans for this additional power two years ago and since that time we have been working on this plan of development. This spring several cars ordered a year ago have been delivered, and twenty more cars for the Worcester system have been ordered."

Near-Side Stops in Springfield.—The Springfield (Ohio) Railway placed in effect on May 1, 1913, a near-side stop order complying with an ordinance adopted recently by the City Council.

Vacation Suggestions.—The Winona Interurban Railway, Winona, Ind., is distributing a series of picture post cards which deal with the attractions which are to be found along the lines of the company by vacationists.

Increase in Wages in Parkersburg.—The Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., has voluntarily increased the pay of all motormen and conductors from 1 cent to 3 cents an hour, depending on seniority of service.

Increase in Wages in Windsor.—The Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., has granted its employees an increase in wages of half a cent an hour. At present the employees of long service receive 22 cents and 23 cents an hour for a ten-hour day.

Fare Boxes in Des Moines.—The Des Moines (Ia.) City Railway proposes to install fare boxes on the twenty street cars operating on the University line. Fifteen new street cars will be put in service on the University line. The steps of the new car are equipped so that they are drawn up when the car doors are closed.

No Smoking on Interurban Cars in Kansas City.—The cars of the interurban railways which enter Kansas City, Mo., over the lines of the Metropolitan Street Railway are subject to the jurisdiction of that company, and John M. Egan, president of the Metropolitan Street Railway, has issued an order that smoking will not be permitted hereafter on interurban cars within the city limits while being operated over the tracks of that company.

Express Service in Boston.—The Boston (Mass.) Elevated Railway has placed in operation an express service during the evening rush hour on three Somerville and Medford lines, running from Sullivan Square. The Medford-Hillside cars operate between Sullivan Square and the top of Winter Hill from 5.30 p. m. to 6.30 p. m., without stopping to discharge passengers. Between 5 p. m. and 6.30 p. m. cars on the Woburn and West Medford lines do not stop between Sullivan Square and Winter Hill except to take on passengers.

Traffic Agreement in Peoria.—An agreement has been reached between the Peoria & Pekin Terminal Railway and the Illinois Traction System, Peoria, Ill., whereby the former will run its cars up Adams Street in Peoria, around the Public Square to the terminal of the Illinois Traction System, over the tracks of the Illinois Traction System and the Peoria Railway and out again. The contract runs for one year with the privilege of renewal at the end of one-year periods. This contract also calls for the sale of power by the Illinois Traction System to the Peoria & Pekin Terminal Railway.

Continuing Trip Concession in Brooklyn.—The management of the Brooklyn (N. Y.) Rapid Transit Company has arranged to furnish continuing trip tickets, good for a cash transfer, to passengers boarding the Flatbush-Seventh Avenue line cars by mistake and desiring to continue their journey along Flatbush Avenue beyond the point where those cars turn into Seventh Avenue. This concession on the part of the company ends a proceeding which has been pending before the Public Service Commission for the First District on a complaint from citizens against the misleading designation of such cars.

Resuming Through Service Between Louisville and Indianapolis.—May 1, 1913, was fixed as the date for resuming through service from Louisville, Ky., to Indianapolis, Ind., via electric railway. A considerable amount of track of the Indianapolis, Columbus & Southern Traction Company was washed away by the flood, and a large force of laborers working night and day was required to repair the line. The Indianapolis & Louisville Traction Company and the Louisville & Southern Indiana Traction Company, operating out of Louisville, have been running regular cars only as far north as Seymour, Ind.

"Safety First" Watch Fobs.—The motormen and conductors of the Georgia Railway & Power Company, Atlanta, Ga., have each been presented with a handsome bronze medallion in the form of a watch fob, bearing the inscription "Safety First, Safety Always." This gift was made by the company as a token of membership in the Atlanta Public Safety League, and is intended to serve as a reminder that safety of the public should be the first and last consideration. The fobs were made by Whitehead & Hoag, Newark, N. J., from a special design furnished by the Georgia Railway & Power Company.

Service Established Between Kansas City and St. Joseph.—The Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., which has been in operation for some time between Kansas City and Excelsior Springs, operated the first car between Thirteenth and Walnut Streets, Kansas City, and the terminus of the line in St. Joseph on April 29, 1913. It was announced that regular service would begin on May 5. Through cars will leave the Kansas City terminus every seventy minutes. The fare is to be $1.30 one way and $2.30 for the round trip. The running time between the cities will be two hours.

Interurban Line Between Victoria and Deep Cove.—Announcement was recently made by the management of the British Columbia Electric Railway, Vancouver, B. C., that on May 15, 1913, the interurban line from Victoria to Deep Cove will be placed in operation. This line extends north from Victoria for a distance of 23 miles and will be the second longest interurban line operated by the company, the longest division of the company's system being that from Vancouver to Chilliwack, a distance of 76 miles. Shelters will be provided at each of the twenty stops along the line.

Increase in Wages in Akron.—On May 1 the motormen and conductors decided to accept the scale of wages offered by the Northern Ohio Traction & Light Company, Akron, Ohio. The result is an increase of 2 cents an hour at once for the new men instead of 1 cent, which the company had voluntarily proposed to make some time ago. New men will receive 23 cents an hour, with an increase of 1 cent an hour each year until 27 cents, the maximum, has been reached. Running boards on the summer cars will be eliminated and the men will be paid 25 cents a day extra for breaking in new men. The increase applies to all the trainmen in the employ of the company.

Safety Talks to Children.—The United Railways & Electric Company, Baltimore, Md., is distributing a folder entitled "Safety Talks to Children" among the school children of Baltimore. The folder contains suggestions for preventing accidents on the streets and illustrates the proper way to alight from a car, besides explaining several other ways in which children should be cautious. The last page of the folder is addressed to the parents, who are asked to read and adopt the suggestions and endeavor to instil them in the minds of their children. Through the co-operation of the Board of Education, the folders were sent to the public schools, where each child received a copy.

Order Affecting Service in Jersey City.—As a result of the inquiry before the Board of Public Utility Commissioners of New Jersey into the service furnished by the Public Service Railway in Jersey City the company has been ordered by the commission to re-route certain lines of cars during rush hours, establish a short inner belt line and increase the number of cars during both rush and non-rush hours. The board realizes that the installation of the full additional equipment ordered will require time. The company is to render monthly reports as to its progress. The charge that the cars of the company are not kept in sanitary condition was dismissed for lack of evidence.

Improvements in Elevated Service in Brooklyn.—On the West End or New Utrecht Avenue line of the Brooklyn (N. Y.) Rapid Transit Company the headway in the night train service to Bath Beach, Bensonhurst and Ulmer Park will be reduced from thirty minutes to fifteen minutes. On the Culver line a seven-and-one-half-minute headway will be maintained from 6.45 a. m. to 7.50 a. m., and in the evening rush hours all short-line trains stopping at Parkville will give free transfers to cars bound for Coney Island. On the Myrtle Avenue line the headway in the service to Ridgewood and Metropolitan Avenue after 1 a. m. in the morning will be reduced from thirty minutes to twenty minutes, and the same reduction will be made on the Broadway line in the service to Brownsville and Canarsie.

Employees of Middlesex & Boston Street Railway Reinstated.—George M. Cox, general manager of the Middlesex & Boston Street Railway, Newtonville, Mass., under authority from the directors, addressed a communication in part as follows to the men who quit work recently: "As the former employees have recognized the fact that the position of the company in connection with the matter referred to was right and that the men in leaving their work made a mistake, I am willing to reinstate the men. I wish to impress upon the employees of this company that the action taken at the present time is not to be considered a precedent so far as the future is concerned, and I wish to impress upon the employees that the best results for the company and its employees will be attained by the earnest co-operation of all."

Fares Over the Nashville-Gallatin Interurban Railway.—The Nashville-Gallatin Interurban Railway, Nashville, Tenn., has on sale twenty-trip family commutation books good for any member of the family, which may be purchased at 2 cents per mile. Sixty-two-trip commutation books and forty-six-trip schoolbooks will be on sale three days before and three days after the first of each month. Under this plan the business and school tickets were put on sale at Gallatin, Henderson and Nashville on April 28 and sale of tickets was continued to include May 3. The twenty-trip family ticket expires six months from the date of purchase. These tickets are sold from any point on the line of the Nashville-Gallatin Interurban Railway to its connection with the city lines at Inglewood. A city fare of 5 cents is collected with each coupon lifted by the conductor. The city fare entitles the commuter, if he so desires, to the privileges of the transfer station in Nashville and of transferring to any of the lines of the Nashville Railway & Light Company.

Near-Side Stops Suggested by Company in Charleston.—The Charleston Consolidated Railway & Lighting Company, Charleston, S. C., has addressed a letter as follows to the Mayor and members of the Charleston City Council suggesting the passage of an ordinance to permit the company to stop its cars on the near side of the street: "The increase in the number of automobiles using the streets of the city has correspondingly increased the liability of collisions between automobiles and the cars of this company. We find, upon investigation, that this situation has been met in other cities by requiring the street cars to stop on the near side, instead of the off side, as now required by the ordinances of the city of Charleston. We believe that such a change in the operation of our cars would add considerably to the safety of the passengers carried by us and of the public generally. We are, therefore, inclosing herewith a suggested form of ordinance providing for the near-side stop as a substitute for that portion of Section 720 requiring the stop on the off side, and we ask your favorable consideration of the same."

Handling Crosstown Traffic in New York.—The Public Service Commission for the First District, upon the recommendation of Commissioner John E. Eustis, has dismissed the proceeding against the New York Railways involving the service on the Eighty-sixth Street crosstown line in Manhattan. The proceeding was begun on complaints against the short-lining of cars at Second Avenue and in many cases the collection of an extra fare from passengers who desired to travel east of Second Avenue. During the hearings the company improved the service so that 60 per cent of the cars were run through to the ferry and only 40 per cent were short-lined at Second Avenue. The commissioner also directed the company to place an inspector at Second Avenue to see that all passengers in short-lined cars desiring to go further were transferred to through cars without the payment of an additional fare. The commission's inspection made after these improvements were put into effect showed that the service east of Second Avenue was adequate, and the hearing was closed with the understanding that the present service will be continued and that the short-lining of cars will not be changed without the approval of the commission.

Through Routing of Elevated Trains in Chicago.—Present indications are that it will be some time before a general merger of the elevated and surface railway systems of Chicago is effected. This being the case the question has arisen of through-routing the trains of the elevated railways, which are now affiliated through the association known as the Chicago Elevated Railways. The executive committee of this association consists of Samuel Insull, Henry A. Blair and Ira M. Cobe. On May 5 these gentlemen wrote to Alderman Block, chairman of the committee on local transportation of the City Council, to say that there was no foundation to the charge that the companies have declined to through-route their trains. On the contrary, they are as keenly alive as the Aldermen to the necessity of giving their patrons the best service possible. Mr. Insull and his associates say that upon receiving the necessary authority from the city for the lengthening of platforms, the physical connection of tracks, the necessary structural changes and the construction of transfer platforms, they are prepared, as soon as it is physically possible, to through-route north and south elevated trains and to establish free transfers at transfer stations between those trains and the two West Side elevated railway systems. The representatives of the companies declare that it is their desire to do everything for the comfort and convenience of the public that is within the engineering possibilities of the situation.

Personal Mention

Mr. E. A. Graham has resigned as electrical engineer of the Winnipeg (Man.) Electric Railway.

Mr. S. Miller Gallaher has been appointed superintendent of the Charleston (W. Va.) Interurban Railroad to succeed Mr. J. C. Rockwell, resigned.

Mr. Frank B. Lasher, formerly auditor of the New York State Railways and the Mohawk Valley Company, has become identified with the organization of Mr. Harrison Williams, New York. A biography and portrait of Mr. Lasher were published in the ELECTRIC RAILWAY JOURNAL of April 5, 1913.

Mr. Frank E. Block has been elected president of the Georgia Railway & Electric Company, Atlanta, Ga., to succeed Mr. Joseph T. Orme, deceased. Mr. Block has long been a director of the Georgia Railway & Electric Company, the property of which is leased to the Georgia Railway & Power Company.

Mr. M. F. Werth, who has been chief clerk to the mechanical superintendent of the British Columbia Electric Railway, Vancouver, B. C., has been appointed acting mechanical superintendent, vice Mr. S. B. Thompson, resigned, who has entered business in New York as a member of the firm of Roosevelt & Thompson.

Mr. Russell Harrington, who has been connected with the accounting department of the Bay State Street Railway at Lowell and Haverhill, Mass., for more than a year, has been appointed cashier of the company at Lowell. Mr. Harrington was graduated from Lowell High School in 1909 and entered the employ of the Bay State Street Railway as a clerk.

Mr. P. A. Bertrand, formerly of Jefferson City, Mo., has been appointed general manager of the Gray's Harbor Railway & Light Company, Aberdeen, Wash., to succeed Mr. H. B. Zimmerman, who has been transferred to the New York office of the Federal Light & Traction Company, as noted elsewhere in this column. Mr. Bertrand will assume his duties with the Gray's Harbor Railway & Light Company on June 1, 1913.

Mr. Alexander Craig Culberson, Louisville, Ky., who has been connected with the editorial staff of the Louisville *Evening Post,* has become associated with his father, Mr. Samuel A. Culberson, in the management of the Rome Railway & Light Company, Rome, Ga., the Vincennes (Ind.) Traction Company and the Pascagoula Street Railway & Power Company, Pascagoula, Miss., of which companies Mr. S. A. Culberson is president.

Mr. A. R. Whaley, vice-president of the New York, New Haven & Hartford Railroad and the Central New England Railroad, has been appointed head of the engineering, construction and maintenance department in addition to his duties as head of the operating department of these companies. He succeeds Mr. E. H. McHenry, vice-president, who has become a member of the firm of McHenry & Murray, engineers, as previously mentioned in the ELECTRIC RAILWAY JOURNAL.

Mr. H. B. Zimmerman, who has been general manager of the Gray's Harbor Railway & Light Company, Aberdeen, Wash., for the past two years, has been transferred to the New York office of the Federal Light & Traction Company on special work. Mr. Zimmerman previous to taking charge of the property of the Gray's Harbor Railway & Light Company was general manager of the Depew & Lancaster Light, Power & Conduit Company and at the same time was sales manager of the Niagara, Lockport & Ontario Power Company and the Niagara & Erie Company, Buffalo, N. Y.

Mr. E. M. Wharff has resigned as assistant general superintendent and operating engineer of the Galesburg Railway & Light Company, Galesburg, Ill., where for the past year and a half he had full charge of the operation of the gas, electric railway and steam heat departments. He will become connected with the Automatic Devices Company, which recently purchased the good-will, tools, machinery and equipment of the Robson Manufacturing Company, Galesburg, Ill. The Automatic Devices Company will manufacture a spring-operated automobile engine starter, the invention of Mr. A. W. Knutson, the inventor of the Knutson trolley retriever. After he was graduated from Syracuse University as a mechanical-electrical engineer Mr. Wharff was with the so-called Beebe Syndicate of Central New York for five years. He resigned from the Beebe Syndicate to accept the position with the Galesburg property, which is owned by the Western Railways & Light Company.

Mr. Julius E. Rugg has retired as superintendent of employment and discharge of the Boston (Mass.) Elevated Railway. Mr. Rugg entered railway work in 1863 as a conductor on the Lynn & Boston Street Railway. He served in this capacity for a year and in the office of the company for three years, and was acting superintendent of the company from 1867 to 1872. He next became superintendent of the Highland Street Railway, operating in Boston and Roxbury. In 1888 he was appointed manager of the Minneapolis (Minn.) Street Railway and subsequently served as superintendent of the Citizens' Traction Company, Pittsburgh, Pa., for seven years. He returned to Boston and was appointed general superintendent of the West End Street Railway, in which capacity he served until 1898. From that year till 1907 Mr. Rugg was superintendent of transportation of the Boston Elevated Railway. He was next appointed superintendent of employment and discharge of the company.

Mr. James E. Allison has resigned as commissioner and chief engineer of the St. Louis Public Service Commission to engage in general consulting practice, making a specialty of public service valuation work and the examination of securities. Mr. Allison was graduated from Harvard University. Before coming to St. Louis he operated gas works and managed and designed for manufacturers of street railway equipment. In 1908 he was appointed chairman of the board of engineers of St. Louis and was consulting engineer in one of the departments of the World's Fair. In 1909 he was appointed commissioner and chief engineer of the St. Louis Public Service Commission and was reappointed in 1911. As chief engineer of the commission he made detailed valuations of public service property for the city of St. Louis, including the Union Electric Light & Power Company, United Railways, Bell Telephone Company, St. Louis Water Works, etc., representing a capitalization of about $170,000,000. He has published a number of reports, pamphlets and magazine articles on valuation and regulation subjects, of which one, on depreciation, was reproduced in part in the ELECTRIC RAILWAY JOURNAL.

OBITUARY

Clarence Deming, formerly associate editor of the *Railway Age Gazette,* died in New Haven on May 8, 1913. Mr. Deming was graduated at Yale in 1872. Following his graduation he served with the Troy *Whig* and the New Haven *Palladium,* and afterwards with the New York *Evening Post,* writing editorials on foreign economics, finance and railway topics. He was also for three years traveling correspondent of the *Evening Post.* He first contributed to the *Railroad Gazette* twelve years ago, and was later made an associate editor of that paper. Mr. Deming represented the Connecticut Company, New Haven, several years ago in the lengthy arbitration regarding the demands of the employees of that company throughout the State for an increase in wages.

J. P. E. Clark, general manager of the Binghamton (N. Y.) Railway and the Waverly, Sayre & Athens Traction Company, Waverly, N. Y., died in Binghamton on May 7, 1913, after a lingering illness. Mr. Clark was born in Troy, N. Y., on Oct. 21, 1858, and had been connected with the Binghamton Railway for more than twenty years. In January, 1913, he was relieved of the management of the affairs of the company for a period of one year with full pay and was granted leave of absence to undergo treatment abroad. In addition to the offices which he held with the companies previously mentioned Mr. Clark was also president of the Binghamton Chamber of Commerce, general manager of the Binghamton Industrial Exposition, secretary-treasurer of the Endicott Land Company and was interested in many other business concerns.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

St. Augustine & Palatka Rapid Transit Company, St. Augustine, Fla.—Incorporated in Florida to build a 26-mile electric railway from St. Augustine to Hastings and Palatka. This railway is to operate in conjunction with the Jacksonville & St. Augustine Public Service Corporation. Capital stock, $2,000,000. Officers: J. G. Merceur, Washington, D. C., president, and William La Croix, Detroit, secretary and treasurer.

Peoria, Canton & Galesburg Railroad, Peoria, Ill.—Incorporated in Illinois to build an electric railway from Peoria to Farmington and Galesburg. The Peoria Engineering & Construction Company, Jefferson Building, Peoria, will begin work at once on the section of the line between Peoria and Farmington. A traffic arrangement has been effected with the Illinois Central Electric Company, which operates a line from Farmington to Lewistown, via Norris, Canton, St. David and Bryant. The new terminal to be erected at Peoria by the Illinois Traction System will be used. Capital stock, $2,000,000. Officers: Horace Clark, president; C. B. Coffeen, vice-president; James A. Lyon, treasurer, and James A. Fenelson, secretary.

***Springfield, Taylorville & Pana Interurban Railway, Taylorville, Ill.**—Incorporated in Illinois to build an electric railway to connect Springfield, Taylorville and Pana. Capital stock, $325,000. Heaquarters, Taylorville. Incorporators: W. B. Adams and Albert Morgan, Taylorville; P. E. Balliet, Edinburg; George H. Baeker and H. V. Gehm, St. Louis, Mo.

***Ogden, Lewiston & Northern Railway, Ogden, Utah.**—Application for a charter has been made by this company in Utah to build an electric railway from Ogden, Utah, to Preston, Idaho. Surveys have been made and the county franchises have been secured. Capital stock, $100,000. Officers: Frederick W. Crockett, Logan, president; A. L. Hyer, Lewiston, vice-president; Morris J. Swinyard, Lewiston, secretary and treasurer; T. S. Karren and Martin Pond, Lewiston; John Johnson, Millville, and George S. Obray, directors.

FRANCHISES

Los Angeles, Cal.—The Los Angeles Railway has received a twenty-one-year franchise from the Council over certain streets in Los Angeles, beginning at Hoovar Street and Tenth Street.

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a franchise to make improvements in the rear of the Sixth Street and Main Street depot to relieve the Main Street congestion in Los Angeles.

San José, Cal.—The San José Railways has received franchises from the City Council over portions of the electric lines in Los Angeles formerly operated under county franchises.

Alton, Ill.—The Alton, Jacksonville & Peoria Railway has received a franchise from the Council to use the tracks of the Alton, Granite & St. Louis Railway from Third Street and Belle Street to the City Hall Square in Alton.

Nahant, Mass.—The Nahant & Lynn Street Railway has asked the Council for a franchise to double-track its line on Flash Road.

Linden, Mich.—Oliver H. Lau, Detroit, has asked the Council for a franchise in Linden. This is part of a plan to build an electric railway to connect Linden, Fenton and Holly. [E. R. J., March 29, '13.]

St. Louis, Mo.—The St. Louis & Jennings Railway has received a fifty-year franchise from the County Court for a line from the present terminus, Florissant Avenue and Jennings Road, to Melrose Avenue in St. Louis. David P. Leahy is interested.

Jamestown, N. Y.—The Jamestown Street Railway has received a fifty-year franchise from the Common Council to extend its Winsor Street line easterly on Willard Street to Willow Avenue in Jamestown.

Hatfield, Pa.—The Lehigh Valley Transit Company, Allentown, has received a franchise from the Council in Hatfield.

Pointe aux Trembles, Que.—The Montreal Tramway has asked the Council for a forty-year franchise in Pointe aux Trembles.

Saskatoon, Sask.—The Mayor and Council of Saskatoon have been asked to grant a franchise for an extension of the Saskatoon Electric Railway about 2 miles from the present terminus of the Mayfair line along Seventh Avenue to connect with the Seventh Avenue terminus.

Nashville, Tenn.—The Nashville Railway & Light Company has received a franchise from the Council for the extension of its Buena Vista line out Buchanan Street to Twenty-third Avenue in Nashville.

Wellsville, Utah.—The Logan Rapid Transit Company has received a franchise from the City Council in Wellsville.

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has received a franchise from the Common Council over Wells Street in Milwaukee.

TRACK AND ROADWAY

Gadsden, Ala.—Preliminary arrangements are being made for the survey for an electric railway to connect Gadsden, Center, Cave Springs and Rome. J. B. Wentworth, Gadsden, is interested. [E. R. J., Dec. 28, '13.]

Globe, Ariz.—The Stone & Webster Engineering Corporation, Boston, Mass., has been investigating the situation in Globe with a view of constructing an interurban electric railway to connect Globe, Miami and Live Oak. [E. R. J., Dec. 7, '12.]

Pacific Electric Railway, Los Angeles, Cal.—The work of placing ties and rails has been begun by this company at the Rialto end of the line and work is being done toward Bloomington. This company has secured permission to begin work at once on the San Pedro Street line in Los Angeles.

Oakland (Cal.) Traction Company.—Surveys have been made and plans are being considered by this company to extend its San Pablo line west on Market Street in Oakland to reach the plants of the Western States Porcelain Works, the Sterling Fixture Company and the Rebuilt Typewriter Company.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—Plans are being considered by this company to extend its San Pablo line west on Market Street in Richmond to reach several industrial plants.

Peninsular Railway, San José, Cal.—Plans are being made by this company to begin work at once on the extension of its San José and Santa Clara line in Santa Clara from Grant Street to the Southern Pacific depot.

San Ramon Valley Railway, San Francisco, Cal.—Palmer, McBryde and Quayle, Hooker and Lent Building, San Francisco, who have the contract for constructing a 9-mile electric railway up the San Ramon Valley for this railway, which is a branch of the Oakland, Antioch & Eastern Railway, have sublet all trestle and pile driving work to M. Anderson & Company, Oakland. The general contract includes all the work except the overhead construction.

Mount Tamalpais & Muir Woods Railway, San Rafael, Cal.—This company has received permission from the Railroad Commission to purchase the entire property of the Mill Valley & Mount Tamalpais Scenic Railway. The company plans to extend the line from West Point, on the slope of Mount Tamalpais, to Bolinas. [E. R. J., March 22, '13.]

Santa Barbara (Cal.) Consolidated Railway.—Work has been begun by this company rebuilding its Mission car line in Santa Barbara.

Tidewater & Southern Railroad, Stockton, Cal.—Work has been begun by this company electrifying its line from Stockton to Modesto.

Miami & South Florida Railway, Miami, Fla.—This company has been formed to build an electric railway from Detroit to West Palm Beach. Capital stock, $1,500,000. Officers: H. C. Roome, president; Nathan A. Cole, vice-president; J. M. Cobb, secretary and treasurer; A. A. Boggs and R. E. McDonald, directors. [E. R. J., Feb. 8, '13.]

Nez Perce & Idaho Railroad, Lewiston, Idaho.—Grading will be begun at once by this company on its line between Forest, Waha and Lewiston. Z. A. Johnson, Lewiston, president. [E. R. J., Aug. 31, '12.]

Wendell, Idaho.—Plans are being considered by this company to build an electric railway between Wendell, Hagerman and Buhl. J. Stewart Clark, Twin City, is interested. [E. R. J., Aug. 24, '12.]

Belleville & Mascoutah Traction Company, Belleville, Ill.—Surveys have been made and grading completed on this 11-mile line between Belleville and Mascoutah.

Springfield & Central Illinois Traction Company, Springfield, Ill.—This company has increased its authorized capital stock from $100,000 to $20,000,000. This railway will connect Springfield, Terre Haute, St. Louis and Duquoin. Isaac Smith, 1042 Pierce Building, St. Louis, president. [E. R. J., April 19, '13.]

Fort Wayne & Toledo Electric Railway, Harlan, Ind.—This company advises that surveys have been made for its 55-mile line between Fort Wayne and Bryan, Ohio. Grading has been done between Fort Wayne and Harlan, a distance of 15 miles, and construction will soon be begun. Power will be purchased. This line will connect Fort Wayne and Harlan, Ind., and Hicksville, Former Center, Williams Center and Bryan, Ohio. The company will do its own work. W. H. Cost, New Albany, Ind., chief engineer.

Indianapolis & Delphi Traction Company, Indianapolis, Ind.—This company has filed a mortgage for $2,000,000 with an Indianapolis trust company as trustee. The company proposed to build an electric railway from Carmel to Sheridan and Frankfort, Ind. Trackage rights from Carmel to Indianapolis are to be arranged over the lines of the Indiana Union Traction Company. The line will open a new section to electric transportation, and construction is to begin within a few weeks. [E. R. J., Oct. 17, '11.]

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.—This company plans to extend its Mount Vernon Road line, its Grand Avenue line, its Thirteenth Street line and the Third Avenue lines in Cedar Rapids in the near future. It will also double-track sections of its lines on First Avenue and on Third Avenue, making the approximate length of new lines and reconstructed lines about 8½ miles, of which 6.56 are additional track.

Fort Dodge, Des Moines & Southern Railroad, Des Moines, Ia.—Homer Loring, receiver for this company, has submitted a proposition to the people of Fort Dodge and other towns between it and Spirit Lake for the construction of an electric railway between Des Moines and Spirit Lake. The offer is based on agreements with the Rock Island Railroad and the Minneapolis & St. Louis Railroad Companies. The plan is to electrify the line of the Minneapolis & St. Louis Railroad from Fort Dodge to Livermore. From that point the Rock Island branch to Spirit Lake will be converted into an electric line. Mr. Loring asks the people in the towns through which the railway extends to raise a bonus equal to 25 per cent of the cost of electrification.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—Within the next sixty days this company will place contracts for the concrete, bridge work, grading and track work, and the pole-line construction and will purchase rails, ties, poles, wire and cars for 40 miles of track. This line will connect Kansas City and Bonner Springs via the Kaw Valley. J. D. Waters, president. [E. R. J., March 29, '13.]

Manhattan City & Interurban Railway, Manhattan, Kan.—This company has plans under way for the extension of its line from Manhattan to Topeka, thus connecting the line from Junction City to Topeka. The Rocky Ford Power Company will furnish the power for the line.

Louisville & Interurban Railway, Louisville, Ky.—The matter of urging an extension of the lines of this company from its present terminus at Shelbyville to Frankfort has been referred by the directorate of the Louisville Board of Trade to a standing committee on State development. The extension of the line to Frankfort, about 55 miles from Louisville, has been urgently solicited.

Bay State Street Railway, Boston, Mass.—Work has been begun by this company on double-tracking its line in Beverly from Fayette Street to the Beverly Bridge.

Cheboygan Electric Light & Power Company, Cheboygan, Mich.—Work will be begun at once by this company on its Pellston line. It will connect Cheboygan and Petoskey via the Mullet Lake and Burt Lake districts. F. B. Spencer, general manager. [E. R. J., Jan. 4, '13.]

Grand Rapids, Holland & Chicago Railway, Holland, Mich.—It is reported that plans are being considered by this company to build a 10-mile line along the Lake Michigan front to Saugatuck.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—This company has placed in operation the section of its line between Kansas City and St. Joseph.

***Faribault, Minn.**—H. A. Knight and associates are considering plans to build an electric railway from Faribault south to Wells and thence west to Sioux Falls.

***Linden, N. J.**—Plans are being made to build an electric railway from Linden to Warner Station. The line will be 6 miles long and connections will be made with Elizabeth and Rahway.

Cloudcroft-Pecos Valley Railway, Cloudcroft, N. M.—It is stated that the General Electric Company has agreed to report on the proposed interurban electric railway between Artesia and Cloudcroft, 125 miles. It is planned to erect a hydroelectric plant at the falls on the Penasco River. The route under consideration runs from Artesia to Hope and Elk, thence through the James Canyon to Cloudcroft. [E. R. J., April 26, '13.]

Buffalo (N. Y.) Southern Railway.—This company has partly graded its 8-mile line between East Seneca and East Aurora.

Charlotte (N. C.) Electric Railway.—This company has placed in operation its new line to the Mecklenburg Country Club.

Ohio Electric Railway, Cincinnati, Ohio.—This company recently began the construction of its line over the Gilbert Avenue viaduct in Cincinnati. Cable slots on Gilbert Avenue are to be taken up and new tracks laid.

Kansas-Oklahoma Traction Company, Nowata, Okla.—Work will be begun at once by this company on its line between Nowata, Okla., and Coffeyville, Kan. Clyde A. King, Coffeyville, has charge of the surveys. [E. R. J., March 1, '13.]

Brantford (Ont.) Street Railway.—This company has received permission from the committee of railways and Canals at Ottawa to extend its railway from Langford to a point near Galt.

Niagara, Welland & Lake Erie Railway, Niagara Falls, Ont.—Surveys have been begun by this company for the 36-mile section of its line from Niagara Falls to Welland and Port Colborne and east along the lake shore to Fort Erie. C. J. Laughlan, Jr., Welland, general manager.

Lehigh Valley Transit Company, Allentown, Pa.—This company has secured the entire right-of-way for a proposed new double-track line from Lansdale north to Souderton. Bids have been asked for the construction of this 14-mile section.

***Lancaster, Pa.**—Ezra Zimmerman and other representatives of the bond house of W. D. Sloan & Company, New York, N. Y., are considering plans to build an 18-mile interurban railway between Lancaster and White Horse. Storage battery cars will probably be used.

Dallas Eastern Interurban Railway, Dallas, Tex.—Surveys have been begun by this company on its line between Dallas, Gainesville and Denton. E. P. Turner, promoter. [E. R. J., March 8, '13.]

Dallas Western Interurban Railway, Dallas, Tex.—Surveys have been begun by this company on its line between Dallas and Glenrose, via Cleburne. E. P. Turner, promoter. [E. R. J., July 13, '12.]

Houston (Tex.) Electric Railway.—This company has placed in operation its new line through Central Park and Magnolia Park in Houston.

***Trackless Trolley Company, Appalachia, Va.**—The Trackless Trolley Company of the South has been organized at Appalachia, Va. It is proposed to establish a trolley system to be operated over the new stone roads in Wise County. The company has taken over the patent rights to use the trackless trolley cars in Virginia, West Virginia, eastern Kentucky and east Tennessee.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—This company will lay new rails and improve the roadbed on Herron Street between K Street and Division Street in Aberdeen at once. The company also plans to spend about $30,000 on its holdings in the Gray's Harbor country during the summer.

Tacoma Railway & Power Company, Tacoma, Wash.—This company announces that it will spend about $315,000 in reconstructing its present lines in Tacoma. The work will be begun early in June.

Ohio Valley Electric Railway, Huntington, W. Va.—This company, which is owned by the American Railways Company, has decided not to build the proposed line between Ashland and Russell. The surveys and estimates of the cost of this line reach the sum of $200,000 and the company concluded that the line would not pay.

SHOPS AND BUILDINGS

Chicago (Ill.) Railways.—In a fire on May 6 at the carhouse of the Chicago Railways, located at West Division Street and Northwestern Avenue, Chicago, six double-truck cars and fifteen single-truck cars were destroyed. It is estimated that the total loss on the building and contents will reach $75,000.

Evansville (Ind.) Railways.—Plans are being made by this company to begin work on the improvements at its repair shops on Maryland Street in Evansville. The addition will cost about $20,000.

Public Utilities Company, Evansville, Ind.—A new carhouse will be built by this company at Water Street and Goodsell Street in Evansville in the near future. The cost is estimated to be about $30,000.

Chicago, Lake Shore & South Bend Railway, South Bend, Ind.—Plans are being made by this company to build soon a new terminal for passenger traffic and new carhouses in South Bend.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—Announcement has been made by this company of the proposed expenditure of $40,000 in the construction of an addition to its carhouse in Spartanburg.

Southern Traction Company, Dallas, Tex.—Plans are being considered by this company to build new machine shops in the southern city limits of Dallas.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—During the next four months this company will award contracts to build a new carhouse in Aberdeen. The structure will be 105 ft. x 110 ft. and of steel frame and galvanized-iron construction.

POWER HOUSES AND SUBSTATIONS

Northwestern Pacific Railroad, San Francisco, Cal.—This company has placed an order with the General Electric Company for a 1325-kva motor-generator set and switchboard apparatus to be installed at its Alto power house near Sausalito.

Lewiston-Clarkston Valley Railway, Lewiston, Idaho.—This company has awarded a contract for its new substation equipment and electrical appliances to the General Electric Company, Portland, Ore. F. L. Sturm, Lewiston, Idaho, is interested. [E. R. J., April 12, '13.]

Evansville (Ind.) Railways.—The old power house of this company located on Water Street in Evansville is to be dismantled at once. Everything except the brick buildings will be cleared off. The buildings will be remodeled, enlarged and improved. The cost is estimated to be about $30,000.

Lewiston, Augusta & Waterville Street Railway, Portland, Maine.—This company will add to its substation equipment a 400-kw motor-generator set and switchboard apparatus. The apparatus has been ordered from the General Electric Company.

Rhode Island Company, Providence, R. I.—This company will add to the equipment in its Manchester Street substation nine 150-kva transformers, six 200-kva reactances, two 200-kw induction-motor-driven exciters and switchboard apparatus. The order has been placed with the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Hagerstown (Md.) Railway is reported as expecting to purchase seven double-truck cars.

Capital Traction Company, Washington, D. C., has just ordered five double-truck cars from The J. G. Brill Company.

Shore Line Electric Railway, Saybrook, Conn., has ordered one express car body from the Wason Manufacturing Company.

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., is in the market for several standard double-truck pay-as-you-enter cars.

Chicago (Ill.) Railways is asking for bids on 150 new cars, according to specifications which are now being prepared by the company.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., expects to purchase several new cars to equip its new 40-mile line.

Manhattan & Queens Traction Corporation, Patchogue, N. Y., has ordered twenty-five center-entrance cars from the St. Louis Car Company.

Bay State Street Railway, Boston, Mass., has placed an order with the Laconia Car Company for fifty 28-ft. semi-convertible car bodies and five express car bodies.

Memphis (Tenn.) Street Railway expects to be in the market soon for thirty cars, including both motor and trail. As yet no decision has been reached as to the details of this equipment.

Bangor Railway & Electric Company, Bangor, Maine, has placed an order with the Wason Manufacturing Company for three semi-convertible cars mounted on Brill 27-MCB-1 trucks.

Manhattan Bridge Three-Cent Fare Line, Brooklyn, N. Y., has purchased through W. R. Kerschner from the Cincinnati Car Company six double-truck cars mounted on Standard O-36 trucks.

New York State Railways, Rochester, N. Y., has ordered twenty-five pay-as-you-enter car bodies with trucks and twenty-five center-entrance cars from the G. C. Kuhlman Car Company.

Chicago (Ill.) Railways Company lost six double-truck cars and fifteen single-truck cars by fire on May 6, 1913, in its carhouse at West Division Street and Northwestern Avenue, Chicago.

San Diego (Cal.) Electric Railway expects to purchase several cars in the near future. The company is now working on the specifications, but at this time has not determined on the type of car.

East St. Louis & Suburban Railway, East St. Louis, Ill., has purchased ten 33-ft. 4-in. closed cars with 27-MCB-24 trucks and five 28-ft. 8-in. closed pay-as-you-enter cars, with No. 22 special trucks, from the American Car Company.

Norfolk & Western Railway, Norfolk, Va., expects to purchase twenty-five electric locomotives for use on the 30-mile section of its line which is to be electrified between Bluefield and Vivian, W. Va. The locomotives will be used for both switching and main-line service.

Imperial Japanese Government Line, Tokyo, Japan, expects to purchase a large number of railway cars during the coming year, for use on its double-track electric railway between Yokohama and Tokyo. Communications in regard to the equipment for the line may be addressed in English to the Imperial Japanese Railway Bureau, Tokyo, Japan.

British Columbia Electric Railway, New Westminster, B. C., expects to purchase sixteen passenger cars for city service. Over its interurban lines the company will require three additional passenger cars, three baggage and express cars and two combination mail cars. For freight service will be ordered fifty box cars, thirty flat cars and twenty-five steel dump cars. In addition to this the company plans to purchase three snow sweepers.

Detroit (Mich.) United Railways has specified the following details for the fifty single-truck cars recently ordered from the Cincinnati Car Company:

Seating capacity	28
Length of body	23 ft. 1½ in.
Length over vestibule	34 ft. 6½ in.
Width over all	8 ft. 0 in.
Height, rail to sills	25½ in.
Sill to trolley base	9 ft. 4¼ in.
Body	wood
Interior trim	white oak
Headlining	¼-in. Galco
Roof	monitor
Underframe	wood
Bumpers	⅜-in. x 7-in. plate
Cables	BS-00 single braid, rubber covered
Car trimmings	Dayton
Curtain fixtures	Forsyth
Curtain material	Pantasote
Destination signs	Hunter
Gongs	12-in. pedal alarm
Headlights	Golden Glow
Seats	longitudinal
Seating material	Wilton carpet
Step treads	Mason
Trolley catchers	Ideal
Varnish	Berry

Belt Line Railway, New York, N. Y., reported in the Electric Railway Journal of April 12, 1913, as having ordered forty 18-ft. storage battery cars from The J. G. Brill Company, has included the following details in the specifications for this equipment:

Weight (car body only)	4500 lb.
Length of body	18 ft. 0 in.
Length over vestibule	25 ft. 6½ in.
Width over sills	6 ft. 5½ in.
Width over all	7 ft. 9¼ in.
Height, rail to sills	2 ft. 5½ in.
Sill over roof	8 ft. 2½ in.
Body	wood
Interior trim	bronze
Headlining	carline finish
Roof	monitor
Underframe	wood
Bumpers	angle iron
Cables	G.E.
Car trimmings	Brill
Controls	hand
Conduits and junction boxes	G.E.
Curtain fixtures	Tuco
Curtain material	Pantasote
Destination signs	board
Gears and pinions	solid
Gongs	8-in. pedal
Hand brakes	Brill
Headlights	Elec. Serv. S. Co.
Journal boxes	roller-bearing
Motors	G.E.-1027
Sanders	Columbia
Sash fixtures	Brill
Seats	longitudinal
Seating material	solid veneer
Springs	Brill
Trucks	Brill special
Varnish	Murphy
Wheels	cast iron

TRADE NOTES

Trackless Trolley Company of America, New York, N. Y., has removed its offices in the Hudson Terminal Building from Suite 348 to Suite 819.

Standard Coupler Company, New York, N. Y., has removed its offices from the United States Express Building to temporary quarters in the Hudson Terminal Building, New York.

W. J. Jeandron, New York, N. Y., American representative for the Le Carbone Brush Company, is at present on his annual trip to Paris, France, to visit the plant of the company.

Ohio Brass Company, Mansfield, Ohio, has received a contract from the Boston Elevated Railway for 610 automatic air connecting coupler and draft gear equipments for heavy subway and elevated train service.

Perry Ventilator Corporation, New Bedford, Mass., has received orders for ventilators for the thirty new cars now building at the works of the Pressed Steel Car Company for the Boston Elevated Railway.

Curtain Supply Company, Chicago, Ill., has received the order for equipping the forty-five new storage-battery cars of the New York Railways with curtains. These cars are being built by the American Car & Foundry Company.

J. W. McCrosky, the general South American representative of J. G. White & Company, Ltd., of London, expects to arrive in New York May 16 for a holiday visit. While here his headquarters will be at the New York office of J. G. White & Company.

The J. G. Brill Company, Philadelphia, Pa., has received an order from the South Covington & Cincinnati Street Railway, Covington, Ky., for ten 21-E trucks. Also another from the Boston (Mass.) Elevated Railway for fifty-five pairs of Brill 27-MCB-2 trucks.

C. H. Wheeler Manufacturing Company, Philadelphia, Pa., is making extensive enlargements and improvements in its works, due to the rapid increase in sales for high-vacuum condensing apparatus and Rotrex air pumps. The company has increased its capital stock from $200,000 to $600,000.

Platt Iron Works Company, Dayton, Ohio, state that many exaggerated reports have been circulated concerning the damage done to the plant by the recent flood. While it is true that the company suffered considerable damage, the buildings were practically uninjured and have been repaired more quickly than anticipated. A small portion of the plant was put in operation on April 7, and on April 21 the entire plant was running normally.

Power Specialty Company, New York, N. Y., reports that owing to the rapid increase in the demand for Foster superheaters, it is building a new erecting shop 300 ft. x 96 ft. Among recent contracts received for Foster superheaters are the following: Public Service Corporation, Burlington, N. J.; Rhode Island Company, Providence, R. I.; Havana Electric Railway, Light & Power Company, Havana, Cuba; Rochester Railway & Light Company, Rochester, N. Y.; Jones & Loughlin Steel Company, Pittsburgh, Pa., and Brier Hill Steel Company, Youngstown, Ohio.

ADVERTISING LITERATURE

Bridgeport Brass Company, Bridgeport, Conn., has printed a folder on "Phono-Electric" wire.

K. P. F. Electric Company, San Francisco, Cal., has printed Bulletin No. 102, pertaining to K. P. F. high-tension switches.

H. M. Byllesby & Company, Chicago, Ill., have recently issued Department Bulletin No. 3, entitled "Of What Use Is an Appraisal?"

General Bakelite Company, New York, N. Y., has issued a booklet describing Bakelite molded insulation and its various properties.

H. W. Johns-Manville Company, New York, N. Y., has printed a small folder giving a list of J-M asbestos, magnesia and electrical products.

Sherwin-Williams Company, Cleveland, Ohio, is distributing a new catalog describing "Ajax" insulating varnishes and impregnating compounds.

American Mineral Wood Manufacturing Company, Poughkeepsie, N. Y., has just printed a small booklet on "Eterno," a fireproof and waterproof substitute for wood.

Edward B. Smith & Company, Philadelphia, Pa., bankers, have recently issued a chart showing railway stocks on which dividends have been paid continuously from twenty-one to fifty-seven years.

Vulcan Engineering Sales Company, Chicago, Ill., is distributing Catalog No. 51 on foundry molding machinery, illustrating the molding machines of the Mulford Molding Machine Company, for which it is sales agent.

Esterline Company, Indianapolis, Ind., has issued a new catalog on Golden Glow headlights for railway service. This catalog is descriptive of the different types of Golden Glow lamps for city cars and powerful incandescent headlights for interurban service.

Ohio Brass Company, Mansfield, Ohio, has issued a folder in which the type J all-wire rail bond is described and illustrated. The motor-driven milling machine and hollow milling cutter used in connection with the installation of the bond are also described and illustrated.

American Steel & Wire Company, Chicago, Ill., has printed an attractive booklet fully describing triangle mesh wire, reinforced concrete pavements and roadways. The booklet also contains many illustrations of work that has been done by the company throughout the country.

The J. G. Brill Company, Philadelphia, Pa., has issued the *Brill Magazine* for April, 1913, which contains an illustrated biography of T. J. Minary, president and general manager of the Louisville (Ky.) Railway. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Louisville, Ky.," "Representative Types of Electric Railway Rolling Stock," "Novel Operation of New Prepayment Cars for Madison, Wis.," "Motor Omnibuses for Washington, D. C., Prepayment System."

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MAY 17, 1913 No. 20

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.

Chicago Office..............................1570 Old Colony Building
Philadelphia Office.........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8100 *copies are printed.*

OPERATIVE AGREEMENTS IN CHICAGO

The abandonment or postponement of the plan for the consolidation of the elevated and surface railways of Chicago into a single unit for purposes of operation will probably be followed by an operating agreement between the surface companies alone and a separate operating agreement between the elevated companies alone. These should result in an improvement in both surface and elevated operation. The revised plan made necessary by the failure of the first negotiations to reach a satisfactory conclusion does not provide for any operating agreements between the two classes of roads such as would have been made if the proposed general merger had been worked out on lines which would have justified the companies in introducing more of the changes desired by the city. The steps that are now under discussion in Chicago will meet only part of the requirements for the betterment of transportation facilities. The remainder are dependent upon the adoption of a satisfactory financial and operating plan for the creation of a terminal subway in the downtown district and for such interchange agreements between the surface and elevated lines as will promote the use of the elevated lines for long-distance travel and will tend to restrict the shorter-distance haul to the slower-moving surface cars.

BLOCK SIGNALS ON INDIANA LINES

The placing of contracts completing the installation of block signals planned for this year on the interurban lines in the State of Indiana affords an evidence of the willingness of railway managements to go to any reasonable length in meeting the wishes of the public. Every one of the lines in question has only recently been subjected to heavy loss from the disastrous floods in the Middle West, and in several cases the properties suffered material physical damage in addition to the losses in revenue due to the general suspension of service. There was, in fact, every reason for a postponement of the work of signal installation until the railways had, at least in part, recovered from the effect of the disaster. The interurban mileage in Indiana is at present about 1500, and of this only 71 miles, or 5 per cent, is equipped with signals. Yet the projected installations will raise this approximately 300 miles, 20 per cent of the total interurban mileage, within a year. When it is remembered that approximately 40 per cent of the steam railroad mileage in the country has been equipped with block signals during the many years which have elapsed since automatic signals were first introduced, an idea is obtained of the relative magnitude of the work which the Indiana lines have undertaken.

EFFECT OF STRIKE LOSSES IN DULUTH

The decrease in total revenue of the Duluth-Superior Traction Company shown by the abstract of the annual report for the calendar year 1912 published in the issue of the Electric Railway Journal for April 5, 1913, is the first reduction in gross reported by this company for any year since 1904. It is, of course, the result of the strike which lasted on the property for two months last fall. The decrease amounted to 4.6 per cent. It compared with gains in 1911 of 4 per cent, in 1910 of 9.4 per cent and in 1909 of 11.8 per cent. This, however, represents only the effect due to the traffic that the company did not receive because of the strike conditions. Another outcome of the strike was a charge against the surplus of $75,561 on account of extraordinary strike expenditures. Without regard to this extraordinary charge, the ordinary operations of the year, after provision for operating expenses, taxes, interest and the regular dividends of 4 per cent on the preferred stock and 5 per cent on the common stock, showed a deficit of $1,224. After the appropriation of $70,114 for depreciation the net result was a deficit of $71,338. The average gain per year in gross revenue in the three years preceding 1912 was 8.4 per cent. If there had been a gain in 1912 at the small rate of only 4 per cent, as in 1911, it would have made a difference of $97,000 in gross revenue. Strike losses are a very serious charge on the revenues and prosperity of a company, and, while they arrest its progress, they are only a part of a larger and more general loss in curtailment of buying power and inconvenience that is suffered by the entire community.

CONVENIENCE AS AN ASSET TO RAILWAYS

Experience indicates that where a public utility service is rendered in units which are purchasable by small sums of money its successful development depends to a large degree upon the factor of convenience. The introduction of shorter car intervals always tends to increase the amount of riding in cities and large towns, simply because it cuts down the total time required to journey between local points. Much of the business which has been captured in the suburbs from steam railroads by cars making much slower time than that of the trains has been due to the frequency of the electric service. And in like manner the sale of metal or other tickets encourages riding just as the possession of a book of drug store coupons tends to stimulate the use of the soda fountain far beyond its normal patronage with cold cash. On the lines of the Union Street Railway, New Bedford, Mass., a rather novel extension of this idea is in force in the weekly sale of nickels by representatives of the company to local merchants along its routes in the various centers of population in the long and narrow territory served. Every Friday the nickel distributers make the rounds of the stores, and by means of an even exchange of money a large volume of these useful coins is put in circulation immediately before the large industrial population of the city completes its week's work and begins its pay day shopping. The nickels are given freely in change and are in so much demand by the public that on a recent Friday when a certain large store was overlooked in the distribution immediate and forceful complaints were forthcoming. The company is convinced that the scheme has been an important factor in stimulating riding upon its lines, and the cost of endeavoring to flood the town with nickels is trifling in proportion to the benefits of the increased traffic.

NO CORPORATION TAX FOR LEASED COMPANIES

According to Attorney-General McReynolds, the refusal of the United States Supreme Court on May 12 to order a rehearing in the case of the Minehill & Schuylkill Haven Railroad involving the collection of the federal corporation tax has left a large loophole in the law. It is claimed that under the decision in this case, given by the Supreme Court on April 7, it will be possible for any corporation to escape payment of the corporation tax merely through leasing its plant to a holding company.

The facts in the Minehill case are briefly that the company, a Pennsylvania railroad corporation, leased its road in 1896 to the Philadelphia & Reading Railway for 999 years, at a certain annual rental, with the right to assume control and operation at the expiration of this time or upon violation of the lease. Since that time the Reading company has operated the line, but the Minehill company has kept its corporate existence, maintained its organization through annual elections, received rental, interest and dividends from a "contingent" fund, and paid annual salaries and dividends. Suit was recently brought by the Minehill company against the collector of internal revenue for the purpose of securing a refund of the corporation tax for 1908 and 1909, on the ground that it was not "doing business" within the meaning of the act as it was not fulfilling the prime object of its incorporation, the maintenance and operation of its road. It was the lessee which was "doing business" and it should pay the tax instead of the lessor. Objection was made that taxation would be escaped altogether, inasmuch as the Reading company could deduct from its gross income the amount of the rental paid, but the court held that it was the intention of Congress to have the lessee make such deductions whether the lessor was within the scheme of taxation or not.

The government now fears that not only railroads but all other corporations may avoid taxation under the corporation tax law by simply leasing their plants and even that stockholders of a corporation may organize a holding and operating company, leasing its plant to the latter at a figure so high as to leave no taxable income, while, at the same time, the lessee corporation would not be taxable on its income. If this view is correct, the government is confronted not only with the necessity of refunding many thousands of dollars collected but also with the prospect of finding a constantly decreasing number of taxable companies.

As the decision of the court was simply upon the construction of the existing statute its effect will continue only so long as Congress retains that statute as law. The income tax provision of the Underwood tariff bill is based upon a different principle. The tax is one on incomes and is not restricted by any technical distinctions in regard to "doing business" but is specifically assessable against incomes from every source, with a few minor exceptions. Hence lessor companies, whether "in business" or not, will find themselves within the taxable limits.

MONEY CANNOT BE PAID OUT IF IT IS NOT IN HAND

The talk of Mayor Fitzgerald of Boston in reference to the conditions confronting the Boston Elevated Railway, which was published in our issue of April 26, is a rare example of courage on the part of a public man. Mayor Fitzgerald, speaking with evident sympathy for the trainmen, asked how they are going to get an increase in pay if the company is not in a position to pay out any more money. This is in marked contrast to the policy-inspired utterance of a member of a recent board of arbitration, who said that if the evidence showed that the men ought to receive more wages, they should have them without regard to the question of whether or not the companies concerned were able to pay dividends.

The issue involved in questions of this nature and its effect on the company, the employees and the public are very clear. A company is entitled to protect its legitimate investments, to pay a fair rate of interest thereon, and to pay its men such wages and render such service to the public as it can with consistent regard for all of the factors. It is not the duty of the company to meet demands of employees for increased pay by foregoing the payment of an interest return on the reasonable capital value of the property. It is the capital outlay which creates the property that furnishes work for the employees and, in connection with that work, provides service for the public. While capital is sometimes lost or does not earn a fair rate of interest, a large going company is impelled continually to add new facilities because of the demands of increased population for more transportation; and if the initial capital is lost, or if a fair rate of interest is not paid thereon, the additional capital to enable the company to meet the demands for further facilities will not be forthcoming.

This question is particularly acute just at the present time in Massachusetts, because the Board of Railroad Commissioners of that State has tried under the law to safeguard the interest of the public by directing the various transportation companies to issue new stock at the prices which it prescribed. These prices in the case of the Boston Elevated Railway, as well as in that of the Boston & Maine Railroad, both of whose securities have declined seriously, were fixed by the commission on different occasions at prices far above those now prevailing. When the State prescribes the prices at which the stockholders of corporations must buy the stock, if they buy it at all, does it not assume a moral responsibility in the matter? It says in effect that the stock is worth the price it names, and its pronouncement goes far to establish a market for the securities and to enable the company to secure the capital it needs for additions and betterments. Having helped in the sale of the securities at a high price, the State should not then wash its hands of the matter and let the securities and the owners save themselves if they can.

The thing that the public does not seem to understand is that the cost of wages is part of the cost of operation. The cost of operation must be met from the earnings, and if the earnings are not large enough to meet this cost, the enterprise must undergo reorganization, the rate of fare must be increased or the cost of operation must be reduced. If a company is protecting its capital investment and paying a fair rate of dividend—such a moderate rate for instance as the Boston Elevated Railway has maintained—and if it does no more than this, then it cannot meet an increase in wages and continue as a going corporation without a reduction in the quality or amount of the service or a reduction in the rate of dividends. A prosperous community owes the public utilities that serve it a fair rate of return and full protection.

MUNICIPAL RESPONSIBILITY FOR STRIKE LOSSES

In the United States District Court at Newark, N. J., last week a jury rendered a verdict which, if sustained, may prove of great importance to electric railways and others who suffer losses as a result of strikes. It concerns the liability of the municipalities for losses caused by failure to afford protection against strike damage and to enable business to be carried on. This case arose out of the strike of express-wagon drivers in 1910. The Wells-Fargo Express Company sought to prove and apparently convinced the jury that it had suffered $300 damages to its property and $43,000 loss of business as a result of the failure of the city to provide adequate police protection. These amounts were awarded by the jury to the company in spite of the fact that the city introduced evidence to show that it had added to the police force and had sought diligently to protect the property of the company and to enable it to carry on its business. It was shown by the company, however, that whatever may have been the efforts of the city, as a matter of fact adequate protection was not given.

As a part of the company's case evidence was introduced to the effect that its own employees were not on strike and that the interference with its business was incident to strikes declared against other express companies. How much influence this had on the jury does not appear, but it seems to have little or nothing to do with the scope or application of the verdict, for the reason that in nearly all labor troubles the employer can show that a relatively small number of employees actually participate in the declaration of a strike, the majority being prevented from working by fear or intimidation which would not exist if thorough protection were given to men who desire to work.

There have been prior cases where railways and others have recovered against municipalities for failure to provide protection in case of strikes, but the disposition is usually to avoid litigation of this kind for the reason apparently that the utility company hesitates to antagonize a community by damage suits. More often the company that suffers loss by reason of inadequate protection talks about a damage suit and then after the trouble is over pockets its loss and forgets its threat to make the city pay. In the case of the nine weeks' strike in Philadelphia $2,225,000 was charged to strike losses, a very large part of which could presumably have been recovered from the city, but no effort was made to make the city pay for its inadequate protection of property or for the business losses that proper policing would have made impossible, although these losses amounted to as much as $50,000 a day for weeks at a time. No doubt, sound reasoning directed the Philadelphia company's course in this instance, but it is evident that if street railways would make it a rule to collect damages in every case where it could be shown that losses are due to inadequate police protection a few substantial verdicts would have the effect of making city administrations more active in protecting property and enabling companies to operate their lines. It too often happens that a city administration for political reasons is slow to take radical measures to suppress lawlessness, but if it were shown that such timidity is likely to cost a city heavily in dollars and cents, there would be a far stronger public demand than now exists for the kind of protection and policing that enables a company to run its cars in spite of the objections of strikers. If the fear of damages to be collected did not influence the mayor, it might at least bring some sense of responsibility to the representative citizens and taxpayers.

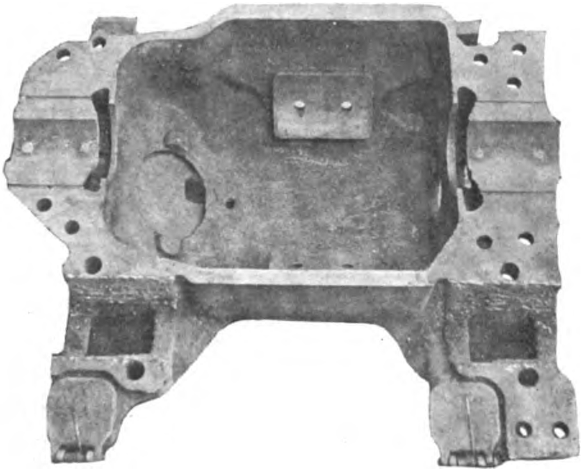
Too often when violence follows a strike the city authorities overlook their duties and the law-abiding citizens' responsibilities in the matter. Their first thought seems to be that of peace at any price, whereas the matter about which they should be most concerned is the maintenance of law and order. After these are established there is plenty of time to consider the merits of the controversy.

This seems to have been the sober second thought of the Mayor of Cincinnati this week. The strike there was accompanied with the usual acts of intimidation and destruction and even of murder. The only remedy for such a condition which suggested itself to the Mayor was "arbitration"! But after the company accepted this, the employees attempted to make important changes in the conditions under which they would arbitrate, and the city authorities have now been compelled to face the question which was really paramount from the first, that is, whether law or disorder is to rule. To this, of course, there can be but one answer.

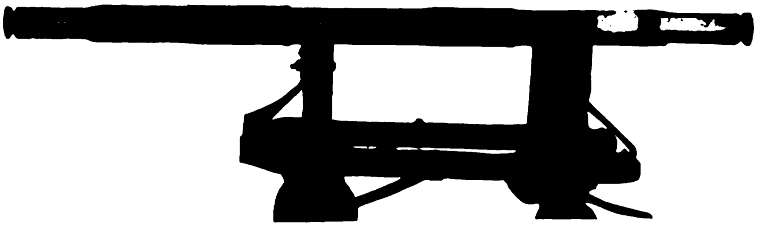
Electric-Arc Welding and Other Features of the San Francisco Shops

Particulars Are Given of the Different Kinds of Shop Repair Work Undertaken in San Francisco with the Electric Arc—A List of Savings Made Is Included—Novel Equipment for the Paint Shop Is Also Described

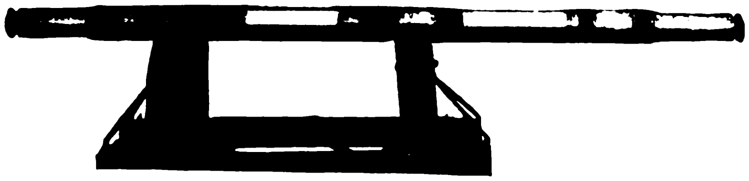
One of the features of the large shops of the United Railroads of San Francisco is the system of using the electric arc for a great many classes of electric railway repairs. The method was developed in the shops of the company by J. M. Yount, master mechanic; Edward S. Branaman, general foreman, and Thomas Finigan, purchasing agent. A portable welding outfit embodying the ideas of these inventors has since been placed on the market with their approval, and the system is used in a number of shops. It is employed, however, more extensively in the shops of the United Railroads property, the place of its origin, than in any other place, and it has there a greater range of service. An account was published in the issue of this paper for Jan. 11, 1913, describing some of the work done in the San Francisco shops, but the greater part of that article was devoted to the methods employed for rehabilitating special work in that city. The shop uses are, however, much wider in their scope, and in the accompanying article an effort has been made to summarize some of the work accomplished as well as to give a statement of the cost of the operation applied to car parts and the net saving. These figures are taken from the shop reports of actual work done.



San Francisco Shops—Motor Casing with Bearing Housings Renewed by Arc Welding



San Francisco Shops—Worn Axle Built Up in Motor-Bearing Seats



San Francisco Shops—The Same Axle Ready for Use After Metal Added to Worn Portions by Welding Has Been Machined

PROCESS OF WELDING

The process of welding is so simple that it does not require an expert to handle it. In fact, any ordinary laborer can be instructed in its use after a few hours' practice. The welding apparatus consists of a portable rheostat from which is attached an insulated wire, to the end of which is fastened a piece of brass 1 in. thick and 1½ in. in diameter. Through the center of this brass is a ⅜-in. hole, through which is placed the 3/16-in. or 5/16-in. steel electrode, a set screw being inserted to hold the electrode in place. A piece of split fiber 26 in. long is placed over the wire to act as a handle and for the protection of the operator. The operator wears a leather hood with colored glass lenses for the protection of the eyes.

In welding axles two methods are employed, the size determining which one should be used. When the motor-bearing seats of an axle are worn too much for further service and the diameter is 4¼ in. or under, it undergoes a building-up process; that is to say, layers of metal are fused on until it is brought up to a size somewhat larger than the diameter desired, after which it is put into a lathe and turned to the proper size. If the axle is 5 in. or 5½ in. in diameter, the bearing seats are first turned down to 4⅝ in. A steel shell made up of four formed segments of machine steel, 5/16 in. x 3¼ in. x 9 in., with four ¾-in. holes in each, is then placed around the axle, securely welded and turned down to the required diameter. The time required to weld the axle and finish it in the lathe varies according to the size, but neither method takes more than three hours to complete, and the average is much less.

A very interesting and original method of making brake pins is employed. A piece of tool steel 1 in. in diameter is cut to desired lengths, generally 3 in., and a hole for the cotter key is drilled in one end. The head for the pin is made by winding a piece of Norway iron ¼ in. in diameter into a coil with an inside diameter of 1 in. This coil is then cut up into rings, and a ring is slipped over one end of the pin and welded; it is then hardened. The welding requires less than twenty seconds for each pin, and the total cost, including material and labor, is 4 cents per pin.

The welder has also been found to be very useful for cutting holes in various materials and in burning out rivets. It is particularly adaptable for burning holes in manganese steel. The following may be quoted as an illustration of what can be done. A core oven was to be made out of an old boiler ⅜ in. x 48 in. in diameter and 7 ft. long. There were to be two door openings 14 in. x 24 in. and one 24 in. x 24 in. The welder was put on the job, and in six hours the door openings and forty-eight rivets were burned out and three sets of hinges were welded on. Any other method of doing this work would have cost many times the amount charged to the welder.

In burning out metal a 1-in. round carbon point is used.

Frames of various kinds made up of angles, channels and I-beams have been welded together without the use of a single bolt and in no case has there been a question as to the durability of the weld.

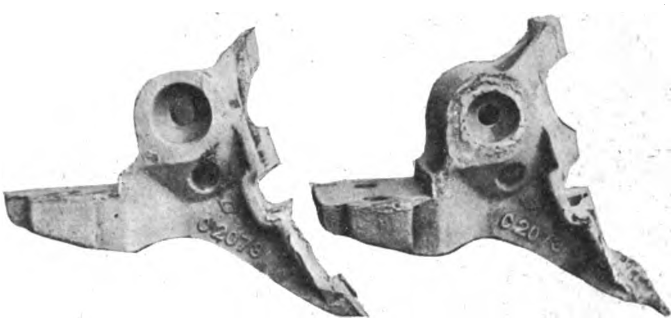
The system is being used daily for building extensions on car bottoms. Some of the older types of cars are being remodeled into prepayment cars, and as it is necessary to add about 30 in. to each platform, a 1-in. x 5-in. iron is laid against the web of each platform sill and welded to the top and bottom flange, no bolts being used. The average cost of welding is $2.16 per car.

Broken bumper irons, step hangers and various other things that were formerly sent to the blacksmith shop for repair are now sent to the welding room, and the time required for welding any one article is seldom more than one hour and oftener only a matter of a few minutes.

A great saving has been made on brakeheads and brake hangers. Formerly there was only one thing to do with a badly worn brakehead or hanger, and that was to send it to the scrap heap and replace it with a new one. Now, no matter how badly worn, it is possible to build it up and put it in a condition that will give it the same service value as a new one, at a fraction of its original cost.

SAVINGS EFFECTED

It is impossible to give an exact statement of the total saving made on car equipment by the company during the year 1912. In some instances the welder has added years to the life of certain equipment, owing to its being an old type and the impossibility of renewing certain parts that are no longer manufactured. Another important thing is the saving in time. A truck or motor frame can be removed from a car, repaired and replaced in a few hours, whereas if a new part was to be installed it might mean that the car would have to remain out of service for a number of days. It is even possible to do certain minor repairs with the apparatus in place. For instance, controller backs are welded in place, and even the connections are not removed.



San Francisco Shops—Brakehead with Worn Socket Before and After Repair

The shop report for nine months shows that 234 car axles, twenty-nine truck frames, forty-seven compressor armature shafts, ninety-eight motor armature shafts and 630 gear cases have been welded, besides the many other parts given in the appended list.

If it should be assumed to have been necessary to replace each of the pieces just mentioned with a new part, then the net saving on these parts for nine months would have been $10,251.14. If to this sum is added the saving made on the other pieces given in the list, the value of the welder as a factor in the economy of the shop is evident.

The accompanying illustrations show how some of the work is done. The view of the interior of a motor casing shows a GE-90 motor frame on which the axle-bearing housings have become worn too much for further service. In this case sufficient metal was built on to allow it to be finished to standard size. Heretofore the shop practice with worn-out motor frames was to bore out housings and put in a special liner. It should be noted that in welding motor frames no shells are used. The metal is put in layers of sufficient thickness to allow finishing to standard size. The actual time required for welding a frame of this kind is three and a half hours.

The second view shows a 4-in. axle that has undergone the building-up process. The actual time required for welding this axle was two and three-quarters hours. The third view shows the same axle after it has been finished to standard size.

One view on this page shows a Brill brakehead that ordinarily would have been scrapped, as the sockets are worn ¼ in. oblong and the face and ends of head are worn entirely away, making it unfit for further service. The second view shows the head after it has been to the welding room. It is now ready to be put back in service and will probably last as long as a new head. The time required for welding this head was twenty minutes.

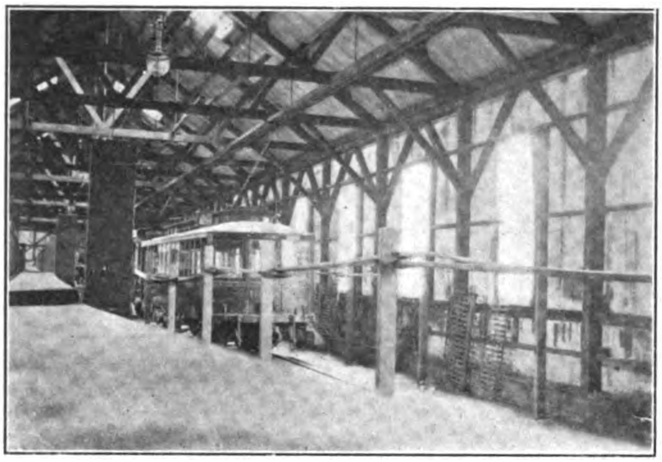
A list of the various pieces welded, with a tabulated statement showing the cost of welding, the cost of a new part and the net saving, is included. It should be noted

REPORT OF ELECTRIC WELDING SHOP OF THE UNITED RAILROADS, SHOWING 101 DIFFERENT ARTICLES REPAIRED DURING THE YEAR 1912

	Cost of Welding and Machine Work	Cost of New Part	Net Saving
AA-1 armature shaft without removing from core..	$1.60	$4.00	$2.40
A-4 armature shaft without removing from core....	1.70	4.72	3.02
AA-4 armature shaft without removing from core..	1.70	4.50	2.80
GE-1000 armature shaft without removing from core	1.97	8.25	6.26
GE-80 armature shaft without removing from core.	1.97	14.78	12.81
GE-90 armature shaft without removing from core.	1.97	14.78	12.81
GE-57 armature shaft without removing from core.	1.97	10.90	8.93
GE-73 armature shaft without removing from core.	1.97	15.13	13.16
10-in. brake cylinder	....	.....	.....
U. S. No. 6 trolley base	0.06	.....	.....
Register pins	0.01	.....	.....
Gong pins	0.01	.....	.....
GE-1000 armature cap, CE-14717	0.22	3.07	2.85
GE-1000 armature cap, PE-14718	0.22	3.28	3.06
GE-1000 axle cap, CE-14719	0.22	3.45	3.23
GE-1000 axle cap, PE-14720	0.22	3.51	3.29
Controller casting	0.04	....	....
Side Bearings:			
GE-90 armature-bearing cap, CE-40377	0.27	6.07	5.80
GE-90 armature-bearing cap, PE-40378	0.27	6.07	5.80
GE-90 axle-bearing cap, CE-40379	0.27	6.07	5.80
GE-90 axle-bearing cap, PE-40380	0.27	6.07	5.80
Car wheels	0.15	....	....
Bolsters	0.28	....	....
Dead lever guides	0.09	....	....
Gear case GE-1000 top, DE-15	0.48	6.80	5.32
Gear case GE-1000 top, DE-6	0.48	7.30	6.82
Gear case GE-1000 bottom, 71111-B	0.44	6.80	6.36
Gear case GE-1000 bottom, 41044	0.48	7.30	6.82
Dolly box	0.12	....	....
Wrench	0.06	....	....
Saw frames	0.62	....	....
GE-90, seventy-one-tooth, four-bolt split gear	0.27	....	....
Brill 27-G truck side frame	0.72	44.40	43.68
Center plates, Brill 27 GE-2	0.08	....	....
Brake levers	0.06	....	....
Gear case GE-90 top, DL-37945	0.58	18.32	17.74
Gear case GE-90 bottom, 215322-B	0.58	18.32	17.24
Pinion puller	0.36	....	....
Crane	0.48	....	....
Brake hangers	0.11	....	....
Circle bars	0.18	....	....
Controller castings	0.04	....	....
Check plates for journal box	0.07	....	....
Brakeheads	0.06	1.15	1.09
Brake pins	0.04	....	....
Car sign brackets	0.03	....	....
Grip crotches	0.72	10.00	9.28
Bumper irons	0.36	....	....
Step hanger	0.18	....	....
Tool holder for Armstrong planer	0.18	3.50	3.32
Controller backs	0.08	....	....
GE-1000 motor frame	0.96	11.50	10.54
Axle cap, GE-90	0.18	....	....
Burning hole for smokestack in furnace	0.36	....	....
Brakebeams	0.24	....	....
Peckham 14-B truck side frame	0.90	46.98	46.08
Armature truck	2.22	....	....
Grip center plates	1.25	....	....
Tools for boring machine	0.12	....	....
Piston for steam hammer	1.19	....	....
End frame for C. G. rheostat	0.18	....	....
Gear case GE-80 top, DL-37921	0.58	....	....
Gear case GE-80 bottom, 121664-B	0.58	....	....
Switch cover	0.18	....	....
Drawhead	0.06	....	....
Brass foundry core oven	2.52	....	....
Bench vise	0.08	....	....
Door sheave frame	0.04	....	....
Journal boxes, Brill 27-G-2	0.30	....	....
Gate handles	0.04	....	....
Steady rest for lathe	0.12	....	....
Gear case GE-57 top, DE-3	0.54	7.65	7.11
Gear case GE-57 bottom, 88420-H	0.54	7.65	7.11
Fender braces	0.06	....	....
Gear rods on seat	0.03	....	....
Guard rail	0.04	....	....
Draft rigging for work car	1.08	....	....
Motor support hanger	0.12	....	....
Brake connection rods	0.06	....	....
Gear case GE-73 top, DL-37940	0.58	21.27	20.59
Gear case GE-73 bottom	0.58	....	....
GE-90 motor frames	2.88	16.80	13.92
Machinist hammer	0.05	....	....
Frame for rail grinder	2.88	....	....

that the cost of welding also includes the cost of machine work necessary to put the piece welded in condition for service. The cost of machine work in some cases exceeds the cost of welding.

The welding room is 20 ft. x 20 ft. and contains a table and a bench with a vise for holding small pieces while being welded. Axles are placed between two centers and rotated by hand as the operator desires. A traveling hoist is used for handling axles and motor frames. Three portable welding outfits are in use, and three men are kept at work continually, two doing the heavy work and the other attending to the welding of small pieces and doing various jobs that require moving the welder to different parts of the shop.

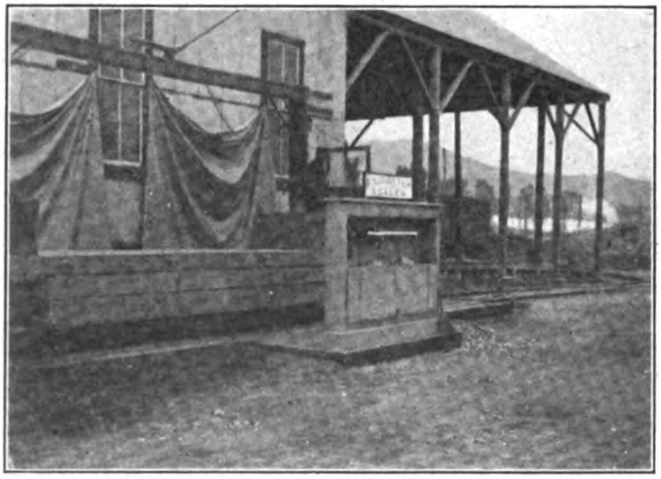


San Francisco Shops—Interior of Paint Shop with Adjustable Scaffolding

Formerly the scrap heap occupied a very large space at the back end of the shop, but since the advent of the welder things have changed. The scrap heap has greatly decreased in size, and the output of the welding room has steadily increased. The once familiar phrase "Send it to the scrap heap" has been changed, in most cases, to "Send it to the welding room."

SAND BLASTING

Practically all apparatus for repair is exposed to a sand blast before being welded or undergoing any other repairs. The process is very simple and quick and rapidly cleans the grease and dirt from the part and makes the application of the welding process or other repair a simple matter. The sand blast is used even on such parts as commutators and the boards of controllers and thoroughly cleans the metal parts without affecting the insulation. Trucks also are sandblasted when brought into the truck shop for overhauling. This not only removes all grease, dirt, old paint, etc., but it also gives a clean surface of metal so that it is easy for an inspector to see whether there are any mechanical defects in the truck which need attention.



San Francisco Shops—Track Scales

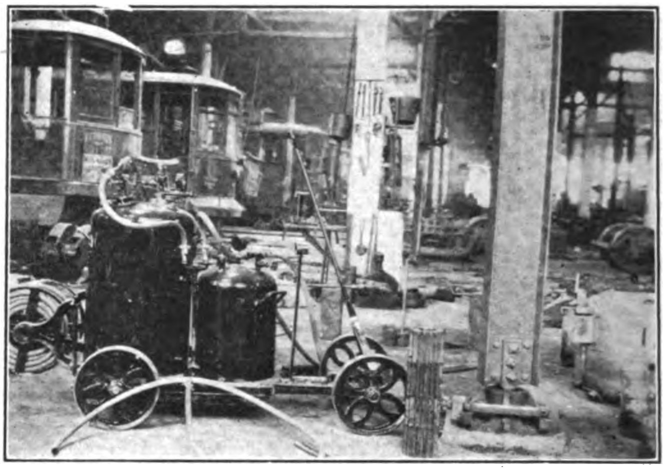
PORTABLE HEATER

Although the new process of electric welding is probably the most interesting feature of the shops of the United Railroads of San Francisco, the mechanical department has developed a number of other interesting appliances. One of these is a portable electric heater used for small forging processes on truck parts or other bulky material which it would be inconvenient to heat in an ordinary oil furnace.

The portable heater, as shown in the illustration, contains two tanks for the fuel, which is crude oil and distillate in equal portions. These are supplied under pressure to the burner, which is a blow-torch and receives its air from the compressed-air pipes which are carried about the shops.

THE PAINT SHOP

The company has recently completed a paint shop adjoining the repair shop. This shop has a capacity of twelve cars, and as the painting process requires six days, this allows two cars to pass through the shop per day. The paint shop is open at both ends so that the progress of the car through the shop is continuous. An interesting feature of this shop is the adjustable painter's scaffold, shown in an accompanying engraving. This scaffold runs the entire length of the shops.



San Francisco Shops—Portable Burner

The construction includes the use of permanent wooden posts, 4 in. x 6 in. and spaced 13 ft. apart. They are set in concrete to a depth of 8 in. The adjostable rack with which each post is equipped, for holding the painters' boards, is simply a strap-iron bracket made up of 1½-in. x ¾-in. iron, looped around the post and with an arm on its outer end on which the painters' boards rest. The angle at which this bracket hangs on the pole provides sufficient friction so that it will hold its position on the post under the weight of the painters. As it is simply looped around the post, its height, of course, may easily be adjusted. Steel cars, of which the company has a few, are sandblasted before being painted.

TRACK SCALES

Adjoining the shop is a set of car scales of 100 tons capacity which have recently been installed. These scales allow the company not only to ascertain the weight of any car on the system when desired, but the scales are also used for weighing all scrap taken from the shops. To get the weight of the scrap, the scrap car is first weighed empty and then loaded. The scales are also used for ascertaining the weight of ballast which is used on track construction.

DEDICATION OF TRANSPORTATION BUILDINGS FOR THE UNIVERSITY OF ILLINOIS

The new Transportation Building and the Locomotive and Mining Laboratories of the University of Illinois have been formally dedicated to the use of the student body at Urbana, Ill., with appropriate exercises extending over May 8 and May 9. As a part of the program a number of speakers prominent in the railway industry made addresses, among them being Samuel Insull, president of the Commonwealth Edison Company.

Mr. Insull talked of the influence the engineering art has had upon civilization and emphasized the innumerable advantages it has brought and the luxuries it has afforded. He predicted that the next quarter of a century would see such a development of the electrical field as to be of huge benefit to every community in the country and recalled that the first time he saw a street electrically lighted was in 1878, when the embankment of the Thames in London was illuminated by arc lamps, the invention of a Russian. In conclusion Mr. Insull cited the benefits that modern invention has contributed to mankind, contending that Lord Macaulay was right when he said that the science of "abridging distance" could do more for humanity than almost any other force.

W. B. McKinley, president Illinois Traction System, spoke of the development of electric railways and the necessity for ample capital to carry on the work. The readiness with which money lent itself to any new project depended, he said, upon the prospects held out to investors for a reasonable return upon their investment and for the future stability of the enterprise. It was also necessary to secure legislation to enable electric railways to be built and operated and also to prevent unfair legislation when the road was in actual operation, under which they might be unable to maintain the proper relations between earnings and expenses, resulting in loss to investors and, as a consequence, inferior service. Mr. McKinley called attention to the problems of securing trained operating executives and of obtaining efficient and loyal men in the ranks. On the Illinois Traction System, he said, the best of feeling was maintained among the 3500 employees by keeping them in close touch with the management, and the courteous manners, splendid appearance, loyalty and interest of the men was one of the most noticeable features of that railway. The management assisted the men in their clubs, mutual aid societies, hospital associations and death benefit association. The affairs of these organizations were conducted by trustees elected by the men and they had proved successful in every way.

In conclusion, he stated that one of the most important problems of the electric railway was to operate the property in a manner that would return a reasonable profit to the company and give the maximum convenience and service to the public, as the relations existing between an electric railway and the communities which it served were very close. On these relations depended in great measure the success of the undertaking. The frequency of the service, the convenience to the farmer in having the cars stop at highway crossings, the familiarity which the patrons have with the organization from daily use, all made the electric line a home institution, and all it asked was fair play, honest criticism and the opportunity to assure good service by making a reasonable profit.

Albert Reichman, president of the Western Society of Engineers, spoke on the technical society as an aid to education, saying in part that the training an engineer received at a university was so broad that to a limited degree it enabled him to commence the practice of almost any branch of his profession, but that in order to excel an engineer must choose a comparatively narrow field of activity in which he can become thoroughly proficient. An engineer in order to be successful must associate with his fellow engineers and he could best secure such association through the technical societies. The meeting of engineers under conditions where all were on a common footing fostered a spirit of kindly co-operation and helpfulness which bound them together and made each of greater usefulness to the others. It was only by wide co-operation that the best advancement could be made in engineering science and achievement. In the technical societies the various steps of mechanical development were depicted both from the practical and the theoretical standpoint. They afforded the engineer an opportunity to supplement his own knowledge by the experience of other engineers, to present to the world what he himself had accomplished and to receive criticisms and suggestions from his fellow-men.

The changing character of railroad problems was made the subject of an address by T. H. Goodnow, president Western Railway Club, who outlined the progress which had been made in the science of railroading during the past quarter of a century. He spoke of the vastly increased size and strength of the freight and passenger cars of the present day and of the great improvement in equipment.

In an address entitled "Vocational Education in Connection with Railroad Work," W. L. Park, vice-president Illinois Central Railroad, said that the men in the shops and on the track carrying heavy responsibilities for the maintenance of safety and economy desired to learn and to advance and should be assisted and encouraged. It was even difficult at times to obtain certain information with all the advantages of a great city or college, and this gave some conception, vague though it might be, of the conditions surrounding an operator, towerman or section foreman isolated almost as if on a lonely island by the environment of his occupation. The management on the Illinois Central had, he said, taken cognizance of these conditions, and that there was much eager demand for greater knowledge was evidenced by the thousands who were availing themselves of the opportunities presented by the company's educational bureau. That this raised the plane of intelligence there could be no doubt, and that it enabled some who had the requisite talent and genius to advance was evidenced by the recorded results.

CHICAGO ELECTRIFICATION COMMITTEE

Joseph Holdom, chairman of the committee of investigation of smoke abatement and electrification of railway terminals of the Chicago Association of Commerce, presented a report on the progress of that committee at the hearing May 12 of the committee on railway terminals of the City Council. He referred first to the electrification plans and said that the territory being considered was divided into two zones, one comprising 191 sq. miles within the city and the other 237.6 sq. miles without the city. In these two zones there were 4501 miles of track, of which 2819 miles were within the city limits. Electrification by the third-rail system and by the overhead contact system was being considered. Consideration was also being given to the use of self-contained units such as storage battery locomotives and locomotives operated by internal-combustion engines. The committee was also making an exhaustive study of the subject of the abatement of smoke, not only from locomotives but from the stacks of stationary power plants, and a large number of observations had been made. He hoped the report would be completed by January, 1914.

At the same meeting Howard Elting, president of the Chicago Association of Commerce, said that the work of the committee up to the present time had cost $250,000. This expense was being borne by the railroads, although they exercised no control over the course of the investigation other than that they had four representatives among the seventeen members of the committee.

Convention of the Oklahoma Association

This Convention Was Held at Oklahoma City, May 6-8—Abstracts Are Presented of the Papers of Most Interest to Electric Railway Companies.

The second annual convention of the Gas, Electric & Street Railway Association of Oklahoma was held at Oklahoma City on May 6-8. The delegates were welcomed to the city by Mayor Grant, and following his speech the annual address of the president was delivered by F. W. Caldwell, of Shawnee. Abstracts of the papers of special interest to electric railway companies are published herewith.

LIGHTNING ARRESTERS

Four main types of lightning arresters were described in detail with accompanying slides by W. B. Clayton, of the Southwest General Electric Company, after a short talk on the characteristics of natural and artificial lightning phenomena. In the compression chamber multi-gap arrester the gaps were inclosed in an air-tight chamber, and when the discharge took place the gases formed in the gaps were compressed, which aided the rectifying action in promptly extinguishing the arc. With the graded shunt resistance multi-gap arrester, the temperature of the arc was reduced by selecting metals of low boiling point for the cylinders and by limiting the value of the current by means of resistance. In an arrester of this kind the gaps would take care of high-frequency discharges and the resistance with the small number of series gaps at the bottom would take care of low-frequency discharges. For systems employing 6600 volts or more the aluminum cell arresters were best adapted, having an action very similar to that of the safety valve on a boiler. Horn gaps of various types were useful on the very high voltages and were adaptable to use in connection with the aluminum cell type. In conclusion the author made a plea for further co-operation between power plant engineers and the designers of lightning arresters in order to enable the latter successfully to cope with necessary demands.

LEGISLATION AFFECTING PUBLIC UTILITIES

An interesting treatment of the question of legislation affecting public utilities was given by H. V. Bozell, of the University of Oklahoma. In it he presented some of the basic ideas of legislation in general, the power of the State to legislate in connection with the business of public utilities, the causes of some of the recent legislation, the general class of legislation resulting from these causes, subsequent effects upon the utilities and the proper attitude of the utilities regarding this legislation in order to conserve their own best interests. Summed up in brief, the author was inclined to think that the gross abuse of privileges by a small number of monopolistic utilities during the early days was responsible for the passing of drastic laws which proved a burden to those utilities which had aimed to be fair as well as to the guilty ones. But he pointed out the present tendency to place the regulation of utilities in the hands of commissions to allow of their protecting the utilities' interests as well as those of the community. There had been a noticeable effort of late on the part of all utilities to make a special point of reducing the causes for complaints, and it was the author's belief that a continuation and extension of this policy, together with the proper publicity measures and co-operation with the public service commissions, would work to the advantage of the utilities. A point worthy of special note was the statement made that if privately owned utilities were to be subject to state regulation by commission municipally owned utilities should be subject to the same control.

LIABILITY INSURANCE

Frank H. Ellis, underwriter of the Kansas Employers' Inter-insurers' Exchange and the Illinois Indemnity Exchange, read a paper on "Liability Insurance." He first discussed the conditions which led to the passage of employees' compensation laws in different states and mentioned briefly the chief features of some of them. The Kansas law was the mildest of any in effect. In that State payments did not begin until after two weeks of disability, and they could extend for a period not greater than eight years. The Wisconsin and the Illinois laws were the most drastic. Payments in Wisconsin extended for fifteen years, and in Illinois for life, in case of total disability. He believed that compensation laws offered a greater temptation to malinger and defraud. Moreover, workmen were quick to realize that there is no need for particular haste in getting back to work. On the other hand, compensation laws should serve to reduce the amount of litigation. At all events, the system, in the opinion of the speaker, was here to stay.

A serious evil, however, was that extortionate rates were charged for liability insurance by insurance companies. This condition was due to the indifference and lack of information on the subject by the public. In fact, insurance methods had not kept step with economical management in other directions. The ordinary business man did not like to think about his insurance and he would leave it for someone else to do. Under clerks were often permitted to handle insurance involving hundreds of thousands of dollars when they would not be permitted to buy even a barrel of fuel oil on their own initiative. In no other business does the middleman so utterly dominate the situation. The casualty companies, for instance, were spending from 50 per cent to 65 per cent of their income for expenses and commissions. These were paid for by the insuring public.

There are in general three possible means of escape, briefly as follows: First, carrying one's own risk, or so-called self-insurance, which was only open to the very few comparatively, since only the few had a sufficient spread of risk to make a safe venture. State insurance was open to a number of objections, among which are the question of dishonesty in its administration and the flavor of paternalism. In mutual insurance there was a defect which might cause trouble in that it provided a partnership liability. On the other hand, reciprocal or inter-insurance eliminated this liability and could be conducted at one-half of the expense ratio of stock insurance.

Best's insurance reports of last year recognized seventy-three such organizations in fire and casualty insurance as going and successful concerns, and the saving accomplished averaged between 40 and 60 per cent per annum. Inter-insurance was recognized by the insurance departments of nearly all states, and in Kansas, Illinois, Minnesota and many other states reciprocal exchanges were under the supervision of the state insurance departmenets and were licensed much after the manner of the stock companies.

PREVENTION OF ACCIDENTS

A paper on this subject was presented by George W. Knox, second vice-president and general manager Oklahoma Railway. He cited the principal measures taken by railway companies in the safety campaign as follows:

"Great care in selection of trainmen and thorough physical examinations with proper tests as to hearing and sight.

"Schools of instruction for trainmen with competent instructors and follow-up system of inspection work of new men until such time as they become thoroughly proficient; in some cases return of the trainmen to the school of instruction for further instruction if found necessary.

"Systematic efforts to retain trainmen in the service through square dealing with them; establishment of benefit associations and pensions.

"Lectures to trainmen by the claim agent and operating officials on prevention of accidents; lectures often accompanied by stereopticon views, showing various types of actual accidents, also dangerous points on the lines, bad curves, bad thoroughfares, garage entrances, blind alleys, block lights, etc.

"Printed safety bulletins to employees issued monthly.

"Examination and instruction of new men by claim agent before they are permitted to go to work.

"Close communication between departments in relation to cause and prevention of accidents.

"Organization of safety committees.

"Reasonable inquiries by inspectors and others in charge of trainmen into their manner and habits of living, their observance of the laws of health and decency.

"Office accident charts known as 'bogies,' with curves showing daily all classes of accidents occurring, curves showing daily and cumulative accidents, curves showing cumulative and daily accident expense.

"Carhouse competitive safety charts, known as 'bogies.' These charts show daily and cumulative curves of accidents in each carhouse numerically. They are continually watched by trainmen and cause a friendly rivalry between the trainmen of the various lines.

"Folding or sliding gates on both ends of cars undoubtedly decrease step accidents, particularly after the trainmen have become accustomed to their use. Theoretically, apart from defects in car steps and landings, gates should eliminate all liability to step accidents, and they will do so, the committee believes, if the gates are handled by trainmen according to rules.

"Concise and intelligent advertising conspicuously printed in the public press calling attention to reasonable and proper methods of avoiding accidents, with cuts illustrating common types of accidents.

"Safety cards posted in public schools.

"Safety lectures in public and other schools, women's and other clubs, universities, business colleges, etc.

"Desk blotters distributed in offices and mailed with bills to company's customers with warnings against accidents printed thereon.

"Letters to vehicle owners on avoidance of accidents, also cuts illustrating various kinds of collisions posted in barns of vehicle owners.

"Warnings against accidents printed on back of transfers.

"Cuts on cards posted in cars showing right way to alight from car."

Mr. Knox then described the practice of his own company as follows:

"The Oklahoma Railway Company began its active campaign for the prevention of accidents and the promotion of safety during the latter part of the year 1911. With one full year of this campaign in operation, the results reflected may be noted in the comparison shown between 1911 and 1912 with respect to the company's accident account. The number of claims for 1912 was reduced over the year 1911 by 30 per cent and the total amount paid for releases was in excess of 50 per cent less for 1912 than for 1911.

"The total disbursements for the claim department expense, included in which are the salaries of that department's employees, lawyers' fees and office charges, were 2.86 per cent of the gross earnings of the road. This may be regarded as very moderate when it is known that that item usually runs from 5 to 7 per cent and has run with some properties as high as 18 per cent. It will therefore be noted that the number of accidents in 1912, as compared to 1911, was not alone materially decreased, but that they were of such a character as to permit of over a 50 per cent reduction in the aggregate cost of the settlements which were made by the company.

"While it is felt that the plans and methods proposed and employed in the handling of the accident and safety promlem have been splendidly devised and followed and the results therefrom are showing very satisfactorily, we are still groping about for means by which the many details may be so manipulated as to enable the better accomplishing of the much desired results, i. e., the absolute minimum —or a 'bogie' as some have put it—in the number of accidents and the highest possible attainment in the matter of safety. Now, there is no possible way of fully realizing this condition unless there be a world-wide movement of co-operation among all civilization."

OTHER BUSINESS

Following the presentation of the papers the annual business meeting was held. At this meeting the association voted to change the membership from personal to company, but also to leave a class for individual membership. The company members were divided into three classes, those in towns of 5000 or less, those in towns of 5000 to 10,000 and those in towns of more than 10,000 population. Manufacturing and wholesale commercial companies were made associate members of the one class, and retail commercial firms and contractors associate members of another class. The registration at the convention reached the unusually large total of 125.

The following officers were elected for the ensuing year: President, F. E. Bowman, Ada; first vice-president, Lincoln Beerbaum, Enid; second vice-president, George Knox, Oklahoma City; secretary and treasurer, H. V. Bozell, Norman. The executive committee will be composed of the president and H. S. Cooper, Weatherford; W. H. Bagley, Tulsa, and R. D. Long, Muskogee.

GRAPHICAL RECORD OF CAR ACCIDENTS

B. F. Boynton, claim agent Portland Railway, Light & Power Company, has adopted an ingenious method of graphically recording the different kinds of railway accidents which occur on that system. He has cut a map of the city into twenty equal sections and pasted each section upon a flat board so that it can be easily handled. Then whenever there is an accident he places a pin in the map at the point where the accident occurred. Pins with heads of different colors are used to designate different kinds of accidents as follows:

Black, collision with vehicle.
Pearl, collision with person.
Green, collision with auto.
Pale blue, collision with car.
Brown, car leaving track.
Amber, injury caused by presence of structure or other object near track.
Dark blue, alighting from moving car.
Coral, stationary car accident.
Plain, fell off car at curve.
Round gilt, premature starting of car.
Square gilt, falling in car.
White, boarding moving car.

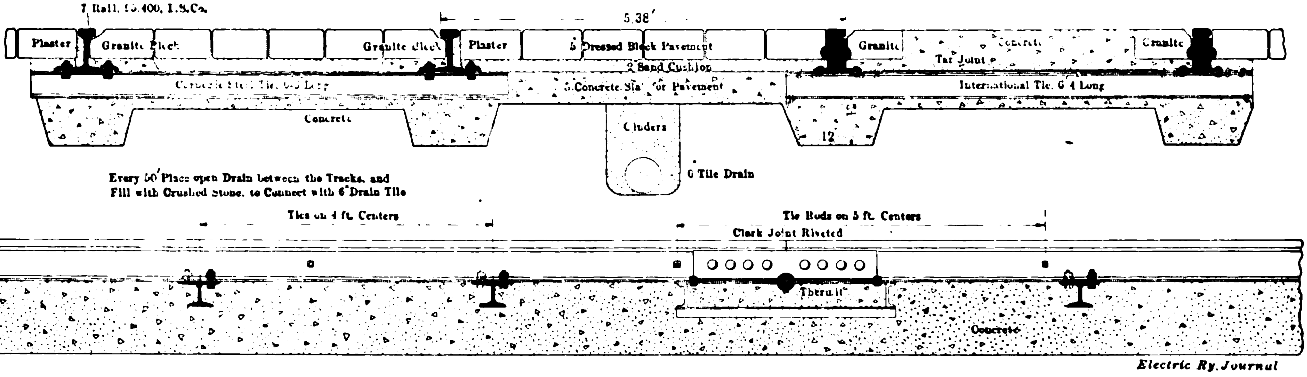
In this way twelve different kinds of accidents can be indicated on the map, and the accumulation of pins of any one kind at any single point or at several points on the map calls attention to the desirability of looking into possible remedial measures at that place.

For convenience in office use the twenty map sections are kept in a case with a corresponding number of horizontal shelves, the shelves being far enough apart not to interfere with the vertical position of the pins which are stuck into the map. Mr. Boynton removes all pins at the beginning of each month but makes a tabulated record of their location for reference purposes.

Track Improvement in Cleveland

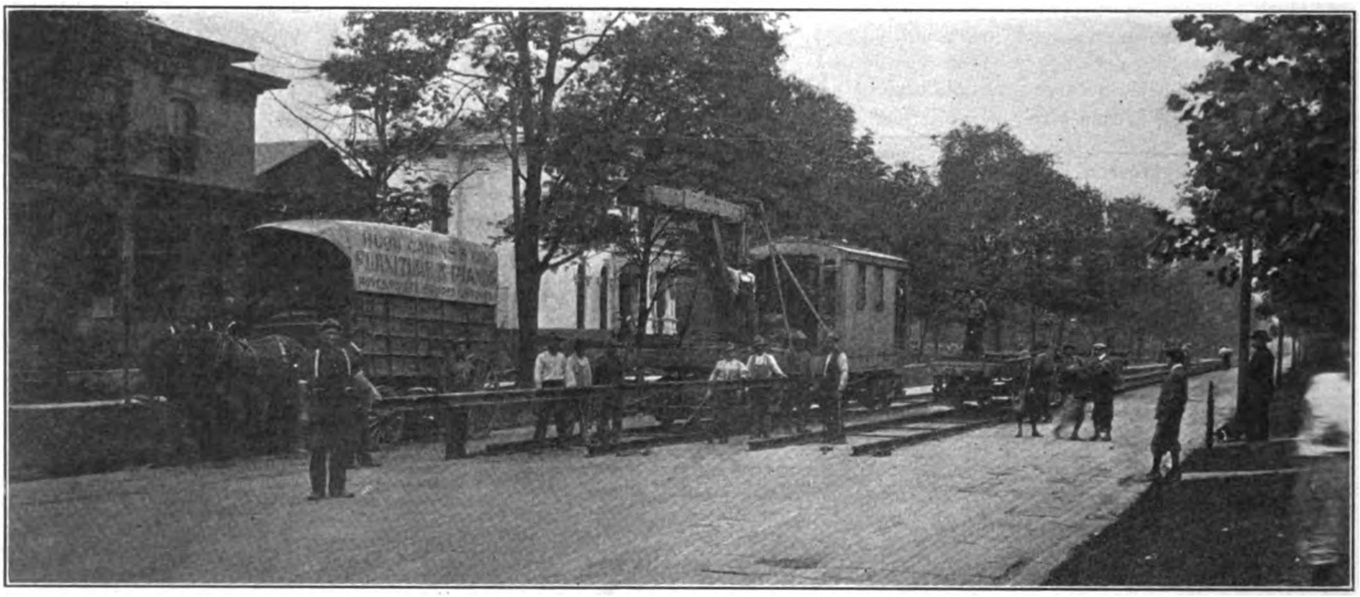
The Cleveland Railway Company Has Undertaken Extensive Rehabilitation of Its Permanent Way and Is Using for the New Track Steel Ties Set in Concrete Beams—A Brief Account of the Way Department's Equipment and Methods Is Included

With the maintenance-of-way department of the Cleveland Railway Company—well known for its originality in evolving new developments in track work, including the widely used Clark joint, which was turned over to the public without remuneration by its inventor, Charles H. Clark, engineer of maintenance of way—the present year will be an unusually active one. At least 20 miles of new track will be constructed, and this will involve the laying of 3600 tons of rail.


7 Rail. 95.400, L.S.Co.
5.38'
Plaster
Granite Block
Granite Block
Plaster
5 Dressed Block Pavement
Granite
Concrete
Tar Joint
Granite
2 Sand Cushion
Carnegie Steel Tie, 6-0 Long
5 Concrete Slab for Pavement
International Tie, 6 4 Long
Concrete
Cinders
12
6 Tile Drain
Every 50' Place open Drain between the Tracks, and Fill with Crushed Stone, to Connect with 6" Drain Tile
Ties on 4 ft. Centers
Tie Rods on 5 ft. Centers
Clark Joint Riveted
Thermit
Concrete
Electric Ry. Journal

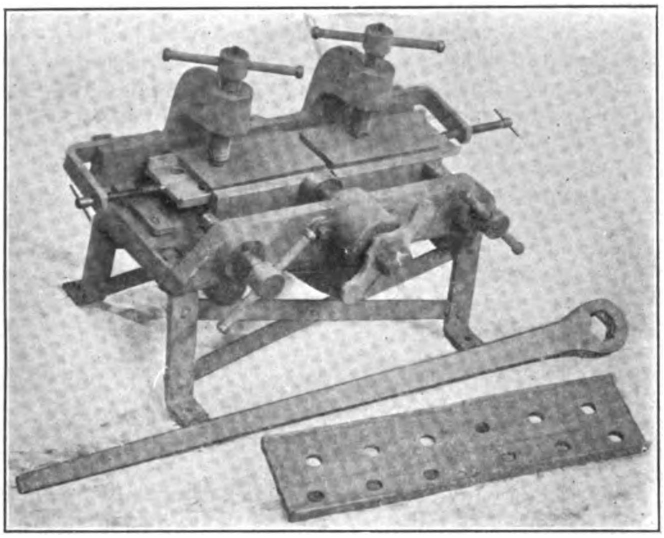
Cleveland Track—Cross-Section of Standard Construction

The construction for this year's standard track is shown in the accompanying illustration. T-rail will be used everywhere except on two bridges where there is wood-block pavement. The standard rail is 7 in. high and weighs 95 lb. per yd., laid on Carnegie and International steel ties spaced on 4-ft. centers and attached to the ties by clips. Clark joints, supported on International joint ties, insure good mechanical support of the rail ends. The joint consists of long, heavy plates riveted to the sides of the rail with eight 1 1/16-in. nickel-steel rivets. The joint is mechanically and electrically bonded by a small mass of iron which is cast about the base by the Thermit process. The joint tie is an open frame made of two channels placed back to back and separated by somewhat more than the length of the joint. These are joined by small angles riveted under the base at each end and by plates somewhat wider than the base of the rail riveted on top to carry the rails. The rail is clamped to the tie by special clamps held in place with wedges.



Cleveland Track—Laying Track on Street Surface for Temporary Route

The ties are buried in a concrete slab which covers the full width of the track and is 5 in. thick. This is reinforced under the rails by a concrete beam with sloping sides. The beam is 12 in. wide at the bottom and gives a total depth of concrete under the rails of 12 in., the composition of the concrete being one part of cement and six parts of washed gravel. Between the rails of each track a 2-in. sand cushion furnishes a base for the paving blocks where such are used, but in some constructions a granite concrete paving will be used. This will be laid directly on the concrete base with a thin coating of tar or a thin layer of sand to keep the paving concrete from sticking to the concrete which forms the foundation. This granite concrete paving will cost $2.03 per sq. yd. as compared with $3.09 for the granite blocks and it is expected to give equally good satisfaction. When it wears out it will be broken up, crushed to small size and used again in making concrete. Wherever granite blocks are used between rails, the blocks next to the rail which form the groove will be laid on a concrete base to insure permanence. The blocks next to the outside of the rail will be laid close against the head and will be grouted with a cement plaster filling.



Cleveland Track—Splice Plate Bender

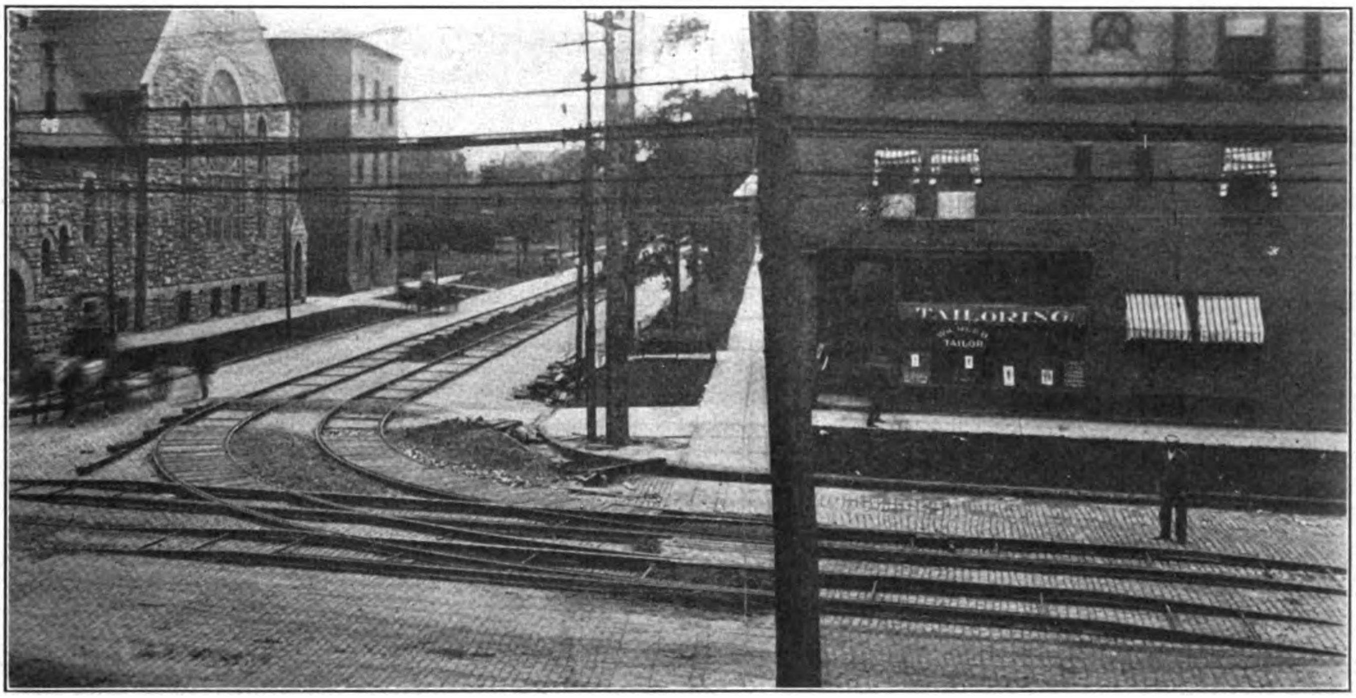
In preparation for the season's activities ten new three-compartment, 5-yd. dump cars have been ordered from the Orenstein-Arthur Koppel Company. Four of these will be equipped with motors and operating cabs and four Westinghouse 307 motors will be used on each. The remaining six dump cars will be trailers. A Brown hoist has also been ordered and an electric shovel which has been very useful in grading the site of a new car yard will be pressed into service for street excavation. Three concrete mixers mounted upon cars will be utilized in laying the track foundation.

An interesting temporary track construction used recently is shown in the accompanying illustrations. On account of the excavation of an important street for the installation of a sewer the railway track had to be moved to an adjacent parallel street. The rails were laid directly upon the asphalt paving and spaced with tie rods. Temporary special work for connecting the temporary track with cross streets was made up of standard pieces and Kerwin cross-overs. The only effect of this construction on the asphalt was to make shallow ruts in it. In laying the rails a derrick car was utilized, and the work was thus done very rapidly.

A very useful device designed in the way department of the company is a bending machine for putting an offset in joint plates. Such an offset permits the lining up of the surfaces of low joints and the same bender can be used for a wide variety of plates and offsets. In operation the plate to be bent is placed in a jig made of two parts, one stationary, the other movable. By means of set screws and filler blocks, the ends are pressed into the jig after set screws have been adjusted at the ends to bring the plate to its proper position. The movable part of the jig is then pressed sideways to give the desired offset by means of a heavy set screw and wrench.

In addition to the new construction described above, the railway company is now constructing a new inspection and storage yard located on St. Clair Street, several miles east of the business section of the city. Approximately $80,000 will be expended in track work and grading, the latter costing one fourth of this amount. The yard has been laid out with special care to avoid interferences among car movements and to do this with a minimum amount of special work. The yard provides storage room for at least 165 cars.

The project of the Allgemeine Elektricitäts-Gesellschaft to build a rapid transit line in Berlin between Gesundbrunnen and Rixdorf (Neukölln) has now been placed before the Minister of Public Works for the Prussian royal consent, which will be the final approval required. The new railway will be partly high level and partly below the street surface. The concession is for a period of ninety years, although the municipal authorities will have the right of acquisition at the expiration of thirty years and at succeeding terms of five years. It is estimated that the construction of the railway will occupy seven years, and the expenditure is computed at $21,250,000. One-half of the capital will be raised by the issue of common and preferred shares in a new company eventually to be formed, and the other half will be provided by a loan the interest on which will be guaranteed by the municipal authorities.



Cleveland Track—Temporary Track Laid on Surface of Pavement to Permit Routing Cars Around a Closed Section of Street

Convention of Arkansas Association

The Papers Most Closely Concerning Electric Railway Interests Read at This Meeting Were on Public Relations and Recent Legislation.

The sixth annual convention of the Arkansas Association of Public Utility Operators was held at Little Rock, Ark., May 5 to 7, inclusive. Owing to the late arrival of a number of the members, the first session was not held until Monday afternoon. In the absence of President J. W. McLendon, who has left the State, Second Vice-president J. F. Christie, of Jonesboro, presided. Following an address of welcome by Mayor C. E. Taylor of Little Rock and replies by several members, Acting President Christie addressed the association concerning matters of mutual interest. He spoke of the preponderance of proposed legislation affecting public utilities introduced at the last session of the Legislature, some of it ridiculous in character, but practically all tending to put additional burdens on the utility companies.

The association includes operators of electric light, water, gas and electric railway companies, and most of the papers presented were on electric lighting subjects. The two papers of most interest to electric railway companies appear in abstract below:

RELATION OF PUBLIC UTILITIES WITH PUBLIC

The paper on this subject by J. W. Gillette, general manager Fort Smith Light & Traction Company, urged that a public utility company make every effort to secure the good will and confidence of the community which it serves. He said in part:

"There is a grave duty and a heavy responsibility resting on the shoulders of those who are to shape its policies, administer and direct its affairs. We are prone at times to take too much to heart the attacks and criticisms that are so often either justly or unjustly aimed at the interests we represent. Just criticism at times, when given in the proper spirit either by public, press or city officials, is a good thing, for it is often only by having our attention drawn to our faults and mistakes that we are able to correct them, and this should be done promptly and cheerfully. To indulge through the columns of a newspaper in a quarrel with some disgruntled or aggrieved patron or with city officials is the height of folly, and ten chances to one you will make a dozen enemies where you had only one. Meet those who are aggrieved on their own ground, listen patiently to all they have to say, and for the time being place yourself in the attitude of making them think that they are entirely right. Then, at the proper time, quickly open a discussion of the situation but never an argument.

"Accidents and interruptions to the service are bound to occur at times, even in the best regulated plants, and when they do occur prompt attention should be given by the manager himself to the situation. It is very unwise in this day and age either to insinuate or to allow the idea to get out that the public must do business with you or not at all; it is very poor policy in our class of business to go around with a chip on one's shoulder inviting trouble.

"It is good policy to keep in close touch with those who have under their charge civic improvements. Get their ideas and plans, co-operate with them, and when possible assist in carrying out schemes and ideas that are for the good and betterment of the community at large, for what they may accomplish for the benefit of the public and the city in which you are operating is to a large measure good for your company. Eliminate the word 'antagonism' from your vocabulary and remember it never brought much good to anyone.

"I have found it a good plan to keep a few of our leading business men posted regarding our street railway receipts (daily in two cases). Printed blanks are made out and sent to the presidents of four of our largest institutions, a bank in one instance. The blank shows the number of passengers hauled on each line, tickets and cash fare receipts, and as one gentleman remarked to me the other day: 'Your daily street railway reports to us indicate a forecast of general business conditions throughout the city. It is a very good scheme and is certainly appreciated.'

"Be optimistic. It is unwise to complain about how poor business was last week and immediately contribute it to the fact that times are hard and things are generally dull all over the country. Carry your optimism with you always no matter how hard or difficult your problems may seem to be, and in the carrying of this feeling of good will, friendship and cheer to others you will be surprised how much it will lighten your own duties and burdens."

DISCUSSION

In the discussion which followed the reading of Mr. Gillette's paper, W. L. Wood, Jr., of the Texarkana Gas & Electric Company, emphasized the importance of maintaining the quality of the service and of paying attention to complaints. He said there was a time when managers did not realize this, but most of them now understand its importance.

A. E. Main, of the Hot Springs Water, Gas & Electric Company, called attention to the publicity policy adopted by the Federal Light & Traction Company and effective in Hot Springs. Cards are posted in cars and other public places which state that courteous treatment is always due the public.

LEGISLATION AFFECTING PUBLIC UTILITIES

Another paper was one on "Legislation Affecting Public Utilities," by C. J. Griffith, general manager Little Rock Railway & Electric Company. Mr. Griffith first showed that no public utility corporation does more to advance the progress of the city than the street railway. It may be actuated by self-interest, but its interest is to aid the development of the city in which it operates. Moreover it does a great deal for the city besides supplying rapid transit. It often paves the streets. It encourages the establishment of manufacturing enterprises by the supply of power at a lower rate than an individual plant using steam power. By developing the city it adds to the tax receipts. It employs a large number of men who spend their money in the city. It is a large taxpayer. Nevertheless, the tendency is often to criticise its management, and legislators pass unconsidered bills hampering the operation of the line. The time of meeting of the average legislature is usually far too short to permit of proper consideration of corporation bills. The sessions last from sixty days to four months, and measures which require months of careful study are passed in as many days. The speaker said that he concurred with State Senator Tustin of Pennsylvania, who in stating his objection to the passage of Governor Tener's pet measure of a public utilities bill (which was defeated) said that any measure which undertook to regulate twenty-nine different classes of corporations, as this did, should be carefully considered in all its ramifications for at least two years by a commission before being enacted.

The speaker then referred to some typical bills of this kind. A decade ago Arkansas passed a bill debarring from that State all companies which entered into agreements in regard to rates, not only in Arkansas, but in any place. Under this law an English company which entered into a rate agreement with other companies in London in regard to rates in that city could not do business in Arkansas.

The result was that many strong companies withdrew from the State and irresponsible home companies sprang up. The next legislature undid the bad work of its predecessor. Referring to other legislation, the speaker said in part:

"In the Rhode Island Senate a bill was introduced providing for a public service commission of five members to be appointed by the Governor, with the approval of the Senate. Among the privileges of the commission was full control over fares, freight rates, price of gas, electricity and telephone tolls; also it was to have power to fix wages, regulate the hours of labor and conditions of employment of conductors, motormen, linemen, operators, and not only these, but clerks, bookkeepers and other employees of all public service corporations. The hours of motormen and conductors were limited to a maximum of ten hours. This commission was designed to relieve general managers, superintendents, master mechanics and other officials from all responsibility and care, leaving to them the less arduous work of drawing their salaries and carrying out the details of orders issued by the commission.

"The California Legislature considered a bill providing that every transfer issued by a street railway company should be honored by the conductor on the line the transfer is issued to, at any time during the day it is issued. Massachusetts had a bill of the same kind before its Legislature. The gross injustice of a measure of this kind is so apparent that it is a wonder a member of a legislature would have the hardihood to introduce such a bill. It is true these bills were defeated, but it is also true—almost unbelievably true—that the California Legislature actually passed a compromise measure making transfers good for ninety minutes. This eliminates carrying men and women to their work in the morning and back at night for a single fare, but it permits a woman to attend to quite an amount of shopping and return home by a different route for a single fare for the round trip, or it may well enable astute passengers to go home and back at the lunch hour on a single fare.

"In Ohio the Legislature had before it a bill providing that a rival company may condemn its way over the tracks of an existing company by grant of a city council. The possibilities of barefaced legalized robbery under such a law are apparent at a glance. The existing company builds an extension into new territory. It is perhaps years before regular travel suffices to justify the outlay. And then, without all this preliminary expense and waiting for profits, with no risk of non-development of traffic, a rival company is formed, jumps in, under color of law, on the tracks of the existing company and shares the business.

"Less radical but still unjust was the bill in the New Jersey Legislature giving the Public Utilities Commission power to direct any railway or street railway to establish and maintain connections with other railways and street railways.

"The lower house in the Massachusetts Legislature passed a bill limiting the hours of motormen and conductors to nine hours out of a continuous eleven hours. One representative pointed out that the Supreme Court had held a like bill unconstitutional applied to an individual employer, and that the same principle applied to the street railway. Representative Underhill sagaciously showed that the bill was purely a political measure and that the employees would discover that the bill, if passed, would cut off $2 each week from their wages. The bill was killed in the Senate.

"What at this distance would seem to be in the nature of duress was the New York bill requiring interchange of transfers on all lines crossing any of the bridges connecting the boroughs of Manhattan and the Bronx and withholding certificates permitting operation of cars on bridges until such interchanges should be arranged. It has always seemed to me to be an injustice to oblige competing companies to interchange transfers. There may be and there are cases where such transfers are mutually beneficial and such traffic arrangement tends to hold the good will of the people, which is always a valuable if intangible asset. But it should not be obligatory nor should it be enforced by harassing the companies concerned by withholding any of their track privileges.

"Illinois considered a bill to oblige street car companies to equip car ends with gates. Tennessee had a bill to prohibit installation of pay-as-you-enter cars equipped with gates or any sort of obstruction to free ingress and egress. The Pennsylvania Legislature had before it a bill under which 10 per cent. of the stockholders of a corporation could petition the Common Pleas Court to reduce the salary of any official of such corporation. In Connecticut the House passed a bill requiring electric railways to screen arc headlights on approaching vehicles under a penalty of $7 for each violation.

"But before closing it is a pleasure to note that in some quarters it is recognized that the corporations have some rights. Thus Massachusetts failed to pass bills permitting mail carriers to ride free, to pay damages where tracks abut on estates and to oblige street railways to double-track all extensions. The Attorney-General of Massachusetts held that the bill requiring free transportation of mail carriers was unconstitutional. The company which I have the honor to represent thrashed out this question successfully in the courts only recently. The Minnesota Legislature passed a bill exempting street railways from the strict anti-pass laws of that State in order that policemen and firemen might ride free, but the Governor vetoed the measure on the ground that if policemen and firemen could not afford street car fare the cities should raise their salaries.

"In Ohio the municipal ownership bill was defeated and in Massachusetts a like bill was withdrawn. In the Ohio debate it was demonstrated that municipal ownership had not been satisfactory in European cities where it has been tried, and it is a curious coincidence that on the very day the citizens of Detroit voted in favor of the city taking over and operating the traction company's properties the whole Commonwealth of Australia was threatened with a complete paralysis of industry by the calling of a general railroad strike for higher wages on all the government-owned railroads."

ELECTION OF OFFICERS

The following officers were elected for the ensuing year: J. W. Gillette, of the Fort Smith Light & Traction Company, president; E. C. Bellamy, of Mammoth Springs, first vice-president; C. M. Richards, of Hope, second vice-president; A. E. Main, of Hot Springs, third vice-president, and W. J. Thorp, of Little Rock, secretary-treasurer. The executive committee is composed as follows: B. C. Fowles, of Pine Bluff, chairman, and C. J. Griffith, of Little Rock; A. E. Main, of Hot Springs; W. H. Walkup, of Batesville; W. L. Wood, of Texarkana; S. C. Dowell, of Walnut Ridge; S. C. Stearnes, of Little Rock; L. S. Hunt, of St. Louis, and Mrs. La Salle Stoops, of Stuttgart.

ENTERTAINMENT FEATURES

Social entertainment provided during the week included a moving-picture show, illustrating the use of Westinghouse Electric & Manufacturing Company's domestic electric appliances, a luncheon given by the Little Rock Chamber of Commerce, and an elaborate banquet and informal dance given by the supply men.

MEETING OF SUPPLY MEN

At a meeting of the supply men, or Class B members of the Arkansas association, held on May 7, L. S. Hunt, of the Commercial Electric Supply Company, St. Louis, Mo., was elected president; Donald B. Cameron, of the Western Electric Company, Chicago, Ill., vice-president, and W. R. Herstien, of the Electric Supply Company, Memphis, Tenn., secretary-treasurer. Upon request, the president of this division of the association was made a member of the executive committee of the operators' association.

The next convention will be held at Little Rock.

Cincinnati Traction Strike

A Strike of the Platform Men of the Cincinnati Traction Company Has Been Carried on During the Past Week and Has Been Characterized by Acts of Exceptional Violence—An Account of the Efforts at Arbitration and of the Most Recent Developments as Seen by Our Special Correspondent Is Published

Although the strike of the motormen and conductors of the Cincinnati Traction Company was called at 9 o'clock on the evening of Friday, May 9, the men were slow to respond to the order for suspension of work which was issued by Division 627 of the Amalgamated Association. By 3 o'clock the next afternoon, however, no cars were running, and the company announced that while few of its men had gone on strike it could not operate its cars owing to attacks on them by street mobs. The rolls of the union, nevertheless, show that a large number of the men promptly enrolled after the strike order was issued—many more than had joined the union before the strike was declared.

Cincinnati Strike—Crowd Surrounding Burning Trolley Car

Last week, before the men were fairly organized, a self-constituted committee had proposed an agreement between the company and Division 627 of the Amalgamated, the first paragraph reading as follows: "1. That in the operation of the lines of the company it is agreed by both parties that all business shall be transacted directly between the duly accredited officers of the company and the duly accredited officers of the Association." It was characteristic of this proposal that company was written with a small "c" and Association with a capital "A" throughout. Upon rejection of the proposed agreement, which was dated May 7, the strike order followed on May 9.

President Mahon and Vice-president Orr of the Amalgamated appeared early on the scene of trouble. On Friday, the traction company being deaf to requests for conferences, the intervention of the Mayor, H. T. Hunt, was sought with even greater success than is the rule in such cases.

To Mayor Hunt's invitation for a conference with the union representatives on Sunday, W. Kesley Schoepf, president of the traction company, sent a refusal, "because this company is in a position to continue the operation of its cars immediately, provided proper police protection is afforded, and, further, because, there being no grievance on the part of employees against the company, I cannot believe that they desire such a meeting." On Sunday several hundred men were brought in to take the places of strikers, but only a few cars were sent out, and these were soon disabled. The double pole and trolley wire used in Cincinnati added to the troubles of the new men.

The Mayor renewed his demand upon the company to submit to arbitration, adding to his second letter the threat of receivership proceedings if his demand was refused. In this communication, dated May 11, the Mayor said:

"The city administration, being charged with the duty of protecting the convenience and safety of the citizens of Cincinnati, demands that your company take the necessary steps to resume immediately the operation of its cars. In order to accomplish this it will be necessary for your company to submit to arbitration the matters at issue between your company and its employees.

"I am advised by a committee representing your employees that they will abide by the result of arbitration if your company will do the same. I would suggest, therefore, that your company proceed to name an arbitrator. I will request your employees also to name an arbitrator on their part, these two arbitrators to agree upon a third arbitrator within twenty-four hours after their first meeting. In case no agreement can be arrived at, the judge of the United States District Court for this district, or some other unprejudiced person, is to name the third arbitrator. If your company will agree to proceed in this manner, I am sure that your employees will return to work and will thereby make it possible immediately to resume street car service.

"If your company will not agree so to proceed, the city of Cincinnati will be forced to apply to a court of competent jurisdiction for the appointment of a receiver to operate your property and if necessary for a forfeiture of its franchise.

"I am aware that your company is reluctant to recognize any organization of its employees, but the fact is, nevertheless, that an organization comprising almost all your motormen and conductors actually exists and the existence of such an organization is no longer an issue. As a public utility company it is your duty to render service to the public, and a refusal to recognize what is already a fact furnishes no excuse for failure to render this service. I shall expect a reply by 6 p. m., Monday, May 12, 1913."

Cincinnati Strike—Cars Stopped on Street by Strike Sympathizers

With this letter was a communication from the men embodying the first formal statement of their demands. These include a ten-consecutive-hour day, no run to pay less than nine hours' time; half pay for extra men; 25 cents an hour for first-year men, 27 cents for the second year and 30 cents thereafter; "the right of organization," and a written agreement with the company providing for adjustment of other grievances and for arbitration in case of failure to agree with the company as to questions that may arise in the future. The present wage scale is 20 cents for the first year, 21 cents for the second and third years, 22 cents for the fourth and fifth years, 23 cents for the sixth to ninth year, inclusive, 24 cents for the tenth to fourteenth year, inclusive, and 25 cents for the fifteenth year and thereafter.

A few minutes prior to the expiration of Mayor Hunt's time limit President Schoepf agreed to arbitrate on the understanding that the "matters at issue" were the demands summarized above from the letter to the Mayor. The company designated Walter A. Draper, its secretary, to act as arbitrator. The company's reply was unsatisfactory to the strikers, who, after the Mayor had presented Mr. Schoepf's letter and urged an immediate resumption of work, refused by a mass-meeting vote taken on the morning of Tuesday, May 13, to accede to the arbitration proposal unless the union was first formally recognized. This action was taken in spite of the urging of their champion, the Mayor, who said: "Now that you are assured of a fair adjustment of your grievances, the people of Cincinnati are entitled to your assistance in bringing about an immediate resumption of car service. The Cincinnati Traction Company has done its part. I am sure that the men your committee represents are not willing to be outdone in fairness."

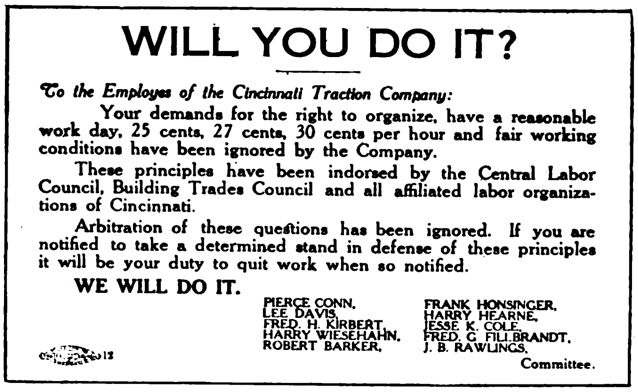
Another mass meeting held on the evening of May 13 more formally rejected the Mayor's arbitration plan on the ground that the company's acceptance was neither "clear nor satisfactory" as to the "right to organize." The recognition of this right, an agreement to meet and treat with the union, the reinstatement of all employees in their former positions and that Mayor Hunt should be the third arbitrator if the men and the company failed within five days to agree upon another selection were proposed as new conditions upon which the men would agree to arbitration.

The Mayor's remarks late Tuesday night, following the action just outlined, showed that he had gained experience from his three days' dealings with the Amalgamated. This was especially evident in his unofficial comments on the failure of the men to stand by their signed offer to arbitrate on the basis of their statement of May 11. It was evident, also, in this letter, which the Mayor hurriedly dictated Tuesday night and sent immediately to union headquarters: "It is my duty as Mayor of Cincinnati to preserve order and to protect property. The Cincinnati Traction Company is entitled to the protection of the laws and the use of its property. The people of Cincinnati are entitled to the use of a public convenience. The Cincinnati Traction Company is under a legal obligation to operate its cars, whether or not any settlement is made with its striking employees. The company also has a right under the law to employ whom it chooses to operate its cars. The Mayor of Cincinnati is under a duty to protect persons operating the cars from violence or intimidation. Street railway transportation must be immediately resumed, and I propose to call upon the officers of the Cincinnati Traction Company to resume operation of its cars.

Cincinnati Strike—One of the Means Used for Publicity by the Strikers

"I also propose to see to it that the operation of its cars shall have adequate protection to the best of my ability.

"I am sure that the striking employees of the Cincinnati Traction Company recognize these facts and as law-abiding citizens of Cincinnati will not only not interrupt by violence or intimidation the operation of the cars of the Cincinnati Traction Company, but will assist the authorities in preserving order and in inducing disorderly elements of the community to refrain from any effort at interruption.



WILL YOU DO IT?

To the Employes of the Cincinnati Traction Company:

Your demands for the right to organize, have a reasonable work day, 25 cents, 27 cents, 30 cents per hour and fair working conditions have been ignored by the Company.

These principles have been indorsed by the Central Labor Council, Building Trades Council and all affiliated labor organizations of Cincinnati.

Arbitration of these questions has been ignored. If you are notified to take a determined stand in defense of these principles it will be your duty to quit work when so notified.

WE WILL DO IT.

PIERCE CONN,	FRANK HONSINGER,
LEE DAVIS,	HARRY HEARNE,
FRED. H. KIRBERT,	JESSE K. COLE,
HARRY WIESEHAHN,	FRED. G. FILLBRANDT,
ROBERT BARKER,	J. B. RAWLINGS,

Committee.

Cincinnati Strike—Circular Issued Prior to Walk-Out

"I have a right to call upon all citizens to do this, and I do now so call upon the organization which you represent."

This letter was in a very different tone from the Mayor's previous communications, in which he had said among other things that he would not police cars run by strikebreakers or be responsible for the results if new men were imported. On Sunday he had declared that "we might as well run the cars ourselves with policemen" as to attempt to protect strikebreakers. At union headquarters Wednesday it was evident that the men were greatly surprised when the Mayor failed to support them in their refusal to arbitrate in accordance with the original proposition made through him.

SITUATION ON SUBURBAN LINES

For the first time since Sunday the traction company's cars made their appearance on the downtown streets at 9 o'clock Wednesday morning. The cars were run in bunches of three preceded, followed and guarded on either side by mounted police and four patrol wagons filled with policemen. No passengers except strikebreakers rode on the cars. There was little disorder, although crowds of strikers and sympathizers followed the cars along the Avondale route.

By Sunday some 500 employees of several suburban and interurban lines had suspended work. These included the motormen of the Cincinnati, Georgetown & Portsmouth Railroad, the Interurban Railway & Terminal Company and the Cincinnati, Milford & Loveland line. Although union officials say that the Cincinnati, Covington & Newport Traction Company's men have lately joined the Amalgamated in large numbers, 450 in all, this company's service continued without interruption. In consequence, the business center of Cincinnati saw the usual number of "green cars" on the street and strangers could not understand the reports of a complete suspension of trolley service until informed that these were Kentucky cars.

All but two of the conductors and motormen of the Cincinnati, Milford & Loveland Traction Company had signed the roll of the new street car men's union on Wednesday. One car remained in operation outside of the Cincinnati limits by permission of the union on promise that the remaining two employees walk out to-day.

F. H. Talbot, superintendent Interurban Railway & Terminal Company, said on Wednesday that the line would not operate any passenger cars until the strike trouble had been settled. The company is running freight and produce cars, however, bringing in the milk and farm products from the farmers in the outlying country districts. The produce car comes in at midnight and leaves at 4 in the morning, while the milk car comes in early and leaves at 9 o'clock. They will not carry passengers, however.

GENERAL SAFETY COMMITTEE ORGANIZED BY CHICAGO RAILWAYS COMPANY

A general safety committee has been created by the Chicago Railways Company, and plans have been made to develop a systematic arrangement under which the safety work will be extended to each division of every department of the system. The initial general safety committee is composed of the following members:

Williston Fish, general manager, chairman; Sidney Ossoski, general claim agent; M. B. Orde, treasurer; F. E. Smith, comptroller; J. R. Guilliams, general attorney; J. Z. Murphy, chief engineer; C. A. Caul, general roadmaster; Benjamin Phillips, superintendent of transportation; N. M. Thorssen, purchasing agent; J. V. Sullivan, general supervisor; Dr. H. M. Moyer, E. C. Hagerman, auditor of claim department, and George England, chief investigator.

Each member of the general safety committee who is a head of a department will appoint one or more sub-committees in his department. For instance, in the larger departments, or in those which have a number of employees at different points on the system, several sub-committees will be appointed. Thus there will be one sub-committee at each car station, substation and power house, and various sub-committees dealing with different subdivisions of the general work will be established in the road, shop and line departments. The sub-committees will be made up of members drawn from all classes of the service in the departments concerned, and in this way the condition of the entire property and methods used in the operation will be subject to supervision. The members of the sub-committees will rotate in office and will probably serve about six months in each case, although this is a detail that will be arranged to accomplish the best results after the work is well started. The sub-committees will probably meet about once a month, and the general safety committee will hold its meetings about the same interval apart.

In addition to the definite steps that will be taken by the general committee and by the sub-committees, arrangements have been made to get each employee in direct touch with the movement. Postal cards will be distributed at each car station as well as at other locations where there are employees, and these will be used to promote the work of prevention. The postal cards are headed "Suggestion to Prevent Injury" and are addressed to Williston Fish as chairman of the general safety committee. A postal card provides for a notation of the station and department of the company, the date and the name and occupation of the employee. Space is provided for a description of the condition or practice criticised after the following words, which appear on the post card: "Your attention is called to the following practice or condition." There is also a space for a memorandum regarding the action taken or the recommendation which follows as a result of the suggestion. No personal criticism of one employee by another is to be made to the committee. A button has been adopted which bears conspicuously the word "Safety." It also has the words "Courtesy" and "Prevent injury," as well as the insignia of the Chicago Railways Company.

The matter of the appointment of a committee and sub-committees has been under consideration by the company for some time. Before the decision to start the work was made the work of like committees on other roads was investigated. It was found that general safety work has been conducted by other companies without any friction among the various departments and with such earnestness that the committee has had the effect of bringing all the departments more closely together. During the investigation which preceded the appointment of the general committee it was found that one of the steam railway companies which established a safety committee about four years ago had accomplished wonderful results in the prevention of accidents and had also, in connection therewith, lowered its expenses due to injuries 33⅓ per cent. This same company expects this year to make the reduction 50 per cent.

The appointment of the committee was authorized by the executive committee of the board of directors on April 22, 1913, when resolutions were passed which in part are as follows:

"Whereas it has been clearly shown by the experience of railroads and large manufacturing concerns that the establishment of safety committees, dealing directly and comprehensively with matters of safety in the construction, maintenance and operation of such properties, is of great benefit in reducing the number of accidents involving injuries to persons or damage to property;

"Therefore, be it resolved, that a standing committee is hereby established, to be known as the general safety committee of the Chicago Railways Company.

"The duty of the general safety committee will be to inform itself of any and all conditions and practices existing or arising in the construction, maintenance or operation of the company's lines, power plants, stations, shops, offices and other property which by any likelihood may cause injury to persons or damage to property, and to devise, develop and recommend remedies therefor.

"Recommendations of remedies involving the expenditure of money will be subject to the approval of the general manager or of the executive committee, according to the amount of expense involved."

COMMITTEE MEETINGS OF AMERICAN ASSOCIATION

Secretary Donecker of the American Electric Railway Association was in Chicago May 15 and 16 to attend several committee meetings. On May 15 a committee met to consider proposed changes in the constitution and by-laws of the association. Charles L. Henry, C. N. Duffy and Mr. Donecker participated. It was decided to recommend an amendment that would provide for closer affiliations of the American Association with all other electric railway associations to the end that all may co-operate in the work of standardization and in other movements in which the interests of the various associations are identical. It was also decided to make a change in the method of distribution of the printed proceedings of the annual meeting and a reduction in the number of copies allotted to companies.

Later F. D. Norviel, chairman of the committee on express and freight traffic of the Transportation & Traffic Association, and Mr. Donecker went over the work of that committee in preparation for the report to be submitted at the Atlantic City convention.

On May 16 a meeting, attended by F. G. Buffe, Peoria, Ill., J. E. Gibson, general superintendent Kansas City Railway & Light Company, and Mr. Donecker, was held to discuss the report of the committee on passenger traffic of the Transportation & Traffic Association. On account of Mr. Buffe's resignation from the Illinois Traction System he resigned from the committee, and Mr. Gibson was appointed chairman. The report to be presented by the committee at the Atlantic City convention will consist of studies by the separate members of the committee on various interesting subjects such as relief of rush-hour conditions by encouragement of travel at other times, etc.

Report on Chicago Rolling Stock

Height of Car Steps, Schedule Speed, Time of Loading, Street Occupation and Motor Testing Are Among the Subjects Discussed by the Board of Supervising Engineers

The report of the Board of Supervising Engineers, Chicago Traction, for the year ended Jan. 31, 1911, has a chapter on "Cars and Car Operation" which discusses the subjects of height of car steps, schedule speed, time of loading, street occupation, motor development, service temperature tests and car operation. An abstract of this part of the report follows:

HEIGHT OF STEPS

"In the design of all the new rolling stock it has been the effort of the board to standardize dimensions as far as possible, particularly those affecting the habits or convenience of the public. But the public has not always understood that it is impossible absolutely to adhere to a fixed standard dimension. In respect to the height of the steps, the standard worked to is as follows for new equipment, unloaded (wheel new 34 in. in diameter): Height of first step above rail head, 16 in.; height of second step to platform, 14 in.; height of third step to car floor, 11 in.; total, 41 in.

"These represent the maximum heights for present types of platform construction and cannot be reduced materially without decreasing the diameter of driving wheels and introducing radical changes in the dimensions of apparatus involved.

"The factors which are involved in causing variation of step height may be discussed under two headings:

"First—Elements of Variation:

"a—Wheels originally 34 in. diameter when new wear down to 31 in. diameter before renewing. Drop of car body, 1½ in.

"b—Springs compress under live car load 1¼ in. with eighty passengers; maximum, 1⅞ in.

"c—Car tilting due to eccentric loading.

"d—Surface of pavement irregular, dropping below the head of rail from wear, track elevation or other causes.

"The total drop to be expected from wheel wear and spring compression totals about 3 in. Thus, disregarding the other causes of variation, the step height in cars properly constructed and maintained may be expected to range from 13 in. up. Occasionally the standard height of new equipment unloaded—16 in.—may be slightly exceeded, but as often decreased, which results from the fact that in practice such a flexible structure cannot be expected to conform exactly to a fixed standard. Eccentric loading may further add or subtract a small amount. Finally, pavement inequalities are manifestly quite beyond the control of the car designer. Complaints of high steps have generally been traced to cases where pavement is badly out of alignment or not yet surfaced, so that the addition of 4 in. or 5 in. in step height thus becomes serious. Similarly the enforced change of track grade without regarding the entire street paving has resulted in 2-in. or 3-in. increased step height. Thus it appears that for properly paved street the present standards of car design will result in a fair average height of first step of about 14¼ in. after the cars have been in operation for about half the wheel life and are fully loaded, or about 15 in. for cars hauling an average load.

"Second—Controlling Elements of Design:

"The fixing of a minimum height of car flooring at 41 in. above the rail head results from necessary clearance and conditions as noted below:

"a—Diameter of wheel tread.

"b—Height of truck side frames at pedestal determining height of side sill of car (on account of necessary clearance for operating short radius curves).

"c—Bulk of motor for requisite capacity.

"d—Clearance of gear casing above pavement.

"e—Elliptical springs require depth for easy riding. Spring hangers must clear irregularities in pavement.

"f—Springs must have considerable compression in order to make trucks easy riding.

"g—Both body and truck bolsters require considerable depth for requisite strength unless weight is sacrificed.

"h—Height of truck from rail to bearing plate thus fixed.

"i—Clearance required between motor and car floor for brake rods, conduit pipes, etc.

"j—Long platforms require considerable depth of knees in order to secure necessary strength and rigidity without sacrifice of weight.

"k—Platform drop, therefore, limited in order to avoid interference of trucks and motors on curves.

"l—Short radius vertical curves in track require extra clearance of car floor to avoid interference with motors.

"m—A second step to platform of excessive height results in passengers stumbling on entering and leaving car.

"n—Three steps to the platform floor cannot be used without insetting platform underframes and contracting platform standing space. This arrangement also increases the possibilities of accidents by landing passengers on the wrong foot.

"From a consideration of the above elements, it will be seen that with a given wheel diameter the lowering of car steps involves a large number of details in the design of trucks, motor and car body. The present truck builders have already secured maximum compactness, although it is possible to reduce the depth of springs at the sacrifice of easy riding qualities. Smaller wheels can be used in the cities where pavement surfacing is maintained to a uniform elevation with reference to the rail head, insuring a fixed clearance, but they cannot be used where bad paving occurs along any portion of the routes.

"A condition peculiar to Chicago exists at the entrance to the river tunnels, where the limitations of the street entrance to these tunnels have necessitated a vertical curve of such short radius that the tilting of the trucks at the entrance to the grade renders practically impossible any lowering of the car floor below that now standard and, as a matter of fact, in some cases, raising has been necessary in order to afford ample clearance for apparatus under the car floor.

"The two-riser platform step is out of the question if extending beyond the car body, and the restricted tread necessary with a step flush with the car introduces liability of accident from stumbling. Moreover, this type of step has been found particularly unfortunate in landing passengers on the wrong foot for safe egress from the car.

"It is, therefore, clear that any material reduction in step height will require one of three things:

"First—Reduction in wheel diameter (requiring special motors).

"Second—The redesign of the car and platform underframe to permit of cut-in double steps (objectionable).

"Third—The development of an extension folding double step to avoid traffic interference.

"Electric Railway Association Recommendations.—In this connection, it is of interest to cite the recommendations of some of the important railway associations of the country which have definitely studied this subject through special committees. They are given in Table I.

"From this table it may be seen that for the same car height Chicago car steps have been brought from 1 in. to 2 in. nearer the street surface than the distances recommended in other cities.

"The above discussion relates to end-entrance cars with drop platforms and standard four-motor equipment and does not apply to center-entrance cars or cars with maximum traction trucks.

Table I—Recommendations for Height of Car Steps—Inches

	Am. El. Ry. Assn.	New York St. Ry.	Chi. 1910 Car Max.
Height of first step from ground	17	18—14 17 average	16
Height of first step to platform	14	15—12 14 average	14
Height of platform to car floor	10	10— 8 10¹ average	11
Total	41	41	41
Diameter of wheel	33	33	34
Tread of step not less than	..	10	..

WHEEL TREAD

"Report II, 1908, recorded the adoption of rolled-steel wheels on Chicago surface lines. The original design of wheel contour has been modified slightly with the object of increasing the life of the wheels. These changes are as follows:

"First—Radius of throat increased from 9/32 in. to ½ in., which materially increases the inside slope of the flange of the wheel.

"Second—Taper of wheel tread increased from 1 in 38 3/16 to 1 in 16 over that portion of the tread which constitutes the main bearing surface. Outer portion of tread increased from 1 in 20 to 1 in. 10; contour of rail section and taper of head unchanged.

"These changes in wheel contour were made to prolong the life of the wheel by reducing inside flange wear, and the change has been found to produce the results expected.

CAR HEATING

"In line with the general efforts being made to reduce maximum demand and to increase both the efficiency of operation and the uniformity of heating, arrangements have been made to test in Chicago surface cars, under practical operation, a thermostat regulator for automatically cutting in and out the heater circuits. This thermostat consists of a compound brass-iron element with electrical relay circuit operating a power solenoid which carries the main switch contacts. The thermostat is sensitive within about 3 deg. above or below the normal temperature desired and can be easily adjusted at the shop. Furthermore, the apparatus may be installed so as to control either the entire heater current or connected behind the main heater switch so that the regulative feature may be limited to either the first or second point circuit. This latter feature is very desirable in mild weather, to avoid the frequent closing of the switch which would otherwise take place if all the heat were to be turned on and off by the regulator.

SCHEDULE SPEED

"The general increase in schedule speed which has been made possible by track reconstruction and the use of prepayment cars has already been noted in Report II, 1908, for a number of South Side lines. Similar data are now presented for lines of the North and West Sides. Averaging all of these lines without regard to their relative importance, the schedule is found to have increased over 8 per cent—from 7.60 m.p.h. in March, 1910, to 8.22 m.p.h. one year later. Or, considering only the lines of maximum traffic density, i.e., those which carry over 1,000,000 passengers per month, it appears that lines of maximum traffic throughout their length, such as Madison and Van Buren Streets, now average somewhat over 8 m.p.h., moderately heavy routes about 9 m.p.h., and long routes, such as Clark-Devon and Rogers Park, traversing much outlying sparsely settled territory, about 10 m.p.h. In contrast therewith the short-haul State Street line, lying entirely within thickly settled territory with a large part of the length traversing the business district, is not able to make more than 6 m.p.h.

"Expressed in concrete figures, an increase of 1 m.p.h. in schedule speed means that passengers may reside one-half mile further away from business, assuming thirty minutes as the maximum time allowable for surface transit in competition with elevated lines. For example, on the Madison Street line passengers can now ride to Garfield Park, where formerly a thirty-minute ride would approximately reach Sacramento Boulevard, a half mile shorter run. The general effect of this change throughout the city may be inferred from the fact that approximately 500,000,000 passenger rides per year are involved. By September, 1911, this speed had been still further raised to 8.36 m.p.h.—13.5 per cent increase since March, 1910.

"Most of the increased speed is directly due to track rehabilitation, removal of obstructions to clear operation on curves, etc., and more powerful car equipment. On some lines double track has replaced single track with turnouts, and others have been extended into thinly populated residential territory, where more rapid running is possible.

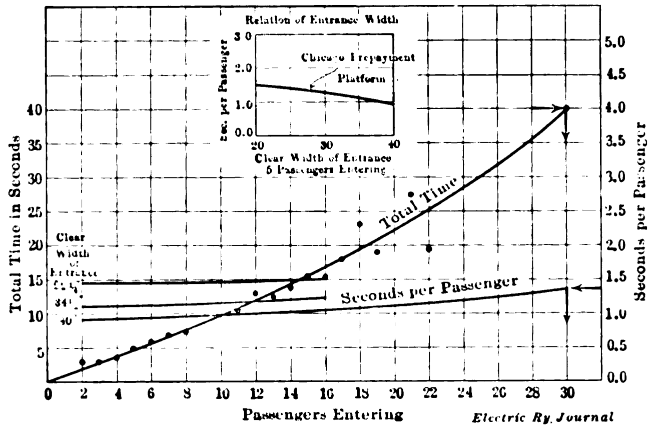


Fig. 1—Chicago Report—Typical Loading Curves of P-A-Y-E Cars

TIME OF LOADING

"A very important factor contributing to a general increase in average speed is the effect of the prepayment platform on speed of car loading. Observations made by the board's engineers are presented herewith in graphic form. These show that the loading of the Chicago cars is extremely rapid and that up to the capacity of the platform space—eight to twenty passengers—the time consumed averages about one second per passenger. Similar observations taken in other cities have rarely shown better results, and in most cases a slower speed.

"At the time the prepayment platform was introduced it was opposed on the ground that loading time would be considerably longer than when passengers could enter unobstructed at both ends of the car in the old way. The facts show that this conclusion is not applicable, at least to conditions existing in Chicago. In fact, observations recently taken in an Eastern city upon new pay-inside equipment show about double the average time of entrance found in Chicago. The so-called pay-within system is here considered as a variety of the prepayment system. Pay-inside means the old system of double entrance, conductor collecting fares from seated passengers. There is no doubt that the large platform introduced in Chicago is responsible in part for this quick loading on account of its great storage capacity, but it is also apparent that the separation of ingoing and outgoing passengers, so as to avoid interference, largely contributes to this more rapid loading.

"Typical loading time curves for a standard forty-seat Chicago car are shown in Fig. 1. The observations cover three widths of entrances, all on prepayment type platforms —40-in., 34½-in. and 22¼-in. The 'pay-inside' results, of course, cannot be considered as broadly typical of the old-style plan of fare collection, for the passenger movement in this particular city is admittedly slow.

"All of these observations were conducted in the heart of the congested business districts where the maximum interference to be experienced with prepayment platforms would be looked for.

"The effect of the narrower entrance opening is shown in the greater time required per passenger. This is almost entirely due to decreased platform storage capacity as passengers generally enter single file even on the widest entrance platforms.

"This final result is indicated by the upper curve, Fig. 1, showing that the average time required per passenger is as follows, shown in Table II:

Table II—Average Time of Loading per Passenger

Width of Opening of Door	Prepayment Normal Rush Hour	Maximum Holiday
40 in.	0.95 seconds	1.46 seconds
34½ "	1.13 "	1.55 "
22¼ "	1.45 "	

"The comparison is here made on a basis of five passengers entering, as this appears to represent a fair average applicable to the entire city. In the heavy loading districts, however, the number entering in the great majority of cases averages from eight, on lines where the loading is distributed for many blocks, to ten, on lines where there are comparatively few loading points.

"These figures in general indicate that a very radical saving in loading speed may be obtained when platform standing capacity is suitably proportioned to the capacity of the car. Here in Chicago the long platforms show to the best advantage; thus the average loading time for twenty passengers is only 1.2 seconds per passenger, whereas 1 second per passenger is required for five passengers entering. Further observations taken during the holiday shopping season show that the maximum time of slowest loading in Chicago is only about 50 per cent higher than for normal rush-hour traffic.

STREET OCCUPATION

"The great importance of a study of the most effective routing is illustrated by the diagram, Fig. 2, which has been prepared to show:

"First—The relative number of cars per hour passing along each side of downtown thoroughfares. (This is indicated by the relative width of the bands as compared with the scale thereon.)

"Second—How uniformly these thoroughfares have been utilized for street car traffic.

"Third—One important source of delay in the congested districts due to car interference from intersecting lines. Wherever lines of traffic cross the time required for cars to pass is largely increased, which forms an element of congestion.

"Fourth—The nature of the looping problem in the downtown district and how much the absence of through routing is responsible for the conditions existing.

"In the efforts of the two principal companies both to serve as much of the business center as possible, their individual lines have been extended practically across the loop district. Hence car interference has multiplied rapidly, and in taking advantage of certain loops and curves of great strategic importance some streets have been disproportionately used for car traffic while others are comparatively free. This also applies to one side of the street as compared with the other.

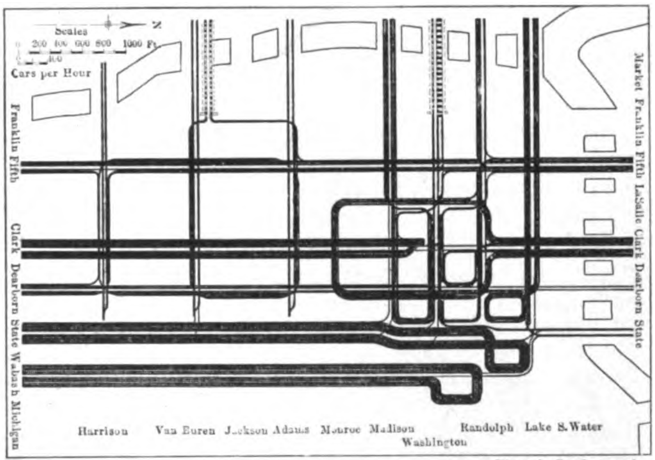
"Through routes are not indicated separately because of the small number of cars operated per hour as compared with loop traffic. The through routing of cars in the business district along straight lines as far as possible and the elimination of loops, the operation of which increases the number of crossing points, eliminating also the switchbacks on through-route streets, will evidently greatly alleviate car interference and tend to reduce congestion in the loop district pending the application of transportation facilities that will remove large numbers of cars from surface operation in congested territories. This map, therefore, provides a powerful argument for the earliest possible establishment of rapid transit subways to relieve Chicago's surface thoroughfares through the business district.

BRIDGE DELAYS

"A serious element of congestion occurs from delays due to the opening of Chicago River bridges. Although river traffic is limited to 'non-rush hours,' the all-day traffic in Chicago is so large that bridge delays form not only a serious element of inconvenience to the riding public, but also involve no inconsiderable expense to the company.

MOTORS

"At the present time there are 1068 four-motor interpole equipments in service, all of the solid or box-frame type, approximately 40 hp (at 500 volts). For the 300 equipments ordered on the 1910 car design interpole motors will be used, rated at approximately 35 hp (500 volts).



N
Scales
0 200 400 600 800 1000 Ft.
Cars per Hour
Franklin Fifth
Clark Dearborn State Wabash Michigan
Market Franklin Fifth LaSalle Clark Dearborn State
Harrison
Van Buren
Jackson
Adams
Monroe
Madison
Washington
Randolph
Lake
S. Water

Electric Ry. Journal

Fig. 2—Chicago Report—Street Occupation and Car Flow Diagram

"The development of the 35-hp size motor resulted directly from the desire of the board to equip the lighter cars of the 1910 design with motors of approximately the same horse-power per ton as experience with previous heavier equipments in Chicago had shown to be satisfactory. In order to ascertain positively the fact that the previous 40-hp equipments were adequate for all normal conditions of service, continuous temperature-service runs were conducted by the builder upon the 40-hp equipments previously furn-

Table III—Results of Tests of Motors

	Requirements as per Specifications L-2	Tests of Nov. 12 and 13, 1909.
Hp output at axle, 73 amp, 500 volts	40	Motor developed 40 hp at 72 amp, 500 volts.
Speed while developing 40 hp, 500 volts....................	Not to exceed 560 r.p.m.	Average during one hour hp test showed 550 r.p.m. at 72 amp.
Tractive effort at rim of 33-in. wheel 17:69 gear ratio, at 73 amp, 500 volts..............	1100 lb	Motor developed 1130 lb at 72 amp, 500 volts.
Efficiency of motor, including gear, and transmission losses at 40 hp, 500 volts.........	82 per cent	83 per cent, assuming 4 per cent loss in gear.
Temperature rise allowed on commutator during one hour hp test, referred to room temperature of 25 deg. C.....	90 deg. C.	43.72 deg. C.
Temperature rise in any other part of the motor during one hour hp test, referred to room temperature of 25 deg. C.	75 deg. C.	Maximum was 49.34 deg. C. on armature core.
Maximum increase in resistance by per cent allowed during one hour hp test...	40 per cent	Maximum was 34.5 per cent in the armature.

ished the Chicago Railways Company. Results typical of the performance of this interpole motor are presented in Table III.

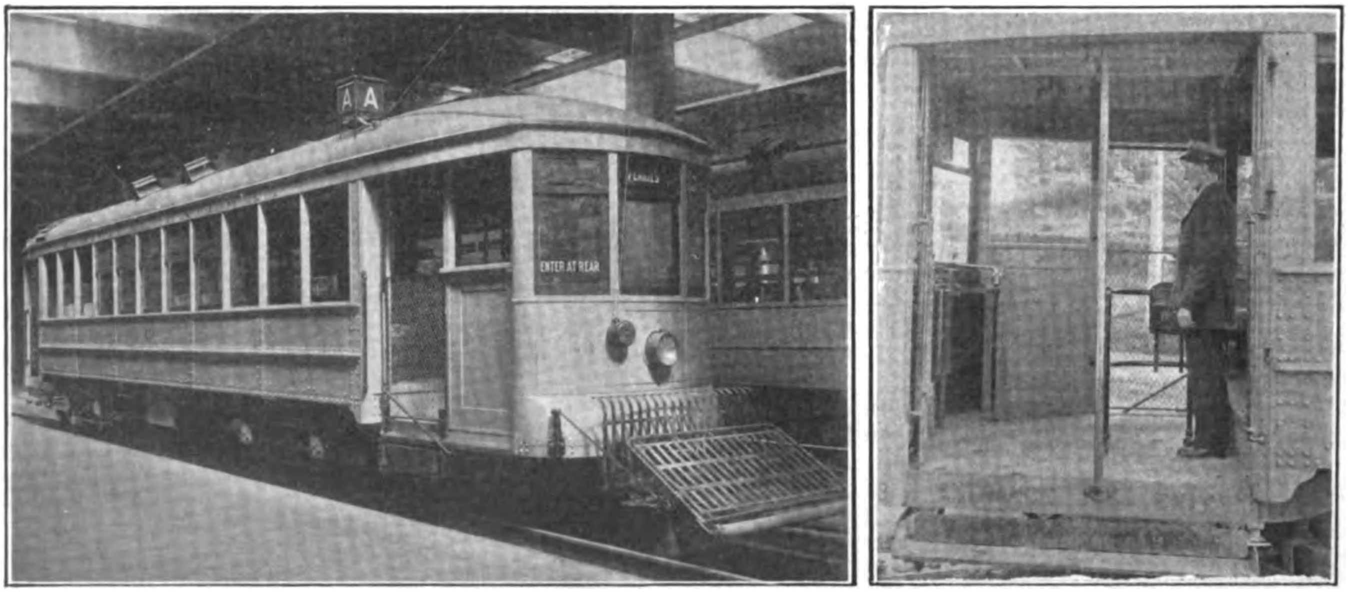
"The motor had been at rest for at least twelve hours before the one-hour test started. In the flashing test a potential of 740 volts was rapidly applied while run at full speed without any signs of flashing. Furthermore the motor was subjected to 740 volts potential when at rest and came up to speed without any signs of flashing. This may be regarded as a most severe test. The specifications for the new 35-hp interpole motors prescribed that the design of the new motors should incorporate those desirable features which past experience under Chicago conditions had proved correct, and while possessing these features this new motor is found to have an even greater weight efficiency than the former standard motors."

MUNICIPAL CAR IN SAN FRANCISCO

A plan of the standard car proposed for use on the municipal road in San Francisco and designed by B. J. Arnold was published on page 313 of the issue of this paper for Feb. 24, 1912. A few halftone illustrations of the completed car are presented in this issue. The most interesting and novel features of the car are connected with the platform arrangements. In the first place a drop platform is used for the first time, it is said, with any car of the California type. Although the "drop" is 13 in., the height of the riser into the car is only 11 in., because the floor is sloped 2 in. from the center of the bolster to the end sill. The first platform step is 14 in., and the second step is 13 in., based on a height of car floor of 40 in. above the rail.

In dimensions the platforms are fairly large, being 7 ft. 4 in. long over the bumper and 6 ft. 4 in. long to the inside vestibule panel. As there are no end bulkheads in the California type of car, the platforms seem very roomy. Master controllers are used, and this also increased the space on the platform.

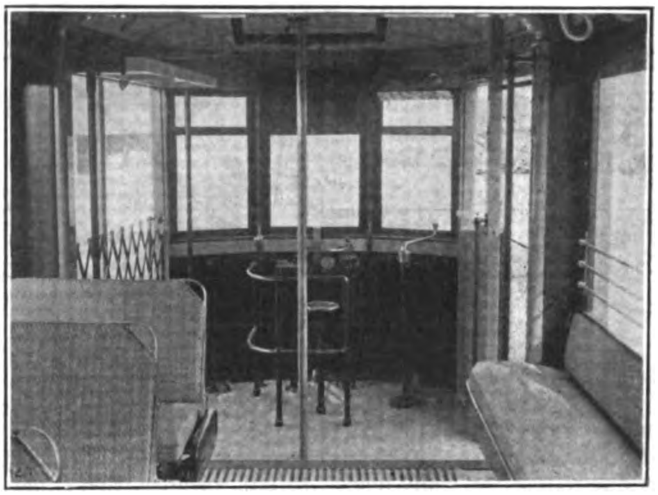
The front exit is located next to the car-body end sill instead of next to the bumper. The effect of this is to encourage the use of the forward exit as well as to increase the loading speed by removing the necessity for passengers to force their way through a crowd standing on the front platform. Then the platforms are tapered more than is usually the case, in order to provide clearance on curves, although for the present the enforced use of an overhauling fender defeats this purpose. Folding steps are used. Those of the forward exit are automatically operated with the gate, while those at the entrances are of the plain lift type and are operated from the platform.



San Francisco Municipal Car—Side View and Rear Platform

Following are given some of the dimensions and other details of the car:

Weight complete with equipment	48,000 lb.
Weight per seated passenger	1,000 lb.
Length over bumpers	47 ft. 1 in.
Length over body corner posts	32 ft. 5 in.



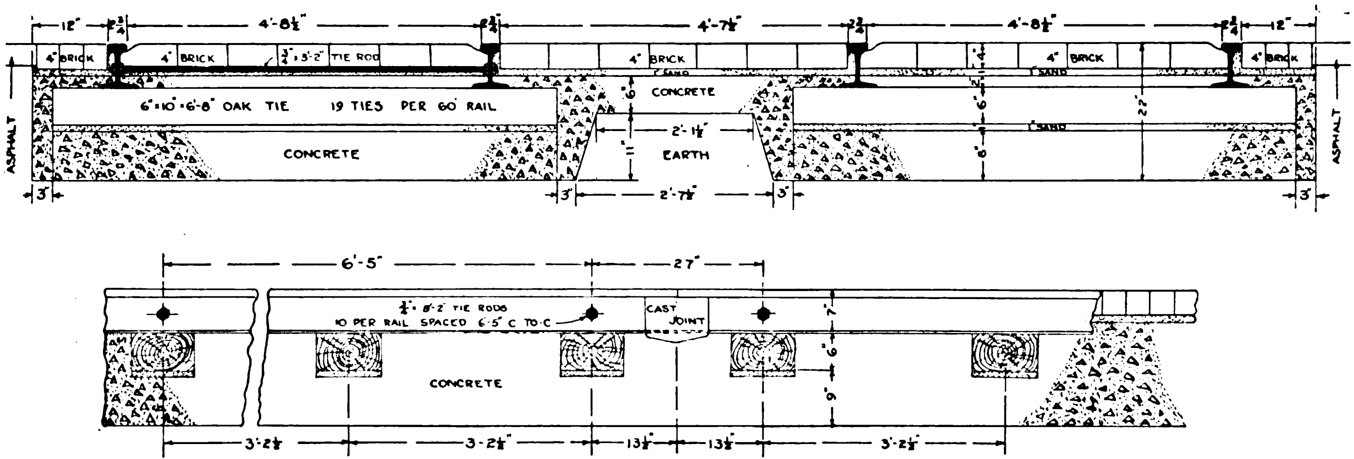
San Francisco Municipal Car—Front Vestibule

Length over closed section	14 ft. 6½ in.
Truck centers	20 ft. 10 in.
Wheel base	4 ft. 10 in.
Width of passageways:	
Entrance at step	34¼ in.
Exit at rear step	23¼ in.
Exit at forward step	30 in.
Aisle—open section	43 in.
Aisle—closed section	27 in.
Door openings, clear	30 in.

Body side framing, plate girder type, No. 8 steel, U. S. gage.
Body side posts, ash.
Bottom framing, all-steel construction.
Body bolsters, cast-steel I-beam section.
Platform framing, all-steel construction; maximum stress, 12,500 lb. per square inch.
Roof, arch type; continuous steel carlins at each post; two wood carlins between posts.
Flooring, 13/16-in. maple, single floor.
Dasher, No. 6 steel, U. S. gage.
Sash, raised type, three-quarter lift.
Curtains, Pantasote, both inside and outside sections.
Seats, Hale & Kilburn walk-over type, 199A; pressed-steel bracket and pedestal; spacing, 31 7/32 in.; rattan cushion, 17 in. x 34 in.
Inside finish, cherry.
Headlining, Agasote, Nile green.
Fare box, Johnson, selective; Sterling Meaker, No. 16 register.
Ventilators, automatic eductor type; four in roof of closed section.
Steps automatic folding type on forward exits; plain lift steps at rear entrance and exit, raised from inside platform.
Lighting, tantalum high-efficiency lamps.

APPRAISAL OF THE CITY LINES OF THE DETROIT UNITED RAILWAY

In connection with the suit against the so-called Hally, or 3-cent fare, ordinance passed by the City Council of Detroit, the Detroit United Railway has made public the figures of the valuation of its property as comprised in the Detroit city street railway system. The case is before the courts. It was taken into the United States court by the Guaranty Trust Company of New York, trustee under the issue of first mortgage 4½ per cent bonds of the company. The Detroit United Railway is made co-defendant with the city of Detroit and others in the case. Since the case was started considerable testimony bearing on the detail values of the physical property has been presented to the court before a master in chancery.



Detroit Appraisal—Section of Track in Asphalt-Paved Street with 8-in. Concrete Construction

Robert B. Rifenberick, the consulting engineer of the company, presented the figures of the valuation and testified regarding the method by which it was made. Owing to the fact that the present consolidated Detroit street railway system is made up of numerous constituent companies that in the earlier days of the industry were operated as separate and independent units, there were necessarily a number of different classes of track construction, all of which were gone into in considerable detail. This detail was considered necessary in order that the real values of each class involved might be brought out.

The accompanying illustration, used in the valuation, shows the method of plain track construction, class No. 84-1. Table I gives the specifications for 1 mile of 7-in., 91-lb. plain girder rail on oak ties in asphalt paved streets, with an 8-in. concrete foundation.

This plan indicates the method followed throughout the whole valuation. The prices of material used were those as of March 1, 1909, f.o.b. cars Detroit, and all labor was calculated as of the same date. The only exceptions to this were in the cases of copper and cement, the prices of which, of course, fluctuate largely. The prices of these two materials were determined on the basis of a five years' average.

To the material and labor cost so ascertained there were added, where accruable, contingencies or incidentals, general contractor's profit, employer's and public liability insurance, builder's risk and architect's fees to bring the several schedules to the physical reproduction value. To the physical reproduction value percentages were added to cover overhead charges for engineering, organization and administration, carrying charges and financing, giving the total reproduction value.

A summary of the valuation, presented by Mr. Rifenberick and relating only to the Detroit city system of the company, is published in Table II. There was also presented the following description of the percentage charges used in the appraisal:

PHYSICAL CHARGES

"Contingencies or Incidentals of Construction, 10 per Cent.—This charge is intended to provide for necessarily incomplete inventories, for it is impossible to make a full examination of buried structures or to include each item of physical property, as some of it is bound to be overlooked.

"Contractor's Profit, 10 per Cent.—This charge is intended to provide for a general contractor's profit, but it also includes general contractor's expenses of plant, etc.

"Employer's and Public Liability Insurance.—$2.50 for $100 of labor pay roll. This charge is intended to provide for accidents to persons employed on construction and the public during such construction.

"Builder's Risk.—On brick buildings, $1.50 per $100 of labor pay roll. On frame buildings, $2 per $100 of labor pay roll. This is the usual charge in this territory for this character of insurance.

TABLE I—DETAIL OF TRACK VALUATION, STRAIGHT TRACK CONSTRUCTION—CLASS NO. 84-1

Specification for 1 Mile of 7-in., 91-lb. Plain Girder Rail on Oak Ties in Asphalt-Paved Street; 8-in. Concrete Construction

	Total
47,520 sq. ft. of 3½-in. asphalt top course and binder removed and hauled to dump, at 3 1-6 cents	$1,504.80
829 cu. yd. of paving concrete removed and hauled to dump, at $5.21	4,319.09
1,515 cu. yd. of earth and sand excavation, at 35 cents	530.25
1,515 cu. yd. of excavation removed to dump, at $1.43	2,166.45
1,222 cu. yd. of 8-in. concrete for track foundation, at $7.13	8,712.86
29 cu. yd. of sand cushion for tamping, lining and surfacing ties, at $2.01½	58.43
1,672 6-in. x 10-in x 6-ft. 8-in. white oak ties laid 19 to 60 ft. rail length, at $1.18	1,972.96
143 tons of 7-in. 91-lb. plain girder open-hearth rail, in 60-ft. lengths, joints laid even and suspended between ties, at $43.44	6,211.92
19¾ kegs 9/16-in. x 5½-in. standard railroad spikes, at $5.05½	99.84
880 ¾-in. x 5-ft. 2-in. round tie rods, ten to rail, with 4¾-in. nuts per rod, at 39½ cents	347.60
1 mile of track laying	1,400.00
176 7-in. cast welded joints, at $4.25	748.00
10,560 lin. ft. of rail plastering, at 4½ cents	475.20
715 cu. yd. of paving concrete laid, at $7.13	5,097.95
138 cu. yd. of sand cushion for paving, at $2.01½	278.07
4,974 sq. yd. brick paving, at $1.38½	6,888.99
306 sq. yd. of 3½-in. asphalt top and binder laid at $1.50	459.00
Total cost per mile	$41,271.41
Of this total the labor cost per mile is	20.063.29

Location of this construction, Jefferson Avenue from Bates Street to Mount Elliott Avenue, 20,740 lin. ft., 3,928 miles.

Note.—These are reproduction values as of March 1, 1909, and are based on hand labor and team haul, the average haul being 3 miles, and the assumption being that a team will average 2 tons per load and travel 18 miles per day.

"Architect's Fees, 5 per Cent.—This charge is intended to provide for the cost of the plans and specifications for and the superintendence of the buildings during their erection.

"Acquiring Land, 10 per Cent.—This charge is intended to provide for the expense of juries, commissioners or arbitrators in condemnation cases; to provide for the cost of removing buildings not included in property purchased; to provide for the cost of plats, abstracts, notarial fees, recording deeds and examination of titles; to provide for cost of abutting damages, surveying and agents' commission.

OVERHEAD CHARGES

"Engineering, 4 per Cent.—This charge is intended to provide for the cost of the engineering necessary to the proper construction of such a property.

"Organization and Administration, 5 per Cent.—This charge is intended to include the salaries and expenses of the executive officers and the clerks in the general offices engaged on construction accounts or work; the upkeep of the general offices, legal fees, etc., fees of notary, and also the cost of taxes and licenses paid on property belonging to the corporation during the course of construction.

TABLE II—RECAPITULATION OF PHYSICAL CONSTRUCTION COSTS AND OVERHEAD CHARGES APPLIED TO THE APPRAISAL OF THE CITY LINES OF THE DETROIT UNITED RAILWAY

	Material and Labor	Incidentals, 10 per Cent	Contractor's profit, 10 per Cent	Liability Insurance	Builder's Risk	Architect's Fees	Cost of Acquiring Land	Engineering, 4 per Cent	Organization, 5 per Cent	Carrying Charges, 9 per Cent	Financing, 8 per Cent	Total
Power department	$3,257,558	$196,677	$331,672	$10,295	......	....	....	$151,262	$196,641	$371,652	$360,089	$4,875,848
Track department	8,447,980	710,644	782,108	82,812	......	....	....	364,555	519,405	981,675	951,134	12,840,315
Mechanical department	5,051,781	31,814	34,996	10,099	......	....	....	205,137	266,691	504,046	488,365	6,592,933
General department	1,906,216	111,158	....	11,057	$17,243	$62,551	$79,463	....	109,384	206,736	200,305	2,704,117
Total appraisal	$18,663,536	$1,050,294	$1,148,777	$114,264	$17,243	$62,551	$79,463	$720,955	$1,092,122	$2,064,111	$1,999,894	$27,013,215
Per cent of material and labor cost		5.6275	6.1552	0.6122	0.0924	0.3352	0.4258	3.8629	5.8516	11.0596	10.7155	44.7380
Per cent of material and labor cost, plus incidentals		......	5.8273	0.5796	0.0875	0.3173	0.4031	3.6571	5.5398	10,4700	10.1446	37.0263
Per cent of total physical costs		......	......	......	......	......	......	3.4111	5.1671	9.7657	9.4620	27.8059

"Carrying Charges, 9 per Cent.—This charge is intended to provide for the interest on the capital required in the construction of a property such as this, which capital is necessarily idle during the construction period but drawing interest. It is assumed that it will take three years to complete the physical construction of this property and that the use of the money in so doing would be required at least for half the time. The interest is figured at the rate of 6 per cent per annum.

"Financing, 8 per Cent.—This charge is intended to provide for the cost of promotion, the cost of engraving bonds, fees for printing mortgages and trust deeds, fees and taxes for recording mortgages and trust deeds, fees and commissions paid underwriters and brokers for marketing bonds and the discount on bonds."

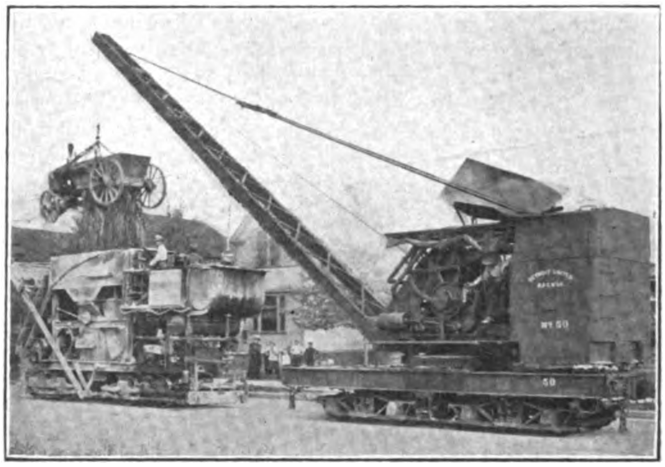
MOVING-PICTURE FILM USED IN CHICAGO TO WARN AGAINST ACCIDENTS

The value of the moving-picture film as a teacher in accident prevention was early recognized by Sidney Ossoski, general claim agent Chicago Railways Company, and the film is being used in the safety movement of the company with the co-operation of the Advance Motion Picture Company of Chicago. The claim department branch of the general safety committee has obtained a reel of 1000 ft. containing about forty scenes, illustrating the principal types of accidents that occur on one of the largest street car systems in this country. These scenes portray some startling and very instructive occurrences. The reel will be used to prevent accidents in this safety campaign by instructing the employees of the company on its safety or instruction car and in large halls located at the several car stations. This reel is one of three that are being taken. The others will be used for the instruction of school children and the general public respectively through the aid of regular moving-picture houses and by their projection on street screens as well as at public educational centers.

Many members of the organization of the National Railways "Safety First" Association, which was formed at a meeting held at the Hotel La Salle on April 21, visited the offices of the law and claim department of the Chicago Railways Company and later were taken on a trip in a private car to the Kedzie Avenue car station to visit the safety or instruction car. They also saw a part of a reel of these safety pictures as well as a 1000-ft. reel of the safety pictures of the Chicago & Rock Island Railroad. Much favorable comment was made on these two sets of pictures and their value from a safety bureau standpoint was readily acknowledged.

HANDLING CONCRETE AGGREGATE IN WAGON LOADS AT DETROIT

In the construction of track in Detroit it has been found economical in some cases to unload sand and cement by dumping wagon loads directly into the concrete mixer. John Kerwin, superintendent of tracks Detroit United Railway, makes a practice of calculating the cost of delivery of sand and cement from the railroad cars to the point where work is being done, and if it is cheaper to haul it by wagon than by car the work is done in that way, the cost of hauling in wagons being figured at 5 cents per ton mile. In handling material in this manner the sand and cement are loaded in the wagon in the proper proportions and the load is hauled to the point where the work is being done. Upon arrival the horses are unhitched and the wagon is then lifted by a locomotive crane and is dumped when directly over the concrete mixer, as shown in the accompanying illustration. Tests have shown that two and one-half minutes are sufficient for the entire operation from the time the men start to unhitch the horses until they are ready to go away after dumping a load.



Handling Concrete Aggregate in Wagon Loads at Detroit

The city cars in Detroit often carry theater or baseball announcements on the front left panel of the car vestibule. These announcements are on 24-in. x 26-in. cards, held in position by being slipped into narrow metal guides, which are attached permanently to the panel. Disfigurement to the car at this point is avoided by painting the guides the same color as the panel, so that they can hardly be seen when they are not in use.

NARROW-GAGE COMBINATION CAR FOR THE PACIFIC COAST RAILWAY

An all-steel car of the drop-side, center-entrance type has recently been built by the Cincinnati Car Company for the Pacific Coast Railway. This line is an electrified division of the steam railroad bearing the same name and it extends between the towns of Santa Maria and Guadaloupe near San Luis Obispo, Cal.

The car is of the double-end, center-vestibule type, the main passenger compartment being located on one side of the center entrance and the smoking and baggage compartments on the other, the baggage compartment being at the extreme end with a single sliding door on each side. At the front right-hand corner of the passenger compartment is located the motorman's cab and a saloon is placed at the rear left-hand corner. The control for the opposite end of the car is located in the baggage compartment.

The length over bumpers is 55 ft. 6 in. and the width over belt rails is 8 ft. 9 in. The lengths of the four compartments into which the car is divided are as follows: Baggage room, 17 ft. 6 in.; smoking room, 10 ft. 6 in.; vestibule, 4 ft., and main compartment, 22 ft. 6 in. The car, when the folding seats in the baggage room are in use, will seat fifty-eight passengers.

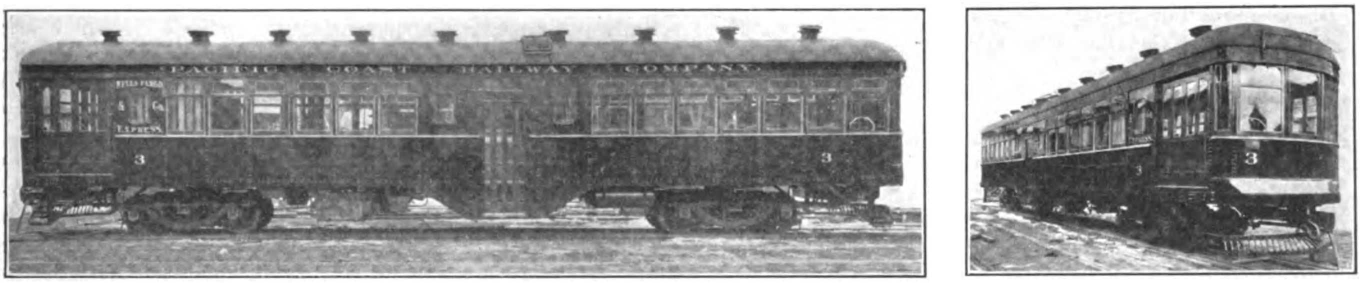
The vestibulue is inclosed by manually operated mechanically folding doors and the steps of the car are inclosed by Edwards traps when the doors are shut.

The baggage room is finished in ash and steel, the wood being varnished in the natural color and the steel work grained to match. The partitions are of steel covered with mahogany veneer. The smoking compartment and the main compartment are finished in solid mahogany. Seats in both compartments are of "Walk-Over" type furnished by the Hale & Kilburn Company. Both compartments are provided with continuous bronze package racks, and these as well as the saloon fittings were made by the Dayton Manufacturing Company.

The roof of the car is a true ellipse in form and is of steel plate, divided into panels by mahogany carlines. The ceiling throughout the car is enameled in white and forms a reflector for distributing the light evenly throughout the compartments.

The car body is mounted on Baldwin trucks, provided with compensated ball center plates and roller side bearings and rolled steel wheels, the gage of the wheels being 36 in. The trucks are equipped with four Westinghouse interpole motors of special design to suit the 36-in. gage, the control being of the Westinghouse H.L. type. The motors are geared for a speed of 50 m.p.h. The brakes, which were furnished by the Westinghouse Traction Brake Company, are of the combined automatic-straight-air pattern with graduated release and the car is equipped with Tomlinson radial drawbars with heads of the standard M.C.B. pattern.

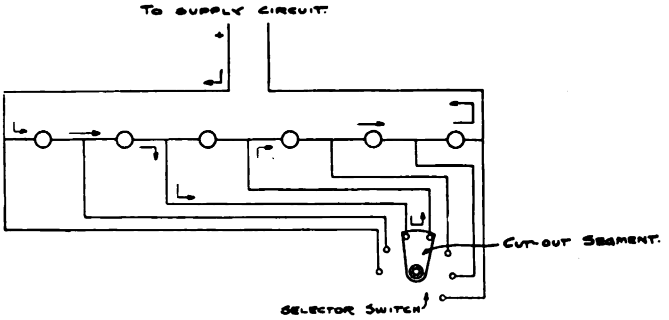
The car is insulated throughout against heat and cold with cork insulation 1 in. thick, the cork being cemented to the outside plates and covered on the inside by either steel plate or mahogany veneer. The weight complete is 59,900 lb., the body with electrical and air-brake equipment weighing 36,300 lb. and the trucks and motors 26,300 lb.



Pacific Coast Car—Side and End Views Showing Drop Siding and End Doors for Baggage

SELECTIVE CUT-OUT FOR DAMAGED LAMPS

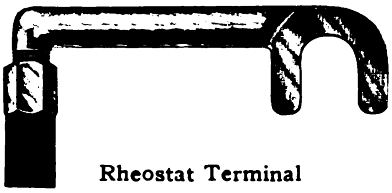
One of the primary difficulties in the way of obtaining the full benefit from tungsten-filament lamps in electric railway service has been the necessity for the use of small units. The smaller sizes of tungsten lamps are more fragile than those of the old carbon type and their efficiencies are materially less than when the lamps are made up in the larger sizes. Heretofore the general practice in car lighting has been to use two or more five-lamp circuits so that the number of lighting units has been comparatively large with a consequent necessity for using lamps of small candle-power. If in a car lighted by a single series of lamps one lamp burns out, the car will be left in darkness. There is ordinarily no way of telling which lamp is burned out without trying out every socket until the right one is found, and in order to overcome this difficulty the Nichols-Lintern Company has developed a manually operated selector switch which solves the problem by throwing into the circuit a sixth lamp to take the place of the burn-out. The only manipulation necessary is a simple turning of the knob of the selector until the lamps light.



Selective Cut-Out for Damaged Incandescent Lamps

NEW RHEOSTAT TERMINAL

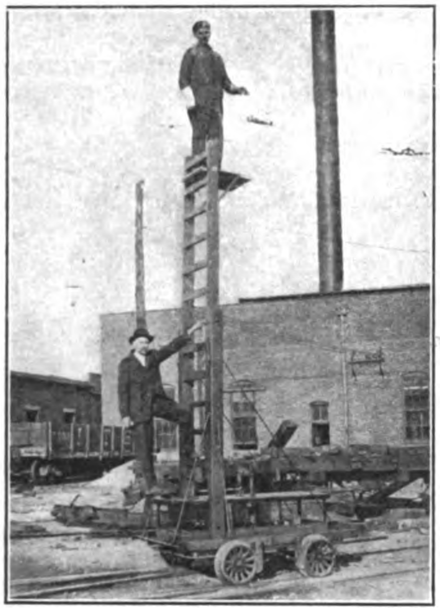
A new Dossert terminal connector, which has been substituted for the old screw-type terminals for making the connections from the dial to the grids of field rheostats in one of the largest power-generating stations of the Metropolitan district, is shown in the illustration. The shank of the connector is elongated so as to admit the cable in a direct line, while the contact disk is slotted to fit over the grid and is offset slightly to the right or left respectively to facilitate the work of installation. The cable is held in the connector by the compression method characteristic of all connectors of the make.



Rheostat Terminal

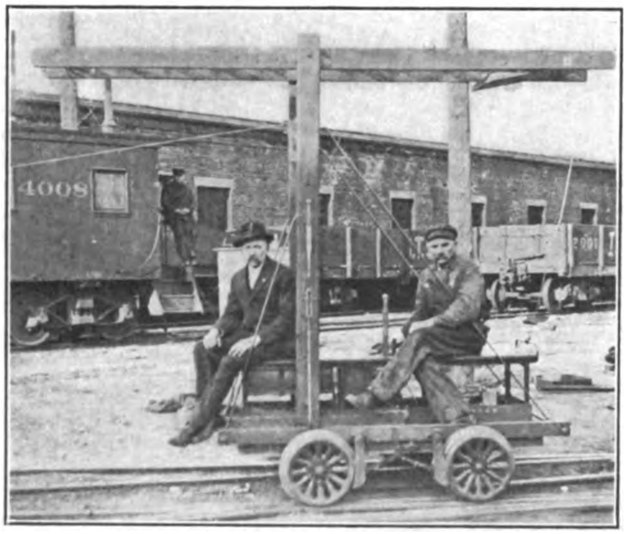
GASOLINE REPAIR CARS ON ILLINOIS TRACTION SYSTEM

As a substitute for the regular line repair car for light repair work, the Illinois Traction System has adopted specially equipped gasoline motor cars to carry trouble men to emergency repair jobs. Continued experience has proved that these improvised line cars are available for service with minimum preparation, and since they are self-contained they are entirely independent of line and power house troubles. The adoption of this repair car on all divisions has actually produced a saving of about $800 per month in trainmen's time and other labor expenses.



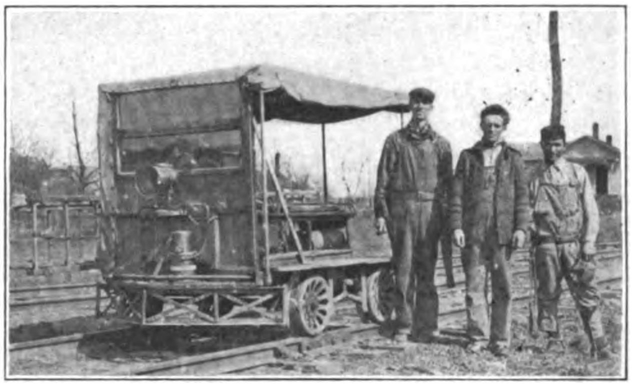
Illinois Traction System—Extension Ladder on Gasoline Line Car

The motor cars used by this company are of the No. 33 Fairbanks-Morse type. Two of the accompanying illustrations show a car as equipped for summer and winter use respectively. The summer car has an extension ladder which is pivoted at the top of a well-braced upright standard and may be set and locked in a vertical position for working on the line. A small folding platform just below the top round of the ladder permits the linemen to work either from a standing or seated posture. When it is desired to move along the road the pivoted ladder is swung to a horizontal position to form a "T" with the standard as illustrated, and it is then held securely by two sections of light strand attached to the car frame. The motor car proper is as light as practicable to permit the men to remove it from the track to clear regular trains.



Illinois Traction System—Gasoline Emergency Car Equipped for Summer Use, Ladder Included

In winter the car consists essentially of an inclosed body with an acetylene headlight and tail-light. The front of this inclosed body is built of wood, and the three other sides are provided with canvas drop curtains. The front end has a window through which the operator may have a plain view of the track ahead, and one side has a pipe rack for wire and linemen's tools. In making repairs with this car the linemen are required to work from a special extension ladder.

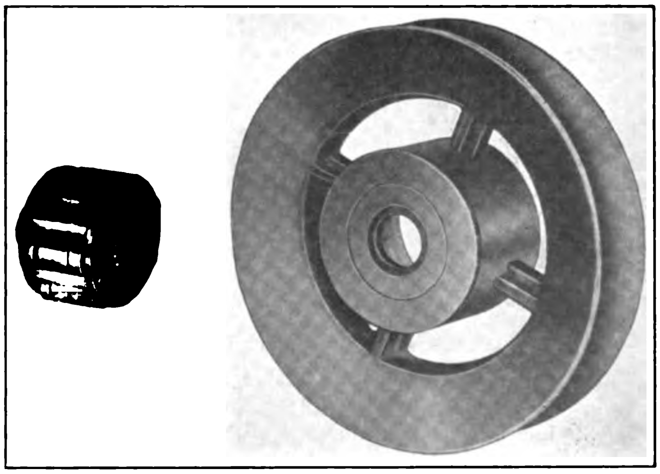


Illinois Traction System—Gasoline Emergency Car Equipped for Winter Service

ROLLER-BEARING TROLLEY WHEEL

The American Roller Bearing Company has had for some time past in experimental service on the Pacific Electric Railway several roller-bearing trolley wheels, of which one has run 7000 miles and shown no sign of wear. On its first test the car obtaining its current through this wheel ran at the rate of approximately 60 m.p.h. for twenty minutes, the wheel thus making 6000 r.p.m.

The anti-friction principle introduced by the rollers makes it possible to operate this bearing without lubrication. This is accomplished by separating the rollers which carry the load by idler spacing rollers, the latter revolving in a direction opposite to that of the load rollers between which they lie. This eliminates all sliding contact and provides a completely free rolling motion for both load and spacing rollers, thus preventing any possibility of heating and scoring even though no lubricant is used.



Roller-Bearing Trolley Wheel with Roller Casing Removed to Show Idle and Load Rolls

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The Public Works Department, Madrid, Spain, has invited tenders for the construction of three lines of electric tramways at Cadiz and also for the construction of an electric tramway at Barcelona.

News of Electric Railways

Third Arbitrator Appointed in Cleveland

Federal Judge John M. Killits, Toledo, Ohio, has been appointed the third arbitrator to consider the differences between the Cleveland (Ohio) Railway and the city administration by Judge Day of the United States District Court at Cleveland. The other two arbitrators were unable to agree upon a third man and Judge Day acted in accordance with the request of J. J. Stanley, president of the company, and A. B. DuPont, acting for the city. C. Nesbitt Duffy, Milwaukee, who will represent the company as arbitrator, could not be present at that time and Mr. Stanley acted in his stead.

Before making the appointment Judge Day called Mr. Stanley, Henry J. Davies, secretary, and H. J. Crawford, attorney of the company, and Mayor Newton D. Baker, A. B. Dupont and Street Railway Commissioner Peter Witt, acting for the city, before him and they agreed to accept Judge Killits. Judge Killits explained that he could not give more than a week or ten days to the work.

It was agreed that the arbitration shall cover only the right of the company to an increase in its operating and maintenance allowances. The city's representatives, however, stated that later on arbitration will be demanded upon the six questions that were proposed by the City Council. These include the reduction of fare to 3 cents cash, two tickets for 5 cents and 1 cent charge for transfers.

Proposal for Immediate Traffic Relief in Montreal

The Montreal (Que.) Tramways has sent to the Mayor and comptrollers the final report embodying the company's proposals for the immediate relief of the congestion at the center of the system. These proposals embody the opening of certain portions of new streets to the cars and the re-routing of some lines, in order to enable people in the northern portions of the city to reach the shopping districts of St. Catherine Street without having to transfer. In its communication, which details the changes in routes, etc., the company said in part:

"The situation is complicated to some extent by the fact that it is necessary to provide temporary accommodations for the growing traffic of the city while the city and the company draw up permanent plans for the future. With this object in view we have drawn up proposals which we believe will enable the company to handle the traffic to the satisfaction of the public while we are working out the permanent plans. We have confined our suggestions to the changes that can be put into effect without delay. We estimate that we could add a further 200 cars over and above the 200 cars now being delivered, which would more than double the service over what it was in November, 1912. We are prepared to put these changes into effect at once and ask your board's co-operation to that end."

Report on Boston Subway Extension

The Boston Transit Commission sent a report to the Massachusetts Senate on May 12 discussing the proposed extension of the Boylston Street subway from Boylston and Tremont Streets to Post Office Square and asking for more time to consider the project, which means the abandonment of the present authorized route to Park Street. By a referendum passengers traveling on the Boylston Street surface lines west of Copley Square voted in favor of the Post Office Square route by 37,848 against 31,481 ballots in favor of Park Street. The board states that the Boston Elevated Railway, as lessee of the subway, is willing to have the question reopened, but that the company is not willing on short notice to agree that it will abandon the Park Street route in favor of that to Post Office Square. The commission suggests connecting the Boylston Street subway with the Tremont Street subway between Charles and Tremont Streets pending the determination of a final terminal location. The company favors this plan, which would permit the introduction of a partial subway service by the summer of 1914 and do much to relieve the existing congestion on the surface tracks of the Back Bay, besides facilitating the regular movement of traffic at Park Street. The board also suggests the cross-connection of the four subway tracks to be in service in Boylston Street easterly from Park Square as a convenience in operating the completed tubes. Changes in the Public Garden incline are favored in this connection. Regarding the question of cost, the board states that its chief engineer, Edmund S. Davis, estimates that the cost of the authorized route from Boylston and Tremont Streets to Park Street would be $2,150,000, while the cost of what appears to be the most favorable route to Post Office Square from Boylston and Tremont Streets would be $3,800,000. The length of the entire subway, if the terminus is at Park Street, will be 10,300 ft., and if it ends at Post Office Square, 12,000 ft. As the Boston Elevated Railway pays a rental of 4½ per cent on the cost of subways, the location of the terminal at Post Office Square would involve an increase of $74,250 per year in the rental.

Strike in Jamestown

On May 15, 1913, the Chautauqua Traction Company and the Jamestown Street Railway, the employees of which went on strike on May 1, 1913, announced that they were operating all of their cars except eight and that the old men were returning and that applications were being accepted from new men.

About two months ago the companies learned that the employees desired to change the runs from early day, late day and swing to early and late day, and in accordance therewith the companies prepared a bulletin requesting all motormen and conductors to signify their desire. There was only one vote against the proposal, and the companies changed the schedule of runs as the men desired. After doing this the companies decided voluntarily to advance wages as follows: First year, 19 cents; second year, 19½ cents; third year, 20½ cents; fourth year, 21½ cents; fifth, sixth and seventh years, 22½ cents; eighth and ninth years, 23½ cents; tenth year, 25 cents. Notice to this effect, together with the change of runs, was prepared and posted in the club room, to take effect on May 1, 1913.

Between the time of the posting of the notice in the club room and May 1, on which date the changes were to take effect, labor men succeeded in forming a union among the motormen and conductors, who declined to accept the voluntary advance in wages made by the companies and the change in run schedules and went out on strike on May 1.

On the night of May 1 the men formed into two or three squads and started to tear down wires and otherwise damage property. The companies anticipated that violence would be resorted to and instructed their power house superintendents and substation attendants to leave power on all night in order that they might know if any wires were being tampered with. The officers of the companies also furnished the police with a descriptive chart covering the inside and the interurban lines, showing the zones in which trouble might occur. The engineers at the power house were instructed to locate the trouble for the police if the power service was tampered with. The men on strike began operations by throwing ropes over the high-tension wires for the purpose of drawing them together and short-circuiting the lines. Their work was detected at the power house and substations. The police were notified and twenty-three arrests were made. Five men confessed having attempted to destroy property.

Improvements in Trenton

The Trenton & Mercer County Traction Corporation, Trenton, N. J., recently furnished to Mayor Frederick Donnelly of that city a statement setting forth in detail the program of the company for improvements to be carried out during 1913. In a statement made to the Trenton *True American*, Rankin Johnson, vice-president of the company, referring to the work of the company already accomplished, said, in part:

"Since taking control of the operation of the street railway properties in Trenton, this company has, during the past three years, reconstructed new a large part of its tracks and pavements through the center of Trenton, and it is our plan to continue this work by the complete reconstruction of 2 miles of track and pavement during this year. All of this construction has been carried on in accordance with the best modern standards. In addition to this work, we have each year expended large sums in making repairs to such portions of our pavement as had become worn out and we have thereby largely reduced the area requiring such repairs. While this is very early in the season, we have already electrically welded about 1000 rail joints, at the same time grinding down the joint so welded to a smooth surface and repairing the pavement. We have a force of more than 60 men in Trenton making repairs where needed to that part of the pavement which is under our jurisdiction. It can, therefore, be stated that before the end of the present season we will have reconstructed or completely repaired very nearly all of the pavement in the city which is under our care.

"We feel that we have largely improved the physical condition and efficiency of service of this property during each of the past three years, and we hope that our continued efforts to maintain and improve such conditions will receive recognition by the people of Trenton.

"In an enterprise whose operations are so intimately associated with the daily lives of many people, we cannot hope entirely to avoid adverse criticism, but we ask that such criticism be tempered by fairness and based on facts. As our aim to improve conditions and service is sincere, we trust that in the consideration of any question concerning us which may arise we may have the opportunity of stating our attitude."

Municipal Ownership Negotiations in Toronto

The Toronto Board of Control at a recent meeting decided to withdraw the bill before the Ontario Legislature providing for the purchase of the property of the Toronto Railway and Toronto Electric Light Company, but on a special meeting of the Council being called the members declined to authorize the withdrawal of the bill and reaffirmed their previous decision. Hon. Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, has objected to the purchase on the ground that the city would be required to continue the power contracts between the Toronto Railway, the Toronto Electric Light Company and the Toronto Power Company for the remainder of the term of the railway franchise. Mr. Beck claims the city could not carry out this plan under the terms of its contract with the Hydro-Electric Commission, which contract confines the city to the use of power supplied by the commission.

The third reading of the bill was fixed for April 21, but it did not take place. Instead the original bill was remodeled and referred to the private bills committee. A new clause was inserted providing that no agreement for the purchase of the Toronto Electric Light Company shall be submitted to the electors until it is approved by the Ontario Hydro-Electric Commission and the Lieutenant Governor in Council, and another clause was added prohibiting the amalgamation of the property of the Toronto Electric Light Company with that of the Civic Hydro-Electric System. The bill was passed April 23, with all reference to the Toronto Electric Light Company eliminated, the previous legislation giving authority to purchase this company being still in force. It is thus necessary to submit two bylaws to the vote, instead of one as originally intended. It is understood that, should the companies actually desire to sell, the properties must be taken over by the city together, while the legislation being promoted would provide for submitting the question of taking over of the properties to the ratepayers separately.

Under the bill power is given to purchase the Toronto Railway and also the rights and interests of all companies and persons owning or operating electric or street railways within the city or such parts of them lying outside the city as the city may deem it expedient to purchase. For the purpose of providing for such purchases the city may borrow the money required and issue debentures payable in not more than forty years, without the necessity of submitting the debenture issue to the electors. The debentures are not to be counted as part of the general debenture debt of the city. The money borrowed may be secured by a mortgage upon all electric and street railways and electric-light systems owned by the corporation, including those purchased under the act. The management of the street railway and electric light systems is to be vested in a commission to be appointed by the City Council, to consist of three members, none of whom is to be a member of the Council.

Transportation Discussed at City Planning Conference

At the city planning conference which closed in Chicago on May 9, 1913, the subject of transportation in its relation to city development and congestion received a great deal of attention. Among those who contributed to the discussion on transportation were Edward M. Bassett, formerly a member of the Public Service Commission of the First District of New York, and Dr. Werner Hegemann, general secretary of the German City Planning Conference. Mr. Bassett while a member of the New York Commission studied railway operation in London, Paris, Berlin, Vienna, Munich and Budapest. Perhaps his greatest service to the commission was in connection with the framing of the New York rapid transit law and in pushing the elimination of dangerous grade crossings. Mr. Bassett said at Chicago:

"A modern city after it gets more than 1,000,000 people needs rapid transit so that people will not have to travel so many hours in going from the traffic centers to their homes. This movement should not be directed toward a single center. No great city can afford to build up with one congested center. It must, like London, develop numerous transit centers.

"There was a tendency in New York constantly to pile one business stratum closely on another and then begin apartment houses toward Harlem and the Bronx so that the city became essentially a long city. A long city is not an economical city from a transportation or housing point of view. A round city has the largest area with the shortest distances to its traffic centers, but a long city has the smallest area with the longest distances.

"Rapid transit routes, if built as diameter lines, will help to make a round city and at the same time produce many traffic centers. I mean by diameter lines lines that start in the suburbs and go through a dense part of the city and out again at another suburb. Thus a train will start in the morning, picking up its load as it approaches the center of the city, distributing it through the entire inside part of the city, then go out into the suburb. There it changes its direction, swings back again, and distributes its load through the city. The same process is repeated in the evening. Radial lines of this sort were for a long time needed in New York City."

Dr. Hegemann objected to the use of Paris as a model for Chicago. He stated that transportation and housing in Paris were the worst in the world and said that in order to secure a comprehensive transportation plan for a large city the opinion of the leading transportation experts of the country, if not of the world, must be asked. According to Dr. Hegemann, modern transportation, if thoroughly applied to city planning, will produce a type of decentralized city, which will contain many more green spaces, gardens and parks than the crowded cities of the past.

Rules for Procedure Before Missouri Commission

John M. Atkinson, of the Public Service Commission of Missouri, in discussing the rules for procedure before the commission, said recently:

"The rules abolish all technicalities in procedure. A plain statement only of the complaint is required to be made, verified by the complainant. Complaints may be amended at any time in the discretion of the commission.

"The commission will hold regular monthly sessions at its office in Jefferson City on the first Tuesday in each month, convening at 9 a. m. Under the law and the rules the commission is continuously open for the transaction of business during every day of the week, except Sundays and legal holidays. Other sessions of the commission will be held in Jefferson City and elsewhere as the business requires.

"No rate of any public utility in the State can be increased after April 15, when the law became effective, without thirty days' notice and consent of the commission.

"One of the features of the rules is the supervision to be exercised over the issuance of stocks, bonds and notes by public service corporations of the State. In addition to scrutinizing the purpose for which such bonds, stocks and notes are to be issued the commission will require an itemized statement of the expenditure of such moneys, verified by oath of some officer of the public service corporation, to be filed with the commission at the end of each six months, showing what disposition has been made of the proceeds of the sales of such stocks, bonds and notes. In this way the commission feels that all moneys and obligations of public service corporations on which the public has to pay a return in rates should be honestly invested and properly expended for the interest of the public as well as the individual utility.

"The rules of the commission set out in full forms for complaints, applications and other proceedings before the commission, which will be of interest to lawyers practising before the commission and also to all utilities under regulation of the commission.

"Under the rules, when a complaint is received, an order of the commission is made that the party complained against must satisfy the complaint or answer it within ten days thereafter; also a copy of the complaint is sent the party complained against. If at the end of ten days the complaint is not satisfied, then the commission enters an order for a public hearing, giving the party complained against ten days' notice of such time and place. In this way it is hoped that the business of the commission will be expedited without long-drawn-out litigation."

Provisions of Detroit Municipal Ownership Amendment

The municipal ownership amendment under consideration by the charter commission at Detroit, Mich., has been considerably changed from the original plans for the operation of street railways. One change provides for the election of the three members of the street railway commission and fixes the salary of each member at $5,000 per year. The original idea was to make the commission appointive and have the members serve without salaries. The latest draft takes the responsibility for the operation of any municipally owned road from the Mayor and places it with the commission. The commission is also made non-partisan. The expression "a system of transportation" has been substituted in the amendment for "street railway system" in order that provision may be made for trackless trolleys and buses. Corporation Counsel Lawson, however, does not believe that the bus lines could ever be operated legally under the amendment. In the case of the death of a member of the commission, his successor is to be selected by the other two members. The commission will appoint its own general manager, superintendents and other employees. Approval of new lines and extensions is left with the City Council.

Because of the fact that the question of the occupation of Fort Street by the Detroit United Railway is now before the United States Supreme Court, the board of estimates is in doubt as to what steps should be taken in regard to repaving portions of that thoroughfare. Under the old franchise, the company would be required to pay for the pavement between its tracks, but with its right to occupy the street in dispute, the city cannot be certain that any of the funds for paving can be secured from the company.

Arguments were presented before the United States Supreme Court at Washington on May 6, 1913, in the suit of the Detroit United Railway against the city of Detroit in relation to the company's occupancy of Fort Street. Attorneys for the city argued that no federal question had been raised in the matter, but that it is a difference between the city and the company that should be settled in the state courts. A decision will probably not be reached for some time, as the arguments were upon a motion to dismiss, advance or affirm the decision of the lower courts.

Indiana Employers' Liability Act Constitutional.—The constitutionality of the Indiana employers' liability law was upheld on May 5, 1913, by the Supreme Court in the suit of Haynes L. Hackett against the Chicago, Indianapolis & Louisville Railway.

Strike in Colorado Springs.—Service on the Colorado Springs & Interurban Railway, Colorado Springs, Col., was resumed on May 12, 1913, following an agreement reached by the officers of the company and the employees. The men were on strike only one day.

Strike in Fort William.—Service was suspended on May 13, 1913, on the Port Arthur & Fort William Electric Railway, Port Arthur, Ont., as a result of a strike of the employees of the company for higher wages and shorter hours. The road is owned by the municipalities which it connects and is under the management of a joint commission appointed by the cities of Port Arthur and Fort William.

Strike in Roanoke.—There has been little or no change in the situation in connection with the strike of the union conductors and motormen of the Roanoke Railway & Electric Company, Roanoke, Va., which began on May 1, 1913. Committees from the Common Council and the Board of Aldermen have failed to bring about an adjustment of the differences. The strike has been characterized by the absence of disorder.

Municipal Railway Plan Defeated in Tacoma.—The special election held in Tacoma, Wash., on May 11, 1913, to authorize an issue of $250,000 of bonds to provide funds for municipal purposes resulted in the defeat of all the propositions which were submitted. The most important proposal was to spend $87,000 for a municipal railway across the new city bridges to the factory and railroad terminal districts on the tidelands.

Tornado Damage Fund Distributed Among Omaha Employees.—With a fund raised by fellow employees and contributions from officers, directors and the company itself, the twenty-eight employees of the Omaha & Council Bluffs Street Railway, Omaha, Neb., who were affected by the recent tornado have had 76 per cent of their losses in the storm made good. The fund amounted to $7,996. Allotments to individuals ranged from $3 to $1,615.

Demand for Reinstatement of Carhouse Employees in New Haven.—It was announced on May 15, 1913, that the members of the union among the employees of the Connecticut Company, New Haven, Conn., had voted to strike if necessary to uphold their executive committee in the latter's demand on the company for the reinstatement of certain carhouse employees who were discharged recently. The company maintains that the carhouse employees are not included within the scope of the provisions of the two-year agreement between the company and the union.

"Solving the Street Car Problem in Great Cities."—Richard Spillane contributed to the St. Louis *Globe-Democrat* of May 4, 1913, an illustrated article, "Solving the Street Car Problem in Great Cities," which carried the subcaption "Devices to Relieve Congestion of Traffic and to Save the 'Missed Fare' and How They Have Been Applied to the Service with Success." Mr. Spillane referred particularly to the work in car design accomplished by Duncan McDonald, J. S. Doyle and Thomas E. Mitten, portraits of whom accompanied the text, together with reproductions of views of the single-deck and the double-deck stepless car.

Tentative Saginaw Franchise Unsatisfactory.—The tentative blanket franchise drawn by the Board of Trade of Saginaw, Mich., in favor of the Saginaw-Bay City Railway is said to be unsatisfactory to the company. J. A. Cleveland, general manager of the company, is quoted as follows: "The ordinance is unfair in its provisions, impracticable in its workings, and could not be accepted by this company or any other company for operating a street railway in Saginaw." The directors of the Board of Trade have referred the ordinance back to the special committee, with the request that they enter into negotiations with the company with the idea in view of arriving at an agreement.

Application Made for Elevated Railway Rights in Los Angeles.—The Pacific Electric Railway, Los Angeles, Cal., has applied to the City Council for a forty-year franchise for a four-track elevated railway from the present Main Street terminal east to San Pedro Street, at an estimated cost of $600,000. This is the first step in a plan which contemplates the elimination of grade crossings within a good part of the city. The elevated railway will commence at San Pedro Street and extend thence to an overhead crossing at San Julian Street, where the two tracks will be increased to four, extending thence to the main station, crossing Wall Street, Maple Avenue and Los Angeles Street. The present elevated structure over Los Angeles Street will be incorporated in the new elevated. Right-of-way for the elevated structure has already been purchased.

Suggested Use of Illinois Canal for Railroad.—Governor Dunne of Illinois has announced as an administration policy the conversion of the Illinois & Michigan Canal from Chicago to Lockport into a subway which will provide entrance for steam and electric railways to the heart of Chicago. The Governor has called a meeting of the commissioners of the Illinois & Michigan Canal, the trustees of the Sanitary District of Chicago and representatives of the Chicago plan commission, to be held in Springfield, to initiate active steps in the matter. Broadly stated, the proposal of the Governor is to drain the canal between Chicago and Lockport, dredge out the accumulated dirt, lay tracks on the canal bed, roof it over and use the lid as a boulevard. The subway could be used by the Rock Island, the Alton, the Santa Fé, the Chicago, Joliet & Eastern steam roads or the McKinley electric lines.

New York Rapid Transit Route Rescinded.—The Public Service Commission for the First District of New York has rescinded a resolution passed in July, 1912, laying out a rapid transit route in Thirty-fourth Street, Manhattan, for use either as a subway or a moving platform. The plan aroused considerable opposition from property owners, and last summer the commission withdrew the route and general plan from the Board of Estimate and Apportionment, where it had been sent for approval. Since that time several hearings have been held and the fear was expressed that the construction of a subway near the surface under Thirty-fourth Street would interfere with the construction of the north and south lines in Seventh Avenue and Broadway. The commission's action in canceling the route for the present was taken without prejudice to the future laying out of a cross-town route in Thirty-fourth Street, if it should be deemed advisable.

Terminal Plans of Public Service Railway.—The members of the Board of Works of Newark, N. J., and representatives of the Public Service Railway discussed on May 5, 1913, the application of the company for the twenty-seven franchises asked in connection with the proposed electric railway terminal in Newark, the plans for which were described in the Electric Railway Journal for Feb. 8, 1913, page 246. Following this meeting Thomas N. McCarter, president of the Public Service, in a letter to the board, made a statement of facts covering the operations of the company in acquiring or contracting through its subsidiary real estate company approximately $1,500,000 worth of property needed for the terminal. The engineering plans for the building and trackage have been completed, and on May 6 a contract was entered into with the Newark Cement, Paving & Construction Company which provided that the buildings on the property which has been acquired should be razed by June 1, 1913.

Portland, Eugene & Eastern Railway Improvements.—The program for the improvement of the Portland, Eugene & Eastern Railway, Portland, Ore., to which reference has been made previously in the Electric Railway Journal, calls for the reconstruction and electrification of approximately 180 miles of steam railroad. The lines now under construction are: Canby-Molalla, 11.35 miles, and Monroe-Eugene, 25.2 miles. The proposed lines follow: Oswego-Hubbard, 21 miles of double track; Hubbard-Salem, 19.7 miles; Molalla-Silverton, 15.5 miles; Independence-McNary, 4.31 miles; Albany-Wellsdale, 6.52 miles. The main reinforced concrete inspection repair and paint shop will contain 40,200 sq. ft. of space. Other buildings in connection with the shop follow: blacksmith shop, 20 ft. by 40 ft.; inspection office, 16 ft. by 32 ft.; washing slab, 38 ft. 6 in. by 165 ft.; washing slab, 50 ft. by 65 ft.; boiler house, 40 ft. by 80 ft. Reinforced concrete substations will be erected at the following points at the following approximate costs: Oswego, $6,000; Forest Grove, $4,200; Dundee, $4,200; McCoy, $5,500; Corvallis, $5,500; Monroe, $5,500; Eugene, $5,500; Hubbard, $5,500; Salem, $5,500.

Description of Third Avenue System.—The New York Edison Company, New York, N. Y., published as a supplement to the *Edison Monthly* for May, 1913, an illustrated description of the system of the Third Avenue Railway, New York, of which Frederick W. Whitridge is president. The supplement contains sixteen pages and cover and was bound separately from the *Monthly* itself. Referring to the contract under which the Third Avenue Railway turned its Kingsbridge power station over to the New York Edison Company for operation the *Edison Monthly* says: "It is impossible to predict the economies forthcoming, due to better load factor and diversity factor, when the systems are combined. For instance, with three stations in hand, two can be kept under constant load with the third as reserve for peak load conditions and other emergencies. As the possibilities are great, the central station engineers may be relied upon to make the most of them. The credit due Mr. Whitridge and his associates in thus adopting central station service for the supply of this great system cannot well be overestimated." The cover of the supplement contains a halftone reproduction of a portrait of Mr. Whitridge.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

The hearing of the public utility commission measures on May 6, 1913, before the joint committee of the House and Senate was devoted to explanations of the four measures. Professor Fairley, of Chicago University, appeared for the bill which is fostered by Governor Dunne, and Corporation Counsel Skinner of Chicago appeared for the measure advocated by Mayor Carter Harrison. The Dailey bill, presented by Chairman Dailey of the commission appointed by the Legislature two years ago, and the Ettelson bill were not represented and were discussed but slightly. Another hearing was set for May 14.

The Senate has passed the Olsen bill giving cities power to own and operate gas and electric utilities. Senator Beall's bill, aimed at the Chicago baseball parks, but drawn so as to include common carriers except surface street cars, requiring that all patrons be provided with seats and with ample accommodations, has been passed by the Senate. A bill restricting the employment of women by railroads and others to ten hours a day has been introduced by Senator Bailey. Three of the five members of the subcommittee of the committee on labor and industrial affairs are opposed to recommending the passage of the bill which provides that street car men must finish their ten hours of labor within twelve hours.

MASSACHUSETTS

The electric railway merger bill affecting the western part of the State has been held up by an amendment offered by Robert M. Washburn, Worcester, to meet the objection of those who oppose the control of the electric railways by the New York, New Haven & Hartford Railroad. This amendment provides that the State Railroad Commission is to certify that the New York, New Haven & Hartford Railroad is financially able to carry out the provisions of the bill before the act becomes effective. The measure provides for the consolidation of the electric railways in Worcester, Springfield and Pittsfield and their control by the New York, New Haven & Hartford Railroad. Last year a similar measure was vetoed by Governor Foss and was passed over his veto by the House, but failed in the Senate.

OHIO

Governor Cox of Ohio vetoed the Mills bill on May 6. This bill authorized municipalities to issue bonds in small denominations for the purchase of public utility properties. On the same date the Governor vetoed the Wise bill, drawn to give county commissioners authority to revoke franchises of street or interurban railways where the grant extended over twenty years. He called this one of the most drastic pieces of legislation enacted by the last General Assembly and said that there was a vast difference between legislation and confiscation. There has been some newspaper talk as to the possible voidance of the Snyder indeterminate franchise bill, it being claimed that the measure was not signed by Speaker Swain in the House of Representatives while the body was in session. Governor Cox signed the Snyder indeterminate franchise bill on May 6. This bill gives to the city of Cincinnati the right to grant the Cincinnati Traction Company an indeterminate permit in exchange for its fifty-year franchise, granted under the Rodgers act, and allows a settlement of the street railway situation in Cincinnati under plans agreed upon between the city and the company. All the other bills necessary to that settlement have been signed, except the one doing away with the necessity of securing the consents of property owners along a proposed line of railway. It will be necessary for the company or the city to secure consents of property owners in the usual way for the proposed loop line that is to be built by the city and operated under lease by the company in connection with its own properties.

PENNSYLVANIA

The Rockwell public utilities bill passed second reading in the House on May 14 with but one important amendment and was made a special order for third reading and final passage in the House for May 19 at 9:30 p. m. This amendment relates to the exchange of transfers between connecting street railways. All other suggested amendments, including attempts to give the commission control of stocks and bonds, to eliminate the provision that the commission might permit a company to go through a municipality without first securing the consent of the proper local authorities and to give the commission power to suspend increases in rates until they were approved, were defeated. The House voted 97 to 57 on an amendment to allow the commission to investigate the previous history and finances of corporations in order to fix rates.

The Democrats, whose party bill did not receive serious consideration when the committee returned the composite bill to the House, made ineffectual efforts to incorporate some features of their bill into the bill under consideration. They raised the point of order that the bill was unconstitutional because it referred to the full crew act enforcement only by the title of the act of 1911 and not by the text. This was overruled by Speaker Alter. A new title was inserted changing the phraseology and specifying authority over grade crossings and to a certain extent over municipalities.

The Democrats also attacked the provision empowering the commission to grant permission to a public service company to cross a municipality without consent of local authorities, contending that it was contrary to the cardinal doctrine of home rule and consequently to the spirit of the times. Spokesmen for the bill argued that this feature merely gave the commission authority to grant permission to cross a municipality, not to give service therein, and that the section was in the interest of long-distance corporations. A motion to strike out the whole section was defeated 84 to 79, while a motion to add a provision giving the commission power to suspend increases in rates until they are approved or disapproved also went down, 103 to 73. A motion to amend the bill to give the commission supervision over the issuance of stocks and bonds of public utilities companies was defeated.

During the consideration of the bill the House voted to permit Attorney-General Bell the privilege of the floor. An amendment offered by Mr. Allen which included loans for a period of less than one year in the provision dealing with short-term loans by public utilities was defeated, as was also an amendment to strike out the clause which provided that the taking over of less than the controlling interest in a corporation shall be lawful without the consent of the commission. Other amendments which were defeated were: Eliminating the requirement for adjustment of schedules of street railways to meet schedules of other lines and substituting therefor the Interstate Commerce Commission ruling; striking out the period in which a corporation could change rates without application to the commission so that nothing could be done without approval of the commission; striking out the clause giving the commission authority to pass upon the necessity of charters for public service companies.

The House passed the bill allowing the city of Philadelphia to raise $40,000,000 for subway and transit developments by making personal property in each county taxable for county purposes instead of for state revenues alone. The vote was 100 to 61. It is claimed that this bill would enable the city of Philadelphia to borrow on some $600,000,000 more taxable property.

It is believed by many members that the General Assembly will adjourn by June 12.

WISCONSIN

Assembly bill 292, to allow passengers on street cars to ride free when not provided with seats, has been killed. The Senate refused to concur with the Assembly, by which the measure was passed. The bill relating to the distribution of the street railway tax passed by the Assembly is now in the hands of the Senate committee on corporations. Governor McGovern has signed Senate bill 421 to legalize certain acts of the Railroad Commission and to validate bonds issued and sold by any city for the purchase of a utility. Senate bill 347, amending the statutes relating to time of purchase of street railways by municipalities, has been concurred in by the House, but a motion to reconsider the vote will be acted upon this week. Another amendment bill, 302, relating to franchises of street railways, was returned to the Senate non-concurred in, following the recommendation of the Assembly committee on transportation. Senate bill 140, relating to appeals from decisions of the Railroad Commission, has been concurred in by the House.

PROGRAMS OF ASSOCIATION MEETINGS

Illinois Electric Railways Association

The meeting of the Illinois Electric Railways Association which it was proposed to hold on May 16, 1913, will be held at a later date to be fixed by the executive committee.

New England Street Railway Club

The regular monthly meeting of the New England Street Railway Club will be held on May 22, 1913, in the mahogany room of the New American House, Boston, Mass. Dinner will be served at 6.30 p.m., and the business meeting will be held at 8 p.m. The speaker will be H. W. Irwin, assistant superintendent of repairs of the Bay State Street Railway. His subject will be "The Training of Motormen," and the moving picture machine will be used to illustrate some of the points which he will make. There will be music during the serving of the dinner.

American Institute of Electrical Engineers

The annual meeting of the American Institute of Electrical Engineers will be held in the auditorium of the Engineering Societies Building, 33 West Thirty-ninth Street, New York, on May 20, at 8.15 p.m. At this meeting the report of the board of directors for the fiscal year ended April 30 will be presented and the result of the election of officers for the ensuing year will be announced.

The technical session will be under the auspices of the railway committee, and the following papers will be presented: "Twenty-four-Hundred-Volt Railway Electrification," by H. M. Hobart, and "Trunk Line Electrification," by Charles P. Kahler. The meeting will conclude with the usual smoker.

American Railway Association

The spring session of the American Railway Association will be held at the United Engineering Societies Building, New York, N. Y., on May 21, 1913, at 11 a. m. Reports will be presented by the executive committee, committee on transportation, committee on maintenance, joint committee on automatic train stops, committee on relations between railroads, committee on the safe transportation of explosives and other dangerous articles, committee on electrical working and committee on nominations. The election of a second vice-president will take place at this meeting. Two members of the executive committee, three members of the committee on transportation, three members of the committee on maintenance, three members of the committee on relations between railroads and three members of the committee on nominations are to be elected.

Financial and Corporate

Stock and Money Markets

May 14, 1913.

In the trading on the New York Stock Exchange to-day some slight recessions occurred in the active issues at the opening of business, but after the initial sales the market began to recover. All of the leading railroad and industrial issues moved in about the same way, with rallies immediately following initial losses. The total record of sales for the day was 180,234 shares as compared with 697,289 shares for the same day last year. Rates in the money market to-day were: Call, 2¾@3 per cent; sixty and ninety days, 3¾@4 per cent; four months, 4¼@4½ per cent; five and six months, 4½@4¾ per cent.

On the Philadelphia Exchange trading continued very light. A generally stronger undertone was the feature at the close.

The Chicago market to-day was broad, but the volume of trading was small. The demand for bonds is better.

In the Boston market to-day business was light and fluctuations, usually limited to fractions, were downward.

Trading in Baltimore to-day was very narrow, being confined to five issues. There was little demand for bonds.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 7	May 14
American Brake Shoe & Foundry (common)	92	92
American Brake Shoe & Foundry (preferred)	130	130
American Cities Company (common)	37½	37½
American Cities Company (preferred)	70⅛	70½
American Light & Traction Company (common)	380	370
American Light & Traction Company (preferred)	106	106
American Railways Company	37¾	38
Aurora, Elgin & Chicago Railroad (common)	42	42
Aurora, Elgin & Chicago Railroad (preferred)	84	84
Boston Elevated Railway	89½	89
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	a66	66
Boston & Worcester Electric Companies (common)	a8	a8
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	89¾	89⅜
Capital Traction Company, Washington	120¾	120½
Chicago City Railways	150	*150
Chicago Elevated Railways (common)	25	*25
Chicago Elevated Railways (preferred)	87	*87
Chicago Railways, ptcptg., ctf. 1	91½	*91½
Chicago Railways, ptcptg., ctf. 2	21	*21
Chicago Railways, ptcptg., ctf. 3	7	*7
Chicago Railways, ptcptg., ctf. 4	3½	*3½
Cincinnati Street Railway	115	115
Cleveland Railway	103¼	103
Cleveland, Southwestern & Columbus Ry. (common)	5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred)	28¼	*28¼
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	69½
Columbus Railway (preferred)	82½	82½
Denver & Northwestern Railway	109	109
Detroit United Railway	72	72
General Electric Company	138½	137½
Georgia Railway & Electric Company (common)	119	117
Georgia Railway & Electric Company (preferred)	83¾	84
Interborough Metropolitan Company (common)	14½	14
Interborough Metropolitan Company (preferred)	50½	49⅜
International Traction Company (common)	40	40
International Traction Company (preferred)	95	95
Kansas City Railway & Light Company (common)	..	..
Kansas City Railway & Light Company (preferred)	..	..
Lake Shore Electric Railway (common)	9	9
Lake Shore Electric Railway (1st preferred)	91	91
Lake Shore Electric Railway (2d preferred)	25	25
Manhattan Railway	127	127
Massachusetts Electric Companies (common)	16	16
Massachusetts Electric Companies (preferred)	72½	73
Milwaukee Electric Railway & Light Co. (preferred)	100	*100
Norfolk Railway & Light Company	26½	26½
North American Company	75	70
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	44	43¾
Philadelphia Company, Pittsburgh (preferred)	39½	40½
Philadelphia Rapid Transit Company	23⅜	23
Portland Railway, Light & Power Company	67½	*67½
Public Service Corporation	114	114
Third Avenue Railway, New York	a34¼	33½
Toledo Railways & Light Company	12	12
Twin City Rapid Transit Co., Minneapolis (common)	103½	103½
Union Traction Company of Indiana (common)	7½	7½
Union Traction Company of Indiana (1st preferred)	82	82
Union Traction Company of Indiana (2d preferred)	32	32
United Rys. & Electric Company (Baltimore)	27	27
United Rys. Inv. Company (common)	23	23
United Rys. Inv. Company (preferred)	46	41
Virginia Railway & Power Company (common)	50	50½
Virginia Railway & Power Company (preferred)	90	90
Washington Ry. & Electric Company (common)	91½	91
Washington Ry. & Electric Company (preferred)	91¾	91
West End Street Railway, Boston (common)	74	71
West End Street Railway, Boston (preferred)	90	90
Westinghouse Elec. & Mfg. Company	61	61½
Westinghouse Elec. & Mfg. Company (1st preferred)	105	105

*Last sale. aAsked.

ANNUAL REPORT

Western Railways & Light Company

The annual report of the Western Railways & Light Company, Champaign, Ill., shows the following results for 1912, as compared with the preceding twelve months:

	1911	1912
Gross earnings	$2,029,354	$2,267,259
Expenses	1,270,982	1,421,829
Net earnings	$758,372	$845,430
Other revenue	15,540	27,570
Total revenue	$773,912	$873,000

From this total net revenue as given above there was deducted interest on bonds, etc., in the amount of $536,398, which left $336,602 available for dividends. After $160,035 had been deducted as dividends on the preferred stock, a balance of $176,567 was carried to the surplus account for the period.

During the year there was expended for maintenance and renewals the sum of $321,050, which was 14.16 per cent of the gross receipts as against 13.10 per cent for the preceding year. As usual, the company charged off a substantial amount for discount on bonds of the controlled companies, the amount last year being $29,400. During the year there was expended on improvements $682,506, which included the completion of the hydroelectric plant of the Northern Illinois Light & Traction Company at Marseilles.

W. B. McKinley, president, and H. E. Chubbuck, vice-president executive, say:

"The financial results of the company for the year ended Dec. 31, 1912, show an increase in gross earnings from operation of $237,905, or 11.72 per cent; an increase in other revenue of $12,029, or 77.41 per cent; an increase in operating expenses of $150,847, or 11.87 per cent; an increase in net earnings from operation of $87,057, or 11.48 per cent; an increase in total net revenue of $99,087, or 12.80 per cent; an increase in interest on bonds of $61,707, or 13 per cent; an increase in dividend on preferred stock of $17,775, or 12.40 per cent; an increase in net surplus of $19,605, or 12.49 per cent.

"The net surplus of the system for the year was $176,567, equivalent to 3.00 per cent on the common stock of the company, as against 3.47 per cent for the preceding year.

"Owing to delays in ballasting, the line from Morris to Joliet was not taken over from the construction company in 1912. The net receipts of the Morris-Princeton line show an increase of $53,832 for 1912 over 1911, which is largely due to through business over the additional 22 miles from Morris to Joliet. The prospects for the coming year are very encouraging.

"The hydroelectric plant of the Northern Illinois Light & Traction Company, mentioned in the report of 1911, was in full operation during the year. The gross earnings increased from $121,593 in 1911 to $189,020 in 1912, or over 55 per cent, and the net earnings from $61,567 to $90,484, or about 47 per cent.

"The highest water ever known in the Mississippi and Ohio Rivers was experienced at Cairo. The levees withstood the flood for several days, but finally broke and the interurban railway between Cairo, Mounds and Mound City was obliged to discontinue operation for sixty days. The high water materially affected the business of this entire community, stopping contemplated improvements and causing a setback to the Cairo property which will last several months.

"At Atchison, a comparatively new acquisition, extensive improvements have been made in the electric plant and the results from this department will be materially improved in 1913 over past operation. The gradual failure of natural gas in Kansas, which is distributed by this company in Atchison, has decreased the income from this source over previous years and will probably lead to the installation of an artificial gas plant in the near future.

"Properties purchased during this year were Mound City Light & Water Company, which supplies electricity and water to Mound City, 4 miles from Cairo, and will be operated by the Cairo company, electricity being furnished over a transmission line from the Cairo plant, and the Jefferson City Light, Heat & Power Company of Jefferson

City, Mo., which supplies gas and electricity to Jefferson City, the capital of Missouri, and furnishes current for the operation of the street railway.

"A new street railway franchise was secured at Quincy containing favorable terms. Track extensions were made to cross-town lines and four new modern cars ordered to take care of the additional service.

"At Wichita, owing to the general business stagnation, the gross receipts did not show the usual gain. Conditions give promise of improvement.

"The Western Railways & Light System is furnishing electric light and power to twenty-four cities and villages and to the inhabitants and industries therein.

"It is gratifying to report that there were no serious accidents on any of the properties and labor conditions remain exceedingly favorable."

Reports of New York City Companies for Quarter

The accompanying statement, showing the more important operating figures of the large street railway companies in Manhattan and Brooklyn for the quarter ended Dec. 31, 1912, has been prepared from the reports published by the Public Service Commission for the First District of New York. The grand total includes not only the returns of the companies mentioned but also the returns of all other companies reporting, whose detailed figures are not given in the table herewith published.

Company.	Total Revenue Car Miles.	Number of Transfers Collected.	Number of Fare Passengers.	Total Street Railway Operating Revenue.	Total Operating Expense.	Street Railway Taxes.	Total Gross Income.	Total Deductions‡	Net Corporate Income.
Hudson & Manhattan	2,059.347	no record	15,504,073	$973.916	†$337,900	$52.453	†$818,410	$810.306	†$8.103
Interborough Rapid Transit—									
Subway division	16,752,926	no record	89,063,054	4,562,192	1,700,565	97,078	....	....	....
Elevated division	17,191,528	no record	80,909,792	4,132,096	1,689,923	460,251	4,862,743	2,759,761	2,102,982
Brooklyn Rapid Transit Companies	20,444,381	36,950,505	118,052,793	6,085,162	3,495,052	386,147	2,371,126	1,631,911	739,215
New York Railways	8,967,418	*28,390,230	69,496,668	3,581,884	†2,043,027	295,769	†1,368,546	1,527,354	†158,808
Third Avenue (including Kingsbridge)	1,819,322	2,441,461	13,756,059	982,172	544,852	68,227	606,706	241,561	365,144
Union (including Bronx Traction)	2,577,340	5,879,260	11,811,105	627,495	462,217	40,341	131,383	104,508	26,875
Coney Island & Brooklyn	1,417,428	1,235,073	6,805,931	341,354	237,440	22,982	88,083	82,081	6,002
§Grand total	79,614,652	84,506,060	450,795,822	$23,574,878	$12,308,347	$1,551,247	$10,672,684	$7,628,901	$3,043,782

*Figures reported for period Oct. 1-16, 1912, said by company to be inaccurate. †The company has failed to make a charge for depreciation. In the case of the New York Railways litigation determining this is now in process. ‡Includes sinking fund accruals and other contractual or compulsory deductions. §Does not include the Brooklyn, Manhattan Bridge & North River Line: revenue car miles, 89,598; fare passengers, 301,583.

Questions and Answers Under Uniform System of Accounts

Members of the committee on a standard classification of accounts of the American Electric Railway Accountants' Association and representatives of the Interstate Commerce Commission have agreed on tentative answers to a number of questions raised in connection with the uniform system of accounts. While the members of the committee and the representatives of the commission agreed upon these answers, it is understood that the decisions do not necessarily represent the final conclusions of the commission and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission. Some of the questions and answers follow:

Q. What accounts should be charged and credited with amounts paid and received in the redemption of transfers issued by two connecting electric railways?

A. The transfer arrangement is in effect a division of revenues for through service and the amounts paid to another company for the redemption of transfers should be charged to account No. 1, "Passenger Revenue" in the classification of "Operating Revenues," and the amounts received should be correspondingly credited to the same account.

Q. What account should be charged with the cost of a car body constructed for use as a portable substation?

A. Assuming that the car body in question is mounted on trucks as a car, the cost of its construction should be charged to account No. 38, "Other Rail Equipment," in the classification of "Expenditures for Road and Equipment of Electric Railways."

Q. What accounts should be charged with the wages paid by an electric railway to the crews of steam engines used in switching freight cars at terminals?

A. Operating expense account No. 61, "Freight and Express Conductors, Motormen and Trainmen."

Q. A city builds a new bridge of sufficient strength to carry heavy cars, and a railway company extending its lines over it is asked to pay the excess cost of the bridge over that of one built for ordinary highway travel only. To what account should the railway company charge such a payment?

A. Account No. 2, "Right of Way," in the classification of "Expenditures for Road and Equipment of Electric Railways." (See Case A-112.)

Q. An electric railway company is having a branch line built by contract for a lump sum, payment being made each month for the estimated portion of the work completed. No distribution of expenditures is furnished to the railway company, and it asks whether the entire cost of the branch line should be included in account No. 34, "Cost of Road Purchased," in the classification of "Expenditures for Road and Equipment of Electric Railways"?

A. It would be preferable to have a detailed distribution of the amounts paid among the several primary accounts of the classification of "Expenditures for Road and Equipment" if such a distribution can be made on an equitable basis; otherwise, it would be proper to charge the entire cost to account No. 34, "Cost of Road Purchased."

Q. What account should be charged with interest accruing on receivers' certificates issued to equip an electric railway?

A. Such accruals should be charged to account No. 41, "Interest," in the classification of "Expenditures for Road and Equipment of Electric Railways," until the equipment acquired is put into service. Interest accruing after that time should be charged to income. (See Case 53.)

Q. To what account should receivers' allowances and expenses be charged?

A. To operating expense account No. 73, "Salaries and Expenses of General Officers," except that expenses incurred for legal services should be charged as indicated in the text of account No. 76, "Law Expenses."

Q. What account should be charged with the cost of renewing driveways at unloading tracks?

A. Account No. 25, "Buildings and Structures," in the classification of "Operating Expenses of Electric Railways."

Q. What account should be charged with counsel fees paid for the preparation of the legal papers required in the merger of one electric railway company with another?

A. Account No. 40, "Law Expenses," in the classification of "Expenditures for Road and Equipment of Electric Railways."

Q. To what account should an electric railway company charge the cost of concrete in which the ties are embedded and on which paving is laid?

A. The cost of the materials should be charged to account No. 5, "Ballast," in the classification of "Expenditures for Road and Equipment of Electric Railways," and the cost of labor to account No. 11, "Track Laying and Surfacing."

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—A circular has been issued regarding the first mortgage 5 per cent gold bonds of the Birmingham, Ensley & Bessemer Railroad dated March 1, 1911, and due March 1, 1941, but redeemable at 105 and interest on and after March 1, 1921, par value $1,000, $500 and $100. The capitalization of the company is as follows: First mortgage gold bonds issued and outstanding, $2,450,000; reserved for extensions, betterments, etc., $1,050,000; total, $3,500,000; capital stock (preferred, $1,500,000; common, $3,000,000), $4,500,000. The cost of 28 miles of track recently completed and now in operation between East Lake and Ensley has been $1,346,000, and about $450,000 has been expended for uncompleted work on the Bessemer and Pratt City end, these amounts not including franchises and rights-of-way acquired. When the lines are completely equipped and in operation from East Lake to Bessemer and Pratt City there will have been issued about $2,650,000 of bonds, leaving $850,000 of the issue for further extensions and improvements. The lines at present extend from the eastern limits of Greater Birmingham through a densely settled residential and manufacturing section and through the center of Birmingham to Ensley. The ninety-nine-year franchise through Greater Birmingham covers the transportation of freight, and when the line is completed to Bessemer and Pratt City freight service will be inaugurated, aided by physical connection with steam railroads entering Greater Birmingham. Application for additional franchises has been made and reported on favorably by the city engineer, penetrating the entire business district and covering both North and South Birmingham. A contract is soon to be entered into with new hydroelectric interests whereby power will be purchased more cheaply in the future.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Can.—A special meeting of stockholders of the Brazilian Traction, Light & Power Company has been called for May 23, 1913, to approve an increase in the capitalization by the issue of $10,000,000 of 6 per cent convertible preferred stock and also an increase in the common stock to provide for the conversion of this preferred stock. The new preferred stock is convertible into the common stock at 120, the new stock to be paid for 50 per cent on May 31 and 50 per cent on June 30.

Chicago (Ill.) City Railway.—The Illinois Supreme Court has affirmed the decision of the Superior Court of Cook County in the suit brought by Clarence H. Venner as the holder of 200 shares of the stock of the Chicago City Railway. The Supreme Court held valid the agreement dated Jan. 1, 1910, creating the Chicago City & Connecting Railways Collateral Trust. The defendants included beside the Chicago City Railway and its directors the Calumet & South Chicago Railway, the Hammond, Whiting & East Chicago Electric Railway, the Southern Street Railway and the Chicago & Western Railway, the trustees and members of the committee named in the agreement and others. Among other relief asked for was an injunction restraining the combining, merging, consolidating or uniting of the property, franchises, earnings, capital stock or management of the Chicago City Railway with those of the other defendants or the elevated roads in the city. In answer to the contention that the trust agreement had practically effected a consolidation of the five street railway corporations by indirection, without compliance with the statute, the court holds that in spite of the common ownership of their stock the companies remain separate corporations and there has been no merger, the other companies being operated by the Chicago City Railway under contracts fixing the manner of operation, accounting and amount and time of payment by and to each company. Consolidation with the elevated roads cannot take place without the passage of an ordinance, and this step not being actually threatened or certain to happen if not enjoined, there was no ground for an injunction.

Chicago (Ill.) Railways.—A dividend of 6 per cent has been declared on the 8 per cent cumulative participation certificates, Series 1, of the Chicago Railways. Previous distributions had been made of 6 per cent in February, 1913; 6 per cent in October, 1912; 8 per cent in September, 1909, and an initial payment of 4 per cent in November, 1908. At present payments are still 10 per cent in arrears.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—An order has been issued by Federal Judge Landis authorizing the receiver of the Chicago & Milwaukee Electric Railroad to purchase the Waukegan, Fox River & Western Railway, which has 1 mile of track, for $56,000. The acquisition of this line, over which the Chicago & Milwaukee Electric Railroad has been running its cars under agreement for some time, will make possible a considerable saving in operating expenses.

Cleburne (Tex.) Street Railway.—The Cleburne Street Railway has elected new officers as follows: A. M. Morgan, president; S. T. Shaw, vice-president, and T. B. Maples, secretary and treasurer.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The meeting at which the stockholders of the Cleveland, Southwestern & Columbus Railway were to vote on the refinancing plan was postponed from May 10 to May 17. The State Public Service Commission had not yet acted on the application to issue $5,130,000 of bonds, $1,500,000 of preferred stock and $2,412,000 of second preferred stock, mentioned in the ELECTRIC RAILWAY JOURNAL of April 26, 1913, page 778.

Colorado Mines, Railways & Utilities Corporation, Colorado Springs, Col.—The Colorado Mines, Railways & Utilities Corporation has elected directors as follows: Allen L. Burris, president of the El Paso Consolidated Gold Mining Company; Albert Ehinger, Basle, Switzerland; Harry W. Davis, Wilmington, Del.; Jacob Halstead, director First National Bank, Mamaroneck, N. Y.; Oscar L. Hasey, Albany, N. Y.; Joseph C. Helm, Denver, Col.; George N. Miller, New York; Richard A. Parker, Denver, Col., and William H. Smith, Summit, N. J. The two vacancies which remain to be filled are one representing the London Syndicate and the other the Paris Syndicate. Allen L. Burris, of Cripple Creek, Col., has been elected president and W. H. Smith, Summit, N. J., secretary and treasurer of the company.

Columbus, Magnetic Springs & Northern Railway, Delaware, Ohio.—The Columbus, Magnetic Springs & Northern Railway suffered damage to the extent of $10,000 as a result of the flood in March. This includes the losses to bridges and the power plant.

Columbus, Marion & Bucyrus Railroad, Marion, Ohio.—The property of the Columbus, Marion & Bucyrus Railroad was sold on May 10, 1913, for $103,080 to James H. Caldwell, chairman of the bondholders' committee. Mr. Caldwell took possession of the property on May 11 and has appointed George Whysall, who was one of the receivers of the company, his agent in all matters pertaining to the operation and maintenance of the property. A new company, to be known as the Columbus, Marion & Bucyrus Railway, is being organized to take over the property and operate it.

Electric Properties Company, New York, N. Y.—A committee made up of John F. Wallace, Henry R. Hayes and Albert N. Chambers has been appointed to carry out a plan for the reduction and readjustment of the capital stock of the Electric Properties Company, which was taken over in June, 1912, by a syndicate composed of the Westinghouse Electric & Manufacturing Company, the Equitable Trust Company and William Morris Imbrie & Company, New York, as a medium for dealing in the securities of public service corporations. The plan provides for reduction of the present outstanding common stock of the company from $6,000,000 to $4,000,000. The amount of outstanding preferred stock is to remain at $3,020,200. Provision will also be made for the funding of back dividends on the preferred stock from Feb. 1, 1910. The entire capital stock of Westinghouse, Church, Kerr & Company is owned by the Electric Properties Company.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—A new trustee in the form of the Commercial Trust Company, Philadelphia, Pa., has been appointed under the mortgage securing the Fort Wayne & Wabash Valley Traction Company first consolidated mortgage 5 per cent gold bonds, to succeed the Trust Company of North America.

Grand Rapids, Holland & Chicago Railway, Holland, Mich.—Benjamin S. Hanchett, president of the Grand Rapids, Holland & Chicago Railway, and his associates are reported to have disposed of their controlling interest in the stock of the company to interests representing the Commonwealth Power, Railway & Light Company. Mr. Hanchett is reported to have said that there will be no changes in the personnel of the company. He is quoted as follows: "The principal object in selling is to secure the additional financial assistance for the Holland interurban that will grant the fullest development of the road. We will improve the roadbed, build new bridges and add a complete equipment of steel cars. Four such cars will be in service by June and will be used on the fast steamboat service between Grand Rapids and Holland, connecting with the Chicago boats, giving rapid service for Michigan travelers to Chicago."

Hudson & Manhattan Railroad Company, New York, N. Y.—The Public Service Commission for the First District of New York has received an application from the Hudson & Manhattan Railroad, operating the tunnels under the Hudson River, for the approval of a proposed issue of new bonds in connection with the readjustment of the debt of the company. William R. Willcox, formerly chairman of the Public Service Commission for the First District, is one of counsel for the company. The company now has authority to issue $100,000,000 in bonds and has outstanding $67,148,000 of 4½ per cent bonds. The application asks for the approval of two proposed mortgages as a substitute for the existing mortgage. One of the proposed mortgages is to the Central Trust Company, as trustee, and is to be known as the first lien and refunding mortgage; the other to the Guaranty Trust Company, as trustee, to be known as the adjustment income mortgage. Both mortgages are dated Feb. 1, 1913. The first lien and refunding mortgage is to secure a bond issue not exceeding $65,000,000 and the adjustment income mortgage to secure one not exceeding $33,574,000. All of the adjustment income bonds and $37,035,000 of the first lien bonds are to be issued at once, the remainder of the latter, $27,965,000, being reserved for future issue to redeem underlying bonds having a prior lien upon portions of the property mortgaged. The new issues will be used to refund the $67,148,000 in outstanding bonds and the remainder, $3,461,000, are to be sold to provide money for additional real estate, improvements, car-purchasing instalments, expenses and readjustments, working capital, etc. The new issues are made in accordance with the plan for debt readjustment already approved by the directors and bondholders. Under this plan the fixed charges for interest will be only $1,851,750 a year against $3,021,660 a year now being paid on the outstanding bonds. The charge of $1,851,750 will be the interest on $37,035,000 of the first lien bonds. The interest on $33,574,000 of adjustment income bonds will be payable only out of surplus income. The company will also receive, by an assessment of $8.50 a share on the stockholders, cash to the amount of $3,845,148, which will be used for improvements, back taxes, etc. The result of the readjustment will be a decrease in the bonded debt on which interest must be paid from $67,148,000 to $37,035,000 and a reduction of the annual interest charge from $3,021,660 to $1,851,750.

Illinois Traction System, Peoria, Ill.—The Illinois Traction System has declared an initial quarterly dividend of three-quarters of 1 per cent on the $9,984,900 of common stock, payable on May 15, 1913, to holders of record of April 30.

Interborough-Metropolitan Company, New York, N. Y.—Judge Hough heard on May 7, 1913, the final arguments in the case brought in the Federal District Court by the Continental Securities Company asking for the dissolution of the Interborough-Metropolitan Company and attacking the recent issue of bonds by the Interborough Rapid Transit Company. Judge Hough gave counsel till May 17 to submit briefs.

Kankakee & Urbana Traction Company, Urbana, Ill.—The stockholders of the Kankakee & Urbana Traction Company have voted to increase the capital stock of the company from $500,000 to $1,000,000 and have authorized the board of directors to issue bonds to the amount of $1,000,000 for the extension of the road from Rantoul to Paxton.

Lake Shore Electric Railway, Cleveland, Ohio.—The Lake Shore Electric Railway has been authorized by the Public Service Commission of Ohio to issue its general mortgage 5 per cent gold bonds of the face value of $63,000 at not less than 85, the proceeds to be used to reimburse the income account for expenditures made during the year ended Dec. 31, 1912, for the construction of additions and betterments.

Louisville & Northern Railway & Lighting Company, New Albany, Ind.—The Louisville & Northern Railway & Lighting Company, the Louisville & Southern Indiana Traction Company and the other public utility companies operating in New Albany have elected new officers in compliance with the provision of the public utilities law passed by the last Indiana Legislature requiring officials of such companies to be residents of Indiana. Heretofore Samuel Insull, Chicago, had been at the head of the companies. The new officers are as follows: Chester P. Wilson, Indianapolis, president of the Louisville & Northern Railway & Lighting Company, Louisville & Southern Indiana Traction Company, United Gas & Electric Company and New Albany Water Works; Howard L. Olds, Indianapolis, vice-president of the United Gas & Electric Company and New Albany Water Works, and Frank Smith, vice-president of the two electric railways. John F. Strattan, New Albany, is the new treasurer for all of the companies, and Ira E. Guthrie, Indianapolis, is secretary of all of the companies.

Massachusetts Electric Companies, Boston, Mass.—A sale at 98.60 and interest, yielding 5¾ per cent, of the new refunding $3,100,000 collateral trust 5 per cent gold notes, par value $1,000, dated May 1, 1913, and due May 1, 1915, has been announced by the Equitable Trust Company, New York, for the Massachusetts Electric Companies. This company is a voluntary association owning the entire common stock of the Bay State Street Railway. The capitalization of the Massachusetts Electric Companies after this note issue will be: Preferred stock, 4 per cent cumulative, $23,105,800; common stock, $14,293,100, and coupon gold notes, 5 per cent, due May 1, 1915, $3,100,000. These notes are issued under a trust agreement with the Old Colony Trust Company and the proceeds are to be used to retire the balance of $3,700,000 of 4½ per cent gold notes which mature on July 1, 1913.

New Orleans Railway & Light Company, New Orleans, La.—The New Orleans Railway & Light Company recently sold to Bertron, Griscom & Company, New York, N. Y., $4,000,000 of three-year 6 per cent gold debentures due on June 1, 1916, of which $2,500,000 will be issued immediately for the payment of maturing obligations and for extensions and improvements. The remainder of the debentures will be sold for improvements and extensions during the next three years.

Pacific Electric Railway, Los Angeles, Cal.—The California Railroad Commission has authorized this company to issue $6,839,000 of 5 per cent first mortgage bonds, the proceeds to be used in extensions and additions, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 1, 1913, page 229.

People's Traction Company, Galesburg, Ill.—The property of the People's Traction Company, which operates an electric interurban railway between Galesburg and Abingdon, has been sold to the McKinley syndicate, which now controls 1375 of the 1500 shares of stock of the company. With the sale of the controlling interest, the directors of the People's Traction Company resigned and new directors were elected. The retiring directors are C. S. Harris, Frank W. Harris and J. D. Welsh. H. H. Carnahan was chosen as the new president, with J. A. Knolton, Peoria, and E. Wright, Fowler, Peoria, as the other directors.

Springfield, Clear Lake & Rochester Interurban Railway, Springfield, Ill.—Master in Chancery Pfeifer has decreed that the property of the Springfield, Clear Lake & Rochester Interurban Railway be sold under foreclosure proceedings brought by the First Trust & Savings Bank, Springfield. Exceptions were filed by all parties to the suit and the case will be heard before Judge James A. Creighton in the Sangamon County Circuit Court. Workmen employed on the road six months prior to the filing of the foreclosure proceedings and six months thereafter have prior liens on the sale, according to the decree.

Texas Power & Light Company, Dallas, Tex.—The Southwestern Utilities Company, the financing corporation of the Texas Power & Light Company, has declared an initial dividend of one-half of 1 per cent, payable on June 2 to stock of record May 20. In connection with this dividend the Electric Bond & Share Company, New York, N. Y., will pay to holders of voting trust stock certificates of the Southwestern Utilities Company of record May 20 the amount of dividends represented by the stock deposited, and also to the subscribers of the five-year 6 per cent notes of the company the amount of dividend payable on account of stock represented by the deposit receipts to which subscribers will be entitled when note subscriptions are paid in full.

United Railways Investment Company, San Francisco, Cal.—A committee composed of George W. Bacon, Sidney H. March, Mason B. Starring, Patrick Calhoun and George H. Bean was appointed at the annual meeting recently to formulate a plan to resume dividends on the $16,000,000 of 5 per cent cumulative preferred stock of the United Railways Investment Company or adjust the overdue dividends, which amount to about 32½ per cent.

Winchester & Washington City Railway, Winchester, Va.—The Winchester & Washington City Railway has changed its name to the Northern Virginia Power Company. The company has applied itself to supplying power to municipalities and manufacturers, but has in prospect the construction of electric railways. L. F. Cooper is president of the company.

Dividends Declared

Illinois Traction Company, Champaign, Ill., quarterly, three-quarters of 1 per cent, common.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AMERICAN RAILWAYS COMPANY, PHILADELPHIA, PA.							
1m.,	April,	'13	$399,664	....	....	....	....
1 "	"	'12	374,346	....	....	....	....
9 "	"	'13	3,838,469	....	....	....	....
9 "	"	'12	3,643,346	....	....	....	....
ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, MAINE							
1m.,	Mar.,	'13	$25,674	$19,408	$6,265	$465	$5,800
1 "	"	'12	23,769	18,969	4,800	581	4,218
AURORA, ELGIN & CHICAGO RAILROAD, CHICAGO, ILL.							
1m.,	Mar.,	'13	$141,502	*$92,032	$49,470	$32,341	$17,129
1 "	"	'12	133,523	*83,523	49,999	31,969	18,030
9 "	"	'13	1,455,949	*860,243	595,705	289,326	306,378
9 "	"	'12	1,362,825	*801,426	561,399	285,065	276,333
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE							
1m.,	Mar.,	'13	$58,930	*$27,595	$30,535	$17,374	$13,161
1 "	"	'12	52,319	*25,851	26,468	16,497	9,971
12 "	"	'13	724,050	*327,273	396,777	202,951	193,826
12 "	"	'12	623,177	*288,017	335,160	166,352	168,808
CLEVELAND, PAINESVILLE & EASTERN RAILWAY, WILLOUGHBY, OHIO							
1m.,	Mar.,	'13	$27,981	*$15,214	$12,767	$10,222	$2,346
1 "	"	'12	25,686	*16,108	9,578	9,758	†180
3 "	"	'13	80,624	*46,805	32,819	31,120	1,699
3 "	"	'12	72,407	*49,058	23,349	29,717	†6,368
DETROIT (MICH.) UNITED RAILWAY							
1m.,	Mar.,	'13	$1,046,697	$683,465	$363,333	$180,309	$182,924
1 "	"	'12	870,196	565,434	322,240	177,406	144,834
3 "	"	'13	2,972,211	1,984,760	987,450	537,413	450,037
3 "	"	'12	2,518,097	1,636,396	881,701	537,165	344,535
EAST ST. LOUIS & SUBURBAN RAILWAY, EAST ST. LOUIS, ILL.							
1m.,	Mar.,	'13	$215,594	*$119,600	$95,994	$49,713	$46,281
1 "	"	'12	201,018	*109,901	91,117	48,646	42,471
12 "	"	'13	2,503,497	*1,389,618	1,113,879	582,025	531,854
12 "	"	'12	2,322,714	*1,286,967	1,035,747	555,531	480,216
GRAND RAPIDS (MICH.) RAILWAY							
1m.,	Mar.,	'13	$105,833	*$61,689	$44,194	$15,063	$29,131
1 "	"	'12	98,599	*56,030	42,569	14,599	27,970
12 "	"	'13	1,248,831	*712,631	536,200	175,728	360,472
12 "	"	'12	1,193,458	*673,561	519,897	178,216	341,681
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.							
1m.,	Mar.,	'13	$710,624	$365,363	$345,361	$149,807	$195,454
1 "	"	'12	659,567	349,378	310,189	143,079	167,110
3 "	"	'13	2,036,455	1,095,378	941,077	438,476	502,600
3 "	"	'12	1,911,611	1,055,061	856,551	426,238	430,313
UNION RAILWAY, GAS & ELECTRIC COMPANY, ROCKFORD, ILL.							
1m.,	Mar.,	'13	$387,918	*$223,801	$164,117	$99,955	$64,162
1 "	"	'12	315,800	*188,638	127,162	71,243	55,919
12 "	"	'13	4,259,868	*2,452,749	1,807,119	1,052,082	755,037
12 "	"	'12	3,331,679	*1,922,387	1,409,292	767,957	641,335
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.							
1m.,	Mar.,	'13	$403,953	$199,425	$204,528	$126,625	$78,003
1 "	"	'12	367,364	194,578	172,786	118,817	53,969
9 "	"	'13	3,693,661	1,813,921	1,879,740	1,117,232	762,508
9 "	"	'12	3,467,434	1,815,672	1,651,762	1,064,054	587,708

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*Includes taxes.

†Deficit.

Traffic and Transportation

Important Changes in Operation in Philadelphia

The first of a series of changes in the operation of a number of the electric railway lines of Philadelphia with a view of improving the service were inaugurated by the Philadelphia (Pa.) Rapid Transit Company on May 11, 1913. The initial step in the general re-routing plan was marked by the transfer of the Haddington-Lancaster and Baring Street line from the surface tracks in the business district to the subway and a change in the route heretofore followed by the Lombard and South Streets and the Continental-Depot lines. The diverting of the Market Street sections of these lines wholly to the subway, carrying with it all of the advantages of the transfer and exchange privileges enjoyed by the public before the change was perfected, affords a more rapid means of travel between sections in West Philadelphia and the business district and relieves congestion on busy thoroughfares in the center of the city. Free transfers between all the surface-subway lines and the elevated trains are continued at the Juniper Street station, while the exchange privileges to the north and south heretofore enjoyed by the passengers using the lines diverted to the subway are continued by establishing new exchange privileges on Market Street between the subway-elevated and the north and south surface lines and between the surface-car subway lines and the north and south surface lines.

The near-side cars of the Baring-subway line are the first lot of the 650 now under construction. These new cars have been constructed with additional improvements, chief among which is a new ventilating system approved by Director Neff of the Department of Public Health and by civic organizations. This improvement consists of fresh-air intakes through hoods or funnels in the roof of the car and is considered to be a decided improvement over the old method of ventilation through a system of openings in the car floor. It is expected that all of the near-side cars will be equipped with this new ventilating system by next winter. Another improved feature of the new cars on the Baring Street line is the changing of the position of the conductor from the platform to a point inside the car. This change will considerably increase passenger space on the platform and facilitate the collecting of fares.

The new cars are also equipped with additional safety devices approved by Coroner Knight and the permanent public safety committee. These additional safety devices consist of a wire screen on the "blind" side of the car directly under the front platform and chains connecting the side of the lifeguard with the car body. The automatic safety fenders which have repeatedly proved their efficiency are further improved through being equipped with a foot plunger by which, in case of emergency, the motorman can simultaneously drop the lifeguard and sound the warning gong.

To aid in the dispatching of cars at the Juniper Street station of the surface-subway lines it has been decided to use the rear or emergency door of all near-side cars for unloading purposes during the rush hour at this point.

For the information of the public, the company prepared a pamphlet containing the features of the first step in the re-routing of the lines during May and installed small racks in the cars to hold the pamphlets so that the public could obtain them from the conductor. The company also announced that copies of the guide, together with future changes in routing, would be sent by mail to all who forwarded their name and address to the company.

Petition for Danbury Fare Reduction Denied

The Public Utilities Commission of Connecticut has dismissed the petition of Edward H. Rider, first selectman of the town of Danbury, that the Danbury & Bethel Street Railway be denied the right to charge a 10-cent fare during the annual fair week of the Danbury Agricultural Society on the company's cross-town line from the center of the city to Lake Kenosha, and has also denied a petition requesting the board to order the company to issue transfers good at any time during the day on which they are issued. Regarding the former the board points out that the company maintains $30,000 worth of equipment over and above what is required for ordinary traffic principally to handle the extra traffic during the fair week, and that it also has an increased expense for labor of $550 to $600 during the week in question. The board further says in part:

"No complaint was made as to the character of service rendered during fair week, but the petitioners claimed that it was a hardship on poor people to be required to pay 10 cents each way to and from the fair grounds, especially since the admission fee to the grounds had been raised, and also claimed that a reduction in the fare to 5 cents would tend to increase the traffic so that the revenues would not suffer materially. The traffic during fair week over the cross-town line is naturally congested during the early and late parts of the day, when the cars are operated under one-minute intervals. The company held that there were positive operating objections to reducing the headway between cars, besides the increase in cost of equipment and its operation resulting from such a plan."

In 1906 the Danbury & Bethel Street Railway applied to the city authorities for permission to make certain changes in its layout, which application was approved subject to certain conditions, among which was one that no extra fares should be charged on any of the new lines, except during fair week. The board says:

"It is reasonable to assume that the provision jointly agreed upon by the city and company may have influenced the company in accepting the other conditions requiring the company to make certain highway improvements. However, such a condition as to fares should not be indeterminate to the detriment of the traveling public, provided the financial condition and revenues of the company would warrant a reduction of fare. A statement of the distance and increased travel during fair week might indicate the propriety, if not necessity, of reducing the fare to 5 cents, but the close analysis of all the conditions and the financial standing and revenues of the company, on the other hand, indicate the reasonableness and necessity for the present fare. It may be claimed that the rate complained of is out of proportion, and should be equalized, but the commission is of the opinion that it is in the interest of the people of Danbury to retain the present rates during fair week, rather than to reduce such rates and meet the deficiency in revenue by a small increase in rates covering the whole system throughout the year."

Sunday Operation of Toronto Municipal Line.—Works Commissioner Harris of Toronto, Ont., has ordered the operation of cars on the civic car line on Gerrard Street on Sunday.

Newsboys Barred from Cars.—As part of its safety first campaign the Toledo Railways & Light Company, Toledo, Ohio, has issued an order that on and after May 26, 1913, newsboys will not be permitted to board cars to sell papers.

Fire Stops in Davenport.—The City Council of Davenport, Ia., has passed an ordinance requiring that the cars of all electric railways which operate in that city shall stop 50 ft. from any fire station to await the proceed signal from the conductor and shall then pass the fire station at a speed not to exceed 5 m.p.h.

Souvenir Watch Fobs.—All employees of the Portland Railway, Light & Power Company, Portland, Ore., have been presented with watch fobs under orders of B. S. Josselyn, president of the company. The fob consists of a bronze medallion with "Good Service" inscribed on one side and "Be Patient, Courteous and Attentive" on the other.

Dan Patch Folder.—The Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., known as the Dan Patch Electric Line, has issued a very attractive illustrated folder dealing with the territory through which the company operates. The halftones and text are printed in black and the captions in blue. The cover is in colors.

Safety Department in Men's Magazine.—The San Diego (Cal.) Electric Railway has decided to make a safety department a regular feature of the *Trolley Man*, published in the interests of the employees. The object of the department will be to call attention to avoidable accidents which occur in the city through carelessness in using cars. A series of pictures will be run illustrating the causes of these accidents. They will be accompanied by text explaining how a repetition of such accidents can be avoided.

Increase in Fare Asked For in Virginia.—The Norfolk Southern Railroad, Norfolk, Va., has applied to the Corporation Commission of Virginia for permission to increase its passenger rates. The company claims that the electric division was operated at a loss of $166,000 for the last three years. The application for the increase in rates has the approval of the directors of the Board of Trade and Business Men's Association of Norfolk. The electric division of the company connects Norfolk, Cape Henry and Virginia Beach and comprises 48 miles of the total of 598 miles.

Reduction in Fare Denied in Providence.—D. F. Sherman, vice-president of the Rhode Island Company, Providence, R. I., has announced that the company cannot at this time grant a 5-cent fare between Providence and Norwood. Mr. Sherman in denying the decrease to the petitioners concluded his letter as follows: "This is not a time to reduce fares, but, in line with all other lines of business, there are good reasons for increasing them. As a change of a fare zone to accommodate Norwood would disarrange the zones throughout the entire route, we cannot offer you any reduction of fares under the present conditions."

Address on Safety Precautions.—The employees of the public service corporations of New Albany and Jeffersonville, Ind., were addressed at a recent special meeting held for that purpose by Alexander Shane, formerly general manager of the Indianapolis, Columbus & Southern Traction Company, who at present is connected with the bureau of safety of the Middle West Utilities Company, on the subject of safety devices and the precautions necessary in general in order to avoid accidents. The employees present included those of the gas and water companies and of the electric light, power and railway companies of the two Indiana falls cities. Addresses were also made by James Harmon, of the Louisville & Northern Railway & Lighting Company; F. E. Cole, superintendent of the same company, and W. Dunbar, general manager of the United Gas & Electric Company.

Report on Traffic in Sacramento.—Bion J. Arnold has reported to the city commissioners on the subject of traffic over the lines of the Sacramento Electric, Gas & Railway Company in Sacramento, Cal. He has recommended that the company take over the passenger service of the Northern Electric Railway, Vallejo & Northern Railway and the Central California Traction Company in Sacramento and has suggested that the cars of the Sacramento Electric, Gas & Railway Company be equipped with air brakes and geared for higher speeds. He says that the service over the company's lines to the Southern Pacific depot is more than sufficient to care for traffic originating at that point. He suggests that the T Street line be used for fast service between Oak Park and the downtown section of Sacramento. The scattered settlements in the districts annexed to Sacramento make the extension of the service to these districts difficult at present.

Through-Routing of Surface and Elevated Trains in Chicago.—Samuel Insull, B. I. Budd and other representatives of the Chicago Elevated Railways appeared before the local transportation committee of the City Council of Chicago on May 7, 1913, and presented a tentative plan for the through-routing of elevated-railway trains in Chicago. George Weston, the city's representative on the Board of Supervising Engineers, Chicago Traction, concurred in the recommendations substantially as presented. The committee adopted a resolution asking the companies to prepare a concrete plan and an ordinance authorizing the changes, to be presented to the committee at an early date. Mr. Insull said that the companies were prompted to submit the plan on account of the advantage that would accrue to them from increased business. It was announced on May 10 that L. A. Busby, president of the Chicago City Railway, and W. W. Gurley, general counsel of the Chicago Railways, were at work on a proposed plan for unified operation of these lines and that the plan would be ready for presentation to the city within a few days. The proposal of the surface companies for unified operation was presented on May 12 and was approved by the local transportation committee.

Personal Mention

Mr. W. C. Baker has resigned as superintendent of the Yakima Valley Transportation Company, North Yakima, Wash.

Mr. J. G. Williams has been appointed statistician and accountant of the Public Utilities Commission of the District of Columbia, effective on June 1, 1913.

Mr. J. Jackson Pierce has been chosen president of the Board of Public Utilities Commissioners of Wilmington, Del., to succeed Mr. William H. Vance, who continues as a member of the board.

Mr. J. M. Read has been appointed to succeed Mr. P. D. Kline as superintendent of the Ogden (Utah) Rapid Transit Company, Mr. Kline having been appointed general manager of the company.

Mr. W. V. Neal has been appointed superintendent of the Jefferson County Traction Company, Beaumont, Tex., which has an electric railway under construction between Beaumont and Port Arthur.

Mr. W. G. Murrin, who was formerly connected with the staff of the London (Eng.) United Railways, has been appointed mechanical superintendent of the British Columbia Electric Railway, Vancouver, B. C.

Mr. D. R. Kennedy has resigned as electrical superintendent of the British Columbia Electric Railway, Vancouver, B. C., and will spend the next few months inspecting electrical plants in the United States and Canada.

Mr. W. H. Fraser, who has been connected with the electrical staff of the British Columbia Electric Railway, Vancouver, B. C., has been appointed electrical superintendent of the company to succeed Mr. D. R. Kennedy.

Mr. W. B. McKinley, president of the Illinois Traction System, Peoria, Ill., expects to sail from Seattle on July 10, 1913, on the *Minnesota* on a tour of the world, to be gone until January, 1914. Mr. McKinley has announced that he will be a candidate for election to Congress again in 1914.

Mr. Roy Kennedy has been appointed superintendent of the Union Traction Company of Kansas, Independence, Kan., to succeed Mr. J. L. Kenreigh, who has entered steam railroad work. Mr. Kennedy entered the service of the Union Traction Company as a conductor. He has recently been in charge of the company's business at Parsons.

Mr. F. X. Disney, Elmira, N. Y., has been appointed assistant secretary of the Public Service Commission of the Second District of New York to succeed Mr. George R. Grant, Buffalo, who resigned from the commission after four years of service to become connected with the legal department of the New York Telephone Company.

Mr. E. H. Clark has resigned as superintendent of power and shops of the Indianapolis, New Castle & Eastern Traction Company, New Castle, Ind., to accept a similar position with the Southern Illinois Railway & Power Company, Harrisburg, Ill. Mr. Clark entered on his duties with the Southern Illinois Railway & Power Company on May 15, 1913.

Mr. H. P. Bouslog, who has been chief engineer of the lighting plant of the Interstate Public Service Company at Shelbyville, Ind., has been appointed chief engineer of the power station of the interurban lines of that company, formerly the Indianapolis, Columbus & Southern Traction Company, at Edinburg, Ind., to succeed Mr. Levi Crater, who resigned on May 1, 1912.

Mr. Redmond Quain has been elected a director of the Ottawa (Ont.) Electric Railway to succeed the late George P. Brophy. Mr. Quain is fifty-two years of age. He was one of the pioneers in street railway development in Ottawa and was a director of the Ottawa Electric Railway during the first few years of the company's existence. He has acted as auditor of the company for several years.

Mr. Frank W. Stevens, Jamestown, N. Y., has resigned as chairman of the Public Service Commission of the Second District of New York. Mr. Stevens' term expired on Feb. 1, but in deference to the wishes of the Governor and many of the utility companies of the State, he continued to act until the commission had disposed of the important matters coming under his personal charge. Mr. Stevens has been chairman of the commission since its organization on July 1, 1907.

Mr. John S. Kennedy retired as secretary of the Public Service Commission of the Second District of New York on May 15, 1913, to take a position in the executive offices of the New York Telephone Company. The commission has not as yet named Mr. Kennedy's successor, and until that is done the office will be in charge of Mr. F. X. Disney, assistant secretary. Mr. Kennedy's resignation was filed on Jan. 1. He has been secretary of the commission since that body was created in 1907.

Mr. H. H. Adams, who since May, 1912, has been connected with Ford, Bacon & Davis, New York, N. Y., has been appointed superintendent of equipment of the Chicago (Ill.) Railways Company. Mr. Adams was formerly superintendent of rolling stock and shops of the New York (N. Y.) Railways. He was previously with the United Railways & Electric Company, Baltimore, Md. A biography and a portrait of Mr. Adams were published in the ELECTRIC RAILWAY JOURNAL of Jan. 27, 1912.

Mr. Edward N. Lake, formerly of Chicago, has been transferred from the Boston to the Chicago office of the Stone & Webster Engineering Corporation. During the last year he had had charge of the installation work for the Boston Elevated Railway, the contract for which was held by the Stone & Webster Corporation. Two 15,000-kw generating units were installed and six substations were erected. Ever since Mr. Lake first went to Chicago in 1893 he has been associated with some electrical interests, including the Chicago Edison Company, the Arnold Company and the Board of Supervising Engineers.

Mr. Chester L. Bisbee, for some time past division superintendent of the Bay State Street Railway at Newport, R. I., has been appointed superintendent of the Fall River division of the company to succeed A. E. Holmes, deceased. Mr. Bisbee was born in Middleboro, Mass., in 1876 and began his railway career with the Brockton (Mass.) Street Railway in 1899 as a conductor. In 1902 he was made a foreman in the carhouse of the company in Campello and in 1904 he was appointed a division foreman. He was subsequently made a division foreman in Newport, and when the position of superintendent of the division became vacant Mr. Bisbee was appointed to the place.

Mr. P. D. Kline has been appointed general manager of the Ogden (Utah) Rapid Transit Company. The promotion of Mr. Kline from superintendent to general manager will carry with it the additional duties of caring for the various extensions which the Ogden Rapid Transit Company and the Logan Rapid Transit Company contemplate carrying on during the coming season. Mr. Kline has been connected with the Ogden Rapid Transit Company since Feb. 1, 1913. Previous to that he was general superintendent of the Falkenau Electrical Construction Company, Chicago, Ill., in charge of all field construction. He supervised the installation of several large railway and lighting systems and a number of power stations for the Falkenau Construction Company.

Mr. Frank P. Smith has been appointed assistant to the president of the Interstate Public Service Company, Indianapolis, which company took over the property of the Indianapolis, Columbus & Southern Traction Company under lease on Dec. 7, 1912. Mr. Smith has also been elected vice-president of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company. Prior to entering the electric railway work he was with the Ohio & Mississippi Railway for ten years. He became connected with the Indianapolis, Columbus & Southern Traction Company in 1905, and at the time this system was leased to the Interstate Public Service Company in December, 1912, he was superintendent of maintenance of way and structures. Upon the organization of the Interstate Public Service Company he was appointed assistant to the vice-president and on April 22, 1912, was made assistant to the president.

Mr. Arthur N. Dutton, who since June, 1909, has been vice-president and general manager of the Peerless Motor Car Company, New York, N. Y., has been appointed general manager of the West Virginia Traction & Electric Company, which operates in Wheeling and Morgantown,

W. Va., and is controlled by the Eastern Power & Light Corporation, of which Mr. W. S. Barstow is president. Mr. Dutton was born in Milwaukee in 1873. He began his business career with the First National Bank, Milwaukee, and served for many years in railroad work in the West. In 1903 he entered the employ of the Brooklyn (N. Y.) Rapid Transit Company with the elevated division. Three months later he was made assistant superintendent of the elevated system of the company, and when Mr. George R. Folds resigned as assistant general manager of the company Mr. Dutton was appointed assistant to Mr. J. F. Calderwood, vice-president and general manager, and subsequently received the title of assistant to the general manager. Later Mr. Dutton's authority was extended and he was appointed superintendent of transportation of the Brooklyn Rapid Transit Company, in which position he had supervision of the operation of the entire system. He resigned from the Brooklyn Rapid Transit Company to become connected with the Peerless Motor Car Company.

J. W. Gillette

Mr. James Walter Gillette, the newly-elected president of the Arkansas Association of Public Utility Operators, was born at Burlington, Mich., on June 28, 1871. He was educated at the public schools of Kalamazoo, Mich., and at Wyoming, Ohio. After a special course in drafting at the Ohio Mechanics' Institute at Cincinnati, he spent three years at De Pauw University at Greencastle, Ind. He was mechanical draftsman in the boiler works of Thomas J. Adams & Company, of Cincinnati, for a year, and later was with the Campbell & Zell Boiler Company, New York, and the Electrical Engineering & Construction Company, New York. He next became connected with the repair and construction department of the United States Navy. His first electrical experience was with the American Hoisting Derrick Company as draftsman. After a year of this work he became first assistant to the designing engineer of the California Electrical Works in San Francisco and later installed a number of plants for the company. He then entered the engineering and construction business for himself in southern California. In 1895 he rebuilt the lighting system and station equipment at Fond du Lac, Wis. The following year he became general superintendent of the Marinette Gas, Electric Light & Street Railway Company, Marinette, Wis., but resigned two years later to become manager of the West India & Colombia Electric Company, Barranquilla. During that time he also acted as resident engineer for the Rio Bogua Mining & Trading Company. He next headed an expedition to the interior of Antiqua, in company with two mining engineers. Returning to the United States, he was appointed superintendent of the electrical department of the Evansville (Ind.) Gas & Electric Light Company. In 1902 he became resident engineer of the Phoenix Gas & Electric Company, Phoenixville, Pa., which included the gas works, electric light station and street railways. He later went with the Fort Smith Light & Traction Company, where he has been manager for a number of years. Mr. Gillette is a full member of the American Institute of Electrical Engineers. He was recently appointed representative of the American Automobile Association and is planning to complete as soon as possible the State organization and arrange for automobile trips and for the improvement of highways in the State.

OBITUARY

John S. Wise, formerly of Virginia and later an attorney in New York, died May 12, 1913. Mr. Wise was prominent in the early days of electric railroading as counsel for the electrical interests in their litigation with the telephone companies, first at Richmond and later elsewhere, in connection with interference by induction caused by the railway circuits to the telephone circuits. This litigation placed the responsibility for installing a complete metallic circuit for eliminating this trouble upon the telephone companies.

Julius A. Lebkuecher, president of the Black River Traction Company, Watertown, N. Y., died at his home in Newark, N. J., on May 13, 1913. Mr. Lebkuecher was born in Germany on Feb. 9, 1844. He attended the grammar schools and the high school in Newark and was graduated from the latter in 1860. In 1869 he and George Krementz organized the firm of Krementz & Company, Newark, jewelers, and Mr. Lebkuecher was a member of the firm at the time of his death. In 1894 Mr. Lebkuecher was elected Mayor of Newark and served one term.

Frank O. Briggs, a director of the Virginia Railway & Power Company, Richmond, Va., and the Norfolk Railway & Light Company and formerly first vice-president of the Norfolk & Portsmouth Traction Company, the property of which is now included in the system of the Virginia Railway & Power Company, died at his home at Trenton, N. J., on May 8, 1913. Mr. Briggs was born in Concord, N. H., on Aug. 12, 1851. He was graduated from the Military Academy at West Point in 1872 and served in the Second United States Infantry as second lieutenant until 1877, when he entered the employ of the John A. Roebling's Sons Company, Trenton, N. J. Mr. Briggs was active in public life and was elected Mayor of Trenton in April, 1899, and served until Jan. 1, 1902. On Jan. 3, 1902, he was appointed state treasurer to fill the vacancy caused by the death of George B. Swain, Newark, and in February, 1902, was elected by the Legislature for the full term of three years and was re-elected state treasurer in 1905. In 1904 he was elected chairman of the State Republican committee, and on Feb. 5, 1907, he was elected United States Senator to succeed John F. Dryden. Mr. Briggs was secretary of the New Jersey Wire Cloth Company and an officer of other allied Roebling companies.

Safety and Comfort of Passengers

The subject of Employees' Bulletin No. 46 for May, 1913, issued by the United Railways & Electric Company, Baltimore, Md., is "Safety and Comfort of Passengers." The text of the bulletin, which is signed by T. A. Cross, general manager, follows in part:

"One of the most important duties of the conductor is to provide for the safety and comfort of passengers, and the safety and comfort of persons whom you carry on your car depends in a large measure upon you. This applies especially upon the approach of the summer excursion season.

"While it is impossible at times during the rush hours to provide all passengers with seats, it frequently happens that persons are standing when the full seating capacity is not availed of. This condition is due sometimes to passengers getting into a section of a side-step open car where the bench is full, whereas by the watchfulness of the conductor they could have been directed to a section with unoccupied seats, or the conductor could further assist passengers by calling out the number of the bench upon which there are unoccupied seats. Sometimes this condition is caused by people occupying more space than is actually required for their accommodation. It is within the conductor's power to remedy both of these conditions, and if you will direct persons about to board a moderately well-filled car where they can find vacant seats you will add to their comfort, you will spare other passengers the unnecessary discomfort caused by others standing in front of them and you will add to the betterment of the service by getting your car under way more quickly than you can when passengers stand in the street undecided as to what section of the car they will enter. By reason of your position you can see vacant seats in the car, while a person standing in the street waiting to board a car cannot at all times see them quickly.

"A motorman should keep a sharp lookout for passengers about to alight via the front platform. Caution them to wait until the car stops. People at times stand on the front platform without holding on to anything. Do not be afraid to tell them to hold on to the handles. By so doing you will also add to the safety and comfort of passengers."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Rome & Gadsden Railroad, Gadsden, Ala.—Application for a charter has been made by this company to build a 60-mile electric or steam railway between Rome and Gadsden. Capital stock, $5,000. Officers: J. B. Wadsworth, Gadsden, president; J. M. Garvin, Rock Run, vice-president; G. P. Smith, Center, treasurer, and L. S. Daniels, Rome, secretary. [E. R. J., May 10, '13.]

***Panama-Pacific International Exposition Terminal Railway Company, San Francisco, Cal.**—Application for a charter has been made by this company to build a 10-mile electric railway on the exposition grounds at Harbor View for the transportation of exhibits and materials. Incorporators: J. W. McCarthy, E. H. Hooper, Leon Sloss, Henry F. Fortmann, William H. Crocker, James McNab and I. W. Hellman, Jr.

***Dakota Railroad, Bismarck, N. D.**—Application for a charter has been made in North Dakota to build either a steam or electric railway from Dickinson to Mott and north from Dickinson to connect with the Great Northern and "Soo" railroads and such other extensions as may be authorized.

Cleveland & Akron Short Line Railway, Cleveland, Ohio.—Incorporated in Ohio to build an electric railway between Cleveland and Akron via Brooklyn, Independence, Brecksville, Everett, Ira, Botzum and Portage, with a branch to Barberton. Capital stock, $25,000. John C. Chapman, New England Building, Cleveland, is one of the incorporators.

Beloit, Delavan & Clinton Railway, Beloit, Wis.—Incorporated in Wisconsin to build an electric railway between Beloit, Delavan, Turtle, Clinton and Darien, 30 miles. Capital stock, $50,000. Incorporators: Charles F. Lathers, Joel B. Dow, H. A. Vonoven, William S. Perrigo, B. P. Eldred, W. Bradley Tyrel, A. N. Bort, B. F. Lyons, George Christie, J. F. Kemerrer, W. H. Horton, Thomas F. Fitzgibbons, Hugh McGavock, John F. Mutchow, Alfred J. Ranbenheimer, W. G. Welrick and William F. Holahan. [E. R. J., April 26, '13.]

FRANCHISES

Calgary, Alta.—The Chestermere-Calgary Suburban Railway has received an extension of time from the Alberta Legislature in which to begin the construction of its line. The authorized capital stock has also been increased from $250,000 to $750,000 and the company's bonding powers have been increased from $12,000 to $20,000 a mile.

Lethbridge (Alta).—The Lethbridge Municipal Railway has asked the City Council for a franchise for an extension to No. 6 mile and Hardieville, 2 miles.

Aurora, Ill.—The Aurora, Elgin & Chicago Railroad will ask the County Commissioners for a franchise for an extension of its Downer Place line into Le Grand Boulevard, Aurora.

Peoria, Ill.—The Peoria, Canton & Galesburg Railway has asked the Council for a franchise on Lincoln Avenue and Seventh Avenue and to operate over certain parts of the Peoria Railway in Peoria. This line will connect Peoria, Canton and Galesburg. Horace Clark, president. [E. R. J., May 10, '13.]

Waukegan, Ill.—The Chicago & Milwaukee Electric Railroad, Chicago, has received a franchise from the Council in Waukegan.

Logansport, Ind.—The Laporte, Logansport & Southern Railroad, Laporte, has asked the County Commissioners for a franchise through the northeastern section of the county of Logansport.

New York, N. Y.—The Bronx Traction Company has asked the Board of Estimate for a franchise on Morris Park Avenue from Bear Swamp Road to Williamsburg Bridge Road.

Kanauga, Ohio.—The Kanauga Traction Company, Gallipolis, has received a twenty-five-year franchise from the Gallia County Commissioners to build a line from the terminus of the company's line at Kanauga to the Meigs County line.

Roanoke, Va.—A resolution was introduced in the Board of Aldermen on May 9 proposing to sell and grant a franchise for the construction and operation of an electric railway in and upon certain streets of Roanoke. F. L. Gibbons, city engineer.

Charleston, W. Va.—The Charleston, Parkersburg & Northern Railroad has asked the Council for a franchise from the Charleston city limits to the Jackson County limits. K. E. Stephenson, Parkersburg, president. [E. R. J., May 3, '13.]

TRACK AND ROADWAY

Ensley (Ala.) Street Railway.—This company has laid 1 1/3 miles of track from Ensley to Ensley South Highlands.

Little Rock Railway & Electric Company, Little Rock, Ark.—Work has been begun by this company on its loop from Twenty-third Street to Twenty-eighth Street and Arch Street. It will soon build five storage tracks at the corner of North Street and Ringo Street and a 1½-mile extension in Little Rock.

Los Angeles (Cal.) Railway.—Plans are being considered by this company to build five extensions of its lines in Los Angeles into the Hollywood and Colegrove districts.

Pacific Electric Railway, Los Angeles, Cal.—Right-of-way is being secured by this company for an 18-mile line between Long Beach and Redondo. Work will soon be begun by the company on a 2-mile extension from the long wharf in Venice to the Santa Monica Canyon.

Southern Traction Company of Illinois, East St. Louis, Ill.—This company plans to have its line in operation between Belleville and East St. Louis by Oct. 1 and at the same time will use the Free Bridge and the St. Louis loop. As soon as this work is completed the line will be extended to Marissa, thence to Pinckneyville and to its southern terminus at Duquoin.

Peoria (Ill.) Railway.—This company plans to build a double track on Main Street from Elizabeth Street to Western Avenue in Peoria.

Springfield & Central Illinois Traction Company, Springfield, Ill.—Plans are being made by this company to begin soon the construction of its line between St. Louis, Mo., and Terre Haute, Ind. Terminals have been practically procured in St. Louis and East St. Louis, as well as most of the right-of-way between St. Louis and East St. Louis. A bridge spanning the Mississippi River will also be built. This railway, as at present contemplated, includes a line 180 miles long between St. Louis and Terre Haute and another, 120 miles long, between Springfield and Pinckneyville, Ill. The latter line will be extended to Cairo. The two lines will cross each other at Keyesport, Ill. [E. R. J., May 3, '13.]

Springfield, Taylorville & Pana Interurban Railway, Taylorville, Ill.—Work will be begun by this company on the construction of its railway as soon as the surveys are completed. This 17½-mile line will connect Springfield, Edinburg, Taylorville, Owaneco and Pana. Overhead trolley will be installed. The power house will be located at Taylorville. Capital stock authorized, $325,000; issued, $300,000. Bonds authorized, $325,000. Officers: Henry V. Gehm, 1208 Third National Bank Building, St. Louis, Mo., president; W. B. Adams, Taylorville, vice-president and general manager; George H. Backer, 1208 Third National Bank Building, St. Louis, secretary and treasurer. [E. R. J., May 10, '13.]

Fort Wayne & Springfield Electric Railway, Decatur, Ind.—It is reported that plans are being considered for the formation of a new company to take over the property of the Fort Wayne & Springfield Railway, Decatur, and provide about $600,000 for extending the line from Springfield to Portland, Ind.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company is building its 15-mile line betwen Cedar Rapids and Mount Vernon. It is planned to complete this extension in July. Contracts have all been awarded.

Davenport-Muscatine Railway, Davenport, Ia.—At a conference between the Muscatine City Council and P. P. Crafts, general manager of this company, it was decided as a compromise that the extension of the line to Northwest Muscatine should extend to the intersection of Newell Avenue and the main line.

Fort Dodge, Des Moines & Southern Railroad, Des Moines, Ia.—The proposition to build an electric line between Des Moines and Spirit Lake has been made possible by the House passing a Senate bill providing that property owners within 5 miles on each side of the proposed line may vote a tax on themselves to aid the construction of an electric railway or the electrification of a steam railroad. The Minneapolis & St. Louis Railroad is said to desire to electrify its line from Fort Dodge to Humboldt and the Rock Island Railroad is said to desire to electrify its line from Livermore to Spirit Lake.

Fort Scott & Pittsburg Railway, Fort Scott, Kan.—This company has completed the preliminary work on its 35.3-mile line between Fort Scott and Pittsburg via Frontenac, Arcadia and Mulberry. The company's repair shops will be located at Fort Scott and it will purchase power from the Fort Scott Gas & Electric Company, Fort Scott. It will operate five passenger cars, two express, two flat and two work cars. It will also furnish power for lighting purposes in several small towns. Capital stock authorized, $10,000. Officers: A. B. Dickman, State Bank, Cash, Kan., president; F. H. Foster, Fort Scott, vice-president; T. A. Banker, secretary; C. D. Sample, Citizens' National Bank, Fort Scott, treasurer; T. A. Banker, Fort Scott, general manager, and J. S. Worley, 301 Reliance Building, Kansas City, Mo., chief engineer. [E. R. J., April 19, '13.]

Joplin & Pittsburg Railway, Pittsburg, Kan.—Work has been begun by this company double-tracking its line from Twelfth Street to Twentieth Street in Pittsburg.

Plymouth & Sandwich Street Railway, Manomet, Mass.—Except for a few miles of grading nothing will be done by this company on its lines until next fall.

Miller's River Street Railway, Miller's Falls, Mass.—This company will begin construction within the next thirty days between Orange and Miller's Falls. It will connect with the lines of the Northern Massachusetts Street Railway and the lines of the Connecticut Valley Street Railway. It will be controlled by the Massachusetts Consolidated Railways. D. P. Abercrombie, secretary. [E. R. J., April 19, '13.]

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—It is said that this company has under consideration plans to build a line between St. Joseph and Atchison.

Fredericton (N. B.) Street Railway.—Plans have been prepared for the building of a 5-mile electric railway to connect Fredericton, St. Mary's, Gibson and Marysville, N. B. [E. R. J., March 29, '13.]

St. John (N. B.) Suburban Railway.—This company has been organized to build electric railway lines from the Suspension Bridge at St. John, to different points in Westfield, to Spruce Lake, Loch Lomond, and from Simonds to points in Rothesay. Electricity, gasoline or steam may be used for operating the line. Directors: John R. Graham, president of the Bangor (Maine) Railway & Electric Company; H. W. Cushman, Bangor, Maine; M. W. Doherty, C. F. Inches, D. K. Hazen, St. John.

Linden, N. J.—A company is being organized in Linden to build a 6-mile electric railway through Linden to connect with the new short line of the Public Service Company, Newark. Jacob L. Bauer, 130 Broad Street, Elizabeth, N. J., engineer. F. R. Anderson, Linden, is interested. [E. R. J., May 10, '13.]

Morris Railroad, Morristown, N. J.—This company, which is a subsidiary of the Morris County Traction Company, plans to increase its capital stock to cover the cost of building 2.6 miles of railway between Morristown and Madison.

Freeport (N. Y.) Railroad.—This company states that its 1¼-mile railway, which will connect the line of the Great South Bay Ferry Company with the railroad station in Freeport, will be completed within the next two weeks. T. P. C. Forbes, Freeport, president.

Manhattan & Jamaica Railway, Patchogue, N. Y.—This company has opened its new line over the entire length of Thompson Avenue from Queensboro Bridge to Grand Street in Newtown.

Rome & Delta Dam Electric Railway, Rome, N. Y.—Right-of-way has been secured by this company for its 6-mile line between Rome and Delta Dam. Contracts for the construction of the line will soon be awarded. This line will be connected with the Boonville and Old Forge line, where 12 miles is graded. De Witt C. Hadcock, president. [E. R. J., Nov. 9, '12.]

Syracuse, Watertown & St. Lawrence River Railroad, Syracuse, N. Y.—This company, which plans to build a 12-mile line between Syracuse and Brewerton, states that it now operates cars from Stop 9 in Syracuse to Brewerton, a distance of 6.2 miles. Cars are operated over the Syracuse & South Bay Electric Railroad, Syracuse, to Stop 9 and then over this company's line to Brewerton. H. D. Brewster, secretary.

***Troupsburg, N. Y.**—Preliminary arrangements are being made to build an electric railway between Troupsburg, N. Y., and Knoxville, Pa., via Austinburg, Pa.

Blue Ridge & Interurban Railway, Henderson, N. C.—Plans are being made by this company to build an electric line from Hendersonville to Saluda, N. C., and finally to Spartanburg, S. C. Capital stock, $700,000. George Ladshaw, Spartanburg, S. C., engineer.

Cape Breton Electric Company, Sydney, N. S.—This company plans to expend $350,000 on building a second track on existing lines and putting in additional sidings in Sydney.

Northern Ohio Traction & Light Company, Akron, Ohio.—A route between Canton and Lisbon has been proposed for this company and the officers have appointed a committee to go over the route and see whether the population and industries are sufficient to warrant the extension.

Enid Interurban Traction Company, North Enid, Okla.—This company has surveyed its 3-mile line between Enid and North Enid and has graded about ½ mile of the line. It is expected to begin construction next year. H. M. Spaulding, North Enid, president.

Shawnee (Okla.) Electric Railways.—This company has surveyed its 41-mile line between Shawnee and Oklahoma City and has graded about 10 miles. A. Hardgrave, 112 West Adams Street, Chicago, chief engineer.

Berlin & Northern Railway, Berlin, Ont.—Following a request to extend its line from Bridgeport to West Montrose and Conestoga this company has requested assistance, including bond guarantee and bonus of $18,000 per mile. W. H. Breithaupt, president.

***Cornwall, Ont.**—Plans are being considered to construct a railway between Cornwall and St. Polycarpe, Que., a distance of 28 miles. Adam Beck, London, Ont., is said to be interested.

Imperial Traction Company, Ottawa, Ont.—Work will be begun during the year by this company on its line from Smithville to Bridgeburg and from Hamilton to Toronto. L. B. Howland is interested. [E. R. J., March 8, '13.]

Niagara, St. Catharines & Toronto Railroad, St. Catharines, Ont.—This company is building a branch line to connect St. Catharines with Niagara-on-the-Lake, at the mouth of the Niagara River. This extension is between 12 and 15 miles in length.

Oregon Electric Railway, Portland, Ore.—This company is considering plans to tunnel hills on proposed route west of the Willamette River. The undertaking, if carried out as planned, will cost about $500,000.

Portland Railway, Light & Power Company, Portland, Ore.—Work will be begun at once by this company on the construction of the extension of the Hawthorne Avenue line to reach Seventy-fourth Street and Twenty-ninth Avenue as soon as the right-of-way on Twenty-ninth Avenue is secured. The company also plans to extend its Woodstock line from its present terminus at East Forty-sixth Street to East Fifty-seventh Street. Eventually this line will be extended to East Seventy-second Street in the Mount Scott district in Portland.

Beaver Valley Traction Company, New Brighton, Pa.—Announcement has been made by this company that it will lay 1500 ft. of new track at New Brighton. Considerable other track will be laid during the summer, the total being about 3 miles.

***Pottsville-Shenandoah Railway, Pottsville, Pa.**—This company plans to build an electric railway between Pottsville, Shenandoah and Frackville.

Saskatoon, Sask.—The Saskatoon & Sutherland Contracting Company, Saskatoon, has obtained the contract for the construction of a municipal electric railway on Eighth Street in Saskatoon.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has placed in operation its Kingston Pike extension to Lyon's View.

West Tennessee Traction Company, Memphis, Tenn.—Financial arrangements have been completed by this company to build its 85-mile railway from Memphis to Brownsville to Jackson. George C. Bennett, Memphis, president. [E. R. J., Dec. 14, '12.]

Eastern Texas Traction Company, Dallas, Tex.—This company has completed surveys for its 53-mile line between Dallas and Greenville via Garland, Rockwall, Fate, Royse City, Josephine, Caddo Mills and Greenville. It has graded between Dallas and Rockwall, 24 miles, and is now grading between Rockwall and Greenville, 29 miles. The general contractors are Karner Brothers, Dallas. The line is located with a 2-deg. 30-min. maximum curvature. The maximum grade is 2 per cent. The bridges wherever possible are reinforced concrete of the slab and column type. One containing three 40-ft. spans is now under construction over White Rock Creek. It will be completed in about two weeks. For wood trestlework creosoted piling is being used. The company will use 70-lb. rails and the cars will be equipped for 1200-volt d.c. operation. William A. Obenchain, Jr., chief engineer.

Northern Texas Traction Company, Fort Worth, Tex.—Work has been begun by this company double-tracking its line between Dallas and Fort Worth. It will also straighten out the few curves along the line. Rails have been laid from Fort Worth to Handley.

Salt Lake & Ogden Electric Railway, Salt Lake City, Utah.—The contract for the grading of this company's line through the Jordan Narrows has been let and work will be begun at once. This line will connect Salt Lake City and Provo.

Norfolk (Va.) Southern Railroad.—Plans are being considered by this company to double-track its electric division in the near future. The electric division of the company connects Norfolk, Cape Henry and Virginia Beach and comprises 48 miles of the total of 598 miles.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—This company will place contracts during the next four months to build about 3 miles of new track with concrete ties.

Tacoma, Wash.—The proposal of Mayor Seymour and the other city commissioners to build a municipal electric railway to extend from the center of Tacoma to the manufacturing district on the tide flats was defeated by the voters at the election on May 11, 1913, held to ratify the bond issue for that purpose. [E. R. J., Aug. 31, '13.]

Fairmont, Clarksburg & Grafton Railway, Clarksburg, W. Va.—Right-of-way has been secured and construction will be begun at once by this company on its line to connect Clarksburg, Fairmont and Grafton. George R. Kirk, president, and Eugene Somerville, secretary. [E. R. J., March 1, '13.]

Morgantown (W. Va.) Interurban Railway.—Surveys have been made by this company on its 10-mile line between Morgantown and Point Marion. Joseph H. McDermott, Morgantown, president. [E. R. J., April 12, '13.]

Princeton (W. Va.) Power Company.—S. J. Evans of the Princeton Power Company, has begun the survey for the proposed 12-mile electric railway between Princeton and Bluefield. [E. R. J., March 22, '13.]

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.—Plans are being considered by this company to build an extension to Hortonville.

SHOPS AND BUILDINGS

Peoria, Canton & Galesburg Railway, Peoria, Ill.—Plans are being considered by this company to build a new terminal station in the business district of Galesburg. The company will also build stations in Peoria and Canton. James A. Fenelson, secretary. [E. R. J., May 10, '13.]

Springfield (Ill.) Consolidated Railway.—This company has awarded the contract to the Clinton Bridge Works, Clinton, to build its new carhouse in Springfield. The structure will be 210 ft. x 60 ft. and of steel and concrete construction. [E. R. J., May 3, '13.]

Des Moines (Ia.) City Railway.—Work will be begun at once by this company on new carhouses, to cost $100,000, which will be built between the belt line and the Des Moines River and between Willow Street and University Avenue on the west side of the river. Extensive trackage and terminal facilities will be located on the same site. The site for this improvement is a triangular-shaped piece of ground about three or four square blocks in area.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—This company has secured a site in Watervliet on which it plans to build a terminal in the near future.

Cape Breton Electric Company, Sydney, N. S.—This company plans to enlarge its carhouse in Sydney in the near future.

Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.—Weber, Werner & Adkins are the architects in charge of plans for the reconstruction of this company's interurban station at 508 Sycamore Street in Cincinnati. It is understood that a portion of the walls of the original station will be used for the new structure.

Southern Traction Company, Dallas, Tex.—This company has recently acquired 15 acres of land in Trinity Heights, 1½ miles from the southern limits of Dallas. Work will soon be begun by the company building its new repair shops on this site.

POWER HOUSES AND SUBSTATIONS

Caldwell (Idaho) Traction Company.—This company plans to purchase at once one 300-kw d.c. generator for its power house in Caldwell.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company will add to its substation equipment a new 2000-kw Curtis turbo-generator set. The order has been placed with the General Electric Company.

Freeport Railway & Light Company, Freeport, Ill.—This company will install in one of its substations a 300-kw rotary converter, three 100-kw transformers and a switchboard panel ordered from the General Electric Company.

Hattiesburg (Miss.) Traction Company.—Work has been begun by this company enlarging its power plant and excavating has been begun for the foundation for the cooling tank to be maintained in connection with its 1500-kw turbine engine. A 200-kw generator has been installed and other improvements will soon be made.

Cape Breton Electric Company, Sydney, N. S.—This company plans to enlarge its power plant at Sydney and provide an auxiliary steam plant at North Sydney, N. S.

Portland, Eugene & Eastern Railway, Portland, Ore.—This company has awarded the contract for the construction of a transmission station in Oswego to the Portland Engineering & Contracting Company, Portland.

West Penn Railways, Pittsburgh, Pa.—This company reports rapid progress on the construction of the water-power plant of the Hydro-Electric Company of West Virginia, a subsidiary company. An initial installation of 48,000 hp of an ultimate 150,000-hp capacity is under contract for delivery to the company before Jan. 1, 1914.

Norfolk (Va.) Southern Railroad.—Plans are being considered by this company to purchase new equipment and increase the capacity of its power house.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—This company will add to its substation equipment a 1000-kw three-bearing motor-generator set, two 500-kva transformers, one 800-kva transformer and switchboard apparatus. The order for the equipment has been placed with the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Charlotte (N. C.) Electric Railway, it is reported, expects to purchase eight cars.

Central Pennsylvania Traction Company, Harrisburg, Pa., expects to purchase seven cars.

Boston (Mass.) Elevated Railway has ordered 100 cars from the Jewett Car Company.

Wichita (Kan.) Railway & Light Company is reported as expecting to purchase six new cars.

Caldwell (Idaho) Traction Company expects to purchase one combination passenger and baggage car.

Chattanooga (Tenn.) Railway & Light Company has ordered ten cars from the American Car Company.

South Covington & Cincinnati Street Railway, Covington, Ky., has ordered twenty 21-ft. car bodies from the Cincinnati Car Company.

Puget Sound Traction, Light & Power Company, Seattle, Wash., has ordered ten double-truck, single-end cars from the Cincinnati Car Company.

Amarillo (Tex.) Street Railway has ordered from the American Car Company two 20-ft. 8-in. prepayment closed car bodies, mounted on Brill 21-E trucks.

People's Railway, Wilmington, Del., has ordered one 28-ft. double-truck car body, mounted on standard O-50 trucks, through W. R. Kerschner, from the Cincinnati Car Company.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., has ordered two additional type RE-70-B-11 gas-electric motor cars from the General Electric Company.

Santa Barbara & Suburban Electric Railway, Santa Barbara, Cal., has ordered five center-entrance, semi-convertible cars from The J. G. Brill Company. They will be 41 ft. long, 8½ ft. wide and will weigh 39,000 lb.

Virginia Railway & Power Company, Richmond, Va., noted in the Electric Railway Journal of April 5, 1913, as having ordered twenty cars from the Cincinnati Car Company, has specified the following details:

Type of car	Center ent.
Prepayment type	Pay-within
Seating capacity	66
Bolster centers, length	25 ft.
Length over vestibule,	47 ft. 7 in.
Width over sills	8 ft. 1⅜ in.
Width over all	8 ft. 5 in.
Height, rail to sills	30½ in.
Sill to trolley base,	8 ft. 10½ in.
Body	steel
Interior trim	cherry
Headlining	Agasote
Roof	arch, Agasote
Underframe	steel
Air brakes	emergency
Bumpers	steel channel
Car trimmings,	bronze oxidized
Control type	MK
Couplers	Van Dorn No. 31
Curtain material	Pantasote
Destination signs	Hunter
Fenders or wheelguards	H.B.
Gongs	14-in. pedal
Hand brakes	Peacock
Heaters	Cons.
Headlights	Dayton
Motors,	four per car, inside-hung
Sanders	Elec. S. Sup.
Seats	Hale & Kilburn
Seating material	Rattan
Trolley catchers or retrievers	2 U. S. No. 13
Ventilators,	Cincinnati arch roof
Buzzers	Cons.
Signals	Cons.

Asheville (N. C.) Electric Company, which ordered six 20-ft. 8-in. semi-convertible car bodies, mounted on Brill 21-E trucks, from The J. G. Brill Company, as noted in the Electric Railway Journal of March 22, 1913, has specified the following details:

Seating capacity	32
Weight (car body only),	11,000 lb.
Length of body	28 ft. 8 in.
Length over vestibule,	30 ft. 1 in.
Width over sills	7 ft. 8½ in.
Width over all	8 ft. 3½ in.
Height, rail to sills,	underside, 31⅝ in.
Body	wood
Couplers	Brill
Curtain fixtures	Forsythe
Curtain material	Pantasote
Destination signs	Hunter
Wheelguards	Sterling
Gongs	Dedenda
Hand brakes	Sterling
Headlights	Neal No. 1561
Journal boxes	Brill
Motors, type and number,	GE-80 D.C., inside-hung
Interior trim	bronze
Headlining	birch veneer
Roof	Monitor
Underframe	wood and metal
Axles	hot rolled steel
Bumpers	Brill angle iron
Cables	G.E.
Conduits and junction boxes	G.E.
Car trimmings	Brill
Paint	Masury
Sanders	Brill Dumpit
Sash fixtures	Brill
Seats	Brill "Winner"
Seating material	cane
Springs	Brill
Varnish	Murphy
Wheels	Cast-iron spoke

TRADE NOTES

Cooke, Holtz & Company, Chicago, Ill., state that the corporate name of the company has been changed to H. T. Holtz & Company.

Smiley Company, Edmonton, Alberta, Can., has recently received an order from the Edmonton Radial Railway for four sets of portable cross-overs.

American Engineering Company, Philadelphia, Pa., has just completed an additional erecting shop, 150 ft. x 80 ft., to care for the rapidly increasing sales of Taylor stokers.

Perry Ventilator Corporation, New Bedford, Mass., has received an order from the Boston & Worcester Street Railway, Boston, Mass., to equip a number of its cars with ventilators.

Electric Storage Battery Company, Philadelphia, Pa., has received the order for storage batteries for the car recently ordered by the Milledgeville (Ga.) Railway from The J. G. Brill Company.

Dayton Fare Recorder Company, Dayton Ohio, has opened an Eastern office in Suite 1518, 30 Church Street, New York, N. Y. The sales work of the company will be handled from this new office.

Near-Side Car Company, Philadelphia, Pa., has closed its Philadelphia office, and removed the general offices to Suite 1518, 30 Church Street, New York, N. Y., from which point all sales work will be conducted.

Burton W. Mudge & Company, Chicago, Ill., have changed their firm name to Mudge & Company. The firm has removed its general offices in Chicago from the People's Gas Building to the Railway Exchange Building.

C. & C. Electric Company, New York, N. Y., has appointed George W. Craven manager of its welding department, with headquarters at Garwood, N. J. Mr. Craven was formerly manager of the Chicago office of the above company.

Gibbs & Hill, New York, N. Y., have recently secured the services of Raymond J. O'Brien. Mr. O'Brien was formerly connected with the railway engineering department of the Westinghouse Electric & Manufacturing Company, at East Pittsburgh, Pa.

Railway Utility Company, Chicago, Ill., has removed its general offices from the Rookery to a suite at 226 La Salle Street. The company has appointed James H. Denton its Eastern manager, with offices in the Marbridge Building, New York, N. Y.

General Electric Company, Schenectady, N. Y., held the annual meeting of its stockholders on May 13, 1913, at which time J. S. Keeler, assistant secretary of the company, and C. P. Moore were elected directors, succeeding J. Pierpont Morgan and J. P. Ord, both deceased.

Murphy Iron Works, Detroit, Mich., have removed their New York office from the Hudson Terminal Building to Suite 901 Woolworth Building. H. W. Canning is in charge of this office. The Boston office of the company has been moved from 35 Federal Street to 201 Devonshire Street.

Pyrene Manufacturing Company, New York, N. Y., has received an order from the International Railway, Buffalo, N. Y., for thirty-five extinguishers, equipped with the new brackets which have recently been placed on the market, to be used on its interurban cars between Buffalo and Lockport, N. Y.

Consolidated Car Fender Company, Providence, R. I., has received an order through the Wendell & MacDuffie Company to equip the forty-five new center-entrance storage-battery cars of the New York Railways and the forty new storage-battery cars of the Third Avenue Railway with H-B lifeguards.

Baldwin Locomotive Works, Philadelphia, Pa., expect to let contracts in a few days for the construction of 3 miles of track to be used in connection with their locomotive plant to be built at East Chicago, Ind. The plant, it is estimated, will cost $5,000,000 and will furnish employment to between 4000 and 5000 men.

Louis P. Lipps, Cleveland, Ohio, to whom was recently granted a patent on a new form of railway ticket, which was described in the ELECTRIC RAILWAY JOURNAL of Feb. 8, 1913, page 258, has signed a contract with the Columbus (Ohio) Railway & Light Company for an eight-year license to use these tickets on its different lines.

Ackley Brake & Supply Company, New York, N. Y., reports that an order has just been received from St. Petersburg, Russia, for 300 Ackley adjustable brakes, also one from Japan for 360 brakes. G. S. Ackley on his present trip abroad has sold over 1200 more brakes of this type throughout Europe. Mr. Ackley was expected to return to New York about May 15.

John Hays Smith, Milwaukee, Wis., has resigned his position as commercial engineer of The Milwaukee Electric Railway & Light Company to engage in consulting engineering, with offices in the Merrill Building. Before going to Milwaukee Mr. Smith was with the Duquesne Light Company, Pittsburgh, Pa., and prior to that was connected with the Westinghouse Electric & Manufacturing Company for seven years.

Curtain Supply Company, Chicago, Ill., has received the order for equipping the fifty new cars which are being built by The Laconia Car Company for the Bay State Street Railway, Boston, Mass., with curtains, using Rex, ring 48 all-metal rollers. The company also reports that it has received an order to equip the thirty new cars of the Boston Elevated Railway which are now being built by the Pressed Steel Car Company with curtains using Rex, ring 88 all-metal rollers.

General Electric Company, Schenectady, N. Y., has received equipment orders from the following railways: Saginaw-Bay City Railway, Saginaw, Mich., GE-210 70-hp two-motor equipments for eight new cars; St. Louis, Springfield & Peoria Railway, Peoria, Ill., six GE-69-C 200-hp four-motor locomotive equipments, twenty GE-222-G 140-hp four-motor car equipments and fifty-two GE-201 60-hp railway motors; Public Utilities Company, Evansville, Ind., GE-210 70-hp two-motor car equipments for eight new cars; Portland (Ore.) Railway, Light & Power Company, twenty-four GE-58-A 37-hp railway motors; Northern Texas Traction Company, Fort Worth, Tex., four GE-73 75-hp four-motor car equipments and ten GE-201, 60-hp two-motor equipments; Detroit (Mich.) United Railways, fifty GE-210 70-hp two-motor car equipments.

The J. G. Brill Company, Philadelphia, Pa., has close to $4,000,000 worth of forward business in hand, and ever since last fall has been operating with the largest output in its history. In the year ended Dec. 31, 1912, the company did a gross business of $7,842,091, compared with $5,870,007 in the previous year, an increase of $1,972,084, or more than 30 per cent. This contrasts with a slight loss in gross which the 1911 year showed over 1910. After charging off $353,100 for property maintenance and depreciation, net profits were $1,054,851, compared with $554,980 in 1911 and $326,232 in 1910. Net profits increased $499,871, or more than 90 per cent, over 1911, and $728,619, or 223 per cent, over 1910. The balance for the $5,000,000 common stock last year after deducting the preferred dividend was equivalent to 14.6 per cent on that issue, compared with but 4.6 per cent in the previous year.

Ohio Brass Company, Mansfield, Ohio, has placed on the market a new rail bond known as the type J all-wire bond. The new feature is in the form of the bond terminals, a hole being drilled in each terminal stud while an annular hole is milled with a hollow cutter in the ball of the rail. The contact pin is therefore an integral part of the rail. The bond terminal is placed in the annular hole and driven home with a hammer. Mechanically it will stay there as a double gripping effect is obtained upon the outer wall and pin. Electrically the contact surfaces exceed the conductivity required for the capacity of the bond. The bond is of No. 0000 size and is designed for use on 60-lb. and heavier rails. The hollow milling cutter is made of high-speed steel and can be quickly resharpened. The milling machine itself is motor-driven and is equipped with wheels for moving along the track. It mills two holes simultaneously and backs the cutters out of the holes without stopping or reversing motors.

ADVERTISING LITERATURE

Joseph Dixon Crucible Company, Jersey City, N. J., has issued a new booklet entitled "Graphite for the Boiler."

Ackley Brake & Supply Company, New York, N. Y., has issued a small folder illustrating the different types of the Monarch refillable fuse.

Pittsburgh Reinforcing Pole Company, Pittsburgh, Pa., has issued a folder which describes and illustrates the Orr pole reinforcing process.

Harris, Forbes & Company, New York, N. Y., have printed a small booklet on public utility bonds, giving capitalization, earnings, etc., of companies mentioned therein.

Chicago Pneumatic Tool Company, Chicago, Ill., has printed Catalog 42, describing the Boyer railway speed recorder, with instructions for applying and operating.

Pawling & Harnischfeger Company, Milwaukee, Wis., has reprinted in booklet form an article from the *American Engineer* entitled "Drilling and Boring Operations in Railway Shops," by P. G. Valentine, of the Chicago, Milwaukee & St. Paul Railway.

Nichols-Lintern Company, Cleveland, Ohio, has issued **a** pamphlet containing a condensed copy of a report on illuminating tests made by the Cleveland (Ohio) Railway. The company has also issued another pamphlet illustrating and describing the Nichols-Lintern selector switch.

Federal Storage Battery Car Company, Silver Lake, N. J., has issued an attractive booklet illustrating and describing type 301 of Beach cars, propelled by Edison batteries. The booklet also contains several floor plans of this type of car, with dimensions. The car described is one of an order for the New York Central lines.

Trussed Concrete Steel Company, Detroit, Mich., has issued a booklet pertaining to concrete bridges, roads and curbs. The booklet contains numerous illustrations, with complete discussions on the design of concrete bridges for both highways and railways and tables of designs for flat highway bridges, for railway box culverts and highway arch bridges.

Stone & Webster Engineering Corporation, Boston, Mass., has printed a book containing brief data regarding various water-power plants which it has constructed. Of the twelve plants described therein, six are for companies managed by the Stone & Webster Management Association, and six were constructed for companies which are in no way affiliated with the organization.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. A 4061, which is devoted to the subject of electric arc headlights. Bulletin No. A 4071 describes and illustrates ornamental lamp brackets and center span suspension fixtures for series and multiple incandescent street lighting. Bulletin No. A 4087 is devoted to direct-current motor-starting panels for heavy service. Bulletin No. A 4095 pertains to direct-current switchboards. Bulletin No. A 4097 deals with ventilated railway motors and Bulletin No. 4947 A describes Edison Mazda lamps.

Electric Service Supplies Company, Philadelphia, Pa., has issued a booklet illustrating and describing the automatic trolley guard, a new specialty which has recently been added to its line of electric railway equipment. This booklet illustrates the dangerous situation a trolley car is placed in when the pole leaves the wire at a steam crossing and graphically shows the great value of the automatic guard in keeping the pole on the wire and allowing the car to pass out of the danger zone in entire safety. The company has also issued the *Keystone Traveler* for May, 1913, which contains an interesting article describing and illustrating the automatic trolley guard which is usually placed at dangerous crossovers, grade crossings, etc., and which keeps the pole on the wire or automatically replaces it should it fly off while the car is passing through such danger zones. The issue contains other interesting articles on Keystone steel gear cases, Keystone motormen's seats, "protected" rail bonds and prepayment car operation.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MAY 24, 1913 No. 21

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office .... 1570 Old Colony Building

Philadelphia Office .... Real Estate Trust Building

European Office.... Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, *8100 copies are printed.*

DIVISION POINTS FOR ELECTRIC LOCOMOTIVES

The proposed 440-mile electrification of the Chicago, Milwaukee & Puget Sound Railroad, of which accounts have been given in recent issues of the Electric Railway Journal, is unique in that with the present steam service it now includes several operating divisions, and it will be interesting to see the extent to which electrical operation will tend to combine them. Ability to do this is one of the incidental advantages of electrification and one which is by no means unimportant. When steam is used as a motive power there is every reason for limiting the length of divisions to not more than 150 miles, because the steam locomotive after traveling that distance is generally in need of attention to its machinery or boiler, and the fire has to be cleaned. This involves work which cannot be fairly imposed upon the modern fireman. With the electric locomotive, however, the only limit to its continuous run is the length of the electrified line. It is, of course, true that a crew would hardly be capable of staying on the engine for a distance much greater than 200 miles, but the fact that crews would have to be changed does not by any means involve the removal of the engine even temporarily from service. With a traffic composed largely of through freight the only reason for holding trains at division points, aside from the time required to change crews, is the necessity for inspection and setting out bad-order and local cars, and there seems to be no reason why an electric locomotive could not stay upon its train almost indefinitely. It could, in fact, do the necessary switching, at least at the head end, after the inspection of the train, and thus reduce the costly yards, prolific of delay, to the importance of elaborate sidings. In addition, the increased monthly mileage of locomotives on long runs is an important source of saving. This is shown by the present custom of using, where it is possible, double-crewed passenger engines on runs even 250 miles long.

FORESTALLING CONSTRUCTION DAMAGE SUITS

The truthful camera has long been a friend of the live claim agent in giving indisputable exhibits of conditions at scenes of railway accidents and of the actual doings of supposedly bedridden claimants. However, the photographic practice of the Public Service Commission, First District, New York, shows that the camera may also be used successfully in forestalling or minimizing the expense of damage suits due to construction work. It is obvious that the construction of new lines, whether surface or non-surface, involves some disturbance of streets, sidewalks and buildings, with possible damages to owners of abutting property and injuries to pedestrians and occupants of vehicles. In the case of the Broadway-Lexington Avenue subway, for instance, the commission delegated one of its assistant engineers and its staff photographer to make photographs of each section even before it was let for construction. The engineer accompanies the photographer partly to point out what is to be recorded but chiefly to determine the exact location of each view. The plate therefore always shows the street, surveyor's station number and the date. It is customary to take general views of the paving and sidewalks as well as individual views of every house. In addition to these photographs, the customary progress views and special details of jobs are also secured. For the Broadway and Lexington Avenue subway alone 1400 views were made from Jan. 1 to April 1 of the current year. The effect of this wise policy has been the practical elimination of "fake" suits and the reduction of just claims to an equitable basis. In fact, the photographs have enabled the New York corporation counsel to settle many cases out of court.

GENERALIZATIONS IN PROBLEMS OF ELECTRIFICATION

During the discussion on steam railroad electrification which occurred at the recent meeting of the American Institute of Electrical Engineers emphasis was laid by one of the members on the danger in generalizations. That the point was well taken was shown by the fact that the widest kind of divergence existed between the viewpoints of those taking part in the discussion. Indeed, the expressed opinions, often backed up by figures, ranged all the way from a belief that electrification under the cited conditions would produce vast economies to a conviction that the savings of the hypothetical electrifications would be less than the fixed charges on the overhead construction and equipment. Steam railroads as well as electrified lines work under such an extraordinary complexity of operating considerations imposed by local conditions that it is quite impossible to sum them up into a single example which could be said to apply to all cases even as an approximation of the widest latitude. A statement which was made before the meeting charged that 42 per cent of the total engine-house costs were involved in the washing out of locomotive boilers. This might apply in the Dakotas and Montana, where it is not unusual to find engines being washed out or at least having the boiler water changed every half trip. But there are many favored localities where the water is so pure that, in roundhouse parlance, "the engines are washed out once a year, whether they need it or not." No less subject to wide variation is the price of fuel, which, as cited by one of the contributors to the discussion, may be oil at 70 cents a barrel, making an electric energy rate of ½ cent per kw utterly prohibitive. A similar situation obtains through the Alleghany Mountains, where coal of the finest quality may even be dumped on to the locomotive tender direct from the mine tipple. What interest in the fuel economy of electrification could exist under such conditions? Yet, in the Southwest, poor coal at $5 a ton makes this very item of expense the most serious single one among all the operating costs. In the end every electrification problem will have to be studied by itself with no more consideration of results obtained elsewhere than will provide highly elaborated unit costs, which can be used only with the utmost caution.

BUS COMPETITION IN LONDON

The keen competition for traffic in London between motor buses and street cars, to which we have previously referred in these columns, has reached the stage where it is being considered in the House of Commons by a select committee which has been appointed to study the entire subject of street traffic in London. The special reason for the hearing now is partly the extreme congestion produced in the streets of London by the presence of large numbers of motor buses and partly the accidents both to pedestrians and to other vehicles caused by the reckless driving of the buses. The tramway managers have been called upon to contribute their testimony on the situation, and their contention is that if the present laws which greatly favor the motor bus are repealed the congestion and accidents will be greatly reduced.

At present, according to the testimony presented at the hearing, each tramcar has to pay an annual tax varying from £180 to £220, and the tramway is the only method of traction which is held responsible for road construction and maintenance, whereas the buses pay only the petrol tax of £43 a year. In this connection striking photographs were shown of street congestion which could be eliminated, or at least greatly reduced, if Parliament should only adopt a policy of not discouraging the system of traction on rails. Thus, in one view of a London street exhibited, there are shown five omnibuses and twenty taxicabs whose total seating accommodation could be provided by four tramcars.

The matter of unequal taxation, however, was not the only complaint made by the tramway managers against the buses, as they alleged unfair practices by bus drivers. Two methods in particular are specified; namely, "cutting in" and "nursing." "Cutting in" means the running of a motor bus between a tramcar and the curb at the time when passengers are about to board the car or alight. This practice naturally discourages timid people from using the tramway. According to the British *Light Railway and Tramway Journal*, the method was graphically described by one of the tramway managers at the hearing in the following terms: "Elderly passengers and women are deterred from the tramcars at picking-up points by a motor bus being driven straight at them, the horn being sounded without apparent slackening of speed, the people scattering back to the pavement and the bus drawing up in such a way as to block completely all access to the platform of the tramcar. If the bus is proceeding in front of the tramcar it will keep on the tramway track, despite its normal inferiority of speed limit, and fail to draw up to the curb to pick up or unload, obliging the tramcar to stop behind it while this is done, if indeed it is not stopped so suddenly, and without notice, that a collision is occasioned. A bus will pass a tramcar on the off side and cut across its front so closely that only by the application of his brakes by the tramcar driver are serious collisions averted, and witness has numerous instances in his records where so close has been the risk taken that the step or the laths of the tramcar's lifeguard have been carried away by the bus."

"Nursing" is a very ancient custom of the London bus drivers and used to be employed with great efficiency in the days of horse buses by the old companies against any new company which might attempt to enter the field with a few buses. As directed against an electric car, the practice known as "nursing," as we understand it, is for two buses to "nurse" a tramcar by keeping close to it at the side, one just ahead of the car and the other just behind it. When the car stops the buses stop, and if the car should chance to get ahead they catch up to it. The first bus, as far as it can, takes on board the passengers who would otherwise board the car, and the second bus assists in the attack by frightening away those people who would cross the intervening street to take the car and takes on board those who do not board the first bus. The plan has enough of the sporting element in it to make it popular with the bus drivers, but whether its continuance in London streets will receive the sanction of the Parliament remains to be seen.

ESTIMATED INCREASE IN NEW YORK'S POPULATION

Delos F. Wilcox, chief of the franchise bureau, Public Service Commission, First District, New York, recently submitted to the Charities Conference some surprising figures regarding the population and subways of New York City. On the same basis as that used by the commission in estimating the traffic on the new subways in 1920, Mr. Wilcox estimated that in 1960 the population of the city would be 21,000,000 and its rapid transit systems would be carrying 21,000,000,000 passengers a year. The traffic resulting from such conditions would require 200 tracks through the business section, and the projected system provides for a maximum of only twenty-two tracks. These figures were based, we understand, on the estimate of the Public Service Commission that population between 1910 and 1920 will increase 35 per cent and traffic twice as much, or 70 per cent, these figures being determined by a study of vital and traffic statistics for the past decade. Mr. Wilcox has simply adopted the same ratio and extended it over the period up to 1960. Whether this past relation will hold true for the coming fifty years we are unable to say, but though Mr. Wilcox's estimate seems almost incomprehensible it will at least stir up city authorities and citizens to make a searching inquiry into what the future problems of New York are as regards population and rapid transit development.

With the opening of the new subway lines a larger proportion of the passengers will be able to use through routes, and this will mean fewer rides at more than one 5-cent fare. This, in turn, will tend to offset the natural yearly increase in the number of rides per inhabitant. But to pay the fixed charges on the $330,000,000 new capital involved in the construction of the proposed lines there must be, according to Mr. Wilcox, either an increase of 50 per cent in the population of the city or else a larger average per capita charge for rapid transit facilities. It is perfectly safe to figure on a larger per capita charge, although we do not know the exact mathematical relation which will exist between it and the increase in population. Of course, if the law of squares were assumed to continue indefinitely a time would eventually be reached when every man, woman and child would be spending all his time traveling. This is manifestly absurd. But it is reasonable to assume as the result of the growth of every large city the development of several or of many industrial centers, as in London, and in such a case it is inevitable that the traffic will increase in even greater ratio than the population. It is also logical to expect with the opening of new transportation facilities a shifting of population, the opening up of new areas, a consequent increase and decrease of land values and, to some extent, an economic waste in regard to public institutions established in the evacuated portions unless the old condition of congestion is allowed to return. So far as the railways are concerned, the franchises of those in the outlying sections of the city should increase in value, while the surface lines within the congested districts would continue to do most of the short-haul traffic but, on account of their physical limitations, would not be able to participate to the same extent as the rapid transit lines in the increased traffic.

Two points stand out prominently in this study of the future. One is the necessity of planning so far as may be as to what is to be done with this population for which transportation facilities are being provided and which these same facilities are helping to bring to the city. A thorough investigation should be conducted along all civic lines in order that the municipality may be prepared for its increasing numbers. The second question is one of finances and credits. During the last ten years the city population has increased 36.7 per cent, the per capita debt 81 per cent and the per capita taxes 30 per cent, owing to the fact that the larger a city grows the more it costs for governmental functions. If this condition continues, will the city's increasing margin of credit be more or less taken up by the additional expenses made necessary by the additional people? We believe, of course, that both of these conditions will be met when they arise, but there is no doubt that it is none too early for the prosecution of a systematic and continuous study of the best means for the city to solve the housing and financial problems made necessary by its rapidly increasing population.

RECEIVERS TO END STRIKES

Aside from the exhibition of bad faith on the part of the representatives of the union employees in backing out of their first arbitration agreement, the Cincinnati strike is noteworthy in another respect. It has ended in a settlement brought about, according to common report and belief, largely by means of the threat of a receivership for the railway companies involved if they did not immediately resume operation. Perhaps this is putting the case too strongly, but, to quote one of the most important organs of local public opinion, "It was generally conceded among members of the two committees [representing the company and the employees in the final negotiations] that the suit brought by the Mayor on behalf of the city was the factor that gave impetus to the efforts on the part of the two contending parties to enter into a settlement. It caused the traction company, it was said, to make concessions which it had persistently refused to make prior to this action."

The Mayor's suit was initiated by a petition filed in the Court of Common Pleas by the city solicitor asking that receivers be appointed for the Cincinnati Traction Company and the Cincinnati Street Railway Company. The theory upon which the petition was based was that the city was suffering injury from the failure of the company to operate its cars and that this fact was sufficient to give the city standing in an equity court. There must also have been the belief that receivers as officers of the court could accomplish what the company's officials had been unable to do because of the violent opposition of street mobs.

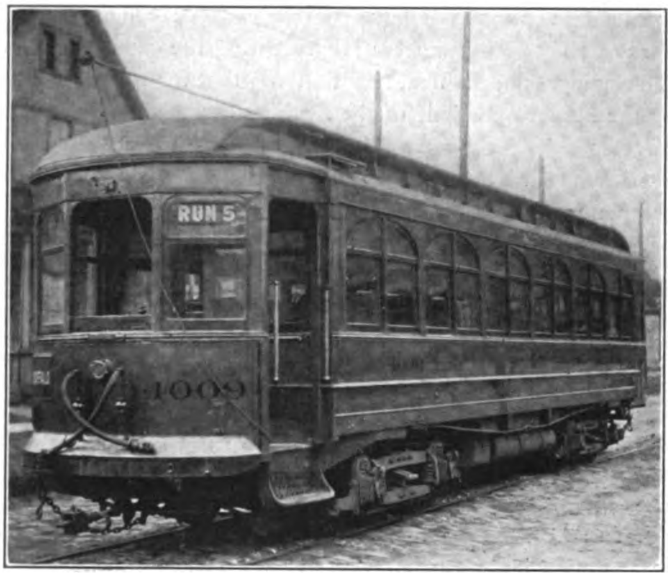
It is decidedly unfortunate that this remarkable suit was not carried to a conclusion, for if a public service corporation can be thrown into the hands of a receiver in the event of a strike of its employees and in spite of its utmost efforts to operate it is time that we knew it. On the other hand, if the proceedings in this case would, as we believe, have been promptly thrown out of court or blocked by higher tribunals, it is a misfortune that this did not happen. Up to this time in American jurisprudence a receiver has been a person appointed by the court to conserve a property and to protect the rights of its owners and creditors. The Cincinnati proceeding, however, was more in the nature of the action known to South American justice as the appointment of a "depositary," who usually has scant regard for property rights.

The best that can be said of the case as it stands is that the public, and more especially organized labor, have been led to believe that a threat of receivership proceedings is the only thing necessary to force the quick surrender of a public service company against which a strike has been called. This being so, it does not require the vision of a prophet to see how frequently labor leaders will be able to induce supine city officials to duplicate the performance of the Cincinnati Mayor. Before this gets to be a habit it is earnestly to be hoped that the questions involved will be threshed out and the fact (if it is a fact) clearly established that such a proceeding as the one begun in Cincinnati has no legal or equitable standing in the courts. The latter, we believe, will stand for justice and will not be misled by specious and demagogic reasoning as to what may be alleged to be the "most popular" course to pursue.

Rolling Stock Maintenance in Buffalo

An Extended Campaign Is Being Conducted by the Mechanical Department to Remodel the Equipment and to Reduce Maintenance Costs—An Unusually Complete System of Records Has Been Developed as One Means to That End

The present year is a very busy one for the mechanical department of the International Railway Company, as the extensive purchase of near-side cars by this company has made it possible to remodel a large number of the older cars at the Cold Spring shops. There are on the pay roll of the mechanical department at the present time a total of 438 men, of whom 236 are employed in the shops. Others are located at the various carhouses as follows: Cold Spring, 58; Hertel, 37; Forest Avenue, 25; Broadway, 38; Walden, 22; Seneca, 22.



Buffalo Car Maintenance—City Car as Rebuilt for Interurban Service on Lockport Line

The company operates nearly 750 cars, of which at present 45 are in the shop undergoing repairs or awaiting attention. The cars in operation from the different carhouses are as follows: Cold Spring, 208; Broadway, 176; Hertel, 89; Forest Avenue, 85; Walden, 62; Seneca, 80; Niagara Falls, 44; Lockport, 19; Niagara Falls, Ontario, 6. In addition about fifty cars are assigned to the various carhouses but not operated.

The Cold Spring shops, which were described in detail in the issue of the Electric Railway Journal for July 7, 1906, are located on Main Street at the corner of Balcom Street, about 2½ miles from the center of the city. At the shops is done the repair work on all of the cars of the system in addition to a great deal of reconstruction. The shops comprise a number of separate buildings, all of liberal size, the shops having been largely extended in 1906 by moving the truck shop and carpenter shop into a carhouse which stood alongside of the main shop building.

RECENT RECONSTRUCTION WORK

Among the more extensive jobs now going through the shops the largest is the remodeling of twenty cars from the Niagara Falls interurban line. These cars formerly had smoking compartments and were arranged in the style customary with interurban cars. The partitions have now been removed, and the bodies have been refinished inside and out. New leather-covered seats replace the rattan seats used in the old cars, and tungsten lamps with ornamental fixtures will provide illumination. The bodies have been placed on high-speed Brill No. 27 M. C. B. trucks equipped with GE-74 motors, and the G. E. type M multiple-unit system of control has been installed. The remodeled cars will operate on the Lockport interurban line.

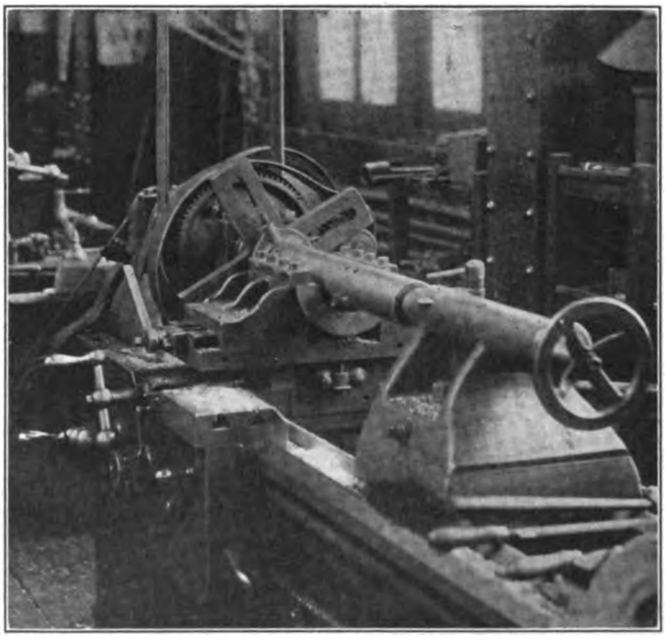
Another large job is the rebuilding of twenty prepayment cars from the Buffalo city lines for use on the Niagara Falls interurban line. These were originally 48 ft. over all, the length over corner posts being 32 ft. 5 in. Short standard interurban platforms replace the long city platforms. In addition to the changes in platforms and a general refinishing inside and out, transoms of crucible steel are being placed under the bodies instead of the built-up transoms of flat steel which were formerly used. These cars have GE-57 motors, with three-turn armature coils. There are four motors to each car, the gear ratio being 28 to 57. The controllers are of the GE K-35 type. As remodeled, each car weighs 27 tons complete.

Forty-two cars which are operating in Tonawanda, Kenmore and Lancaster are also being overhauled, painted and equipped with heavy crucible steel transoms.

In addition to the very large jobs mentioned above a number of interesting pieces of special work are also going on at present. Among these is the remodeling of an older form of maximum traction truck used on a large number of cars. These have been provided with center bearings, supported by heavy flat-steel side frames connecting the pedestals. The motor is outside-hung while the brake rigging is inside-hung. Some of these remodeled trucks have been in operation for a number of months and are giving great satisfaction. Scrapers of original design are also being installed on all of the new near-side cars. This device was developed in order to fit into the limited clearance between the wheels and platform knees.

INSPECTION AND RECORDS

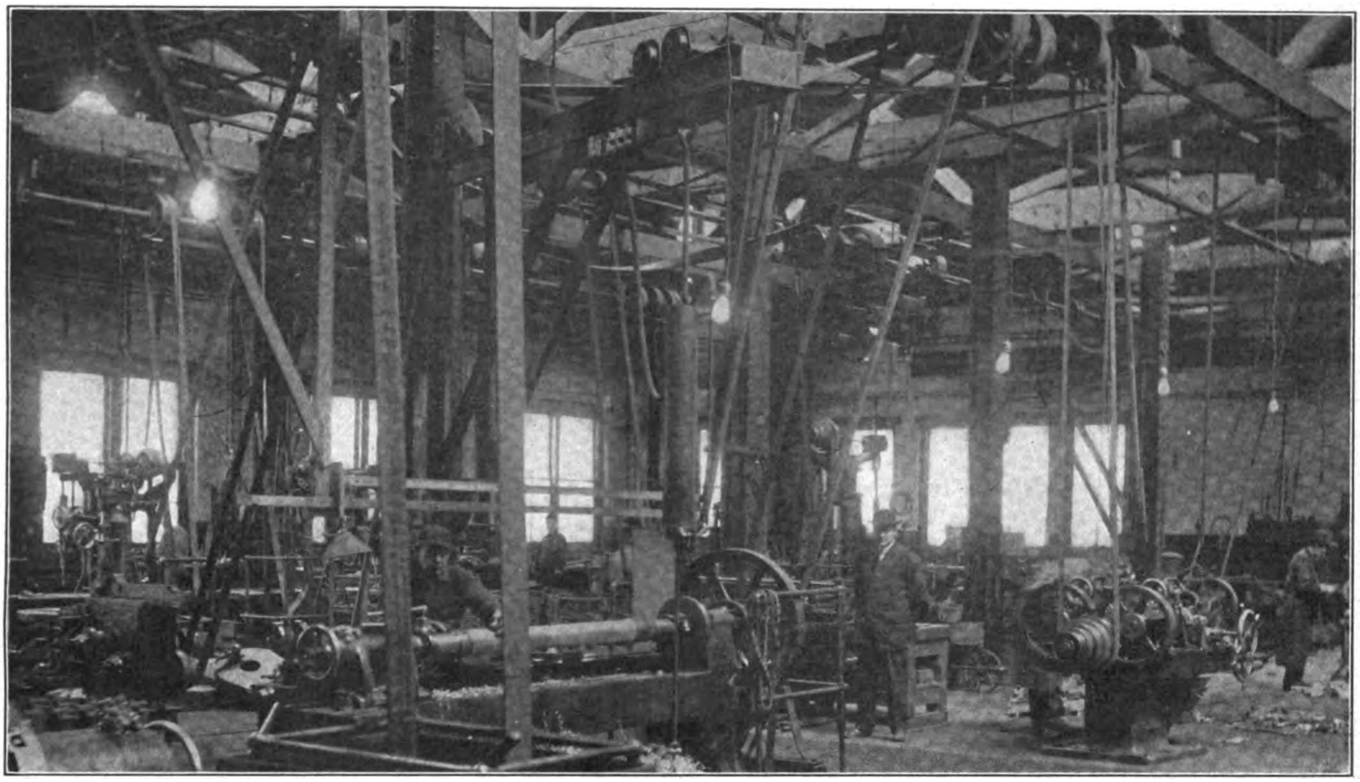
The equipment of the rolling stock is inspected on a 1000-mile basis and cars are taken in every 100,000 miles for a general overhauling. Very complete records of inspections are kept on cards of special design. These are 5 in. x 8 in. in size, and different colors are used for the several parts of the equipment. Separate cards are used



Buffalo Car Maintenance—Engine Lathe Used with Jig for Boring Armature Bearings

as follows: car-body record, giving a history of the body with complete details of the equipment and a history of the painting; truck record, giving a history of the truck, a list of the cars in which it was installed and a list of overhaulings with the corresponding mileages; armature record, showing the number of cars, trucks and motors in which the armature operated, the number of removals and reasons for these, the mileages covered and the repairs made; inspection and overhauling record, giving a complete overhauling history of each car with corresponding mileages; wheel record; axle record; gear record; series of trouble records, including car body, trucks and hand-brake rigging, air brakes, motor compresser and governor, motors and armatures. A lubrication record for each car is kept on a 4¼-in. x 7¼-in. card having horizontal columns for car and armature bearings and vertical columns for the days of the month, a card being used by each car for each month. A small card, 2¾ in. x 4⅜ in. and printed on both sides, is used by the train crews in reporting car defects. A list of over 100 possible defects is given. When a car goes through the shop it is accompanied by a 6¼-in. x 7½-in. shop record card on which are entered the times of entering and leaving each shop, together with an account of the work done.

In addition to the card records, several composite records are made on blueprints for posting. One of these is the



Buffalo Car Maintenance—View of Corner of Cold Spring Machine Shop, Showing Air Lift and Jib Crane Used for Handling Axles

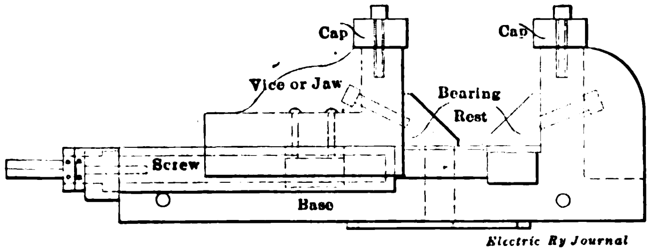
Buffalo Car Maintenance—View at Most Congested Point in the City, Showing New and Old Types of Car

car-painting record. By this system it is possible to assemble the complete car-painting record for four years on a chart less than 2 ft. x 3 ft. in size. The chart is divided into twelve vertical spaces, each of which is subdivided into columns for the car numbers and for each year. The painting record is made by means of abbreviations as follows: A, car burnt off, painted and varnished; B, car painted and varnished; C, car "cut in" and varnished; D, car "touched up" and varnished. In the spaces are recorded, by means of these abbreviations, the painting operation and the date. By this means the superintendent can have always before him the exact status of the painting work, and as many copies of the chart can be made as is found desirable.

Buffalo Car Maintenance—Tools and Jigs for Finishing Trolley Wheels

Another useful chart is that of cars pulled in for repairs. This chart is of the same size as the other, and it is divided up into vertical columns for the car numbers and for records of causes of trouble. There is one space for each day of the week, a new chart being required weekly. An index to fifty-one causes of trouble gives a key number for each cause and these key numbers are used in entering the records. In the index are vertical columns for recording the totals of troubles from each source for each day and for the week. The columns can be totaled vertically also to obtain the total number of defects for each day. In this chart the various types of cars are arranged separately with provision for totaling weekly the number of each type pulled in.

A very convenient set of blueprints, 7½ in. x 9¾ in. in size, has been prepared to show at a glance the standard parts of truck equipment. These are arranged in loose-leaf notebook style. There are books for gears, coiled springs, double elliptic springs, half-elliptic springs and wheels. By means of the sheets with the accompanying indexes, details of each part of the equipment can be seen at a glance, and information regarding the standard parts of a given equipment is immediately available.



Buffalo Car Maintenance—Jig Used for Boring Armature Bearings in Engine Lathe

To determine the adequacy of the forces in the several carhouses a chart has also been recently prepared to show the number of cars maintained per man and the different classes of work required on the cars assigned to the several carhouses.

MEETINGS OF FOREMEN

G. W. Dunlap, superintendent of equipment of the company, is making a special effort to reduce the cost of maintenance by eliminating the causes of trouble. In addition to the data given by the very complete records described above, he has recently instituted the practice of having monthly meetings of all carhouse and shop foremen. A large room has been fitted up especially for this purpose, and in connection with the conferences exhibits of defective equipment are studied. For example, if it is found that a certain type of motor gives trouble due to loose armature coils, the construction of the armature is studied in detail and suggestions are made as to how the coils may be kept tight. By having a number of experienced men concentrating attention on the matter the best conclusion is likely to be reached at once. This practice is very similar to that followed in large manufacturing organizations where committees of representatives from all departments concerned decide upon important details of manufacture. Mr. Dunlap states that already armature and other troubles are being cut down as a result of these meetings. Obviously, they serve not only for their intended purpose but also that of keeping up a spirit of sympathetic co-operation between the shop men and operating men. The men take a pride in having their suggestions considered, and if they are adopted this pride is greatly enhanced.

ALUMINUM UNDERGROUND CABLES IN EUROPE

The use of aluminum underground cables in Europe seems to be developing, according to E. d'Hoop, of the Brussels Tramways Company. Eight street railways say they have them in use, of which one employs aluminum cables only for high-tension alternating current. On the other hand, cable manufacturers mention numerous examples of the adoption of these cables for both high tension and low tension. The proportional area of the useful section of aluminum cables in comparison with copper cables of the same conductivity approximates 1.65. The useful section of cables used for low tension frequently exceeds 1000 sq. mm, the maximum mentioned reaching 1700 sq. mm. The Siemens-Schuckert firm reports the installation of an underground feeder, with a single aluminum conductor for a single-phase current at 60,000 volts, on the Muldenstein-Bitterfeld section of the Prussian State Railways. No practical drawbacks to the use of aluminum cables have been experienced. The making of the joints and connections, however, necessitates the exercise of special care, owing to the low conductivity of the oxide of aluminum which may form on the surfaces of the pieces to be connected. The ends to be joined should be cleaned most carefully, branch sleeves of large contact surface being used and the joint made as rapidly as possible so as to limit the effects of the air. The fear has been expressed that, owing to the greater capacity of aluminum cables, the increased effects of resonance may cause piercing of the insulation in case of a sharp break in the circuit, but so far nothing of the kind appears to have occurred with those companies which have these cables in use.

The opportunity of using aluminum cables, in comparison with copper, depends principally on pecuniary considerations and the relative market prices of the two metals. It is clear, however, that there is an advantage in using aluminum for large direct-current feeders. In some instances the economy thus secured exceeds 14 per cent. According to a formula worked out by the Copenhagen Tramways, the use of aluminum is advantageous when the price of aluminum in dollars per ton is lower by 10.10 times the price of copper, minus 145.5. This formula evidently assumes the parity of the price of lead, iron hooping and the other materials used in the manufacture of cables. Independently of the question of price, aluminum cables have the advantage in the case of very high tensions, when it is necessary to augment the section of the conductors in order to increase the dielectric rigidity.

Arbitration of Operating Expense Charges in Cleveland

Proceedings Before a Board Composed of C. N. Duffy, A. B. du Pont and Judge John M. Killits, Appointed to Arbitrate Differences Between the Cleveland Railway and the City in Regard to the Allowances per Car Mile for Maintenance, Renewals and Depreciation and for Other Operating Expenses

The board of arbitrators in the Cleveland Railway case met in the Federal Building, Cleveland, on May 19, to consider the testimony bearing on the car-mile allowance for operating expenses and maintenance, depreciation and renewal charges. The three arbitrators composing the board are C. N. Duffy, vice-president and comptroller Milwaukee Electric Railway & Light Company; A. B. du Pont, engineer for the city street railroad commissioner of Cleveland, and Judge John M. Killits, of the United States Circuit Court, Toledo. In addition to the two main issues concerned, Mayor Baker of Cleveland asked that the board arbitrate several other questions.

OPENING STATEMENT OF H. J. CRAWFORD FOR THE COMPANY.

H. J. Crawford, of Squire, Sanders & Dempsey, made the opening statement in which he set forth the questions to be arbitrated as follows:

(A) Should the present allowance for operating expenses, as defined by the ordinance, be increased, and, if so, in what amount?

(B) Should the present allowance for maintenance, renewals and depreciation be increased, and, if so, in what amount?

The proceeding was started by a letter from the company to the City Council, written April 14, 1913, in which it was stated that the expense of repairs, renewals and replacements in the last three years had exceeded the allowances prescribed by the franchise for these purposes. These expenses have been ordered or authorized by the city street railroad commissioner and the Council. The company, therefore, requested that the allowance for these purposes be increased to an average per annum of 7 cents per car mile, to be charged to maintenance expense accounts at such varying rates during the twelve months as might seem to the Council or the commissioner to be proper.

It was also stated that the other expenses of operation had exceeded 11½ cents per car mile during the last year and would also exceed this amount, the company thought, during the coming year. The Council was therefore asked to increase the allowance to 12½ cents per car mile so as to enable the company "to meet the legitimate expenses of operation, insurance, accident and damage claims," "to make good any deficit" now existing and "to prevent any deficit" in the future on account of operating expenses.

This request was refused by the Council, and the company thereupon asked for an arbitration to determine the amounts per car mile that should be allowed, and named Mr. Duffy as its arbitrator. Mr. du Pont was appointed subsequently by the city. Judge Killits was appointed as the third arbitrator by Judge Day, of the United States Circuit Court, Cleveland.

Section 21 of the Tayler ordinance provides that the car-mile allowances may be increased or decreased from time to time by agreement between the city and the company. It also provides that the intent with regard to the sum authorized by Section 20 to be set aside for maintenance, depreciation and renewals is to enable the company to maintain, renew, replace, preserve and keep its railway system and property and all extensions, betterments and permanent improvements in good condition, repair and working order, being an average for the entire system of 70 per cent of its reproduction value.

Continuing, Mr. Crawford stated that the allowance fixed by the ordinance was ample for the conditions existing when the ordinance was passed, but that on May 1, 1910, the platform employees of the company requested an increase of wages. This was denied by the company, and under the agreement then existing between the company and the employees an arbitration resulted, the outcome of which was a decision by the arbitrators allowing a very substantial increase. The scale prevailing before the arbitration was as follows: First year, 23 cents per hour; second year, 25 cents; third year and thereafter, 26 cents. The award of the arbitrators fixed the scale at 27 cents per hour for all men in the employ of the company less than one year and 30 cents per hour for all who had been in the employ more than one year. The award was made on June 18, 1910, and became effective as of June 16, 1910, and thereafter the allowance had been insufficient to meet the actual operating expenses. Two days after the award the company sent a letter to the Council stating that the arbitration had been made in accordance with the provisions of the contract with the employees and that the resulting increase of about 15 per cent in wages rendered necessary an increase in the car-mile allowance for operating expenses. The city was asked to take the matter up at an early date. The Council, however, refused to make an increase in the allowance.

On Jan. 23, 1911, the company took the matter up with the Council again, stating that for the preceding four months the operating expenses per car mile had been as follows: September, 11.76 cents; October, 11.82 cents; November, 12.51 cents; December, 12.34 cents; average, 12.11 cents. The company therefore asked that the allowance be increased by 1 cent per car mile from Sept. 1, 1910, until the cost of operation indicated that it should be decreased or again increased.

On May 1, 1911, the Council passed a resolution authorizing an increase in the allowance for operating expenses from 11½ cents to 12½ cents per car mile from May 1, 1911, to Jan. 1, 1912, when the rate without further action by the Council should again become 11½ cents. The deficit in the operating fund on Jan. 1, 1911, was $40,902. On Jan. 1, 1912, it had been reduced by reason of the increase to $2,954. The company wrote to the city street railroad commissioner on Feb. 17, 1912, stating that the report for January showed that operating expenses had exceeded the allowance of 11½ cents per car mile by $35,233. This created a deficit in the operating fund for the month of 1½ cents per car mile, and the company asked an increase sufficient to enable it to make good the deficit then existing in the fund and to prevent future deficits. The Council, by resolution adopted on March 11, 1912, denied the application. On Jan. 1, 1913, the deficit had increased to $203,542, while on April 1, 1913, it amounted to $286,834.

STATEMENT OF MAYOR BAKER FOR THE CITY

Mayor Newton D. Baker, in making an opening statement for the city, said that the contract could not be approached like any other street railway contract. It was a unique contract made by a disinterested arbitrator brought in originally by official relations to the property and the company, but the arbitrator had devoted far more effort than would spring from any official interest to give peace to a community and establish a standard as a model to prevent disagreement. Ten years of conflict preceded the settlement.

The first proposition laid down by Judge Tayler in the settlement ordinance was that the people who had the money in the enterprise were entitled to have the integrity of the property preserved. The second was that, as the enterprise was no longer an experiment but was of assured stability and without speculative hazard, these people were entitled to a sure return limited in amount, but that they were not entitled to any speculative interest. The third proposition was that that was all the interest held by the people who had their money in the property. The only other question was that of service. After the financial interest, as outlined, was provided for, all the rest was a matter to be regulated by the people to be served.

Mr. Baker said that when the ordinance was drafted for submission to Judge Tayler two or three differences arose. It was seen to be necessary that the people should have some way of inspiring the company to render the best service, and that if the power to spend money without limit or regulation was granted the question of the rate of fare would be in the hands of those who controlled the company. F. H. Goff, who was an arbitrator in the first settlement between the company and the city, suggested that the expenditures of the company could be regulated by the insertion of an amount in the ordinance. Since the amount was subject to change, the actual figure inserted was regarded at the time as immaterial.

Mr. Baker said that, in addition to the main questions involved, the city wanted to have the board of arbitrators chart the future. It wanted to know whether the limits were arbitrary or whether they could be altered. It also desired to have some questions of accounting settled. It therefore raised the question of whether the company was willing to have these questions considered in the arbitration.

Mr. Crawford then said that it was entirely agreeable to the company to have the city submit the additional questions.

Mr. Baker then added that the city asserted that there was now in the interest fund $700,000 or more, and this, if so, would lead automatically to a reduction in the rate of fare. Another question was based upon the assertion of the city that the company had no right to exceed the ordinance allowances for operating expenses, maintenance, depreciation and renewals. He also said that the company had no right to set up other reserve funds than those stipulated in the ordinance. Explaining this point, Mayor Baker said that any surplus unexpended for operating expenses should be placed to the credit of the interest fund. The company claimed that it had the right to take out of the allowance for operating expenses arbitrary sums per car mile and accumulate them in funds for damage claims and insurance, and at the end of the year had the right to carry these sums forward if not expended, and thus to augment the funds. The effect of this position of the company was that at present it had accumulated in the accident fund $144,000 and in the insurance fund $63,000.

Another question raised by Mayor Baker upon which the city wanted to have the arbitrators pass was that at the time of the sale of the property of one of the low-fare lines $189,000 stock of the Cleveland Railway held by the Municipal Traction Company was placed in the name of Horace E. Andrews, as trustee, and had been so held from that time until now. Dividends had been paid regularly on this stock. In the judgment of the city, that was part of the capital assets of the company, and that stock, it maintained, should be sold and the proceeds applied to the capital account or to betterments which were not charged to the capital account. The dividends that had been paid on this stock, the city held, should be paid into the interest fund. The books of the company also showed an account "surplus of old companies" and the city wanted a decision as to the proper disposition of this money.

Mayor Baker also said that the company had made a contract to buy power from the Cleveland Electric Illuminating Company. That led to the discontinuance of some minor power generating plants, and the company desired to scrap these and charge the proper sum to the maintenance, depreciation and renewals account in a single year. The power contract with the Illuminating company was to extend over a period of ten years, and as it was this contract which made possible the retirement of the generating plants, the city maintained that the company ought to extend the operation of retiring the value over the full period of ten years.

In concluding, Mayor Baker said that the city tried fighting the company for ten years, and it wanted now to try agreement for a while. It wanted to see if the company and the city could not get along better by agreement than by contest. The people wanted to have the integrity of the property assured. They wanted to have the dividend assured without diminution. They wanted the best service that could be given and wanted to pay what was necessary so that it could be furnished. For some years prior to this settlement it cost the company less than 11½ cents per car mile to operate its cars. For the last two or three years, according to the present method of operation, the costs, for some reason, had been higher, reaching almost 12 cents. The city had not the slightest objection to an allowance of 12 cents. If the maintenance charges were insufficient, the city wanted to make them sufficient. It was not approaching the issue with any spirit of contest but in an earnest desire to settle the questions.

ATTITUDE OF THE COMPANY TOWARD THE CITY

Mr. Crawford then made a short additional statement, calling attention to Section 47 of the ordinance, and stated that the record would show that the company had acceded to every request of the city in connection with the operation of the system. He said that the city reserved absolute control of the service of the company and that the company was obliged to give what service the city directed. The contention of the company was that it could make only such expenditures as were directed by the city and that every expenditure had been approved by the city. It only asked that the city pay the necessary cost for the service that the city required. The cost of service had increased since the ordinance became effective. If the wages of trainmen had not been increased, the amounts fixed in the ordinance would be adequate now. This proceeding was brought to secure again the allowance of 12½ cents per car mile which the Council gave once but withdrew. The company asked for no strained construction of the ordinance but simply for an interpretation that would carry out the spirit of the contract.

Mayor Baker said that while the contract of the company with its employees was not superior to the contract with the city, the city did not now object to the wages paid to motormen and conductors.

Mr. Crawford, in introducing the records bearing on the history of the case, quoted from a letter written by G. M. Dahl, former city street railroad commissioner, to the company on March 8, 1910, directing the company to continue the same system of accounts that had been used during the receivership of the property and the brief control of the Municipal Traction Company. A letter from H. J. Davies, secretary of the company, written to Mr. Dahl on March 14, 1910, said that in so far as the system of bookkeeping which had been in operation during the receivership of the Municipal Traction Company conformed to the system of the American Street & Interurban Railway Accountants' Association it would be continued, of course, because the ordinance required that the books be kept in the manner prescribed by that association. If the receivership method of accounting contained anything additional to the association's plan that seemed either to Mr. Dahl or to the company to be good, it would continue that also.

Mr. Crawford showed that as late as 1911 a committee of the Council was advised that the company was setting funds aside out of operating expenses for damage claims and insurance.

DISCUSSION ON ACCIDENT RESERVE FUND

On May 20 Henry J. Davies, secretary and treasurer Cleveland Railway, presented Table I, showing operating expenses and wages of passenger conductors and motormen per car mile during the ten months beginning March 1, 1910.

Table I—Operating Expenses and Wages of Passenger Trainmen, in Cents per Car Mile, During Ten Months of 1910

Months	Operating Expenses	Wages of Passenger Conductors and Motormen
March	11.03	5.65
April	11.27	5.69
May	11.12	5.67
June	11.62	6.15
July	11.72	6.54
August	11.76	6.56
September	12.00	6.61
October	12.00	6.67
November	12.64	6.67
December	12.43	6.65

An increase in wages of trainmen became effective on June 16, 1910, and this change accounted for the increase in operating expenses per car mile in the following months. The average operating expenses for the entire year of 1911, Mr. Davies testified, were 12.07 cents, and the wages of passenger trainmen were 6.68 cents per car mile. These figures for the entire year 1912 were respectively 12.19 cents and 7.71 cents. During the first three months of 1913 the figures were respectively 12.69 cents and 6.47 cents. Mr. Davies thought that the costs would not be as high for the rest of the year 1913, as a smaller number of car miles would be run and there were operating expenses in the winter months that did not have to be met in the summer, such as those for the heating of cars.

Mr. Davies testified that the city street railroad commissioner, representing the city, received the same detailed monthly report as the directors of the company. The commissioner also received a daily report of earnings and of car miles run and special reports on other subjects from time to time, also duplicates of all vouchers, including those covering receipts, payments and journal entries. Mr. Davies went into details concerning the charges to operating expense accounts for the accident and reserve funds. He said that the purpose of the accident reserve was to provide for the liabilities as the liabilities accrued and the accidents occurred. The company charged 0.8 cent per car mile each month on account of accidents, and the sums so determined were carried to a reserve account, against which all expenditures were charged. This was done because, in his judgment, it was not only permitted but required by the franchise itself. Under Section 15 of the franchise the company was obliged to keep in its office, open to inspection, accurate accounts of all moneys expended and of all liabilities incurred in the operation of its property. Among the liabilities were liabilities on account of accidents. The liability arose as soon as the accident happened, if there was a liability. Another reason for setting up that reserve was that the company had received instructions from the city street railroad commissioner in March, 1910, a few days after his appointment, to put in force the system of accounting that had been in use and in effect during the receivership. That system had been approved by Judge Tayler, who drafted the ordinance or a part of it, and included an accident reserve. The receivers continued the system that had been in effect during the operation of the railroad by the Municipal Traction Company, that company also setting up an accident reserve. That practice had also been followed by the Cleveland Electric Railway Company before the lease of its property to the Municipal Traction Company.

Judge Killits asked if the city objected to this practice. Mr. Baker said that the city was not objecting to the practice within the periods. It objected to the carrying of the balances over, and it did not concede that the appropriate amount was set aside each time.

Mr. Crawford said the company was always willing to discuss the amount. It might be too great or too small. It was the principle for which the company was contending. The ordinance referred to "any surplus" in the hands of the company "remaining unexpended" at the end of each year. There was no surplus unless there was a reserve great enough to take care of the contingent unliquidated liabilities of that year. There had been an intelligent attempt to determine what would represent the unliquidated liabilities, and it had been found by experience that 0.8 cent per car mile was too low, if anything, and in April the company had paid out 0.86 cent. The amount now in the fund was only $144,000 to meet all unsettled obligations since March 1, 1910. All accidents that happened prior to March 1, 1910, by the express provisions of the ordinance, were capitalized. He added that the company was not standing for any arbitrary amount. It was standing for the principle of a reserve to care for the unliquidated liabilities. In March, 1910, the first month under the new ordinance, the company paid only 0.2 cent per car mile, and that represented largely the expenses of the claim department. At the close of the year 1912, however, suits aggregating $600,000 were outstanding in the courts.

In answer to a question from Mr. Duffy, Mr. Crawford said that suits against the company could be brought within four to six years of the time of accident, or, in the case of a minor, at any time up to the age of maturity.

The accident expenses during the period of control by the Municipal Traction Company were 0.96 cent per car mile, while during the receivership they amounted to 0.87 cent per car mile. The interests of the company and the city were absolutely identical in this matter. The whole theory of the account was that there should be taken from the earnings a sufficient amount to pay the expenses in every year. There could be no surplus until the expenses were paid. If the amount reserved was too high, the stockholders could not have the balance; it was part of the property. If provision was not made for the contingent liabilities, the property was impaired. Failure to provide for these liabilities would be a falsification of the books.

Mayor Baker made an extended argument in reply on behalf of the city, contending that the ordinance did not provide specifically for a reserve fund of this nature. He said that those who drafted the ordinance were perfectly familiar with all the conditions of street railway operation and that they made a definite provision for certain funds. If they had desired to make a reservation for damages, they knew how to do it. The amount involved was relatively small. On Jan. 12, 1913, John J. Stanley, president of the company, wrote the City Council that the claim department estimated that the losses and claims outstanding could be settled for about $60,000, but that Mr. Davies thought this amount was low. With a total of 28,000,000 car miles run per year, an increase in operating expenses of 1 cent per car mile would mean $280,000, so that if there should be a catastrophe, such as that which occurred when a car went through an open draw, through no fault of the company Mr. Baker understood, the intent of the ordinance was that the company should go to the Council and say that while the amount was enough under ordinary conditions, it was not enough in such an emergency. The car riders must pay the cost. The ordinance required that the balance should be transferred to the interest fund.

Mr. Crawford said that it was perfectly natural for the claim department to underestimate the amount for which outstanding cases could be settled. In December last the amount in the fund was $150,000, and it was smaller now than then. One accident some years ago cost $90,000. If the reserve fund was transferred to the interest fund, the company had not provided for its liabilities. He did not care what the amount was so long as it was of a reasonable size to provide for the liabilities.

Mr. Davies, testifying further, said that the ordinance set forth that a balance sheet should be prepared. To fail to set up all liabilities was to represent to stockholders and future investors that the property of the company was sufficient to meet all liabilities. If the reserve for accident expenses was wiped out at the end of every year, the balance sheet would be false. The effect of such a course would be to make the car riders of the future pay for the accidents of to-day. An accident might grow out of causes that preceded it. The only right way to provide for accidents, and the ordinance required that provision be made for this expense, was to set up a reserve. In the trial balance certain prepaid accounts were shown, such as for water rent. There was no express provision in the ordinance for setting up prepaid accounts, but it would not be proper to charge the cost of prepaid water rent against the operations of only one month. There was less authority under the ordinance for setting up prepaid accounts than for maintaining a reserve fund for damages.

Mr. Davies said that in the three calendar years 1910, 1911 and 1912 the company had more than 42,000 reports of accidents and 9769 claims were presented for those three years. Of those claims 6900 were settled; that is to say, out of the 42,000 accidents settlements had been made of about one-sixth. Of course the number of claims would increase as the years passed. Last year there were 13,650 accidents, 3183 claims and 2340 settlements. Most claims were pressed promptly, but often serious ones were delayed, and some suits had been filed on the last day before the statute of limitations would apply. Most other companies set up as a reserve a percentage of their gross receipts, but the 0.8 cent per car mile in Cleveland was not nearly as much as the 4 or 5 per cent of the gross receipts that other companies set up.

INSURANCE RESERVE

At the afternoon session on May 20 Mr. Davies described the insurance reserve, which amounted now to about $63,000. The company had been charging to operating expenses and crediting to insurance reserve $4,500 each month to provide for fire, fidelity, burglary and hold-up insurance. The $4,500 was to pay premiums, but the reserve above the actual amount expended was to provide for insurance not covered by the policies. The company carried on cars full value, on all buildings 80 per cent of the value, on all electrical machinery and power houses, Mr. Davies thought, 90 per cent of the value. The insurance reserve was to take care of these differences and the possibility of an insufficient amount of insurance in some locality.

The deficit in the operating expense account on Feb. 28, 1913, was $259,592. This covered the entire period of the ordinance. Mr. Davies outlined the difference between maintenance or renewals and depreciation and said that in Cleveland, according to the ordinance, all three had to be provided from substantially 5 cents a car mile. That reserve had been over-spent. On Feb. 28, 1913, there was a deficit in the reserve of $323,597. On March 31, 1913, the deficit was $349,462.

The company submitted to the city street railroad commissioner and through him to the City Council a statement of renewals that it thought ought to be made with estimates of their cost. If he approved them, he asked the Council to approve. Mr. Davies thought that in all such cases the Council had required the renewal to be made and the cost to be charged to betterments and to the maintenance, renewal and depreciation reserve in proper proportions. These proportions were determined by consultation between the commissioner and the company or its engineers after the work was finished. Since the ordinance had been amended not merely renewals but ordinary maintenance charges were approved by the commissioner and the Council. The recollection of Mr. Davies was that the Council gave the commissioner authority to approve maintenance expenses up to the amount of $5,000 without going to the Council. Charges were made for depreciation when property had been worn out, abandoned, sold or gone out of use. The reproduction value of those items of property was charged against the maintenance, renewal and depreciation reserve and the property account on the books reduced by the amount of charges to reserve. The company was about to face the necessity of some charges due to the abandonment of its power equipment as the result of a contract made last year with the Cleveland Electric Illuminating Company for the purchase of power.

Mr. Crawford said that one of the questions which the city asked to be arbitrated was how the $800,000 value of these abandoned steam plants should be charged off. This was not a renewal or replacement. It was the scrapping of a plant. The city had not realized the necessity of putting the plants out of commission and had helped the company to make its contract.

Mr. Davies said that the power equipment did not stand on the books at $800,000 but at the value placed upon it by Judge Tayler. The company proposed to write off this equipment at its reproduction cost, less its scrap value, in accordance with Section 27 of the ordinance. The witness also expressed the opinion that to provide for the deficit now existing and for the needs of the immediate future the operating allowance per car mile should be increased 1 cent. If the company could operate on 11½ cents and run 28,000,000 or 29,000,000 car miles a year, the present deficit of $286,000 might be wiped out in about a year. If, however, it cost 12 cents to operate, as the indications were that it would, about two years would be required. The increase per car mile for the maintenance, renewal and depreciation account to take care of the deficit and care for the immediate future, in the opinion of Mr. Davies, should be 2 cents per car mile. As the deficit was $349,000, this increase would wipe out the deficit in a little more than half a year, exclusive of the value of the abandoned power plant.

Mr. Davies thought that the property of the company, barring the sudden depreciation of the power plants, was in fully as good condition, judged as a whole, as on March 1, 1910. He thought, however, that 5 cents per car mile was not sufficient to keep the property in good state of repair, even in the 70 per cent condition contemplated by the ordinance, and to provide also for the depreciation that was going on all the time.

Judge Killits asked if this had not been done in the last three years. The witness said that the company had nothing left to pay for depreciation. All of the money had been spent for maintaining and renewing the property. Thus no provision had been made for the depreciation of the property added since March 1, 1910, from the sale of bonds or capital stock and for that which would be added from now until the termination of the grant or any renewal of it. The ordinance provided that the company should make such extensions, additions and permanent improvements as the Council might order or approve and that the company might sell capital stock or bonds to get funds to provide for and make these extensions, betterments and permanent improvements. It was assumed, therefore, necessarily that the capital issued for that purpose would be exactly equal to the cost of the new property, but one section of the ordinance seemed to contemplate that that property, as well as the property that the company acquired on March 1, 1910, should be maintained in such a condition that it would be worth 70 per cent of its cost, and Mr.

Davies found no provision in the ordinance for taking care of the depreciation on that property down to the average condition in which the property had to be kept.

Mr. Baker said that the only provision on that subject was the reserved right of the municipality of recapture at 110, either during the continuance of the grant or at the end. Mr. Davies replied that that might be sufficient if the city exercised its option before the expiration of the present grant.

Mr. Duffy asked if the purchase of the property then would protect the 30 per cent. The witness said it would if the property were bought at the end of the present grant, but the purchaser then would be 30 per cent shy of his investment, having paid 100 per cent.

Mr. Baker said that the terms of the franchise included the accumulated surplus as a part of the property. After the first ten years of operation under the ordinance the company was permitted to put the highest rate of fare into effect and keep it there for fifteen years, and when the Chamber of Commerce committee asked Mr. Davies to work out his estimate of what the company would be able to make under these conditions, he showed that by increasing the number of fares 4 per cent per year compounded —8 per cent had been the history of the company's increase —with the gross earnings at 4.15 cents per fare, the maximum rate in the ordinance, and the operating and maintenance expenses, taxes and interest at 3.64 cents per fare, there would be a surplus of 0.51 cent on each fare, or at the end of the grant of twenty-five years, 1934, a surplus in money of $25,436,000.

Replying, Mr. Davies said that, assuming that extensions and betterments had been added that cost $1,000,000 a year and were capitalized at $1,000,000, and assuming that the company was permitted to maintain that property in such a condition that its value would be but 70 per cent of its cost, there was a depreciation unprovided for in the ordinance in round numbers of 30 per cent of the cost, which, on $1,000,000, would be $300,000, or if that should continue for ten years it would be $3,000,000. He did not remember whether the Chamber of Commerce committee gave him the basis on which to make the figures, or whether it asked him to assume a basis of his own and make the figures, but he stated after submitting the table mentioned by Mayor Baker that he did not feel like dignifying it by calling it even an estimate. He thought he spoke of it as rather a guess, and he did not think it was entitled to very much weight with the committee. He thought he pointed out that if Cleveland increased in population at the rate assumed in the table, and if the fares increased in the ratio of population, they would both be enormous in twenty-five years.

After cross-examination on the subject of the extent of the control permitted the city street railroad commissioner under the ordinance, Mr. Davies said he thought that every dollar that was expended for operating expenses was subject to the approval of the commissioner. Certainly, the company gave him the opportunity to have knowledge of it.

INSURANCE CARRIED

At the morning session on May 25 the examination of Mr. Davies was continued.

Mr. Davies said that the company was the first that had nearly all of its property insured by the factory mutual companies, and they took the property because the carhouses had been protected with automatic sprinklers and the car yards with monitor nozzle equipment. Part of the protective devices had been put in since the ordinance went into effect and had been authorized by the Council as betterments.

Neither the accident nor the insurance reserve funds were held in cash or were invested, but both had either been spent for betterments or used as working capital.

Amplifying his testimony of the previous day, Mr. Davies said he wanted to make it clear that the company had overexpended the maintenance, renewal and depreciation reserve in the past three years. There was what was called in the ordinance a deficit in the maintenance, renewal and depreciation reserve of substantially $350,000. That represented an amount that was spent for maintenance and renewal in excess of the 5 cents per car mile. The expenditures per car mile for maintenance and renewals in the past three years had amounted to 5.32 cents per car mile. That did not include the large depreciation on power plants which ought to be taken care of this year. That would raise the amount of expenditures or add to the maintenance expense a little more than 6 cents per car mile. The depreciation on the power plants would amount to 1 cent a car mile on the car miles of the past three years.

The insurance reserve ought to be sufficient to protect the company against loss or to reimburse it for any loss that might occur in a single fire, and that would be in the neighborhood of $250,000 or $300,000. With that reserve or a reserve a little larger than that, the company could, if it chose to do so, carry no insurance at all with insurance companies, but carry its own insurance.

The increase in the maintenance allowance ought to be continued until the retirement of the power plants was accomplished and possibly for a longer time than that, until the experience of the company in the matter of maintenance and renewal and depreciation should indicate that the amount of the new allowance was too large and might be safely reduced.

Mayor Baker asked various questions bearing on the maintenance, renewal and depreciation fund and the provision in the ordinance relating to a 70 per cent condition of the property. Mr. Davies testified that he understood that the property should be kept in a condition at least as good as 70 per cent, but that the city might ask for a reduction in the maintenance allowance if its condition exceeded 70 per cent. There were provisions in the ordinance by which the city might acquire the property at a fixed price. If the condition of the property was better than 70 per cent of its cost, the city for that fixed price would get a property whose physical value was nearer to the price the city would have to pay than if the condition of the property were but 60 per cent or even 70 per cent of its cost. It was not possible to keep any property at a 100 per cent condition, but there was a point below 100 per cent where the maximum use could be obtained.

In reply to a question by Mr. du Pont, Mr. Davies said that no interest was charged for the use of the amount in the maintenance fund for other general purposes of the company. He thought that a reserve for renewal or depreciation should not be kept in cash and that it would not be efficient management to have it in the bank even at 4 per cent interest.

Mr. Davies also said that there seemed to be a difference in the instructions of the classification of accounts between the account for insurance expense and the account for accident expense. In regard to insurance there was a provision that if the company carried any part of its own insurance or the whole it ought to provide for it by a reserve. In the instructions in regard to injuries and damage accounts there was a provision that, if the company desired, it might set up a reserve. If the company were operating under its own franchise and the city had no supervision, it would have been the desire of the company to set up such a reserve. Whether it could do so without conferring with the city might be a question, but as soon as the company came into possession of the property under the ordinance Mr. Dahl, city street railroad commissioner, expressed to the company a desire that it keep the accounts as they had been kept under Receiver Bicknell and that involved the retention of the accident reserve account.

A report of the continuation of the hearing will be published later.

Illinois Traction System's Freight House at Springfield, Ill.

The Terminal Facilities for the Electric Railway's Freight and Express Business at Springfield Have Been Developed from a Remodeled Store in the Business District to a Large Building Specially Remodeled and Equipped with Every Facility

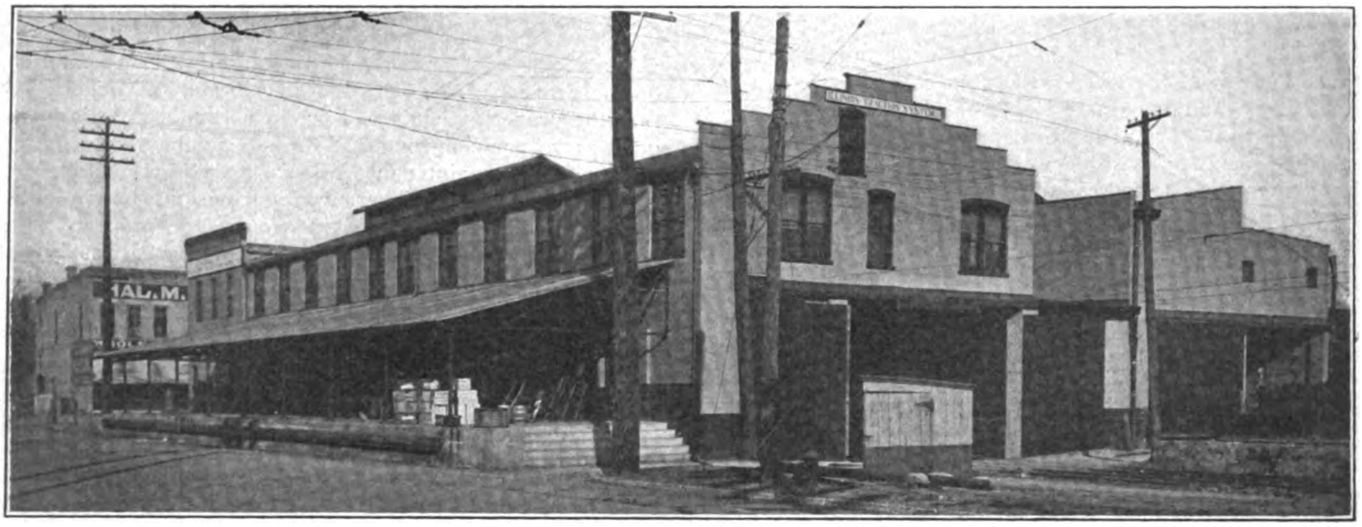
A positive sign of the healthy increase in traffic on electric railways is the continual demand for larger terminal facilities. This is especially applicable to the Illinois Traction System since it passed from the constructive stage to that of operation. Up to 1909 the energies of the management were largely directed to building new lines. Following that year a close study of the existing property was made with a view toward improvements providing greater economy in operation. New and heavier equipment has been purchased, sidings have been extended to accommodate longer trains, additional feeders and substations have been installed, and greatly increased track and freight-house capacity has been built at practically all the important stations.

The additions to terminal facilities were necessary particularly on account of the increase in freight and express traffic. In fact, the situation at each point limited the volume of business handled, and the only way to show a gain in the gross was to enlarge the freight houses and to install a greater house-track capacity.

The present Springfield terminal is located within three blocks of the heart of the wholesale and retail districts and may be approached by way of paved streets from any direction. This central location as well as the quick deliveries which it permits is largely responsible for the increase of traffic at this point. The first station in Springfield consisted of a remodeled storeroom in the business district. This was soon outgrown and a plot of ground 120 ft. x 158 ft. in size was leased at the corner of Eighth and Monroe Streets, the present terminal location. Here, too, a store building was remodeled for a passenger station, but there was still sufficient room on the property to provide a loading platform and a small freight house. As the latter class of traffic grew, additions were made to the platform area from time to time, and it finally became necessary to remodel a building which had been used as a running repair shop to obtain additional freight-house space.

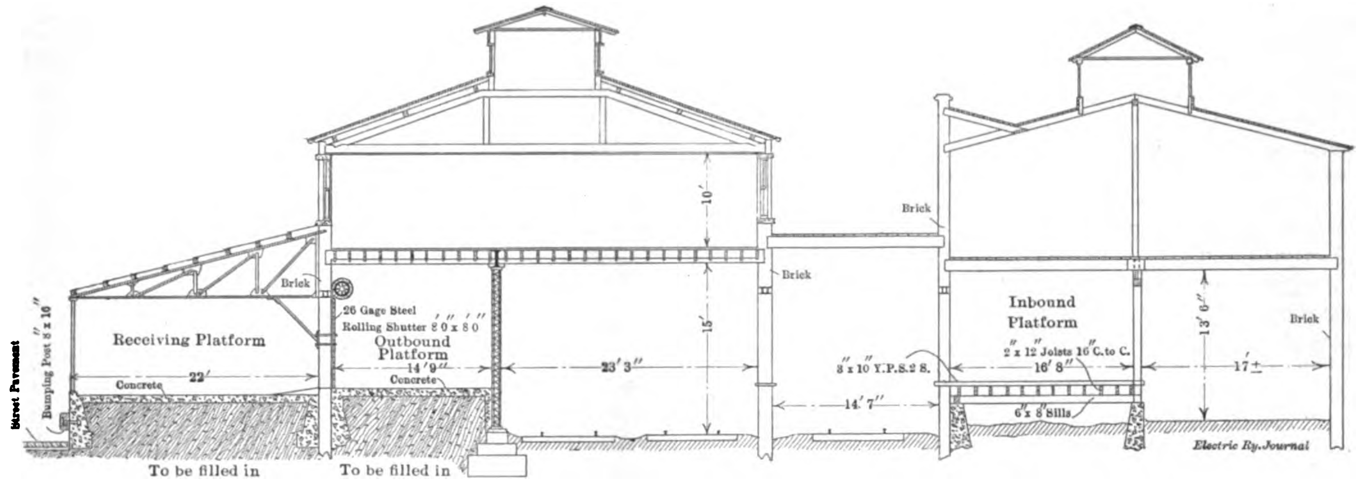
This arrangement served from 1905 to 1908, when it became evident that additional facilities were absolutely necessary if the company expected to handle the normal increase in traffic. The addition to the facilities which was made at that time more than quadrupled the original ground area and included a new passenger station and running repair shop with traffic facilities for both, as well as storage tracks for carload freight and held-over equipment. The new arrangement permitted the turning over of the old track and buildings which had been used for both passenger and freight traffic to the latter department for its sole use. It was evident at that time, however, that additional freight facilities would have to be acquired within a short time, and with this in view the traffic department kept on the lookout for a new location.

In 1911 information was received that the planing mill which occupied a large building across Ninth Street from the existing terminal property had outgrown its quarters and was considering moving. The location of this building as well as its arrangement made it very desirable for freight-house purposes. At about the close of that year a long-term lease was obtained upon the building together with a lot fronting on Monroe Street which provided an approach. The building was of brick construction, two stories in height and 90 ft. x 158 ft. in plan. After a careful survey of the property it was found that three tracks could be laid inside the building, which would provide space for eight cars, and with a small amount of switching it was possible to double this capacity.


Springfield Freight House—View Showing Entrance Doorways and Receiving Platform

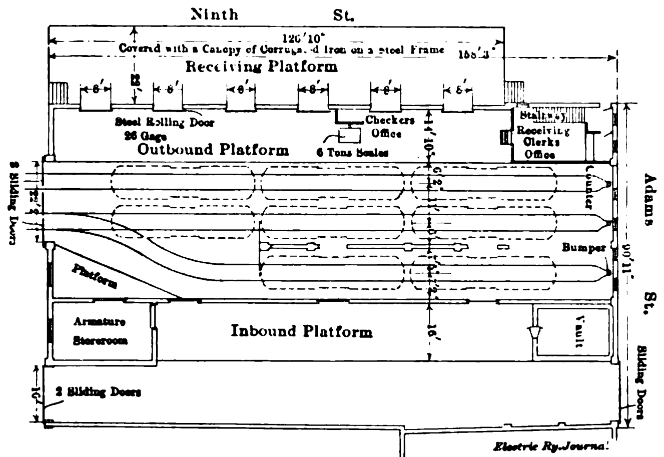
The work of remodeling the old buildings included the removal of cross partitions and rearranging the columns which supported the second floor. It was also necessary to brick up a number of windows, cut new openings for freight-receiving doors on Ninth Street and remove portions of the partitions between the different sections of the building. A plan and section of the remodeled building are shown in the illustrations.

The freight-receiving platform is located on the Ninth Street side. A permit has been obtained from the city which authorizes the construction of the receiving platform on the sidewalk area, thus allowing trucks to be unloaded from the street pavement. By providing a canopy over this platform it is protected from the weather and made available for temporary storage purposes. The receiving platform inside the building is provided with a small office for freight checkers and weighers, and a 6-ton platform scale is situated just outside so that the beam can be extended into the office. Six openings 8 ft. square and provided with rolling steel doors are so spaced as to offer as slight a hindrance to truckers in passing from the team side of the platform to the cars as possible. Three large sliding doors inclose the track entrance at night, offering protection to hold-over freight.


Street Pavement
Bumping Post 8" x 16"
Brick
26 Gage Steel Rolling Shutter 8' 0" x 8' 0"
Receiving Platform
Outbound Platform
22'
14' 9"
Concrete
Concrete
10'
15'
23' 3"
To be filled in
To be filled in
Brick
Brick
8" x 10" Y.P.S.2 S.
14' 7"
Inbound Platform
2" x 12" Joists 16" C. to C.
16' 8"
6" x 8" Sills
13' 6"
17' ±
Brick
Electric Ry. Journal

Springfield Freight House—Cross-Section Through Building, Showing Platforms and Tracks

As the inbound freight is of considerably smaller volume than the outbound, it was unnecessary to provide a platform area for the former equal to that required for the latter. Although this arrangement permits only two cars to unload directly on the inbound freight platforms, the cars are set so that the doors are exactly opposite and aprons may be used in trucking between cars on each of the three tracks. The inbound platform is of timber construction, 15 ft. wide by 108 ft. long. The building at one end of this platform is occupied by an armature storeroom, 29 x 16 ft. in size, which is utilized by the running repair department at this terminal. A space, 13 x 20 ft., at the opposite end of the platform is inclosed by a 15-in. solid concrete wall which extends from the ground level to the ceiling on the second floor. This serves as fireproof storage space for the records of the traffic, land and claim departments.


Ninth St.
120' 10"
Covered with a Canopy of Corrugated Iron on a Steel Frame
168' 3"
Receiving Platform
22'
8'
8'
8'
8'
8'
8'
Steel Rolling Door 26 Gage
Outbound Platform
Checkers Office
6 Tons Scales
14' 10"
Stairway
Receiving Clerks Office
3 Sliding Doors
22' 2"
Counter
Bumper
Platform
Armature Storeroom
Inbound Platform
16'
Vault
2 Sliding Doors
16'
Adams St.
90' 11"
Sliding Doors
Electric Ry. Journal

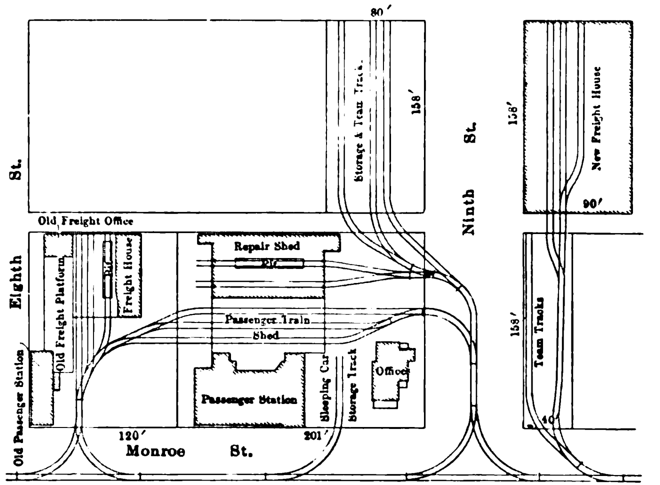
Springfield Freight House—Floor Plan of Building, Showing General Arrangement

A driveway, 16 ft. in width, with an entrance at both the front and rear of the building was provided adjoining the inbound platform. A sliding door at each end of this driveway permits this section of the building to be inclosed at night.

Access to the second floor, which has been divided into office space for the different operating department heads, is effected by way of a stairway at the corner of Adams and Ninth Streets. This same entrance also serves as a means of access to the local freight agent's office, which is situated at one end of the platform used for receiving inbound freight.

Seventeen office rooms are provided on the second floor over the Ninth Street section of the building and along the Adams Street front. Heretofore the operating officials of the interurban railway have been located in different buildings at the Springfield terminal, and some of them have had their offices in Decatur and Champaign, Ill. This new arrangement offers quarters for the whole operating staff at Springfield and will greatly facilitate intercourse between the different departments.

The plans and specifications for remodeling the building were prepared by the track and roadway department of the Illinois Traction System under the supervision of L. B. Martin, engineer maintenance of way, and the actual work of remodeling was done by the owner of the building, from whom the company has obtained a long-term lease. The whole improvement represents an expenditure of approximately $15,000, which is considerably under that which would have been required if it had been necessary to build a new building.


80'
Storage & Team Track
158'
Ninth St.
158'
New Freight House
90'
Eighth St.
Old Freight Office
Old Freight Platform
Freight House
Repair Shed
Passenger Train Shed
Old Passenger Station
Passenger Station
Sleeping Car
Storage Track
Office
158'
Team Tracks
40'
120'
201'
Monroe St.
Electric Ry. Journal

Springfield Freight House—Ground Plan of Terminal, Showing Location of Buildings

Discussion on Steam Railroad Electrification

The Annual Meeting of the American Institute of Electrical Engineers Held on May 20—Two Papers Were Read Dealing with Economies Effected by Electrification Under Conditions of Light Traffic

At the annual meeting of the society held on May 20 a paper entitled "Trunk Line Electrification" was read before the American Institute of Electrical Engineers by Charles P. Kahler. He outlined the steam railroad conditions in the West and gave an idea of some of the results which would occur with electric operation of the steam railroads. One important point brought out was the characteristic of the electric locomotive to operate on overload for short periods and thus be able to haul heavier freight trains over the undulating grades on most steam railroads than was possible with a steam locomotive. Data were given showing the distribution of steam railroad engine service and that it was possible to keep a steam locomotive in service only a small portion of its time. This was not the case with electric locomotives, which had no fire-boxes or boilers to be cleaned and otherwise cared for.

In an example taken, it was shown that only about half as many locomotives would be required to handle a given traffic by electric operation as by steam operation. The line was 467 miles in length and divided into three engine districts. The grades averaged 18 ft. to the mile. The electrical equipment was based upon the use of the 11,000-volt, fifteen-cycle, single-phase system. The equipment necessary with steam was 140 locomotives. With electricity it was sixty-four locomotives and fourteen motor cars. The cost of electrification was $9,972,000 exclusive of the credit for the steam equipment, which, at 70 per cent of new value, was credited at $2,012,000, making the net cost of the electrical equipment $7,960,000. Maintenance of equipment per annum was charged for steam operation at $1,025,879 and for electrical equipment at $619,041, and the total operating expenses showed a saving of $940,000 by the substitution of electricity.

While the financial showing made for electric operation was good, attention was called to the fact that the most important objection to the electrification of steam railroads was the heavy first cost. It was also shown that the purchase of power from central station power companies and co-operation with them in the matter of building high-tension transmission lines would considerably reduce the first cost of electrification.

PAPER BY MR. HOBART

H. M. Hobart, of the General Electric Company, also read a paper on 2400-volt railway electrification. It was largely a comparison of costs of steam and electric equipment for a hypothetical case of a mountain division 96 miles in length. The cost per 100 ton miles with steam was 18.1 cents and with electricity was 11.6 cents. Mr. Hobart also pointed out the decreasing tendency in such undertakings to consider an independent power plant necessary for an electrified division. The power requirements of a railway were such that energy could usually be purchased more cheaply than it could be generated. In consequence, railroad companies need concern themselves only with the rolling stock and the distribution system. The author also pointed out the relatively small amounts of power required in railway operation and illustrated this point by reference to the Butte, Anaconda & Pacific Railway, which was electrifying 90 miles of track with the 2400-volt system. The equipment comprised fifteen freight locomotives and two passenger locomotives, each locomotive weighing about 80 tons.

Although the undertaking involves the transportation annually of 5,000,000 tons of ore over a distance of some 26 miles, the energy consumption annually will be less than 20,000,000 kw-hr.

DISCUSSION

The discussion was opened by F. J. Sprague, who as chairman of the railway committee acted as chairman of the session. He called attention to the fact that although the authors of the papers had approached the problem of electrification from widely different standpoints, they had reached somewhat the same conclusion. He himself considered electrification under the fifteen-cycle, single-phase system and under conditions which had never been made commercial in this country somewhat doubtful in practice, as it was hardly likely that any commercial power station would supply fifteen-cycle current except through the introduction of frequency changers. This would place the proposed system on a parity with direct-current operation without its advantages. Mr. Sprague referred to a written communication regarding the possibilities of electrification on the Pacific Coast, citing a case in which it had been shown that a mountain division of a Western railroad could have been electrified with marked improvement to its service and a great promise of financial return.

A. H. Armstrong, General Electric Company, said that since the investments in railroads which were made at the present time were not based as much upon the traffic of to-day as upon the traffic which later would develop, so the electrification of steam railroads should be considered with a view to the traffic of five, ten or even fifty years from the present time. No system of electrification should be handicapped by reason of the meager tonnage existing, and it was also necessary to consider the possibility of commercializing various new devices which might make possible systems not hitherto commercially practicable. He then spoke of the work which was being done in the development of the mercury-arc rectifier, which had grown from a glass tube having a capacity of 10 kw or 15 kw into a steel device capable of handling 1000 kw or more. There was, in fact, no apparent maximum to the capacity of this type of apparatus. If the development of the rectifier was to influence electrification, the direct-current locomotive was pre-eminently the locomotive of the future. With a rectifier mounted on the locomotive there was provided a better, more reliable and more powerful machine than the equivalent equipped for straight single-phase operation. Rectifiers could, he said, be installed in substations, replacing the rotary converter. The question of location depended upon the volume of traffic, and he considered that the natural place for the rectifier was not on the locomotive using a single-phase trolley but in the substation, thus cheapening the latter and increasing its efficiency some 4 or 5 per cent. This arrangement would soon be used with a certain 2400-volt d.c. system. It was a grave question whether the single-phase trolley locomotive and rectifier could, on account of complication, telephone and telegraph disturbances and the like, compare in first cost of the complete system and in general reliability with the high-voltage d.c. system using a rectifier in the substation itself. When the 2400-volt electrification of the Butte, Anaconda & Pacific had been planned it had been considered desirable to see what could be done with still higher d.c. potentials, and 5000-volt d.c. apparatus had been designed, built and tested with gratifying results. In closing, Mr. Armstrong said that one of the locomotives for the above-mentioned line had been equipped with a 1000-kw rectifier as an experiment and that it had afforded a satisfactory showing.

The next speaker was F. E. Wynne, Westinghouse Electric & Manufacturing Company, who took exception to some of the details given in both of the papers, saying that the over-all figures given for efficiency between power house and line—namely, 89 per cent for general train service and 78 per cent for express train service—should be decreased from 7 to 10 per cent. He also said that a daily mileage of 44 for a Mallet locomotive was hardly high enough. His records, which were averaged over periods of more than one year, showed a minimum of 48 miles and a maximum of 75 miles, including one month out of service for general overhauling. He thought that the total number of electric locomotives specified for the 96-mile electrification was very high as it reduced the average mileage per locomotive to 75 or 80.

E. R. Hill, of Gibbs & Hill, expressed his gratification at the logical manner in which electrifications were being carried out. His firm, he said, had had occasion to figure on a number of mountain-grade electrifications, and in general the substitution of electricity had made a very satisfactory showing, not only through economical operation but also through increasing the speed and reliability of the service and thus improving the earning power of the property.

W. S. Murray, New Haven, said that it was necessary to place a territory upon a proper steam basis before the matter of its electrification should be taken up, as certain local conditions were often improperly handled by the steam roads when the question of electrification was brought up. It was possible, he said, that steam locomotives of the future might be of a totally different character and that oil burners and automatic stokers might make it difficult for electrical engineers to prove their case.

A. H. Babcock, Southern Pacific Railway, in a written communication, said that generalization with reference to trunk line electrification was extremely dangerous. On the Pacific Coast he had found that the saving due to electrification was by no means enormous and would not defray, except after the expiration of many years, the cost of the substitution. Power companies were by no means prepared to furnish electric current at competitive prices, and with the fuel oil on the Pacific Coast at the ordinary market rates of 70 to 80 cents a barrel an energy rate greater than 5 mills per kw-hr. was utterly prohibitive. Moreover, he said, the annual load factor, although given in one of the papers as 60 per cent as a minimum, seldom rose above 20 per cent as a matter of fact. As a rule, the total energy charge could be wiped out of the annual statement without making a material difference in the conclusions, so small a part did it play in the annual operating cost when the fixed charges and other elements of operating expense were taken properly into account. In conclusion, he said that since his experience has been confined exclusively to the Pacific Coast, he could not attempt to generalize without exposing himself to embarrassment.

F. W. Carter, London, in a written communication, called attention to the omission from the papers of the consideration of power used in accelerating after stops. He said also that insufficient regard had been given to the limitations which the traffic department might impose. The average weight of train had been given as 80 per cent of the maximum, but since very many light trains would certainly go forward at the instance of the traffic department without reference to the ultimate capacity of the locomotive, the number of freight trains in actual service at any time would be nearly as great with electric operation as with steam. He also took exception to the costs for maintenance of single-phase locomotives, saying that the single-phase electrical equipment had been found to cost approximately three times as much as for corresponding direct-current equipment.

A written discussion submitted by H. Y. Hall and G. W. Welch took up in detail the costs of installation, operation and maintenance given in both papers, based on Western conditions, finding in general that an insufficient allowance for first cost and maintenance had been made. In both papers a favorable showing for a very general case had been made, but if the same figures had been applied to any of the concrete cases known to the writers they would have resulted in disappointment to the investors. In addition to using unduly low costs for overhead construction and substation equipment and reducing electric operating costs correspondingly, the papers had considered steam locomotives only two-thirds as powerful as those now in regular service, and these comparatively small steam locomotives had been priced at approximately the same figure paid for the largest type ever built. The estimated steam operating costs were correspondingly high, and, in general, the costs of steam operation had been magnified while the costs of electric operation had been to some extent minimized.

ELECTION OF OFFICERS

Prior to the technical discussion the regular annual meeting of the Institute was held and the report of the election of Institute officers was made. C. O. Mailloux was reported by the tellers to have received the largest number of votes for that office and was, in consequence, declared elected as president of the society.

AMERICAN RAILWAY ENGINEERING COMMITTEE ON ELECTRICITY

The following members of the committee on electricity of the American Railway Engineering Association have been appointed to serve for the current year:

George W. Kittredge (chairman), chief engineer New York Central & Hudson River Railroad; J. B. Austin, Jr. (vice-chairman), superintendent Long Island Railroad; D. J. Brumley, engineer maintenance of way Illinois Central Railroad; R. D. Coombs, consulting engineer, New York; A. O. Cunningham, chief engineer Wabash Railroad; L. C. Fritch, chief engineer Chicago Great Western Railroad; George Gibbs, chief engineer electric traction Long Island Railroad, consulting electrical engineer Pennsylvania Railroad; G. A. Harwood, chief engineer electric zone improvements New York Central & Hudson River Railroad; E. B. Katté, chief engineer electric traction New York Central & Hudson River Railroad; C. E. Lindsay, division engineer New York Central & Hudson River Railroad; W. S. Murray, consulting engineer, New Haven, Conn.; A. F. Robinson, bridge engineer Atchison, Topeka & Santa Fé Railway System; Frank Rhea, commercial engineer General Electric Company; J. W. Reid, bridge engineer Chicago & Alton Railroad; J. R. Savage, chief engineer Long Island Ralroad; M. Schreiber, engineer maintenance of way Public Service Railway, Newark, N. J.; W. I. Trench, division engineer Baltimore & Ohio Railroad; H. U. Wallace, vice-president Northern Colorado Power Company, Boulder, Col.; A. G. Shaver, signal engineer Chicago, Rock Island & Pacific Railway; Walt Dennis, assistant engineer Chicago, Rock Island & Pacific Railway.

The following outline of the work of the committee for 1913 has been prepared:

1. Continue the consideration of the subject of clearances.
2. Report on the effect of electrolytic action on metallic structures and the best means of preventing it.
3. Continue the preparation of a standard specification for overhead transmission line crossings.
4. Continue the investigation on electrolysis and insulation.
5. Report on maintenance organization with relation to track structures.

The change of the motive power to electricity on the street railway lines in Queretaro, Mexico, will shortly be consummated, according to a statement given out by Manuel Rubio Arriaga, president of the street railway company in that city.

OPERATING COSTS OF SELF-PROPELLED CARS

At the fifth annual meeting of the International Railway Fuel Association held at the Hotel Sherman, Chicago, May 21 to 24 inclusive, S. T. Dodd and B. H. Arnold, engineering department General Electric Company, presented a paper on the development of self-propelled cars of the steam, compressed-air, storage battery and internal combustion types. The paper was largely historical in nature but contained also some new operating costs for the gas-electric cars of the General Electric Company, of which fifty are now in regular daily service. The authors said that these cars were being operated by former locomotive engineers, who had been instructed by an expert operator from the manufacturing company. They recommended daily inspection to see that no parts had become deranged and that all adjustments were correct. For any car, regardless of mileage, a more thorough inspection should be made at least every ten days, and where there is long mileage an inspection should be made at least every 2000 miles. A large return in insurance against failure would be obtained by keeping on hand $200 or $300 worth of small repair parts. The authors presented the accompanying Tables I and II, giving operating costs of the Frisco lines, and Table III, of the Dan Patch line. Earlier operating figures of the latter line were published in the Jan. 27, 1912, and Oct. 12, 1912, issues of this journal.

Table I is a consolidated statement, July 1, 1912, to Dec. 31, 1912, covering the direct cost of operation and repairs of fourteen cars operating under varying grade and climatic conditions.

TABLE I—FRISCO LINES—COST OF OPERATING GAS-ELECTRIC PASSENGER MOTOR CARS

Revenue motor car miles	251,627
Revenue trailer car miles	114,164
Total passenger car miles	365,791
Per cent of time trailers hauled	40.3
Gal. fuel (naphtha) used per motor car mile	0.721
Gal. fuel (naphtha) used per passenger car mile	0.496

	Total Cost of Six Months	Average Cost per Motor Train Mile
Wages of crews	$19,840.96	$0.0788
Fuel (naphtha)	11,857.68	0.0471
Lubrication (gas engine)	1,553.28	0.0062
Cleaning supplies and miscellaneous expenses	2,545.91	0.0101
Running and shop repairs	7,769.73	0.0309
	$43,567.56	$0.1731

The foregoing figures include extensive classified repairs given to two cars and all the running and shop repairs on the other cars.

Table II shows more detailed information on the performance of six of the foregoing cars. They were all on runs averaging 166 revenue miles daily; four hauled trailers regularly and each carried a full motor-car train crew.

TABLE II—FRISCO LINES—COST OF OPERATING GAS-ELECTRIC PASSENGER MOTOR CARS.

Revenue motor car miles	181,438
Revenue trailer car miles	127,605
Total passenger car miles	309,043
Per cent. of time trailers hauled	70.3
Average working weight of motor cars, tons	51.5
Average load of motor cars (estimated), tons	3.5
Average working weight of trailer cars, tons	23.5
Average load of trailer cars (estimated), tons	2.5
Gross weight motor trains, tons	73.3
Total gross ton miles	13,296,820
Gal. fuel used per motor trail mile	0.751
Gross ton miles per gal. fuel	97.6

	Total Cost for Eight Months	Average Cost per Motor Train Mile
Wages of crew	$14,417.09	$0.0794
Fuel (naphtha)	8,666.42	0.0477
Lubrication (gas engine)	1,356.49	0.0075
Cleaning, supplies and miscellaneous expenses	1,586.89	0.0088
Running repairs and labor	2,908.46	0.0160
Running repairs and material	1,242.28	0.0067
	$30,187.63	$0.1661

The actual revenue mileage only is shown, as no allowance is made for turning or other non-revenue mileage. The runs cover varying speeds and grades. The maximum grade, 2.3 per cent, occurs on the Bolivar-Chadwick run, where a trailer is hauled regularly. On this run there is one stretch of 2 per cent grade for a distance of 4 miles. The table is a consolidated statement for eight months from July 1, 1912, to Feb. 28, 1913, covering the direct cost (no classified repairs made during interval) of six cars, operating between Muskogee and Westville, Okla.; Lawton, Okla., and Quanah, Tex.; Sherman and Dallas, Tex.; Chadwick and Bolivar, Mo.; Kansas City and Clinton, Mo., and Clinton and Enid, Okla.

As an example of the performance on an interurban line with a very fast schedule, Table III was submitted. The trailers hauled consist of a mixture of passenger, freight and work cars. The cost of heating supplies and maintenance of equipment includes also the cost of these trailers. The longest maximum grade of 1.5 per cent is about 2 miles; there is one stretch where the grade averages 1.37 per cent for a distance in excess of 4 miles. In addition to the station stops, there are two compulsory stops at railroad crossings at grade and one drawbridge stop.

TABLE III—DAN PATCH LINE—MINNEAPOLIS, ST. PAUL, ROCHESTER & DUBUQUE ELECTRIC TRACTION COMPANY—COST OF OPERATING GAS-ELECTRIC MOTOR CARS FROM JAN. 1 TO AUG. 31, 1912.

Total motor car miles	216,498
Total trailer car miles	75,948
Total car miles	292,446
Per cent of time trailers hauled	35.5
Number of motor cars in service	8
Length of line, miles	37.34
Maximum grade, per cent	1.5
Schedule time for express trains	1 hr. 17 min.
Average distance between stops for express trains, miles	3.734
Schedule speed of express trains, m.p.h	29.1
Schedule time for local trains	1 hr. 35 min.
Average distance between flag stops for local trains, miles	1.067
Schedule speed of local trains, m.p.h	23.6
Gal. fuel used per motor train mile	0.758
Gal. fuel used per car mile	0.527

	Total Cost for One Year	Average Cost per Motor Train Mile	Average Cost per Car Mile
Wages of crew	$12,056.95	$0.0557	$0.0412
Fuel (naphtha)	17,622.26	0.0814	0.0603
Lubrication (gas engine)	1,141.56	0.0052	0.0039
Journal oil	77.77	0.0004	0.0003
Supplies and car heating	1,389.03	0.0064	0.0047
Maintenance of electrical equipment	1,949.81	0.0090	0.0067
Maintenance of cars and trucks	1,394.56	0.0065	0.0047
Shop expense of heating	3,507.77	0.0162	0.0120
	$39,139.71	$0.1808	$0.1338

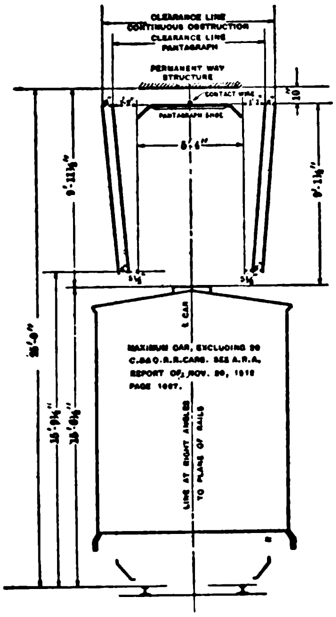
NATIONAL COMMITTEE ON ELECTROLYSIS

The joint national committee on electrolysis will meet for the first time at the headquarters of the American Institute of Electrical Engineers in the Engineering Societies Building, New York, on May 27, at 3 p. m. The committee will consider the subject of electrolysis and if possible agree upon some basic principles or method of procedure to be followed in the case of electrolytic dispute. The American Electric Railway Association, the American Railway Engineering Association, the National Electric Light Association, the American Telephone & Telegraph Company and the American Institute of Electrical Engineers have each appointed three representatives, and it is expected that the representatives of the American Water Works Association, the Natural Gas Association of America and the American Gas Institute will be announced shortly.

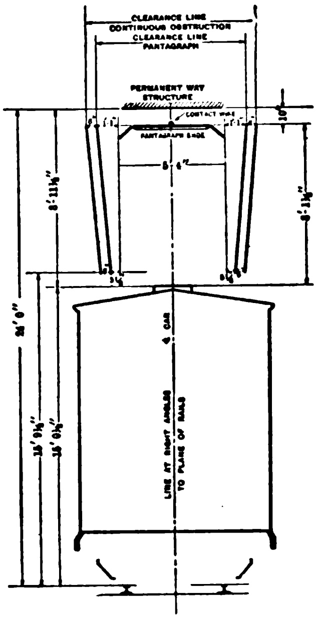
It is the purpose to organize the committee at the first meeting and to outline some definite plan of action. The delegates appointed by each of the national bodies invited to participate in the conference are as follows: American Electric Railway Association—R. P. Stevens, Lehigh Valley Transit Company, Allentown, Pa.; Prof. A. S. Richey, Worcester Polytechnic Institute, Worcester, Mass.; Calvert Townley, Westinghouse Electric & Manufacturing Company, New York. American Railway Engineering Association—E. B. Katté, New York Central & Hudson River Railroad Company, New York; D. J. Brumley, Illinois Central Railroad, Chicago, Ill.; W. I. Trench, Baltimore & Ohio Railroad, Baltimore, Md. National Electric Light Association—Philip Torchio, New York Edison Company; L. L. Elden, Edison Electric Illuminating Company, Boston; D. W. Roper, Commonwealth Edison Company, Chicago, Ill. American Telephone & Telegraph Company—H. S. Warren, American Telephone & Telegraph Company, New York; F. L. Rhodes, American Telephone & Telegraph Company, New York. American Institute of Electrical Engineers—B. J. Arnold, Chicago, Ill.; F. N. Waterman, New York; Paul Winsor, Boston, Mass.

THIRD-RAIL AND OVERHEAD CLEARANCES

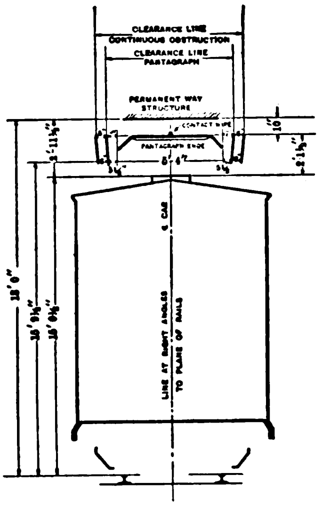
At a meeting on May 21 of the American Railway Association a report was received from the committee on electrical working. This committee consists of George Gibbs (chairman), chief engineer of electric traction Long Island Railroad; J. D. Isaacs, consulting engineer Southern Pacific Company; L. C. Fritch, chief engineer Chicago Great Western Railroad; J. H. Davis, electrical engineer Baltimore & Ohio Railroad; E. B. Katté, chief engineer electric traction New York Central & Hudson River Railroad; A. S. Baldwin, chief engineer Illinois Central Railroad, and E. H. McHenry, formerly vice-president New York, New Haven & Hartford Railroad. The report says:


CLEARANCE LINE
CONTINUOUS OBSTRUCTION
CLEARANCE LINE
PANTAGRAPH
PERMANENT WAY
STRUCTURE
CONTACT WIRE
PANTAGRAPH SHOE
8' 4"
10"
℄ CAR
MAXIMUM CAR, EXCLUDING 20 C.B.&Q.R.R.CARS. SEE A.R.A. REPORT OF NOV. 20, 1912 PAGE 1007.
LINE AT RIGHT ANGLES TO PLANE OF RAILS

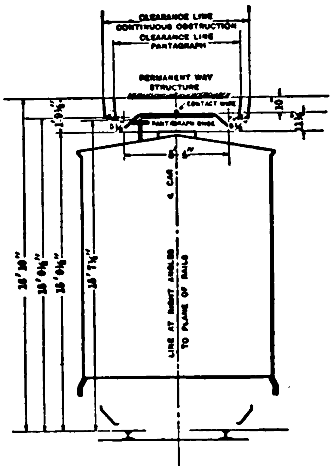
Case I
Clearance for Man with Lantern


CLEARANCE LINE
CONTINUOUS OBSTRUCTION
CLEARANCE LINE
PANTAGRAPH
PERMANENT WAY
STRUCTURE
CONTACT WIRE
PANTAGRAPH SHOE
8' 4"
10"
℄ CAR
LINE AT RIGHT ANGLES TO PLANE OF RAILS

Case II
Clearance for Man without Lantern


CLEARANCE LINE
CONTINUOUS OBSTRUCTION
CLEARANCE LINE
PANTAGRAPH
PERMANENT WAY
STRUCTURE
CONTACT WIRE
PANTAGRAPH SHOE
8' 4"
10"
℄ CAR
LINE AT RIGHT ANGLES TO PLANE OF RAILS

Case III
Normal Minimum Clearance —No Trainman


CLEARANCE LINE
CONTINUOUS OBSTRUCTION
CLEARANCE LINE
PANTAGRAPH
PERMANENT WAY
STRUCTURE
CONTACT WIRE
PANTAGRAPH SHOE
8' 4"
10"
℄ CAR
LINE AT RIGHT ANGLES TO PLANE OF RAILS

Case IV
Special Minimum Clearance —No Trainman

THIRD-RAIL WORKING CONDUCTOR CLEARANCES

"Your committee has no changes to suggest in the standard limiting clearance lines for third-rail working conductors which have been adopted by the association, but proposes, after conference and agreement with the American Railway Engineering Association and the American Electric Railway Engineering Association's committee, to submit at a future meeting of this association a recommendation for the prolongation of certain of the clearance lines within the space between their termination and the nearest running rail.

"In advance, however, of a definite recommendation, your committee suggests that the equipment clearance lines, BE, CE, DE, EE, FE, terminating at a point 15 in. from the track gage line, be continued horizontally to a point within 6 in. of the track gage line and 2½ in. above the top of track rail. This prolongation is intended to prevent the extreme encroachment of rolling equipment upon the space outside of and near the track, and which on some roads is required for devices attached to the permanent way. Your committee's attention has been called to the fact that the meaning of the notation on the standard clearance diagram of the association which reads, 'These lines may be located to fit special conditions, as they do not affect clearances of third-rail above these points;' is not entirely clear inasmuch as the 'points' are not indicated. The reference is intended to apply to the points AS and AE, 10⅞ in. above the track. As a matter of fact, however, the location of these lines above AS and AE has no bearing upon third-rail structure clearances but was incorporated in the diagram as information regarding the prevailing practice in the construction of certain rolling equipment and bridge gusset clearances above the position of third-rail structures.

CLEARANCES FOR OVERHEAD WORKING CONDUCTORS

"In its report of Oct. 19, 1908, the committee presented preliminary data for certain clearances required for the installation of overhead electrical working conductors but stated that the figures were based upon limited experimental data and were given for general information only and should not be considered final. Traction systems using overhead contact wires are now being introduced quite generally, and suitable standards for clearances for these systems are of growing importance, both from the standpoint of interchangeability in the essentials of such traction systems and as bearing upon the clearances for rolling stock and permanent way.

"Your committee, therefore, proposes taking up the various technical questions involved with the electrical working committees of the American Railway Engineering Association and the American Electric Railway Engineering Association, with the view of presenting at a later date to this association a full report with recommendations covering the essential clearance requirements for overhead electrical conductors. In advance, however, of the final report, your committee has thought it advisable to give herein its preliminary conclusions, from present information, of the limiting conditions to be met in operation with the existing rolling stock dimensions and locations of overhead permanent way obstructions. This information will, it is hoped, prevent further encroachment upon the space required for the installation of overhead conductors by the building of cars of a height exceeding the recommended standard of the committee on maintenance.

"Conditions to Be Met.—In the overhead trolley-wire electric systems current is conveyed to the trains by the contact of a collector (pantograph) with an electrically charged wire stretched over the center line of the track and maintained, by suitable supports, at the proper height. The limiting conditions which fix the location of the contact wire (or overhead working conductor) are, first, the safe clearance over rolling equipment and, second, the required space for insulation and supports under fixed structures, such as bridges.

"Rolling Equipment Heights.—For the purpose of fixing car clearances, the replies to the American Railway Association Circular No. 1022 accompanying the report of the committee on maintenance, dated Oct. 21, 1912, were used. The maximum freight car shown (of which there are only ten in use) has a height of 15 ft. 7¼ in. from rail to top of running board. Another lot of ten is given with a height of 15 ft. 4⅜ in. Both of these lots are owned by the Chicago, Burlington & Quincy Railroad Company and neither can pass generally over the railways of the country, because of limiting tunnel and bridge structures. Aside from these twenty cars, none is listed in the tables which exceeds a height of 15 ft. ½ in. to top of running board, and the committee on maintenance has recommended that in future the height of running board on a standard car shall not exceed 13 ft. 6 in. Your committee on electrical working believes, therefore, that 15 ft. ½ in. may safely be considered as the maximum equipment height, present or future, which must be provided for in fixing the limitations for the location of overhead contact wires.

"In the diagram presented with this report four limiting service conditions are shown as follows:

Case 1.—Clearance Required for Trainman with Lantern

	Feet	Inches
Distance between wire and structure	0	10
Reach of 6-ft trainman	7	8
Lantern	1	0
Clearance	0	5½
Total clearance above car	9	11½
Height of car	15	0½
Height of permanent way structure	25	0

"To meet the condition of maximum clearance requirement in Case 1, where men give signals from the top of cars, a distance of 9 ft. 11½ in. must be allowed from the car to the overhead structure, or clearance of 25 ft. between top of track rails and permanent way structures, such as bridges and viaducts over the track.

Case 2.—Clearance Required for Trainman Without Lantern

	Feet	Inches
Distance between wire and structure	0	10
Reach of 6-ft. trainman	7	8
Clearance	0	5½
Total clearance above car	8	11½
Height of car	15	0½
Height of permanent way structure	24	0

"Case 2 is only permissible where men pass over or ride on cars solely for the purpose of setting brakes and are prohibited from giving signals from the top of cars, and to meet this condition a distance of 8 ft. 11½ in. must be allowed from the car to the overhead structure, or a structure clearance of 24 ft.

Case 3.—Normal Minimum Clearance Without Trainman on Cars

	Feet	Inches
Distance between wire and structure	0	10
Desirable clearance between rolling stock and wire	2	1½
Total clearance above car	2	11½
Height of car	15	0½
Height of permanent way structure	18	0

"Case 3 shows 2 ft. 11½ in. as the minimum desirable clearance for normal construction, where men are excluded from the top of cars.

Case 4.—Special Minimum Clearance Requirements

	Feet	Inches
Distance between wire and structure	0	10
Distance between rolling stock and wire	0	11½
Total clearance above car	1	9½
Height of car	15	0½
Height of permanent way structure	16	10

"Case 4 is given as representing the minimum clearance which should be used where joint steam and electric operation is involved, and requires a distance of 1 ft. 9½ in. from car to overhead structure and a structure clearance of 16 ft. 10 in. from the rail. If the railway is operated by electric power only and steam locomotives are excluded, the above clearances may be somewhat reduced, allowing the electrical conductor to be installed under structures having a height of 16 ft. 6 in. above top of rail.

"Side Clearances.—The diagram indicates also the limitations for continuous and non-continuous side structures, which should be adhered to in order to provide clearance for the pantograph contact device on the car or locomotive.

"Inclines.—In places where it is necessary to change the normal height of the contact wire (to clear overhead obstructions) the maximum rate of incline in the wire approaching and leaving low points should be: (a) For train speeds lower than 40 m.p.h., 2 ft. in 100 ft.; (b) for train speeds above 40 m.p.h., 1 ft. in 100 ft. Proper transition curves should be provided at all vertical intersections in the overhead conductor."

NOTES TO DIAGRAM

The following notes were appended to the diagram:

"Momentary obstructions such as signal blades may approach pantograph clearance line.

"Sway of pantograph based on 1-in. difference in height of car springs, ½ in. difference in elevation of track rail and sway of 6 in. either side at 22 ft. above top of rail for pantograph itself.

"These diagrams show minimum clearances; additional clearances will be required to provide for special features of design, sag between points of support as affected by length of span and temperature changes, and also for steady strains, pull-offs, etc., if any.

"All heights to be measured at right angles to plane of rails at center line of track."

CONSULTING ENGINEERS DISCUSS RAILWAY VALUATION

The forthcoming valuation of the railway properties under the jurisdiction of the Interstate Commerce Commission was discussed at an informal dinner of the American Institute of Consulting Engineers held on Thursday evening, May 22, at the Engineers' Club, New York. Frank J. Sprague, vice-president, was chairman in the absence of President Noble.

Mr. Sprague brought up for discussion the resolutions which the Institute had forwarded to the Interstate Commerce Commission calling attention to the great importance of the proposed valuation and the consequent need for an advisory board of engineers qualified in all the various phases of railroad inception, financing, construction and operation. The reply made to these resolutions by the chairman of the Interstate Commerce Commission stated that the personnel of an advisory board would be soon announced and that all other men to be employed in the division of valuations would be selected through the medium of the civil service as the work developed.

W. J. Wilgus said the work involved the valuation of a quarter million miles of road capitalized at eighteen to twenty billions of dollars and serving one hundred million people. The investors and public should feel that the results of this gigantic task would be absolutely fair. Some people believed that ultimately the valuation would be used as a basis for the government ownership of railways. A railway was a living thing, not an aggregation of inert objects. A reasonable valuation could be made only by visualizing the exact progress which a railway passed through from its birth to its self-supporting stage. A mere inventory would not do this, nor was it just to deny railroad investors the same rights as investors in other fields. The overhead expenses were the very things that gave life to the enterprise.

F. A. Molitor estimated that it would cost about $50 per mile to make a comprehensive valuation, or a total of $12,000,000 for all the track under the jurisdiction of the Interstate Commerce Commission. As the commission had estimated the cost to be $6,000,000 to the government alone, the remainder would have to be borne by the railroad companies.

In the past railway valuations had been made by individual states to control issues of securities and fix taxes, but the purpose of the national act seemed primarily the regulation of rates. The engineer and not the lawyer or statesman was best fitted for this work. Furthermore, the valuation should not be carried on by engineers who have had less experience than the engineers who were in charge of the railroads.

Jean de Pulligny, chief engineer of bridges and roads and director of the French government engineering mission to the United States, described the relations between the railroads and the investors in France. Accurate records of railway costs had been kept for the past sixty years, and even in the case of the privately owned roads the government guaranteed a fixed interest to the investors. The question of allowance for land increment did not come up as the book-cost system was used in making this continuous valuation.

Mr. Wilgus pointed out that the book-cost method was impracticable in the United States because of the absence of records. Hence Americans were obliged to consider the reproduction costs in making a valuation. Mr. Sprague added that the state recognized increment value by its method of taxation.

P. W. Henry understood that the Eastern, Western and Southern railroads were each forming a group which would engage engineers to advise them in connection with the coming valuation.

Charles Sooysmith said that anything the consulting engineers did must be from the standpoint of the interest of the public. He favored Mr. Sprague's idea of giving greater publicity to the Institute's attitude on this project and he also thought it would be well to communicate with boards of trade, which in turn could influence their Congressional representatives.

Dr. A. C. Humphreys, president Stevens Institute, had found the ignorance of officials concerned with valuation cases to be simply paralyzing. The engineers of such commissions appeared to be the only men who had any idea of what valuations meant. He said that no deduction ought to be made for depreciation because the money set aside under that account really was used to cover the expense of keeping the equipment in its original condition of efficiency.

C. O. Mailloux said that there was too much engineering by economists, and that it was the patriotic duty of the engineers to see that the railroad companies received a fair deal.

C. R. Ingersoll, formerly chief engineer New York, New Haven & Hartford Railroad, said that he had visited Alaska last year to report to the government on the possibilities of railroad construction in that territory. He had found that if money had to be raised at the usual rates obtainable by private investors the interest would be greater than the earnings available for the fixed charges, but if the government raised the money, say by issuing 3 per cent bonds, construction and operation would be feasible. This experience impressed him with the idea that the United States was very close to government ownership.

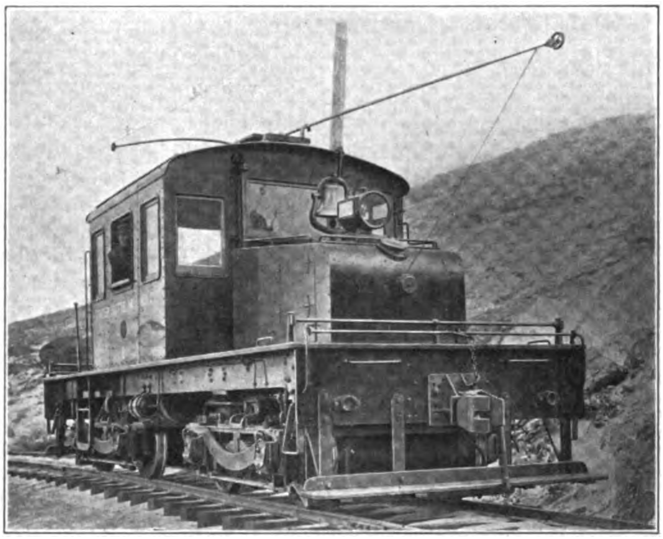
Mr. Sprague said that probably the greatest influence leading toward possible government ownership had been the admirable capacity shown by the government officers in their work of construction and sanitation on the Panama Canal.

Gustave Lindenthal, former bridge commissioner of New York City and member of the engineering board for the Pennsylvania Railroad New York Terminal, believed that the underlying sentiment of the public, although expressed but vaguely, was that capital invested in a given enterprise should not receive a rate of return for ever and ever. The recent rapid transit contracts of the city of New York with their amortization and recapture clauses meant that eventually all the capital would be returned to its owners, who would then have to seek other fields of investment. He described how the railroads of Germany had been acquired by the various governments primarily for military reasons. The 3½ per cent bonds with which they had been purchased had been refunded long ago. To-day the railroads of Germany paid 35 per cent of the national taxes out of their profits.

Following further discussion Vice-president Sprague continued Messrs. Wilgus, Molitor and Sooysmith as a committee to keep track of the developments in the valuation undertaking. The meeting then adjourned.

A 40-TON ELECTRIC LOCOMOTIVE

Within the past few years the application of electric locomotives to many phases of industrial service has become very extensive. One of the uses to which these locomotives have been put is for switching cars in a manufacturer's private yard, thus eliminating the switching charge made by steam railroads and also doing away with the fire hazard to the buildings and material in the vicinity. Locomotives for this service are economical power consumers in view of the fact that slow-speed motors are used which do not make excessive demands on the power house. Often no generating apparatus in addition to that already installed is necessary.



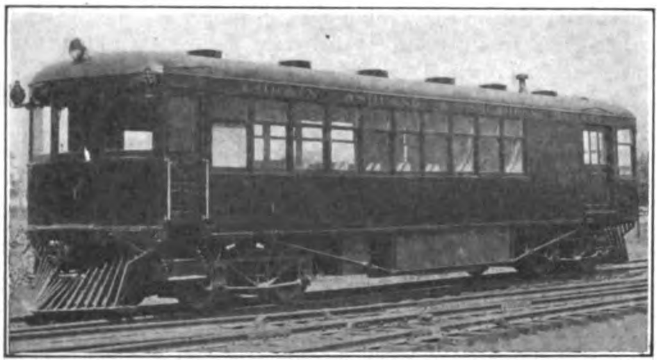
Electric Locomotive for Industrial Service

The Timber Butte Milling Company, Butte, Mont., has recently put into service a 40-ton Baldwin-Westinghouse electric locomotive of this kind. This locomotive is being used for hauling materials to the concentrator site, and as soon as the concentrator is in producing operation, the locomotive will haul the concentrates to points where switching connections have been established with the steam railroads entering Butte.

The electrical equipment consists of four 90-hp, 500-volt, commutating-pole motors known as the 301-D-2 type. The frame of this motor is a one-piece steel casting and the weight of the motor on the axle is carried almost entirely by a solid bracket extending over the axle. The frame is also provided with safety suspension lugs so that should the main suspension lug break the motor would drop only a few inches onto the truck suspension bar. Type HL unit-switch control is used.

STORAGE BATTERY CAR PROGRESS

The Federal Storage Battery Car Company is completing at its works at Silver Lake, N. J., several new types of storage battery cars. Three of these are for the La Jolla line of the Los Angeles & San Diego Beach Railway. These cars are 40 ft. long over all, 29 ft. 6 in. over the corner posts, and owing to the extraordinary width of 10 ft. 4 in. every one of the twenty-four cross-seats is wide enough for three passengers. The motorman's cabs, in diagonally opposite corners, are separated by a bulkhead and door from the passenger compartment. The operating equipment consists of 202 traction cells, ten lighting and control cells, four 200-volt, 75-amp Diehl motors operated at 700 r.p.m., multiple-unit control and Westinghouse straight and automatic air brakes. The trucks are of M.C.B. pattern, and M.C.B. couplers are used.



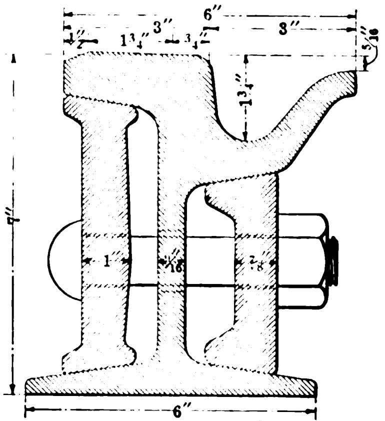
Combination Passenger and Baggage Car for Storage Battery Operation

A significant order is that for a combination passenger and baggage car from the St. Joseph Valley Traction Company, Elkhart, Ind., as this company's earlier orders were for gasoline cars. The battery car is 52 ft. over all, 9 ft. 4 in. wide, and is mounted on two M.C.B. trucks of 6-ft. wheelbase. The main and smoking compartments have plush-covered reversible seats while the baggage compartment has folding benches. The electrical equipment comprises 225 A-10-H Edison cells for traction, five like cells for lighting, four motors of the type and capacity used on the La Jolla cars, Westinghouse air brakes and series-parallel control. An earlier car of this type, furnished with 220 A-8-H cells for traction and seven like cells for lighting, has already been shipped to the Lorain, Ashland & Southern Railway for service between Lorain and Ashland, Ohio, the interests controlling which road also formerly used gasoline cars. This car is shown in an accompanying illustration. A third combination car, fitted with 225 A-8-H and five A-8-H traction and lighting cells respectively, is nearing completion.

The improvements which this company has introduced in truck and car-body construction are considered directly responsible for an order from the Panama Tramways Company for fifteen cars to be used with the overhead trolley. Among the notable features of these cars are the use of a Continental type truck of 7-ft. 6-in. wheelbase with the Beach independent wheel device combined with steel-bottom framing; carbolineum-treated long-leaf yellow pine upper framing, cedar sheathing and mahogany trim because of the tropical climate, and operation as prepayment cars under license of the Pay-as-you-enter Car Company. The cars are 20 ft. 6 in. long over the posts, 30 ft. 2 in. long over all and 8 ft. wide over all. The single-arch roof used is fitted with four ventilators furnished by the Railway Utilities Company. The car seats thirty-two in fourteen cross seats and four corner seats. The cross seats are 33 in. wide, leaving a 22-in. aisle between them. The electrical equipment per car comprises four GE-1022 motors and two KE-12 controllers.

NEW GROOVED-RAIL SECTION FOR PACIFIC ELECTRIC

To meet conditions growing out of the movement of M.C.B. standard equipment over tracks in paved streets, the Pennsylvania Steel Company and the Lorain Steel Company have designed a new 127-lb., 7-in. grooved-rail section for use on the lines of the Pacific Electric Railway, Los Angeles, Cal. A 7-in. depth of rail either for girder-grooved or T-rail in paved streets is standard on this company's lines, and the 116-lb., 7-in. grooved girder rail formerly rolled by these companies would cause the car to ride on the wheel flanges, as the depth and width of the groove were only 1½ in. and 2⅝ in. respectively. This would result in numerous broken flanges and badly worn rails. To overcome these objections in the new section the groove was made ¼ in. deeper and the flare of the lip forming the groove increased ⅜ in. in width.



New Grooved Rail for Pacific Electric Railway, Los Angeles

There was also a demand for a 7-in. section which would give additional girder-carrying capacity. To meet this requirement, the new section was reinforced somewhat similar to a girder beam. The overall width of the head and groove was made ⅜ in. wider than the Pennsylvania Steel Company's standard 7-in. girder-grooved section No. 292, the web was increased 1/16 in. in thickness and the base was made ½ in. wider than the standard section. The points of applying the additional metal tend to stiffen the section both laterally and vertically. To adopt a deeper or 9-in. section to meet these special requirements in paved streets would have necessitated a change in the company's paving specifications which was undesirable. It would also have made connection to existing track more difficult than is the case at present.

BRACKET FOR FIRE EXTINGUISHER.

The Pyrene fire extinguisher is well known for its small size and consequent ease in handling. A further mechanical improvement has now been made by designing for it a bracket which will hold the extinguisher more conveniently than has been the case heretofore. The new bracket, which has been recently placed on the market by the Pyrene Manufacturing Company, New York, N. Y., is shown in the accompanying illustration. This bracket is 14 in. long and weighs only 11 oz. It has a bearing surface of 1½ in. x 12 in., so that it can be securely attached to the wall of a building, the side of a car or other place with minimum disturbance of the woodwork or other permanent fittings. This bracket is made of three strongly constructed parts, which hold the extinguisher firmly and keep the handle securely locked. The bracket is furnished in black, blue and red enamel, galvanized steel, nickeled brass or other finishes to harmonize with car or building interiors, switchboards, etc., and thus produces an exceptionally neat and even ornamental appearance.

Bracket

News of Electric Railways

Terms of Settlement of Cincinnati Strike

Officers of the Cincinnati (Ohio) Traction Company and representatives of the employees of the company reached an agreement on the evening of May 19, 1913, under which service on the road was resumed at 4:40 o'clock the following morning. On the understanding that the men would concede the open shop principle, the company agreed to recognize the union with which the men had recently allied themselves. In doing this each yielded a point which had been considered vital since the men left their cars eight days before. The terms of the settlement follow:

"1. That all said employees in the service of the company on the morning of May 9, 1913, shall return to their work at their usual reporting time and place Tuesday, May 20, 1913, or within a reasonable time not to exceed twenty-four hours thereafter.

"2. The company shall employ and discipline or discharge for cause such men as it sees fit, but it shall not now nor in the future discriminate for or against those who are members of the union, nor shall union men discriminate against non-union men, which the federation understands to be the principle of the open shop.

"3. That hereafter, so long as there exists the organization of the employees under this agreement, such organization shall at all times keep on file with the secretary of the company a written statement naming the accredited representatives of such organization, which shall be conclusively presumed to be authoritative and final until superseded from time to time by an amended statement furnished by said organization, which shall then be of like force and effect. Any employee claiming to be a member of the organization shall have the right at all times to submit his grievance through said representatives, who shall be received by the proper officials of the company for the purpose stated. All employees shall retain their right personally or by representatives to present to and discuss with the proper officials of the company such grievances as they may have.

"4. That Walter A. Draper shall act as arbitrator for the company and John P. Frey for the employees, and that all the following questions be promptly submitted to arbitration:

"a. What shall be the daily hours of labor for motormen and conductors. Among other things due consideration shall be given by the arbitrators to the fact that the company's schedules are more or less determined by the city of Cincinnati.

"b. What pay, if any, shall be allowed extra men for time lost on the show-up.

"c. What the wages to be paid motormen and conductors shall be, including overtime.

"d. Whether the men discharged since March 15, 1913, shall be reinstated, each man's case to be determined on its merits.

"e. What shall be the duration of this contract.

"5. To prevent the possibility of strikes, grievances complained of shall be formally submitted to the company by the union, then discussed by the accredited representatives of both the company and the union, and if they fail to reach an agreement, then the grievances shall immediately be submitted to arbitration by a board of arbitrators composed of three men, one of whom shall be selected by the company, one by the union (both to be named within ten days of the failure of the first-named representatives to agree), and the third by these two. If the two arbitrators selected by the respective parties fail to agree upon a third arbitrator within five days of the time of their selection, then the State Board of Arbitration and Conciliation shall select the third. The decision of any two of these arbitrators shall be final and binding upon both parties.

"6. It is understood that if this offer is accepted the two arbitrators named shall meet at 9 o'clock a. m. May 20; that these two arbitrators shall immediately proceed to select a third, and if they fail to agree upon a third arbitrator by 6 o'clock p. m. May 24, 1913, the State Board of Arbitration and Conciliation of the State of Ohio shall name the third arbitrator.

"7. The three arbitrators so chosen, who shall have full authority to decide what the conditions shall be on each item and part thereof herein submitted, shall immediately proceed to fix the time and place of future meetings, and continue their work until all matters submitted to them are decided, but there shall be no unnecessary delay, and the finding of any two of said arbitrators shall be final and binding upon all parties as to each proposition.

"8. Any matters not included in those set forth herein for consideration by the arbitrators that may be desired to be presented for arbitration by either side may be so considered by the arbitrators upon unanimous consent of the members of the board of arbitration.

"9. The arbitrators in considering the matters to be arbitrated shall have in mind the establishment and maintenance of such working conditions between the company and the employees as will insure harmony and successful working operation."

W. Kesley Schoepf, president of the company, concluded a statement which he issued as follows:

"It will be the intention of the company to meet the requirements of the city and its suburbs as rapidly as possible. We are confident that the men will work harmoniously together and that with the resumption of operation of the cars the conditions existing during the last week or more will be entirely forgotten. The officials of the company will use the utmost broad-mindedness in overcoming such difficulties as may temporarily arise, and I know that our employees are such as will readily adjust themselves to the circumstances in which they may be placed."

Considerable rioting marked the attempt to operate cars on May 17. One car was wrecked in front of the new Union Central Life building by bags of cement, stones and bricks thrown from the upper floors of that structure by men who sympathized with the strikers. The car contained only the regular crew of two and three guards. It became stalled in front of the building and had to be abandoned.

Mayor Hunt instructed City Solicitor Bettman to apply to the courts for relief and accordingly a suit asking for a receiver for the Cincinnati Street Railway and the Cincinnati Traction Company was filed in the Common Pleas Court late on the evening of May 17. Mr. Bettman urged that the situation was so serious that a receiver should be named to operate the road and give the needed service. On the other hand, attorneys for the companies stated that a receiver could do no more than the management and that the situation was not of so serious a nature as to warrant this drastic step. Action was postponed by the court until May 19. Before the time for this suit to be heard the settlement of the strike was effected.

President Ernst of the South Covington & Cincinnati Railway has requested the employees of that road to put their demands in writing.

Reply of Rochester Company to Suggestions of Council Committee

The reply from the New York State Railways to the survey of the Rochester system by a joint committee of the Common Council has been submitted to the Common Council, signed by Horace E. Andrews, president of the company. The report of the special aldermanic committee was made at a special meeting of the Common Council on April 10. The most important suggestion contained in the report was that during rush hours the company give 3-cent fares with full transfer privileges.

The reply of the company takes up in detail the suggestions of the joint committee, many of which are largely of local interest. The portions of the reply which deal with the general attitude of the company, the questions of reduced fare and additional equipment follow in part:

"One of the principal difficulties with which the company has had to contend has been inadequate terminal facilities in the center of the city. Happily the congestion is largely removed by the re-routing of cars. Much remains to be accomplished, before thoroughly good service can be given on some lines, toward the double tracking of all single-track lines. We respectfully ask the aid and co-operation of the Council toward correcting this difficulty. A satisfactory solution of the rush-hour service can only be reached with the aid and co-operation of the owners of factories, stores and other large centers of employment. The transportation and lighting companies of this city propose to expend within the next year upward of $3,500,000 in enlarging and developing their facilities. The purposes and intentions of the company are misunderstood in some of the statements made in the report to the Council. The company proposes to give the highest class of service and to merit the good will and opinions of the community which it serves. It cannot succeed in giving satisfactory service or in raising the necessary money for growth and development without co-operation.

"The company has already contracted for fifty additional cars, twenty-five of which are to be motor cars and twenty-five to be center-entrance 'stepless' cars to be used as trailers. Contracts for the cars provide that the shipments will commence during the first week in August and continue through August and September. These cars will be placed in service as rapidly as possible. The trail cars will be used on routes having loops at the terminals and on such lines as have the heaviest rush-hour traffic. Additional cars will be added as the traffic warrants. The company will, as soon as the new cars are placed in service, begin to retire from service through the day its old equipment, confining the use of the older rolling stock to the tripper service during the rush hours and on days of extraordinary travel.

"The Council has asked the company to abandon the use of eighty of its cars within one year. We ask that this time may be extended as to the use of cars Nos. 300 to 342, inclusive, until the use and availability of trail cars for tripper service shall have been demonstrated in a larger way than is possible with the cars now contracted for. Each car withdrawn from service will be replaced with new equipment.

"Concerning the suggestion by the Council of a reduced rate of fare during the night and morning hours, the high standard service which Rochester demands and is entitled to receive cannot be furnished at a reduced rate, taking into account increasing cost of operation, the excessive depreciation inherent in railroad operations and a fair return on present capital actually invested and additional capital necessary to provide from year to year for the demands of a rapidly growing city.

"The company has endeavored to reply fully to every recommendation made by the Council and if the position of the company is not clear to the Council the officers of the company will be glad to explain their views more completely. The company has also endeavored to comply in every way possible with the wishes of the Council and will appreciate the co-operation of the city in carrying the improvement, as outlined, into effect."

Action Against Proposed Municipal Line in Detroit

Suit has been filed in the Wayne County Circuit Court in the name of five taxpayers of Detroit, Mich., asking that a writ of mandamus be issued to compel the Common Council to rescind its recent action in appropriating $250,000 with which to build a cross-town street railway on Junction Avenue. Hinton E. Spalding and Judge A. C. Angell, attorneys for the Detroit United Railway Company, appeared for the plaintiffs. Judge Philip T. Van Zile issued an order directing the members of Council to show cause why the mandamus should not be issued.

The municipal ownership committee of the charter commission has decided that the management of municipally owned street railroads shall be placed in the hands of three commissioners appointed by the Mayor, instead of elected by non-partisan ballot, as at first proposed. Three members voted for the appointment of the members of the commission and two against the plan.

Senator Guy Miller, speaking in Detroit on May 13, said that under the charter amendment adopted last spring the construction of new lines is so burdened with provisions for charges that the city will gain nothing in the rate of fare or service. He said that it would be impossible to operate under a 3-cent fare because the rate of fare must be based upon the maintenance and operating expenses, the taxes that would be paid if the road were operated under private ownership, certain fixed charges and a percentage for a sinking fund. He believed the Verdier act, which provides for municipal ownership, is constitutional.

Public Utilities Act for Idaho

On March 13, 1913, the Governor of Idaho approved an act passed by the State Legislature to provide for the organization of a public utilities commission. The term "public utility" as used in the act includes every common carrier, pipe line corporation, gas corporation, electrical corporation, telephone corporation, telegraph corporation, water corporation, wharfinger and warehouseman, and it covers all cases where a service is performed and a commodity delivered to the public, either directly or indirectly.

The Public Utilities Commission is to consist of three members appointed at large by the Governor and removable from office by him for dereliction of duty, corruption or incompetency, after a fair hearing. The term of office of each commissioner is six years and the salary $4,000 per year. The commissioners are prohibited from taking directly or indirectly any part in politics and from seeking appointment, nomination or election to any civil office of the State for a period of two years from the date of the expiration of their terms or their resignation or removal from office.

Every common carrier is required by the act to file with the commission and print and keep open to public inspection schedules showing rates, fares and classification of transportation between all parts of its road, owned, leased, operated or controlled, and also all joint and through rates. All other public utilities must file and keep open for inspection schedules showing all rates, tolls, rentals, charges and classifications, with all rules, regulations, contracts, etc., relating to the aforesaid. Unless the commission otherwise orders, no change can be made by a public utility in these data except after thirty days' notice to the commission and the public.

The commission has power, upon a hearing, held upon its own motion or upon complaint, to investigate a single rate, fare, toll, rental, charge, classification, rule, regulation, contract or practice, or any number thereof, or the entire schedule of any or all of these, and to establish new figures or rulings in place of the same. The commission may also prescribe rules and regulations for the performance of any service or the furnishing of any commodity furnished or supplied by any public utility, and on a proper demand and tender of rates such public utility is to furnish such commodity or render such service within the time and upon the conditions laid down by the commission. To this body is also given power to value and revalue public utilities, to ascertain all new constructions, extensions and additions and to prescribe a uniform system of accounting.

Any public utility failing to comply with the decrees by the commission will, in case a special penalty has not been provided, be liable to a penalty of not more than $2,000 for each offense. Every violation of the act is a separate and distinct offense, and in case of a continuing violation each day's continuance is to be deemed a separate offense. Any officer, employee or agent of a utility violating the act is guilty of a misdemeanor and is punishable by a fine not exceeding $1,000 or imprisonment not over one year, or both.

London & Port Stanley Railway Electrification.—Owing to the illness of Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, the time for the vote on the electrification of the London & Port Stanley Railway has been postponed indefinitely.

Subway Expert for Providence.—William T. Lewis, an engineer with the Boston Transit Commission, has been engaged by the joint special committee of the City Council of Providence, R. I., which is investigating the need of subways in that city to act as expert adviser.

Denial of Electrification Report.—Officers of the Oregon Short Line in New York to whom the dispatch in regard to the reported electrification of that line in southern Idaho from Pocatello to Huntington was submitted by the ELECTRIC RAILWAY JOURNAL deny that electrification as reported is contemplated at this time.

Boston Electrification Before Next Assembly.—The committee on railroads of the Massachusetts House of Representatives has voted to refer to the next General Court all the electrification measures pending before it. The report goes to the Senate with the understanding that it will be held on the table until the fate of the Washburn bill is known.

The Strike at Fort William.—The public has refused to countenance the strike of the employees of the Port Arthur & Fort William Electric Railway, Port Arthur, Ont., who violated their agreement by striking for changes in the contract between them and the joint committee appointed by the cities to run the road before the agreement had expired.

Additional Appropriation for Report on Traffic in Newark.—The Board of Public Works of Newark, N. J., has appropriated an additional $300 to enable the City Plan Commission to complete the report on electric railway traffic in Newark which is being prepared for the commission by E. P. Goodrich. It is expected that the report will be ready by June 15, 1913.

Decision in Helena Lighting Case.—The Supreme Court of Montana on Feb. 13, 1913, reversing the District Court decision, held that the city had no right to enforce an ordinance which required the Helena Light & Railway Company, Helena, Mont., to light its tracks within the city limits without cost or expense to the city, and particularly at street intersections.

Strike in Roanoke.—The service of the Roanoke Railway & Electric Company, Roanoke, Va., the trainmen of which are on strike, is practically normal. The strikers have remained orderly and the patrons of the company are using the cars freely. The Central Labor & Trade Council, realizing that the cause of the men who are still out is hopeless, has petitioned the City Council to install a municipal lighting system.

Strike in Halifax.—The employees of the Halifax (N. S.) Electric Tramway went on strike on May 16, 1913. Only a third of the usual number of cars were operated on the first day. Toward night there was serious disorder and several cars were abandoned in the street and left to be guarded by the police. The company announced that it was prepared to resume service in full on May 17 if afforded proper protection.

Negotiations Between International Railway and Its Employees.—It is stated that the negotiations for the settlement of the differences between the International Railway, Buffalo, N. Y., and its employees entered into in accordance with the agreement under which the men returned to work following the recent strike are progressing satisfactorily and that it is likely that an understanding will be arrived at making it unnecessary for the questions at issue to be submitted to arbitration. The negotiations have been delayed owing to the presence of President Connette of the International Railway in New York.

Marginal Railroad Improvements in New York.—An agreement has been reached between the officers of the New York Central & Hudson River Railroad and a committee of the Board of Estimate of New York City for the improvement of the company's waterfront line along the Hudson River. The plan provides for the electrification of the marginal railway and for the depression of the track in a subway below Thirtieth Street. It is planned to construct an immense freight terminal between Thirty-first Street and Thirty-sixth Street, New York. There are to be several changes in the right-of-way of the line. Action on the plan by the Board of Estimate will be deferred until the property owners have had an opportunity to study the plans.

Conversion of Horse Car Lines in Greater New York.—When the Public Service Commission of the First District of New York was organized on July 1, 1907, sixteen horse car lines were in operation in Greater New York. At the present time only six of these remain wholly operated by horse-power. Of the others four have been abandoned and six have been partly or wholly changed to storage battery car operation. Of the six remaining horse car lines, one, the Metropolitan Crosstown line, will soon be changed to storage battery car operation, if an application by the company pending before the commission is granted. The Seventeenth and Eighteenth Street lines will probably be abandoned soon, as the commission is considering an application to that effect.

Franchise Negotiations in Des Moines.—The City Council of Des Moines, Ia., has gone into executive session to discuss the question of an extension of the franchise of the Des Moines City Railway. It is stated that the meetings will be secret until the Councilmen have agreed upon a tentative plan for a franchise. Emil G. Schmidt, president of the company, is reported to have said that the company is willing to grant forty tickets for $1 to schoolchildren, tickets to be good on school days and during school hours and to make a rate of six tickets for 25 cents and to finance extensions and improvements. He is said to be opposed to a special rate during the rush hours, taking the position that the concession of six tickets for 25 cents is the limit to which the company can reasonably go in this direction.

Autobus Line for Montreal.—The issue of *Saturday Night* for May 10, 1913, which is published at Toronto, Ont., contained an article on the plans of the Canadian Autobus Company, which proposes to install omnibus service in the city of Montreal. The plans of this company have been under consideration for some time, but the names of the officers and others who are financially interested in the company have not been made public until very recently. Among the backers of the company are H. S. Holt, president of the Montreal Light, Heat & Power Company; J. S. Norris, manager of the Montreal Light, Heat & Power Company, and D. Lorne McGibbon, president of the Canadian Consolidated Rubber Company. Duncan McDonald, formerly general manager of the Montreal Tramways, will be managing director of the company.

Progress of Negotiations for Purchase of Toronto Railway and Light Plants.—On May 12, 1913, when Mayor Hocken and the members of the Board of Control of Toronto, Ont., met William Mackenzie, president of the Toronto Railway and the Toronto Electric Light Company, in regard to the plans of the city to purchase the property of these companies, Mr. Mackenzie expressed himself as being satisfied with the proposal to submit two by-laws to the people, one in regard to the purchase of the property of the light company and the other in regard to the railway company, but he reiterated his statement that the owners of the properties will not sell one without the other. It is proposed to present a resolution to the Board of Control to provide for engaging the services of an expert to value the property of the companies preparatory to action by the City Council in the matter.

International Engineering Congress.—The American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the Society of Naval Architects and Marine Engineers have appointed a permanent committee of management for the International Engineering Congress to be held in San Francisco in 1915. The committee has effected a permanent organization with Prof. W. F. Durand as chairman and W. A. Cattell as secretary-treasurer and has established executive offices in the Foxcroft Building, 68 Post Street, San Francisco. The chairmen of the committees in charge of definite portions of the work are: committee on participation, Charles F. Rand; executive committee, W. F. Durand; finance committee, W. G. Dodd; papers committee, A. M. Hunt; publicity committee, W. A. Cattell; local affairs committee, E. H. Benjamin.

Dallas Company to Talk Freely of Its Plans and Purposes.—L. C. Bradley, assistant district manager of the Texas properties of Stone & Webster, with headquarters in Dallas, made public a statement recently in which he said: "A full investigation of our companies in Dallas shows that in the last few years enormous sums of money have been expended for almost making over anew the holdings of former years. Although little has been said about it, there is in progress at this moment under actual construction in various sections of the city by our local companies new improvement work costing in excess of $1,295,000. Notwithstanding this, further plans, under the direction of Mr. Moore, for other important improvements are being made. I appreciate that the public is vitally interested in the plans of its public service companies, as they relate to the necessities of their daily life, and the management will from time to time, in the daily press, talk freely of its plans and purposes."

Testimony in Regard to Traffic Inquiry in Toronto.—H. L. Beach, who was connected with the study of traffic in Toronto conducted by Bion J. Arnold, Chicago, Ill., was examined recently before the Toronto Railway Board by Corporation Counsel Geary for the city and by E. B. Osler for the Toronto Railway. Mr. Beach testified in regard to the effect upon the city of the absence of service in suburban districts and defined the protected investment. Chief Assessor G. L. Farley was called to show the increase in population in different sections of the city. Mr. Osler sought to prove that if the company built the lines asked for by the city the company would not realize on the added investment before its franchise expired. Mr. Beach agreed that this was likely to be so. Charles W. Power, engineer in charge of the construction of railway work, testified in regard to the amount of money put back into the property each year by the company in improvements. The Ontario Railway & Municipal Board has decided that sufficient evidence has been placed before it in connection with the traffic study in Toronto.

New Orleans Assessment Reduced.—By a vote of four to one the Commission Council of New Orleans, La., has adopted the minority report of Commissioner Thompson of the Board of Review and has reduced the tax assessment of the New Orleans Railway & Light Company from $23,576,944, as fixed by the Board of Assessors, to $20,644,326. The appeal to the Commission Council is permitted under the commission form of government in force in New Orleans where a committee of three members of the commission is authorized to hear appeals on assessments. This committee is composed of W. B. Thompson, commissioner of public utilities; Harold Newman, commissioner of public safety, and W. G. Ricks, commissioner of finances. In making the report this committee said that the reduction was made to protect the interest of the public at large and to show that the local authorities of New Orleans wish to be fair to the public service corporations. The protest of the company against the assessment as originally proposed was referred to at length in the ELECTRIC RAILWAY JOURNAL of May 3, 1913, page 824, comparative city and railway assessments being given since 1902.

Statement by Connecticut Company in Regard to Its Carhouse Employees.—In connection with the demand made recently by the representatives of its motormen and conductors for the reinstatement of carhouse employees laid off in New Haven, Conn., the Connecticut Company has issued a statement that the necessity for retrenchment compelled the company to reduce its forces. This statement the company concluded as follows: "Heretofore all matters in dispute between the company and the employees have been settled by conferences between the officers of the company and representatives selected by the men from those engaged in like branches of service, and in this case the same procedure should be followed, for which purpose the officers have offered time and again to discuss the matter with the men laid off, or other shop men selected by them, but not with the motormen and conductors. All matters at issue between the motormen and conductors and the company relative to wages and conditions of labor were settled one year ago under an agreement to be operative for a period of two years, and there seems absolutely no justification for bringing that branch of the service into the present dispute."

Chicago Loop Removal Proposal.—Samuel Insull, on behalf of the Chicago Elevated Railways, in a communication to the local transportation committee of the City Council of Chicago, Ill., on May 16, 1913, stated that the companies are interested in the maintenance of the present elevated loop only until some more satisfactory substitute has been arranged for by the city. The elevated railroads would welcome a subway as a "satisfactory substitute" for the loop structure, which they would agree to use on terms mutually agreeable to the city and them. Mr. Insull said: "If, for instance, the city will build a proper subway the route and character of construction to be mutually agreed upon, the elevated railways will agree to lease the subway during the term of their present franchises, to give transfers and through routing by the use of the subway, instead of continuing to use the elevated loop structure, and to pay a graduated income to the city, which during the terms of the lease would amount to a substantial income upon the city's investment. The loop structure could then be removed at the option of the city." The engineering sketches for the proposed changes in the elevated structure were placed in the hands of the supervising board and the commissioner of public works on May 19, 1913, for report upon the practicability and the necessity of the alterations. The ordinance drafted by the company to confer upon it the power to make these changes and to through-route its trains was at the same time sent to the law department for an opinion upon its provisions, especially in reference to the protection of the city's rights.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

Following a conference between Governor Dunne of Illinois and Mayor Harrison of Chicago, Corporation Counsel Sexton and Assistant Corporation Counsel Skinner of Chicago, Senator Glackin, chairman of the Senate committee on public utilities, and Senator Rapp, it was announced that a compromise was likely in regard to public utility legislation. The Dunne measure with an amendment conferring greater powers of home rule on Chicago will probably be reported out of both houses. The home rule sections of the Glackin or Harrison bill will be included in the Dunne measure. Senate bill No. 539 (Waage), Governor Dunne's public ownership bill, has been advanced to third reading in the Senate.

The Senate has passed Senate bill No. 55 (Womack), requiring prompt settlements of claims for damages in freight shipments. House bill No. 721, providing for licenses for railroads to sell liquor on trains and fixing a license fee of 50 cents per year for each car on which liquor is sold, has been advanced to third reading in the House. Senator Cornwell has introduced a bill to amend the corporation act by giving corporations the right to restrict the powers of directors, trustees and managers by certification of incorporation or by-laws. It has been referred to the committee on corporations.

MASSACHUSETTS

The committee on street railways has reported a bill permitting no more than nine hours' work in twelve as a day's work for motormen and conductors on the Boston Elevated Railway. Representative Carr, of Boston, has presented a motion in the House favoring a bill to provide for the removal of the elevated structure of the Boston Elevated Railway between the North Station and Sullivan Square and the substitution of a subway. Representative Wilson, of Boston, opposed substitution for the adverse report of the committee on the ground that consideration should be given the company's investment in the existing structure. On a voice vote the motion to substitute prevailed.

NEW YORK

Governor Sulzer has vetoed the bill to regulate the use of street surface railroad tracks on the Bowery in the borough of Manhattan, New York City. The Governor expressed the opinion that the measure would usurp the power of the Public Service Commission of the First District by relieving the company of the necessity for having the securities to be issued to pay for the improvement passed upon by the commission. The Governor has also vetoed the act for the abolition of horse cars in cities of the first class by Jan. 1, 1914. His reason for vetoing this bill is substantially the same as his reason for withholding his sanction from the act to regulate the use of tracks on the Bowery. The Governor has also disapproved the Foley-Walker workmen's compensation bill.

WISCONSIN

The Linley bill, permitting municipalities to purchase street railways at any time, has been sent to the Senate concurred in by the Assembly. After being concurred in reconsideration of the vote was voted down. Assembly bill 232, relating to the distribution of the street railway tax, has been recommended to the Senate for concurrence by the committee on corporations. The Assembly has concurred in the Senate bill permitting privately owned public utilities to acquire property for extensions of plants by right of eminent domain.

PROGRAMS OF ASSOCIATION MEETINGS

Pacific Claim Agents' Association

The fifth annual convention of the Pacific Claim Agents' Association will be held in Vancouver, B. C., on July 10, 11 and 12, 1913.

Central Electric Railway Association

The committee on hotels and arrangements of the Central Electric Railway Association has chartered the S. S. *St. Ignace* for the meeting of the association in June. This steamer will leave Toledo at 3 p. m. on June 25, 1913, making a trip north through the Detroit River, Lake St. Clair and the flats, possibly as far north as Alpena. Returning, the boat will arrive at Toledo on the evening of June 27. The meeting of the Central Electric Railway Accountants' Association will also be held on the *St. Ignace*. Arrangements have been made for communication between the properties of the various officials and the boat via telegraph and wireless. The expense per person for the round trip out of Toledo, including meals and berth, will be $12 and an invitation is extended to officials of interurban lines not members of either association to participate in the outing.

Keystone Railway Club

The following program of papers has been announced for the meeting of the Keystone Railway Club, which will be held at the Colonial Hotel, York, Pa., on June 2 and 3, 1913:

Paper, "Selecting Transportation Employees and Retaining Them in Service," by W. H. Hitchcock, general superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J.

Paper, "Electric Railway Special Track Work," by Victor Angerer, vice-president and general manager of the William Wharton, Jr., Company, Philadelphia, Pa.

Paper, "A Description of the A. C.-D. C. Equipment in Use on the York Railway System," by E. P. Green, master mechanic of the York (Pa.) Railways.

Paper, "Slotting of Street Car Commutators," by W. H. Rushton, master mechanic of the Altoona & Logan Valley Electric Railway, Altoona, Pa.

The following questions will be included in the question box:

"What is the cause of the annoying back-lash at the moment the wheels come to a standstill?"

"How often should air compressors be removed from cars and be overhauled?"

"What results are obtained from the use of steel bushings on controller shafts and motorman's valve stems?"

"What results and what mileage have been obtained with one-run-steel and cast-steel wheels?"

"Which of the three motorman's valves—rotary, slide and piston type—gives the best satisfaction, and why?"

"What is the best and quickest method to avoid interruption of traffic in bringing double-truck cars with broken axles to the carhouse?"

"Is a lined or a solid journal bearing considered best for city service?"

The meeting of the association on June 2 will be called at 8.15 p. m. So as to permit the presentation and discussion of the papers and questions only routine business will be conducted at this session. The entertainment committee has arranged a trip to the Yorkhaven power house for the afternoon of June 3.

Financial and Corporate

Stock and Money Markets

May 21, 1913.

Trading on the New York Stock Exchange to-day was quiet, but the market tone was firm and the price changes in nearly all cases were in the shape of advances. There was considerable absorption of Brooklyn Rapid Transit early in the day, but toward the close this issue yielded nearly a point. There was very little demand for Interborough-Metropolitan preferred. Rates in the money market to-day were: Call, 2¾@3 per cent; sixty days, 3¾@4 per cent; ninety days and four months, 4@4¼ per cent; five months, 4¼@4½ per cent; six months, 4½@4¾ per cent.

There was a better demand for stocks in Philadelphia to-day. Philadelphia Rapid Transit recovered to 23¼.

The Chicago market was narrow and inactive to-day. The only bond transactions were in Chicago Railways 5s, City Railway 5s and Edison 5s.

The Boston market to-day was exceptionally dull. Dealings were mostly in odd lots.

The market for stocks in Baltimore to-day was narrow and dull. The bond market was narrow but active.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 14	May 21
American Brake Shoe & Foundry (common)	92	92
American Brake Shoe & Foundry (preferred)	130	130
American Cities Company (common)	37½	37½
American Cities Company (preferred)	70½	70⅜
American Light & Traction Company (common)	370	370
American Light & Traction Company (preferred)	106	106
American Railways Company	38	38
Aurora, Elgin & Chicago Railroad (common)	42	42
Aurora, Elgin & Chicago Railroad (preferred)	84	84
Boston Elevated Railway	89	85¼
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	66	66
Boston & Worcester Electric Companies (common)	a8	a8
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	89⅜	91¼
Capital Traction Company, Washington	120½	120
Chicago City Railways	*150	*150
Chicago Elevated Railways (common)	*25	*25
Chicago Elevated Railways (preferred)	*87	*87
Chicago Railways, ptcptg., ctf. 1	*91½	89½
Chicago Railways, ptcptg., ctf. 2	*21	20¾
Chicago Railways, ptcptg., ctf. 3	*7	6
Chicago Railways, ptcptg., ctf. 4	*3½	*3½
Cincinnati Street Railway	115	115
Cleveland Railway	103	103¼
Cleveland, Southwestern & Columbus Ry. (common)	*5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred)	*28¼	*28¼
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	a69½
Columbus Railway (preferred)	82½	83
Denver & Northwestern Railway	109	109
Detroit United Railway	72	72
General Electric Company	137½	138⅜
Georgia Railway & Electric Company (common)	117	117
Georgia Railway & Electric Company (preferred)	84	84
Interborough Metropolitan Company (common)	14	14½
Interborough Metropolitan Company (preferred)	49⅜	50¾
International Traction Company (common)	40	*40
International Traction Company (preferred)	95	*95
Kansas City Railway & Light Company (common)	..	..
Kansas City Railway & Light Company (preferred)	..	..
Lake Shore Electric Railway (common)	9	9
Lake Shore Electric Railway (1st preferred)	91	91
Lake Shore Electric Railway (2d preferred)	25	25
Manhattan Railway	127	129½
Massachusetts Electric Companies (common)	16	16
Massachusetts Electric Companies (preferred)	73	72½
Milwaukee Electric Railway & Light Co. (preferred)	*100	100
Norfolk Railway & Light Company	26½	26½
North American Company	70	71
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	43¾	44
Philadelphia Company, Pittsburgh (preferred)	40½	40½
Philadelphia Rapid Transit Company	23	23¼
Portland Railway, Light & Power Company	*67½	67½
Public Service Corporation	114	114
Third Avenue Railway, New York	33½	34
Toledo Railways & Light Company	12	a12
Twin City Rapid Transit Co., Minneapolis (common)	103½	104
Union Traction Company of Indiana (common)	7½	7½
Union Traction Company of Indiana (1st preferred)	82	82
Union Traction Company of Indiana (2d preferred)	32	32
United Rys. & Electric Company (Baltimore)	27	27
United Rys. Inv. Company (common)	23	22
United Rys. Inv. Company (preferred)	41	44
Virginia Railway & Power Company (common)	50½	53
Virginia Railway & Power Company (preferred)	90	90
Washington Ry. & Electric Company (common)	91	90
Washington Ry. & Electric Company (preferred)	91	90
West End Street Railway, Boston (common)	71	72½
West End Street Railway, Boston (preferred)	90	88
Westinghouse Elec. & Mfg. Company	61½	62
Westinghouse Elec. & Mfg. Company (1st preferred)	105	110

*Last sale. aAsked.

ANNUAL REPORTS

Westinghouse Electric & Manufacturing Company

The board of directors of the Westinghouse Electric & Manufacturing Company submitted on May 20, 1913, its report of the operations of the company and of its subsidiary companies for the fiscal year ended March 31, 1913. The income account for the year is as follows:

Gross earnings:		
Sales billed		$39,977,565
Cost of sales:		
Factory cost, including all expenditures for patterns, dies, new small tools and other betterments and extensions; also inventory adjustments and selling, administration, general and development expenses		35,406,293
Net manufacturing profit		$4,571,272
Other income:		
Interest and discount	$294,887	
Dividends and interest on sundry stocks and bonds owned	647,908	
Miscellaneous—royalties, etc	53,768	996,563
Gross income from all sources		$5,567,836
Deductions from income:		
Interest on bonds and debentures	$1,103,423	
Interest on collateral notes	409,672	
Interest on long-term notes and mortgages	99,319	
Depreciations charged against income	606,128	
Proportion of expenses incidental to bond and note issues	90,000	
Miscellaneous	95,259	2,403,803
Net income available for dividends and other purposes		$3,164,032

Guy E. Tripp, chairman of the board, said in part:

"The sales billed for the year were in excess of any previous year in the history of the company. The ratio of the manufacturing profit to sales billed increased over last year, but unusually keen competition in all your company's activities prevailed and still continues.

"The value of unfilled orders as of March 31, 1912, was $8,137,961; as of March 31, 1913, the value of unfilled orders was $12,061,473. The average number of employees during the year was 20,542, as compared with an average of 16,000 for the previous year.

"The surplus as of March 31, 1912, was $6,648,964. This balance was increased by the net income for the year to a gross surplus of $9,932,203. Against this surplus have been charged dividends declared during the year on the preferred stock at the rate of 7 per cent per annum ($279,909) and three dividends of 1 per cent each, aggregating $1,053,666, on the common stock; also miscellaneous charges totaling $283,187. These charges reduced the surplus to $8,315,441, against which depreciations of investments aggregating $966,919 were written off, leaving the surplus as of March 31, 1913, $7,348,522.

"The increase in property and plant to $20,467,224, or $1,272,036.68 over the figures as of March 31, 1912, after deducting liberal depreciation charges, represents necessary purchases of additional manufacturing equipment chiefly at the East Pittsburgh and Newark works and the erection of additional buildings at East Pittsburgh on real estate already owned. No purchases of real estate were made during the year. A further extension was obtained of the lease of the property on which your company operates an iron foundry at Pittsburgh, Pa. It is possible that the erection of foundry and pattern buildings at Trafford City on real estate already owned will be started during the current year.

"The sinking fund of $160.20 represents the uninvested balance of sinking fund payments made to the trustee on account of the company's issue of convertible sinking fund 5 per cent gold bonds. As a result of the sinking fund payment during the year there was retired and canceled a total of $528,000 face value of convertible bonds.

"The increase in securities of your company held in the treasury is chiefly due to the receipt from the trustee of $686,000 face value of convertible sinking fund gold bonds, in accordance with the provisions of the bond indenture, and to the purchase of $150,000 face value of debenture certificates due July 1, 1913. The bonds are held in the treasury for sale or use for sinking fund purposes, and the debenture certificates will be delivered to the trustee for cancellation on July 1, 1913, on which date the entire outstanding balance of the issue of debenture certificates will mature.

"In general, the affairs of the foreign companies, with the exception of the Russian company, show further improvement during the year 1912. The British and French companies particularly give promise of continued improvement.

"After an exhaustive investigation made upon the ground by your chairman and certain other officers of the company last autumn, your directors determined upon the liquidation of the Russian company, and have proceeded as rapidly as possible in carrying out the plan. The works, consisting of real estate, buildings, equipment and inventories, have been sold and the collection of its accounts and payment of its debts are proceeding as rapidly as possible. It is anticipated that when its affairs are finally closed up there will be a further depreciation of approximately $1,500,000, which will mean that your company will receive practically the amount of its current claims against the Russian company, and that its investment in securities of that company will be entirely charged off.

"The current assets are placed at $18,126,991. The amount of reserve for notes and accounts receivable as of March 31, 1913, is believed to be sufficient to provide for any probable shrinkage in the book value thereof, with the possible exception of a note of the Security Investment Company, to which reference was made in your directors' report for the year ended March 31, 1911.

"A large increase in the working and trading assets of $18,510,222 over the value as of March 31, 1912, was to be expected in view of the increase in shipments billed during the year as compared with the previous year, and the increase of approximately $4,000,000 in the value of unfilled orders on hand as of March 31, 1913, as compared with the close of the previous year. The usual annual inventories of all raw materials, finished stocks and work in progress were taken and valued at purchase prices or manufacturing cost, or less. A fixed basis has been established for the depreciation of inactive stocks.

"The total of other assets again shows a decrease as compared with the previous year. The amount of the expenditures for patents capitalized during the year was $26,381, all additional expenditures for patents and licenses and the cost of all development and experimental work having been charged to operating expenses.

"The changes in the funded debt of the company as of March 31, 1913, as compared with March 31, 1912, have been explained in the comments pertaining to sinking fund and investments. The outstanding balance of debenture certificates matures July 1, 1913, and is expected to be provided for by the sale of convertible sinking fund bonds of an equal total face value that under the terms of the bond indenture were reserved to retire them. The four-year notes issued under the plan for the discharge of the receivers of your company matured on Jan. 1, 1913, and were paid.

"During December, 1912, and March, 1913, your company borrowed with treasury securities as collateral $3,500,000 on notes maturing in June and September, 1913. On Aug. 1, 1913, the issue of $4,000,000 three-year collateral notes made Aug. 1, 1910, will mature. Your directors have under consideration plans to provide for these maturities which it is expected will effect a considerable reduction of the total."

New Orleans Railway & Light Company

The comparative income, profit and loss statement of the New Orleans Railway & Light Company, New Orleans, La., for the years ended Dec. 31, 1911, and 1912, was published in the ELECTRIC RAILWAY JOURNAL of April 19, 1913, page 737. The statement of earnings of the company for the year ended Dec. 31, 1912, as contained in the pamphlet report of the company, follows:

Operating revenue	$6,628,147
Operating expenses	3,420,356
Net operating revenue	$3,207,791
Revenue deductions—taxes, etc	565,991
Net operating income	$2,641,800
Miscellaneous income and revenue:	
Outside operations	41,574
Gross income	$2,683,374
Income deductions—interest, etc	1,688,342
Net income	$995,032

Hugh McCloskey, the president, says in part: "These figures compared against the previous year's result will show the following: Gross operating revenue increased $292,685, or 4.60 per cent; net operating revenue increased $291,977, or 10.01 per cent; net income increased $223,336, or 28.95 per cent.

"The same policy of maintaining the physical condition of the properties in a high state of efficiency has been pursued, as evidenced by the actual charges for maintenance during the year, which have amounted to the sum of $781,761, an increase of $47,939 over the previous year, or 6.8 per cent, and in addition to the above there has been expended during the year $163,172 for renewals and replacements, of which $134,506 was charged into operating expenses and maintenance accounts and $28,666 to the depreciation reserve.

"There has been expended for construction, improvements and betterments $531,953, as follows: roadway and line, $128,726; electric line system and accessories, $106,741; gas distribution system and accessories, $162,297; plant equipment, $55,358; rolling stock and miscellaneous equipment, $19,122; buildings and structures, $26,267; engineering and miscellaneous, $33,440; total, $531,953.

"During the year we sold to Bertron, Griscom & Jenks $200,000 par value of the 5 per cent forty-year refunding and general lien gold mortgage bonds, and a loan of $1,400,000, secured by 5 per cent bonds, was effected through local banks, to cover expenditures made for construction, improvements and betterments and retirement of affiliated companies' bonds.

"Dividends on preferred and common capital stocks aggregating $800,000 were declared and paid during the year."

The comparison of railway traffic statistics for 1912 and 1905, as contained in the report, follows:

	1912	1905
Revenue passengers carried	84,855,983	65,021,214
Transfer passengers carried	21,048,666	6,641,193
Percentage of passengers using transfers	24.8	10.2
Average fare per passenger—cents	4.02	4.57
Car mileage	19,529,116	16,753,874
Number of eighteen-hour cars	121,061	102,156

Finances of the Columbus Railway & Light Company

An application has been filed with the Public Service Commission of Ohio for authority to issue securities to make a settlement with the Columbus Railway & Light Company for money claimed to be due from its subsidiaries for improvements and extensions. The plan includes the issue of $1,353,930 of common stock by the new company, the Columbus Railway, Power & Light Company. Of this, $500,000 is to be sold at par to secure working capital for the new company. The indebtedness to the Columbus Railway & Light Company is to be paid with $534,630 of the new stock, and $283,000 of Columbus Railway consolidated 4 per cent bonds and $36,300 of Columbus Light, Heat & Power Company general mortgage 6 per cent bonds are to be purchased from the Columbus Railway & Light Company with the proceeds from the remainder of the new common stock. This would make the total capitalization under the reorganization $11,538,130, as compared with the present total capitalization of $13,465,900 for all the companies. The commission has authorized an exchange of stock for the underlying companies.

Report on the properties made by Stone & Webster shows that the plant, materials and supplies appearing on the balance sheet as of Dec. 31, 1912, represent a valuation of $19,358,024. Based on the 1912 earning capacity, assuming 18 per cent of the railway gross for railway maintenance and depreciation and 10 per cent of the lighting gross for light plant maintenance and depreciation, the value was $15,380,000. The earnings for the year ended Dec. 31, 1912, follow:

Gross earnings		$2,922,682
Operating expenses		1,586,215
Net earnings from operation		$1,336,467
Non-operating revenue		11,369
Total net		$1,347,837
Less taxes	$243,752	
Trackage rentals	7,500	
Corporate expenses, viaduct rentals, etc	18,613	
Depreciation	155,081	
		424,946
Balance		$922,891

The ratio of operating expenses to gross receipts was 54.4 per cent.

The commission set a date to hear the application, but postponed it until May 20.

Decision in Toledo Control Case

Judge John M. Killits of the United States District Court made known on May 16, 1913, his decision in the injunction suit brought by the Toledo Traction, Light & Power Company, Toledo, Ohio, to oust what is known as the Barton Smith faction from the offices to which some of its members had been elected by the old board of directors. The Smith faction is allowed to have five members of the board of directors, but Barton Smith and others are restrained from interfering with the other sixteen directors elected in the interest of H. L. Doherty & Company, New York, N. Y. The court held that Maurice Allen was not legally elected president of the company by the old board, as he was not considered a director. The meeting of the directors representing the Doherty interests at which Frank R. Coates was chosen president was held to be of no effect, because the five Smith directors were not permitted to participate. This leaves the company without a president, but Mr. Coates was continued as acting president until May 29, when the directors will reorganize.

Under Judge Killits' decision the following officers chosen by the Smith board were restored to their positions: vice-president, Frank Hafer; general manager, L. E. Beilstein; secretary, H. S. Swift. S. D. Carr was treasurer for both factions. The removal of Smith & Baker as general counsel was held as illegal. The injunction does not hold against these officers to prevent their performing their duties. Frank Hafer, C. F. Meilink, Conrad Weil, J. K. Secor and H. S. Swift, Smith directors, are continued. The court holds that a director shall serve his time unless removed for cause. The meeting of stockholders called by the Doherty interests was held to be legal and all but five directors chosen at that time were legally elected. The exceptions are those who were selected to take the places of the five Smith men named previously. The Doherty directors are Messrs. Hoffman, Logan, Chapman, Welles, Diege, Coughlin, Isenberg, Miller, Bump, Williams, Frueauff and Newbegin.

Bucks County Interurban Railway, Philadelphia, Pa.—A dispatch from Harrisburg states that papers have been filed for the merger of the Trenton, New Hope & Lambertsville Street Railway, the Yardley, Morrisville & Trenton Street Railway, the Newton & Yardley Railway and the Bucks County Electric Railway, Newton, Pa., to form the Bucks County Interurban Railway. The capital is $1,000,000. The directors include: W. Frederick Snyder, Philadelphia, president; W. H. Snyder, Sydney L. Wright and W. Redwood Wright, Philadelphia.

Chicago (Ill.) City Railway.—The local transportation committee of the City Council of Chicago on May 15, 1913, ordered an investigation into charges of alleged irregularities in the accounts of the Chicago City Railway. The investigations will be based on the charges made by J. B. Hogarth, who was formerly connected with the Chicago Railways and the Chicago City Railway. The committee referred to the city comptroller a resolution on the advertising contract of the Chicago Railways. A resolution relating to the rate paid by the same company for power was referred to the city electrician.

Columbus, Marion & Bucyrus Interurban Railway, Marion, Ohio.—The Columbus, Marion & Bucyrus Interurban Railway has been incorporated with a capital stock of $250,000 to succeed the Columbus, Marion & Bucyrus Railroad, the property of which, as noted in the ELECTRIC RAILWAY JOURNAL of May 17, 1913, page 908, was sold on May 10, 1913, to James H. Caldwell, chairman of the bondholders' committee.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—Hodenpyl, Hardy & Company, New York, N. Y., and E. W. Clark & Company, Philadelphia, Pa., are offering the unsold portion of $7,500,000 of five-year 6 per cent convertible bonds of the Commonwealth Power, Railway & Light Company to the public at 97½, yielding 6.60 per cent.

Danville, Champaign & Decatur Railway & Light Company, Danville, Ill.—Consolidated and refunding collateral trust gold bonds of the Danville, Champaign & Decatur Railway & Light Company, a holding company and a new subsidiary of the Illinois Traction System, Peoria, Ill., are being offered for sale at 92½ and interest by Merrill, Oldham & Company. The bonds are dated March 1, 1913, and due March 1, 1938, but redeemable at 104 and interest on any interest date.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—The directors of the Fort Wayne & Northern Indiana Traction Company on April 21, 1913, declared a scrip dividend of $3 per share upon the $2,500,000 of 6 per cent preferred stock, payable to stockholders of record April 30, 1913, covering in full the arrears of the dividend, payable 1½ per cent on Dec. 1, 1912, and 1½ per cent on March 1, 1913. The scrip is to be non-interest-bearing, redeemable within five years from April 30, 1913, at the option of the company, or before that time, as it may determine, in the preferred stock at par, or if such optional power has not been exercised, the holder at his option may at any time during the period convert such dividend certificate into preferred stock at par. In view of the fact that a contract has been entered into for increasing the capacity of the power house to over 18,000 kw and that the year in general will be one of considerable expenditure, this scrip dividend is declared and the surplus will be used for development work.

Highland Park & Lake Burien Railroad, Seattle, Wash.—James E. Bradford, corporation counsel of Seattle, has rendered an opinion to O. T. Erickson, chairman of the city utilities committee of the City Council, to the effect that the City Council has authority to accept for the city the offer of the owners of the Highland Park & Lake Burien Railroad to turn over to the city that portion of the road within the city limits. As stated in the ELECTRIC RAILWAY JOURNAL of May 3, 1913, the owners of the railroad offered to transfer the line within the city to the city free of all encumbrances on condition that the city shall maintain the service so that the property owners along the road who subscribed to the funds for the road's construction may have access to Seattle.

Idaho-Oregon Power & Light Company, Boise, Idaho.—An amended plan has been formulated for the readjustment of the capital and the refinancing of the Idaho-Oregon Light & Power Company, a subsidiary of the Idaho Railway, Light & Power Company. Under the amended plan the Idaho Railway, Light & Power Company will purchase all properties, rights and franchises of the Idaho-Oregon Light & Power Company, subject to liens of underlying bonds aggregating $534,000, and will cancel the capital liabilities of the Idaho-Oregon Company held by it. Idaho Railway & Light will create a second mortgage covering all property held by it and by the Idaho-Oregon Company to secure an issue of $4,660,000 of second mortgage 5 per cent convertible bonds, of which $3,212,000 will be Series A bonds and $1,448,000 Series B bonds, convertible into first and refunding bonds of the railway company.

International Railway, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has authorized the International Railway to issue its 5 per cent fifty-year refunding and mortgage bonds to the par value of $1,755,000. Bonds in the amount of $260,000 are to be sold at not less than 92 and the proceeds used for certain additions and betterments made from Aug. 1 to Dec. 31, 1912; $695,000 of the bonds are to be used to refund and retire a like par value of other securities. The latter amount of bonds is to be sold at not less than 92.

Joplin & Pittsburg Railway, Pittsburg, Kan.—Cooke, Holtz & Company, Chicago, Ill., are offering at par and interest $300,000 of 6 per cent gold debentures of the Joplin & Pittsburg Railway of 1910, due April 1, 1920, but convertible after April 1, 1915, if not previously called for (redemption at par and interest), into general mortgage (closed) 6 per cent bonds, due April 1, 1920, the issuance of which was recently approved by the Missouri and Kansas authorities, as noted in the ELECTRIC RAILWAY JOURNAL of May 10, 1913. Under the first mortgage there are now outstanding $1,750,000 of bonds, and additional first mortgage bonds may be issued for not exceeding 80 per cent of the cost of permanent extensions, enlargements and additions, provided the annual net earnings are twice the annual interest charge on all first mortgage bonds outstanding, including those proposed to be issued.

Lehigh Valley Transit Company, Allentown, Pa.—A special meeting of stockholders of the Lehigh Valley Transit Company has been called for June 12, 1913, for the purpose of voting on a proposition to increase the indebtedness of the company in connection with the purchase of the stock of the Easton Consolidated Electric Company and for other purposes.

Michigan & Chicago Railway, Grand Rapids, Mich.—The Michigan & Chicago Railway, the property of which is expected to form part of the system of the Commonwealth Power, Railway & Light Company, Saginaw, Mich., when enlarged under the plan outlined in the ELECTRIC RAILWAY JOURNAL of May 10, 1913, page 867, has been authorized by the Michigan Railroad Commission to increase its capital stock from $3,000,000 to $6,000,000 ($1,017,000 for cash), to issue $3,260,000 of bonds to take up a previously authorized issue, and later, when required, to issue a further $3,512,500 of bonds for new construction. This authorization covers the expenses of providing terminals, tracks, etc., for the road in Grand Rapids; a hydroelectric power plant on the Manistee River; an extension of the company's lines to Otsego, and the establishment of terminal facilities in Allegan. The road is under construction between Kalamazoo and Grand Rapids. It is covered by a mortgage of $3,000,000 filed in August, 1909, with the Chicago Title & Trust Company.

Michigan United Railways, Jackson, Mich.—D. Arthur Bowman & Company, St. Louis, Mo., recently offered at the market price, yielding 5½ per cent, $100,000 of first and refunding gold 5's of 1906, due May 1, 1936, of the Michigan United Railways. Principal and interest is guaranteed (through lease) by the Michigan United Traction Company and the Michigan Railways. The amount of the issue outstanding is $7,208,000, with $3,790,000 reserved for prior liens and for future extensions and additions.

Nashville Railway & Light Company, Nashville, Tenn.—The Nashville Railway & Light Company has taken over the Gallatin Pike Railway, which has been operating a little more than 1 mile of track.

New Orleans Railway & Light Company, New Orleans, La.—E. H. Rollins & Sons, New York, N. Y., are offering for subscription at 99.50 and interest to yield more than 6.15 per cent $2,500,000 of the three-year gold debentures of the New Orleans Railway & Light Company dated June 1, 1913, and due June 1, 1916. This offering is made in accordance with the plan outlined in the ELECTRIC RAILWAY JOURNAL of May 17, 1913, page 909, to offer $2,500,000 of the debentures at this time to provide funds to pay maturing obligations and for extensions and improvements to the system.

New York, New Haven & Hartford Railroad, New Haven, Conn.—A quarterly dividend of 1½ per cent has recently been declared by the New York, New Haven & Hartford Railroad, which places the stock on a 6 per cent basis. This is a reduction from the annual rate of 8 per cent paid since 1895.

Pekin & Petersburg Interurban Railway, Pekin, Ill.—T. W. Rodecker, Pekin, Ill., has been appointed receiver of the Pekin & Petersburg Interurban Railway, promoted by John E. Melick, who was connected with the Springfield, Clear Lake & Rochester Railway. The receivership is the result of a foreclosure suit instituted by M. D. Conaghan, trustee, and Adam Saul, holder of a majority of the first mortgage and debenture bonds of the company, mention of which was made in the ELECTRIC RAILWAY JOURNAL of May 10, 1913, page 869.

Stockton Terminal & Eastern Railway, Stockton, Cal.—The California Railroad Commission has rendered its findings upon the value of the property of the Stockton Terminal & Eastern Railway as follows: original cost, $213,746; reproduction value, $215,918; present value, $202,118.

United Properties Company, Oakland, Cal.—The United Properties Company, in which F. M. Smith is said to own

60 per cent of the $200,000,000 of capital stock, has temporarily been placed in charge of the following trustees pending the preparation of some general plan of financing: Vanderlyn Stow, W. A. Bissell, James K. Moffitt, Gavin McNab, who is attorney for William S. Tevis, and W. I. Brobeck, who is attorney for F. M. Smith. This step followed the placing of the affairs of Mr. Smith in the hands of the Mercantile Trust Company, San Francisco, as trustee, because of the refusal of the banks to renew his outstanding notes, aggregating about $7,500,000. Mr. Smith is president of the United Properties Company.

Virginia Railway & Power Company, Richmond, Va.—The New York Stock Exchange has listed $500,000 of additional refunding mortgage 5 per cent bonds, due 1934, of the Virginia Railway & Power Company. The total of bonds of the company which are now listed is $11,503,000.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1½ per cent, common.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

Citizens' Traction Company, Pittsburgh, Pa., $1.50.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, common.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., $3, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1 per cent, common.

Northern Texas Electric Company, Fort Worth, Tex., quarterly, 1½ per cent, common.

Pensacola (Fla.) Electric Company, 3 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.							
1 mo.	March	'13	$93,157	*$56,997	$36,150	$24,226	$11,934
1 "	"	'12	81,332	*48,662	32,670	21,494	11,176
12 "	"	'13	1,103,348	*663,330	440,018	274,352	165,566
12 "	"	'12	967,272	*571,973	395,299	245,932	149,367
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO							
1 mo.	March	'13	$87,172	*$61,470	$25,702	$31,329	†$5,627
1 "	"	'12	86,529	*54,524	32,004	30,149	1,854
3 "	"	'13	259,992	*173,476	86,515	92,976	†6,461
3 "	"	'12	243,943	*158,811	85,131	90,468	†5,337
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, SAGINAW, MICH.							
1 mo.	March	'13	$562,853	*$318,334	$244,519	$136,236	$108,283
1 "	"	'12	492,601	*290,439	202,162	110,522	91,640
12 "	"	'13	6,603,175	*3,790,854	2,812,321	1,584,216	1,228,105
12 "	"	'12	5,685,169	*3,286,763	2,398,406	1,305,631	1,092,775
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE							
1 mo.	March	'13	$171,116	*$103,150	$67,966	$56,808	$11,158
1 "	"	'12	154,050	*102,578	51,472	52,577	†1,105
12 "	"	'13	2,178,911	*1,214,938	963,973	661,608	302,365
12 "	"	'12	2,044,035	*1,266,293	77,742	581,666	196,076
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.							
1 mo.	March	'13	$203,017	$117,451	$85,566	....	....
1 "	"	'12	176,140	102,688	73,452	....	....
3 "	"	'13	627,724	351,176	276,548	....	....
3 "	"	'12	541,785	303,579	238,206	....	....
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.							
1 mo.	March	'13	$61,309	$30,540	$30,768	$19,396	$11,372
1 "	"	'12	56,172	32,954	23,219	17,177	6,042
9 "	"	'13	574,417	305,762	268,655	167,739	100,916
9 "	"	'12	533,483	317,554	215,929	156,553	59,375
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.							
1 mo.	March	'13	$134,065	$64,925	$69,139	$46,070	$23,069
1 "	"	'12	109,301	52,709	56,592	39,849	16,743
12 "	"	'13	1,605,113	682,470	922,643	522,704	399,939
12 "	"	'12	1,399,059	617,965	781,094	469,036	312,058
NEW YORK (N. Y.) RAILWAYS							
1 mo.	March	'13	$1,672,851	$673,016	$999,834	$388,225	$611,609
1 "	"	'12	1,479,947	705,023	774,924	368,841	406,083
9 "	"	'13	14,478,639	5,926,201	8,552,438	4,078,576	4,473,862
9 "	"	'12	....	....	....	....	....
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY							
1 mo.	April	'13	$1,998,246	$1,193,400	$804,845	$762,444	$42,401
1 "	"	'12	1,903,908	1,161,887	742,021	748,632	†6,611
10 "	"	'13	19,711,038	11,832,115	7,878,924	7,624,964	253,960
10 "	"	'12	18,665,571	11,476,566	7,189,005	7,403,297	†214,292

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*Includes taxes. †Deficit.

Traffic and Transportation

Unification Plans for Chicago Surface Lines

Plans for a unified operating system for the surface railways of Chicago have been presented to the aldermanic committee on transportation by L. A. Busby, president of the Chicago City Railway, and W. W. Gurley, general counsel for the Chicago Railways, and a sub-committee has been appointed to confer with the corporation counsel and representatives of the companies in drafting an ordinance allowing the proposed arrangements. This will be done by altering some sections of the 1907 ordinance now in operation. The plan of unification as presented makes the following provisions, as quoted from the letter to the committee:

"1. (a) Unified operation of all surface railways in the city with the same effect as regards service to the public as though all the lines were owned and operated by one company.

"(b) Through routing of all cars so far as the local service balances—this will eliminate all switchbacks and most of the present looping of cars in the downtown district and will increase the downtown terminal facilities approximately 30 per cent.

"(c) Purchase by the companies of a sufficient number of additional cars to utilize, during the rush hours, the additional track facilities in the downtown district, made available by such through routing—this will increase the rush-hour downtown transportation facilities fully 30 per cent.

"(d) More rapid transit, by means of through-service cars, from one division of the city to another, owing to the relief of congestion in the downtown district.

"(e) A 5-cent fare throughout the entire city on surface lines—this will give a 5-cent fare in lieu of the present 10-cent fare in the Calumet district south of Seventy-ninth Street.

"2. The operating agreement shall be subject to all of the terms, requirements and conditions of the 1907 and subsequent ordinances, except so far as those ordinances are modified by the proposed merger ordinance.

"3. Provision that if in any year, after establishing unified operation on the foregoing basis, the rate of return to the company shall be less than the rate of return under separate operation—which rate shall be agreed upon and specified in the merger ordinance for the remaining period of the present grants—then, in such event, the shortage, if any, shall be deducted from the 'divisible net receipts' the following year before division between the companies and the city. Provided, however, that in case any such shortage shall arise, then the companies shall not be entitled thereafter to receive out of the 'divisible net receipts' any amount in excess of the agreed rate of return until the amount of any such shortage shall have been repaid.

"4. Provision for the investment, in specified securities, of the city traction fund, the renewal fund and any other fund provided by existing ordinances, so as to procure a larger rate of income thereon than can be realized under the present ordinances.

"5. Authority to the companies to lease, on terms to be approved by the board of supervising engineers, any real estate now owned but not necessary to the operation of the properties—this will enable the companies and the city to derive an income from certain property of this kind which cannot now be sold to advantage.

"6. Existing tracks having an estimated life of five years or more may, with the approval of the board of supervising engineers, be rehabilitated, instead of being scrapped, as required by the present ordinances, when new pavement is laid in the street.

"7. Cleaning and sweeping right-of-way occupied by tracks of the companies, including the removal of snow, shall be assumed by the city and the companies shall pay the city monthly the cost of such work—the method of determining the cost to be specified in the merger ordinance.

"8. Reasonable provision shall be made in the merger ordinance for the correction of electrolysis, in lieu of the present electrolysis ordinance.

"9. Specifications in the present ordinances with reference to paving should be revised and brought down to date, and the companies should be permitted to restore or contract for the restoration of any pavement outside of their right-of-way for which they are liable, independent of reserve paving contracts."

The plan as outlined above is one that contemplates an operating agreement rather than a financial merger. The latter, according to Mr. Busby, is not acceptable at this time to some of the companies concerned.

President Shackleford on the Attitude of Tacoma Railway & Power Company

John A. Shackleford, president of the Tacoma Railway & Power Company, Tacoma, Wash., said recently at the open forum of the Commercial Club and Chamber of Commerce of Tacoma:

"Some months ago Mr. Bean and I discussed the matter of the operation of a line over the bridge, and the matter was subsequently taken up with the city commissioners. The city was not prepared to grant a franchise of twenty or twenty-five years' duration and proposed that the company should operate the line for five years. I did not feel that it would be my duty to recommend to my company the operation of such a line, knowing as I did that it would be operated for the first five years at a loss. The Tacoma Railway & Power Company is not willing to bear all the burden, but it is willing to do its share, to stand its proportion of the loss, and if any proposal is submitted to our company that seems at all reasonable I shall be glad to submit the matter to my directors. I believe that even at this late date an agreement can be reached with the city."

Improvements in Peoria.—The Peoria (Ill.) Railway has adopted as a slogan "Watch 1913 Improvements." The company is installing new car signs on top of the cars, bearing significant letters, as "A" for Adams, "H" for Prospect Heights, etc.

New Wage Scale in Winnipeg.—The following wage scale has been agreed to between the Winnipeg (Man.) Electric Railway and its employees: first six months, 25 cents an hour; second six months, 27 cents; second year, 28 cents; third year, 31 cents; fourth and following years, 34 cents.

Oskosh Fair Hearing Closed.—The hearing of the application of the Eastern Wisconsin Railway & Electric Company to amend its schedules of rates between Oshkosh and Omro, continued from April 25, 1913, was held May 15, 1913. The Railroad Commission has taken the case under advisement.

Giving Away or Selling a Transfer Likely to Be Made a Misdemeanor.—Mayor Nye of Minneapolis suggested to the Council in a recent message the passage of an ordinance making it a misdemeanor to sell or give away a street railway transfer. The matter has been referred to the street railway committee.

Stepless Cars in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has received nineteen center-entrance stepless cars similar to the two cars which it has had in operation for some time past. The company has 100 cars of this type on order. The sample car of this type has been described and illustrated in the ELECTRIC RAILWAY JOURNAL.

Distribution of Wage Dividends in Columbus.—The dividends paid to employees of the Columbus Railway & Light Company, Columbus, Ohio, for some time past in periodic instalments will hereafter be added to their wages. The men have been receiving 22½ cents an hour, and this addition will increase the rate to more than 25 cents an hour.

Ohio Company to Stop Rowdyism on Its Cars.—The Northern Ohio Traction & Light Company, Akron, Ohio, will make a determined effort to suppress rowdyism on its cars and has caused the arrest of five offenders recently. Plain clothes men will board the cars at convenient points and all passengers who offend against public decency will be taken into custody.

Baseball Schedule and Timetable.—The Lake Shore Electric Railway, Cleveland, Ohio, is distributing with its compliments a schedule of the games to be played by the Cleveland club of the American League on the home grounds in Cleveland. The schedule is in the form of a four-page folder the last page of which is devoted to a timetable of the six through limited trains between Cleveland and Detroit each way daily.

Safety Campaign in Joliet.—The Chicago & Joliet Electric Railway and the Illinois Steel Company, Joliet, Ill., are co-operating in a safety first campaign for the 7500 school children of Joliet. The railway company takes between 300 and 400 school children daily in special cars to the steel works club, where the safety expert of the steel company delivers talks on caution and the prevention of accidents. These are illustrated by moving pictures. In addition to furnishing the school children with free transportation to these lectures the railway is carrying on a series of safety talks with the moving pictures.

Service Improvements in Atlanta.—The conclusions of the Railroad Commission of Georgia in regard to the railway service of the Georgia Railway & Power Company, Atlanta, Ga., have been submitted to the officers of the company and they have agreed to confer with the members of the commission in regard to the suggestions which have been made. It is unlikely that the commission will enter any order in connection with the inquiry into the service of the company till after the conference between the members of the commission and the officers of the company.

Hearing on Service in Lawrence.—The Massachusetts Railroad Commission gave a hearing at Boston on May 14 on service conditions upon the Bay State Street Railway in Lawrence. James F. Jackson, for the company, said that additional double track is being installed to enable more cars to be operated and better schedules maintained. The work under way will cost about $88,000. At the close of the hearing Chairman McLeod said that the disposition of the company to co-operate augured well for the future service conditions and called attention to the fact that in a large mill town it is almost impossible for a street railway to provide a rush-hour service adequate to the demands.

Through Cars Between Rochester and Buffalo.—It is reported that negotiations are pending between the officers of the Beebe Syndicate, Syracuse, N. Y., and the International Railway, Buffalo, N. Y., for the operation of cars of the Buffalo, Lockport & Rochester Railway, controlled by the Beebe Syndicate, through from Rochester to Buffalo. At present the cars of the Buffalo, Lockport & Rochester Railway are operated from Rochester to Lockport, where a connection is made with the lines of the International Railway. It is also stated that there is possibility of operating cars of the Beebe Syndicate in 1914 through from Syracuse to Buffalo via the Rochester, Syracuse & Eastern Railway, the Buffalo, Lockport & Rochester Railway and the International Railway.

Appeal to I. C. C. Against the Washington, Baltimore & Annapolis Railroad.—Charges of discrimination are made against the Baltimore, Chesapeake & Atlantic Railway, the Washington, Baltimore & Annapolis Railroad and the Washington Railway & Electric Company, in a complaint filed with the Interstate Commerce Commission by the Eastern Shore Development Steamship Company. The principal defendant is the Baltimore, Chesapeake & Atlantic Railway, the others being made defendants because they maintain joint rates with the other company. The petitioner seeks to have the commission, after investigation, not only order the respondents to establish reasonable joint rates with the petitioner but to pay by way of reparation "for the unlawful acts of omission and commission."

Emergency Railway Duties of Physicians.—Dr. R. C. Menzies, surgeon Chicago (Ill.) Railways, made an address on "Surface Traction Emergency Work" before the Illinois Homeopathic Medical Association at the Hotel Sherman, Chicago, on May 15. He said in part: "By taking immediate care of those injured the company is saving money for itself and at the same time is acting to the great advantage of the patient. In paying attention to the care of its accident cases a traction company is acting for strictly business reasons. If an accident is quickly and efficiently cared for, the average amount of the injury is considerably lessened and the amount of the damage for which the company is liable is likewise lessened. The company desires merely to minimize the amount of damage done by accidents, and to protect itself against fraud."

Personal Mention

Mr. C. J. Spragle has been appointed general manager of the United Water, Light & Traction Company, Somerset, Ky., which is controlled by the Kentucky Utilities Company, Lexington, Ky. He succeeds Mr. J. L. Waddle.

Mr. W. C. Wishart, formerly statistician of the Public Service Commission of the Second District of New York, has become connected with the New York Central & Hudson River Railroad, New York, N. Y., in a similar capacity.

Mr. Alfred J. Guyon, assistant superintendent of employment of the Boston (Mass.) Elevated Railway, has been placed in charge of the department of employment until further notice, succeeding Mr. Julius E. Rugg, who retired at his own request recently, as noted in a previous issue.

Mr. Duncan McDonald, formerly general manager of the Montreal (Que.) Tramways, has been appointed managing director of the Canadian Autobus Company, which plans to install an omnibus line in Montreal. Mr. McDonald is president of the Montreal Tunnel Company and is chairman of the board of directors of the Prepayment Car Sales Company, New York, N. Y., and a director of the International P. A. Y. E. Company, Ltd., London, Eng., and Paris, France.

Mr. F. M. Millson, whose appointment as general purchasing agent of the Lincoln (Neb.) Traction Company was noted in the Electric Railway Journal recently, was born in Salem, Ill., in 1880. He entered the service of the Burlington & Missouri River Railroad in the construction department in Montana in 1901 and was later transferred to the Denver & Rio Grande Railroad with headquarters at Denver. Early in 1904 he accepted a position in the office of the superintendent of transportation of the Illinois Central Railroad at Chicago and continued with that company until 1912. He has since been connected in various capacities with steam railroads in the West.

Mr. John E. Wilkie, chief of the customs agents, whose resignation was announced recently, will become assistant to Mr. Henry A. Blair, chairman of the board of the Chicago (Ill.) Railways. Mr. Wilkie was born at Elgin, Ill., on April 27, 1860, and was graduated from the Chicago high school. He began newspaper work on the Chicago *Times* in September, 1877. In 1881 he joined the forces of the Chicago *Tribune*, with which paper he continued until 1893, when he entered the banking and steamship business in London, Eng. In 1896 he returned to the United States and resumed work for the Chicago newspapers. He has been chief of the United States secret service since February, 1898.

Mr. W. F. Graves, superintendent of track of the Chicago (Ill.) City Railway, has been appointed chief engineer of the Montreal (Que.) Tramways to succeed Mr. J. D. Evans, whose appointment as construction manager of the Electric Bond & Share Company, New York, N. Y., was noted in the Electric Railway Journal of Jan. 4, 1913. Mr. Graves entered railway work as a civil engineer with the Chicago, Rock Island & Pacific Railway in 1895. He was finally made engineer of maintenance of way of the Southwestern district for that company. In 1900 he became connected with the Missouri Pacific Railway as assistant engineer of maintenance of way. In 1903 he entered the employ of the South Side Elevated Railroad, Chicago, Ill., as engineer of construction. In 1907 he became connected with the Chicago City Railway as superintendent of track.

Mr. John P. Moore has been appointed superintendent of power and equipment of the Northwestern Pennsylvania Railway, Meadville, Pa. Mr. Moore was formerly connected with the Westinghouse Electric & Manufacturing Company in general railway engineering work. Mr. Moore began his electrical career with the testing and construction departments of the General Electric Company. He was with the Indianapolis Northern Traction Company and the Union Traction Company of Indiana as erecting engineer during the construction of the Indianapolis-Logansport division, and was with the National Railways Construction Company and the Keystone Construction Company as electrical engineer during the construction of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company's line. Mr. Moore was connected with the Wyandotte Construction Company as electrical engineer during the construction of the Kansas City, Clay County & St. Joseph Railway, and upon the completion of the line he entered the service of the Westinghouse company.

Mr. B. J. Denman, chief engineer of power plants of the Detroit (Mich.) Edison Company, has been appointed assistant general manager of the United Light & Railways Company with headquarters at Davenport, Ia. Mr. Denman is well known in the electric railway field. He was graduated from the University of Michigan and from 1892 to 1895 he was connected with the Toledo (Ohio) Consolidated Street Railway in various capacities. He was next appointed electrician for the Toledo & Maumee Valley Railway in charge of the repair shops. During 1899 and 1900 he was instructor in Toledo University and in 1900 and 1901 was associated with Mr. W. G. Clark under the firm name of Clark & Denman, consulting engineers. From 1902 to 1905 Mr. Denman was electrical engineer of the Toledo, Bowling Green & Southern Traction Company. Before his appointment as chief engineer of power plants of the Detroit Edison Company in 1912 Mr. Denman was with the company in commercial engineering work, power house construction and operation and special engineering and appraisal work. During 1906 and 1907 he acted as assistant professor of mechanical engineering in the University of Michigan and in 1908 and 1909 he was non-resident lecturer in the electrical engineering department of the university.

OBITUARY

George D. Rosenthal, district manager of the General Electric Company in St. Louis, Mo., died in the German Hospital in New York on May 19, 1913, following an operation for appendicitis performed on May 12. Mr. Rosenthal was forty-four years old. He became connected with the General Electric Company in 1892. Previous to that he was with the Edison Lamp Works at Harrison, N. J. The interment was at St. Louis on May 23.

Horace G. Burt, formerly president of the Union Pacific Railroad, died in Chicago, Ill., on May 19, 1913. Mr. Burt was sixty-four years old. He began his railroad career in 1868 with the engineering department of the St. Louis, Vandalia & Terre Haute Railroad. In April, 1911, he was selected by the electrification committee of the Chicago Association of Commerce as chief engineer to direct the investigation to be conducted by the committee in regard to the necessity for the electrification of the railroads which operate into Chicago.

Stephen D. Field, one of the pioneers in electric railways, died at his residence in Stockbridge, Mass., on May 18, 1913. Mr. Field was an inventor in many fields of electrical work and in 1879 and 1880 applied for patents for an electric railway, including a stationary generator, trolley wire, electric car, under-running trolley and bonded rails for return circuit. In 1880 he constructed an experimental electric line in Stockbridge and in 1883, in connection with Mr. Edison, operated an electric locomotive by a third-rail at the Chicago Railway Exposition. He also made a number of inventions in telegraphy. Following his early work he did little in the electric railway field except in the later nineties, when, representing American capitalists, he had engineering charge of the electrical equipment of the tramway system at Geneva, Switzerland.

M. J. Maxwell, superintendent of transportation of the Pittsburgh (Pa.) Railways, died on May 20, 1913. Mr. Maxwell was born in Ireland in 1857 and came to this country with his parents in 1866. He entered the employ of the Pennsylvania Railroad Company and later was appointed foreman of the foundries of the Pittsburgh Malleable Iron Company. He assisted in organizing the Pittsburgh Express Company, which operated the first electric railway express cars in Pittsburgh and was superintendent of that company. Mr. Maxwell next became division superintendent of the Pittsburgh Railways in charge of all of the North Side lines. He served the Pittsburgh Railways until 1895, when he was made general superintendent of the Beaver Valley Traction Company, but in 1899 he re-entered the employ of the Pittsburgh Railways as superintendent of transportation.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***California, Shasta & Eastern Railroad, Redding, Cal.**—Application for a charter has been made by this company to rebuild the 16-mile Anderson & Bella Vista Railroad, which it recently purchased, and to extend the line to Ingot, 12½ miles. The Railroad Commission has authorized the company to sell bonds for construction purposes. Capital stock, $600,000. Directors: S. E. Bretherton, W. T. Barnett, Berkeley; Felix T. Smith, Paul A. McCarthy, Platt Kent, V. W. Vincent, San Francisco; F. D. Madison, San Rafael.

Miami & South Florida Railway, Miami, Fla.—Application for a charter has been made by this company in Florida to build a 100-mile electric railway to connect Palm Beach, Miami, Homestead and Detroit. Capital stock, $500,000. Officers: H. C. Roome, president; Nathan A. Cole, vice-president; J. M. Cobb, secretary and treasurer. [E. R. J., May 10, '13.]

***Charlotte Harbor & East Coast Electric Railway, Venice, Fla.**—Application for a charter has been made by this company in Florida to build a 26-mile electric railway to connect Venice, Salt Spring and Charlotte Harbor. Officers: W. J. Bowling, St. Louis, Mo., president; W. J. Epherson, Bronson, vice-president; T. C. Epherson, Bronson, treasurer.

***Chicago & Northern Railroad, Chicago, Ill.**—Chartered in Illinois to build an interurban railway from Chicago to Lake Geneva, via Palatine, Algonquin, Crystal Lake, Richmond and Genoa Junction. The surveys have been made and the line will be so constructed as to allow steam trains as well as electric cars to run over the tracks. It is intended for both freight and passengers.

Columbus, Marion & Bucyrus Interurban Railway, Columbus, Ohio.—Incorporated in Ohio to take over the property of the Columbus, Marion & Bucyrus Railroad, purchased by representatives of the bondholders on May 10. Capital stock, $250,000. Incorporators: F. L. Hopeley, James R. Hopley, William H. Auck, Peter McCarthy and James D. Livingston.

***Dallas (Tex.) Electric Company.**—Incorporated in Maine presumably as the successor to the Dallas Electric Corporation of New Jersey. Capital stock, $7,000,000. Directors: William E. Tucker, Chelsea, president; Davis W. Snow, Portland, Maine; Alvah K. Todd, Milton, Mass.; Philip L. Warren, Wollaston, Mass.; Ernest I. Doe, Boston; John M. Pierce, Carrol B. Skillin, Ernest M. White and Robert M. Pennell, Portland, Maine.

FRANCHISES

Medicine Hat, Alta.—A vote was taken on May 22 authorizing the Council to sign a franchise agreement with the Montreal Engineering Company for the construction of an electric railway in Medicine Hat. The agreement gives the company a twenty-year franchise renewable every five years. The company agrees to begin work within three months from the final passing of the by-law and to finish 3 miles of railway within nine months, a further 3 miles within twelve months and a further 3 miles within twenty months; the whole provided the necessary material can be obtained in time. [E. R. J., April 19, '13.]

Pine Bluff, Ark.—The Pine Bluff & Sulphur Spring Interurban Railway has received a franchise in Pine Bluff. This 8-mile electric line will connect Pine Bluff and Sulphur Springs. A. G. Russell, president. [E. R. J., April 19, '13.]

Orange, Cal.—The Pacific Electric Railway has received permission from the Supervisors to begin work on North Main Street north of the city limits of Santa Ana, over which the company holds franchise rights.

Freeport, Ill.—The Freeport Railway & Light Company has received a twenty-year franchise from the Stephens Supervisors to build through Florence and Harlem.

Rockford, Ill.—The Rockford City Traction Company and the Rockford & Interurban Railway have asked the City Council for a franchise to construct a double track on State Street from Royal Avenue west to the city limits.

West Hammond, Ind.—The Union Railway & Power Company, Chicago, has asked the Council for a franchise in West Hammond. This line will connect Chicago, Hegewisch, West Hammond and Hammond. Arthur Jost, 715 Royal Insurance Building, Chicago, president. [E. R. J., Sept. 28, '12.]

Oxford, Mass.—The Worcester Consolidated Street Railway has asked the Council for a franchise in Oxford.

Greece, N. Y.—The New York State Railways, Rochester, has asked the Town Board for a franchise in Greece.

New York, N. Y.—The Union Railway has asked the Board of Estimate for a modification of contract authorizing the company to construct an electric railway on the 155th Street viaduct westerly to Broadway by substituting Amsterdam Avenue for Broadway and reducing the annual payments; also for a franchise to build three extensions to its existing lines.

Hamilton, Ont.—The Ontario Railway & Municipal Board has approved of the plans for several extensions of the Hamilton Street Railway in Hamilton.

Scarboro, Ont.—The Toronto & Eastern Railway has received a franchise from the Council in Scarboro.

Pointe-aux-Trembles, Que.—On condition that 5-cent fares are given, the Council of Pointe-aux-Trembles will grant a forty-year franchise to the Montreal Tramways.

Chattanooga, Tenn.—The Chattanooga Railway & Light Company has asked the Council for a franchise on Seventh Street, from Market Street to Broad Street, in Chattanooga.

Chattanooga, Tenn.—The Eastern Tennessee Traction Company has asked the James County Court for a franchise to build a 30-mile railway between Chattanooga and Cleveland, Tenn. The other counties through which the line will pass have already granted franchises. Lewis M. Coleman is interested. [E. R. J., May 3, '13.]

Austin, Tex.—The San Antonio & Austin Interurban Railway has accepted the franchise granted by the County Commissioners' Court of Travis County to cross the Colorado Bridge and to build through Travis County. This line will connect Austin and San Antonio. Vories P. Brown, San Antonio, president. [E. R. J., April 19, '13.]

Gainesvile, Tex.—E. P. Turner and associates of Dallas have received a franchise from the Commissioners' Court to build an electric railway in the county.

Salt Lake City, Utah.—The Salt Lake & Ogden Electric Railway has asked the Council for a franchise to connect with the lines of the Salt Lake & Utah Railway to extend its tracks eastward from the site of the present terminal to First West Street, Salt Lake City, where connection will be made with the lines of the Salt Lake & Utah Railway.

Tacoma, Wash.—The Tacoma Railway & Power Company has received a franchise from the Council to extend its lines to the tideflats in Tacoma.

Morgantown, W. Va.—The Morgantown Interurban Railway has received a franchise from the County Court for its 10-mile line to connect Morgantown, Point Marion and Star City. Joseph H. McDermott, Morgantown, president. [E. R. J., May 17, '13.]

Appleton, Wis.—The Wisconsin Traction, Light, Heat & Power Company has asked the Council for a franchise to double-track its line on Lake Street in Appleton.

TRACK AND ROADWAY

***Tidewater Securities Corporation, Birmingham, Ala.**—This company has been organized at Birmingham to build a railroad from Birmingham to Gadsden, 60 miles, and to the Warrior River, 30 miles. Capital stock, $100,000. J. M. Dewberry, Birmingham, president.

Edmonton, Stony Plain & Wabamun Railway, Edmonton, Alta.—Arrangements have been made by this company to begin the construction of its line at the western city limits of Edmonton. This 40-mile railway will connect Edmonton, Stony Plain and Lake Wabamun. E. S. McQuaad, Edmonton, is interested. [E. R. J., April 12, '13.]

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded the contract for the grading of its Clover-Burnside loop to Brown & Simmons.

Pacific Electric Railway, Los Angeles, Cal.—Work will be begun at once by this company on its 21-mile line between Upland and San Bernardino. Construction will be begun at Fontana, just west of Rialto, June 7.

Waycross Street & Suburban Railway, Waycross, Ga.—Work will be begun at once by this company on its Gilchrist Park extension.

Lewiston-Clarkson Valley Railway, Lewiston, Idaho.—The citizens of Lewiston have subscribed $90,000 for the construction of an electric line from Lewiston to Lewiston Orchards, via Normal Hill. F. L. Sturm, Lewiston, president. [E. R. J., May 3, '13.]

Union Railway & Power Company, Chicago, Ill.—This company states that construction will be begun as soon as the company has obtained certain franchises for its 18-mile electric line to connect Chicago, Ill., and Hammond, Ind., via Hegewisch and West Hammond. Surveys have been made between Hegewisch and Hammond, 4 miles, and surveys are under way between Harvey and West Hammond, 6 miles. Arthur Jost, 715 Royal Insurance Building, Chicago, Ill., president. [E. R. J., Sept. 28, '12.]

Springfield & Central Illinois Traction Company, Springfield, Ill.—This company has filed with the recorder of Madison County at Edwardsville a mortgage for $20,000,000 to the Chicago Title & Trust Company, Chicago, and the City Safe Deposit & Agency Company, Ltd., London, England. I. Smith, 1042 Pierce Building, St. Louis, president. [E. R. J., May 17, '13.]

Evansville & Indianapolis Light, Power & Electric Railway, Evansville, Ind.—This company states that it will not begin the construction of its 158-mile electric railway to connect Evansville and Indianapolis, via Oakland City, Petersburg, Washington, Bloomfield, Worthington, Spencer and Martinsville, until next year. Surveys are being made between Evansville and Bloomfield. Arthur C. Stone, 113 Upper Fourth Street, Evansville, president. [E. R. J., July 6, '12.]

Davenport-Muscatine Railway, Davenport, Ia.—Among the improvements planned by this company will be the rebuilding of some of its lines in Muscatine with heavier rails.

Hutchinson (Kan.) Interurban Railway.—Work will soon be begun by this company on its line along Sixth and Eighth Avenues east from Hoagland Avenue in Hutchinson.

Independence, Neodesha & Topeka Railway, Independence, Kan.—The citizens of Independence have voted $35,000 to aid in the construction of this 130-mile electric railway to connect Independence and Topeka, via Neodesha, Altoona, Fredonia and Chanute. T. Blarksley, Neodesha, president. [E. R. J., Sept. 14, '12.]

Salina, Tifton & Northern Railway, Salina, Kan.—Permanent surveys are being made by this company for its railway between Salina and Osborne via Penn, Hancock, Bloom, Pittsburgh and Custer. This line has been promoted as a steam railway with gas-electric or gasoline motors for its passenger service. There is a possibility of it being changed to an electric line as plans for this are now being considered. H. W. Neiswanger, Salina, is interested. [E. R. J., April 27, '13.]

Topeka (Kan.) Railway.—Plans are being made by this company to build an extension to Twenty-first Street in South Topeka and an extension to Gage Park.

Wichita Railroad & Light Company, Wichita, Kan.—During the summer this company plans to spend $71,000 on improvements of its lines in Topeka. The work will include the double-tracking and extension of some of its lines.

Kentucky Utilities Company, Lexington, Ky.—Several improvements are being planned by this company, including possibly the extension of its line to Burnside from Somerset, 7 miles.

Brandon (Man.) Municipal Street Railway.—Further debentures to the amount of $100,000 will be issued to complete the construction of this electric railway. This will bring the total debentures issued for this purpose to $400,000. About 6½ miles of track have already been laid and it is proposed to add 2 more miles. [E. R. J., June 22, '12.]

St. Joseph & Savannah Railway, St. Joseph, Mo.—This company has received a joint communication from the Commercial Clubs of Stanberry, Mo., and Empire Prairie, Mo., in which the organizations guarantee a free right-of-way for an interurban line from St. Joseph to Stanberry, with free terminal facilities at Stanberry.

St. Louis & Western Traction Company, St. Louis, Mo.—This company will not begin the construction of its 40-mile electric railway from St. Louis to Gilmore until all the right-of-way has been secured. About 25 miles of the right-of-way has been obtained and 6 miles have been graded. James D. Houseman, 701 Roe Building, St. Louis, president. [E. R. J., Sept. 7, '12.]

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—According to the estimates, the entire cost of this railway from its eastern terminus in the business section of Omaha to its western terminus in Omaha will be $2,634,756, with provisions made for a power house. Under the plans as outlined, the cars will operate over the Omaha & Council Bluffs Street Railway's tracks through South Omaha into Lincoln and over the present established line into Omaha and Bethany Heights. The rest of the route will be entirely new construction. The company has obtained permission to issue $3,100,000 of stock and bonds, providing for the cost of construction. The estimated costs of some of the various steps of construction are given as follows: Right-of-way and lands, $146,000; clearing of lands and grading, $316,380; track materials assembled, $376,621; bridges and culverts, $191,146; the Platte River bridge, $94,300; overhead trolley and feeders, $155,765; rolling-stock equipment, $180,000; power houses and substations, $441,825; carhouses and repair shops and buildings, $135,000.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Work has been begun by this company reconstructing 1 mile of its line on Leavenworth Street in Omaha with heavier rails. Extensions to the north and southwest sections of Omaha are being planned by the company.

***Sioux City, Neb.**—F. W. Baker and H. P. Buhman, Omaha, are considering plans to build an electric railway to connect Sioux City and Niobrara and later extensions to O'Neill and other cities of eastern Nebraska.

United Traction Company, Albany, N. Y.—Plans are being considered by this company for an extension from New Scotland Avenue over the old railroad bed, coming out on Delaware Avenue at a point near Morton Avenue in the Woodlawn section in Albany. Plans are being made to extend the company's lines into the Temperance Hill district of Watervliet.

Winchester & Northern Railroad, White Plains, N. Y.—The Connecticut Legislature has passed the bill which authorizes this company to build its line from White Plains, N. Y., to Danbury, Conn. The company has a New York charter and did not apply for a charter in Connecticut, but merely for the right to operate in the State. [E. R. J., Jan. 6, '12.]

Cape Breton Electric Company, Sydney, N. S.—This company plans to expend about $1,000,000 on improvements and extensions of its lines in Sydney during the year. Work will soon be begun.

Cleveland & Akron Short Line Railway, Cleveland, Ohio.—This company will begin work soon on its 26-mile electric railway to connect Cleveland, Akron and Barberton. The company will also furnish power for lighting purposes. Capital stock, $25,000; issued, $25,000. Officers: Henry S. Chapman, 304 New England Building, Cleveland, president; Charles O. Hall, Cleveland, vice-president; Charles E. Barnum, Citizens' Bank Building, Cleveland, secretary and treasurer, and W. E. Hawley, New England Building, Cleveland, chief engineer. [E. R. J., May 17, '13.]

Ottawa & Morrisburg Electric Railway, Ottawa, Ont.—Financial arrangements have been perfected by this company and construction will be begun at once on this 26-mile line to connect Ottawa, Morrisburg and Brockville. It will ultimately be extended to Kingston. Power will be secured from the Chaudiere at Ottawa. A Chicago firm has secured the contract to build and equip this railway. J. G. Kilt, Citizens' Building, Ottawa, president. [E. R. J., March 22, '13.]

Portland Railway, Light & Power Company, Portland, Ore.—This company will spend about $250,000 in laying new tracks in the Woodstock district this year. Calls for bids for materials and construction will be issued at once.

West Side Electric Street Railway, Charleroi, Pa.—This company is now letting contracts for the extension of its line between Charleroi and Bentleyville, Pa., the Parsons Construction Company, Brownsville, having secured the latest contract. This is for the grading of 2 miles of the work. The tracks are to be laid by the company itself. About 30,000 cu. yd. of material will have to be removed.

Northwestern Railways Company, Meadville, Pa.—This company, which operates all the electric railways radiating from Meadville, has offered the Erie Railroad $150,000 for its old-grade line between Meadville and Cambridge Springs. The new double-track line of the Erie Railroad will result in the abandonment of the old grade.

Oxford, Cochranville & Parkersburg Electric Railway, Oxford, Pa.—This company has surveyed its line from Oxford to Parkersburg, a distance of 16 miles, and graded 3 miles between Oxford and Hayesville. The line will connect Oxford, Parkersburg, Cochranville and Russelleville.

Franklin & Towamensing Street Railway, Slatington, Pa.—This company states that construction of its line from Slatington to Lehighton, 10 miles, will not be begun until the state road now under contemplation has been built through the Lehigh Gap. A. P. Berlin, Slatington, president. [E. R. J., Jan. 15, '10.]

Monongahela, Ellsworth & Washington Railway, Washington, Pa.—This company has asked permission to increase its capital stock to $600,000. Financial arrangements have been made whereby the company plans to build soon its line between Monongahela and Ellsworth. [E. R. J., March 1, '13.]

***Washington, Pa.**—Officials of the Washington & Jefferson College and the Washington Board of Trade are considering plans to build an electric railway from the river district into Washington. The project will be presented to the Pittsburgh Railways, and it is said that an effort will be made to persuade that company to co-operate.

Hull (Que.) Electric Railway.—This company has been authorized to build a line from a point on its main line between Hull and Aylmer, Que., to the premises of the Connaught Park Jockey Club.

Montreal & Southern Counties Railway, Montreal, Que.—The first link of 18 miles in the line which this company is building from Montreal to the eastern townships has been completed and will be placed in operation on May 31. It will extend from McGill Street in Montreal through St. Lambert to Richelieu via Greenfield Park, St. Hubert, Brookline, Chambly Basin and Chambly Canton.

Quebec Railway, Light & Power Company, Quebec, Que.—It is reported that this company will build an extension to Limoilou, Que.

Rhode Island Company, Providence, R. I.—Plans are being considered by this company to build a line from Chepachet to Smithfield and Providence.

***Cross Anchor, S. C.**—Daniel M. Miles and associates plan to build an electric railway from Spartanburg to Cross Anchor, via Arkwright Mills, Walnut Grove, Nesbitts and Hobbyville.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—Grading has been completed by this company between Paris Station and Enoree River and the rails will be laid at once. Work has been begun on the other side of Enoree River.

Sioux Valley & Northwesern Railroad, Watertown, S. D.—This company states that definite plans have not yet been made for the construction of its 20-mile interurban railway between Watertown and Strousetown. Capital stock authorized, $1,000,000. Officers: Frank S. Heathcote, Summit, president; J. C. Maxwell, Ortey, secretary. [E. R. J., April 19, '13.]

Lake View Traction Company, Memphis, Tenn.—Work has been begun by this company improving its line between Memphis and Lake View, Miss.

Dallas & Terrell Interurban Railway, Dallas, Tex.—The Stone & Webster Engineering Corporation, Boston, Mass., has arranged to begin soon the construction of this interurban electric line which is to run between Dallas and Terrell. The survey for the proposed line has been finished and the right-of-way is being secured. A. M. Somers, Terrell, is interested. [E. R. J., April 19, '13.]

Logan (Utah) Rapid Transit Company.—This company has acquired the right-of-way for its southern extension through Wellsville Canyon.

Fayette Traction Company, Fayetteville, W. Va.—This company, which plans to build an electric railway to connect Fayette Station, Oak Hill and Fayetteville, has increased its authorized capital stock from $50,000 to $75,000. M. M. Malcolm, Fayetteville, is interested. [E. R. J., March 22, '13.]

Charleston, Parkersburg & Northern Railroad, Parkersburg, W. Va.—Right-of-way has been secured and preliminary arrangements are being made by this company to begin soon the construction of its 47-mile electric railway to connect Charleston and Parkersburg. K. B. Stephenson, Parkersburg, promoter. [E. R. J., May 3, '13.]

Beloit, Delavan & Clinton Railway, Beloit, Wis.—This company advises that construction will be begun as soon as it has obtained the right-of-way for its 22½-mile line between Beloit, Shopiere, Clinton, Allen Grove, Darien and Delavan. About one-half of the right-of-way has been secured. The company will also furnish power for lighting purposes, and water power will be obtained at Shopiere. Capital stock authorized, $50,000. Charles F. Lathers, Beloit, is interested. [E. R. J., April 26, '13.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company will begin the reconstruction of its tracks on the east end of North Avenue and Lake Drive in Milwaukee at once.

SHOPS AND BUILDINGS

Tri-City Railway & Light Company, Davenport, Ia.—This company is said to have secured an option on property at Second and Perry Streets in Davenport for a site for a four-story building. The first floor will be used as an interurban station and waiting room for city lines and the rest of the building for headquarters for the general offices of the company.

Springfield (Ohio) Railway.—This company has purchased 5 acres of land at Clifton Street and East Street in Springfield on which it plans to build a new carhouse in the near future.

POWER HOUSES AND SUBSTATIONS

Albany (Ga.) Transit Company.—This company will add to its power house a 200-kw motor-generator set and switchboard apparatus recently ordered from the General Electric Company.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company will add to its substation equipment a 1000-kw rotary converter. The order has been placed with the General Electric Company.

Omaha, Lincoln & Beatrice Interurban Railway, Lincoln, Neb.—Plans are being considered by this company to build a new power plant in Lincoln. The cost of power houses and substations is estimated to be about $441,000.

Columbus Railway & Light Company, Columbus, Ohio.—This company has placed an order with the General Electric Company for a 5000-kw Curtis turbo-generator unit with exciter and switchboard apparatus.

Philadelphia (Pa.) Rapid Transit Company.—Work will soon be begun by this company on alterations and additions to its power house at 963 North Beech Street in Philadelphia. The new work will include a two-story wing. The cost is estimated to be about $250,000.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—This company has placed an order with the General Electric Company for new substation equipment consisting of a 2500-kva Curtis turbo-generator with a 35-kw motor-generator exciter set, three 500-kva transformers and switchboard apparatus.

Manufactures and Supplies

ROLLING STOCK

Bay State Street Railway, Boston, Mass., is building ten cars in its own shops.

Omaha & Council Bluffs Street Railway, Omaha, Neb., is building ten 44-ft. trail cars in its Omaha shops.

Holyoke (Mass.) Street Railway has ordered five closed car bodies from the Wason Manufacturing Company.

Scranton (Pa.) Railway has placed an order with the Southern Car Company for five double-truck city cars.

Northampton (Mass.) Street Railway has placed an order with The J. G. Brill Company for two closed car bodies.

Tidewater Power Company, Wilmington, Del., is building three double-truck interurban cars in its own shops.

Seattle, Renton & Southern Railway, Seattle, Wash., has ordered eleven cars from the Cincinnati Car Company.

Galesburg & Kewanee Electric Railway, Kewanee, Ill., is rebuilding seven of its closed city cars at its shops in Kewanee.

Los Angeles (Cal.) Railway has ordered seventy-five side-entrance cars, with double trucks, from the St. Louis Car Company.

Bangor Railway & Electric Company, Bangor, Maine, has ordered one express car body from the Wason Manufacturing Company.

Springfield (Ohio) Railway has ordered ten double-truck cars, mounted on Baldwin maximum traction trucks, through W. R. Kerschner, from the Cincinnati Car Company.

Altoona & Logan Valley Electric Railway, Altoona, Pa., expects to purchase ten 28-ft. double-truck cars, with maximum traction trucks and five interurban cars.

People's Street Railway, Nanticoke, Pa., has ordered two 36-ft., semi-convertible, pay-as-you-enter cars, mounted on 27-GE-2 trucks, from The J. G. Brill Company.

Philadelphia (Pa.) Rapid Transit Company has ordered one 36-ft. milk motor car and six 40-ft. flat trail car bodies, mounted on Brill 55-G trucks, from The J. G. Brill Company.

Hagerstown (Md.) Railway, noted in the Electric Railway Journal of May 10, 1913, as expecting to purchase seven double-truck cars, has ordered these cars from the G. C. Kuhlman Car Company.

Saskatoon (Sask.) Electric Railway, noted in the Electric Railway Journal of April 12, 1913, as expecting to purchase six double-truck cars, has ordered these cars from the Preston Car & Coach Company.

Toronto (Ont.) Civic Line, noted in the Electric Railway Journal of Feb. 15, 1913, as expecting to purchase twenty cars, has ordered these cars, mounted on Baldwin 75-20-k trucks, from the Niles Car & Manufacturing Company.

Southern Traction Company, Dallas, Tex., noted in the Electric Railway Journal of Feb. 22, 1913, as having ordered twenty-two closed cars from the St. Louis Car Company, has specified the following details:

Seating capacity	56	Couplers	Tomlinson
Length of body	53 ft. 6 in.	Curtain fixtures,	Nat'l L. W. Co.
Length over vestibule,	52 ft. 6 in.	Curtain material	Pantasote
Width over sills	8 ft. 10 in.	Destination signs	St. L.
Width over all	9 ft.	Gongs	Elec. S. Sup.
Height, rail to sills	43 in.	Hand brakes	St. L.
Sill to trolley base	9 ft. 2 in.	Heaters	electric
Body	composite	Headlights	G. E.
Interior trim	quartered oak	Sanders	Keystone
Headlining	Agasote	Sash fixtures	Edwards
Roof	turtle-back	Seats	St. L.
Underframe	composite	Seating material	leather
Bumpers,	Hedley anti-climbers	Step treads	Stanwood
Car trimmings	St. L.	Trolley catchers	Knutson
Conduits and junction boxes,	St. L.	Trolley base	U. S.
		Trucks	Brill 27-MCB-3-x
		Varnish	Murphy

New York State Railways, Rochester, N. Y., noted in the Electric Railway Journal of March 1, 1913, as having ordered ten semi-convertible pay-as-you-enter cars from the Cincinnati Car Company, has specified the following details for these cars:

Seating capacity	44	Couplers	Brill
Bolster centers, length,	21 ft. 11 in.	Curtain fixtures	Forsyth
Length of body	30 ft. 11 in.	Curtain material	Pantasote
Length over vestibule,	43 ft. 4 in.	Gongs	Dedenda
Width over sills	8 ft. 3 in.	Hand brakes	Peacock
Width over all	8 ft. 3 in.	Heaters	Smith
Height, rail to sills	34 in.	Headlights	Crouse-Hinds
Sill to trolley base	8 ft. 7 in.	Motors,	two West, outside-hung
Body	wood	Sash fixtures	Dayton
Interior trim	cherry	Signals	Consolidated
Headlining	Agasote	Step treads	Feralum
Roof	arched	Trucks	Brill 39-E
Underframe	metal	Ventilators	Brill
Car trimmings	Dayton	Wheel guards	H-B

TRADE NOTES

M-C-B Company, Chicago, Ill., has elected Charles R. Westcott secretary and treasurer of the company.

Standard Railroad Supply Company, Indianapolis, Ind., has been incorporated with a capital stock of $10,000 to deal in railroad supplies. The directors are Ernest H. Tripp, L. P. Newby and John R. Ward.

Perry Ventilator Corporation, New Bedford, Mass., has received an order to equip the twelve new cars of the Springfield (Mass.) Street Railway with ventilators. These cars are now being built by the Wason Manufacturing Company.

The J. G. Brill Company, Philadelphia, Pa., has received an order from the South Covington & Cincinnati Street Railway, Covington, Ky., for ten 21-E trucks; also one from the Milwaukee (Wis.) Electric Railway & Light Company for three Radiax E-1 trucks.

United States Light & Heating Company, New York, N. Y., has elected W. P. Hawley vice-president of the company. Mr. Hawley, who has been manager of the New York office for some years, still holds this position in addition to his duties as vice-president.

Indiana Car & Equipment Company, Chicago, Ill., which was recently incorporated in Illinois, has increased its capital stock from $12,000 to $30,000. The company has an extensive plant at Calumet, East Chicago, Ind., which is fully equipped for rebuilding freight and passenger cars.

Standard Steel Car Company, Pittsburgh, Pa., has appointed P. G. Jenks assistant to the president, with office at Chicago, Ill. For the past few pears Mr. Jenks has been a partner in the steel and pig-iron firm of Banning, Cooper & Company, Ltd., Pittsburgh, Pa., which position he resigned to go with this company.

Hall Switch & Signal Company, New York, N. Y., has recently acquired the patent rights formerly owned by the General Railway Equipment Company, the United States Electric Company and the Sandwich Electric Company and in future will make and sell the apparatus and equipment formerly handled by these companies.

General Electric Company, Schenectady, N. Y., held a meeting of its directors on May 20, 1913, and organized by re-electing the same officers. The company has appointed Cliff R. Croninger assistant district manager in the St. Louis district. For the past six years Mr. Croninger has been representative for the company in the South Central States.

Allen & Peck, Inc., Baltimore, Md., have opened offices at 601 Maryland Trust Building. The office is in charge of S. K. Colby, who was recently elected vice-president of the concern. Alan P. Norris, formerly connected with the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., has accepted the position of assistant to Mr. Colby.

Ackley Brake & Supply Company, New York, N. Y., has received recent orders for automatic trolley guards from the following railways: Tri-City Railway, Davenport, Ia., 568 ft.; Scranton (Pa.) Railway, 450 ft.; Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa., 96 ft.; Selma (Ala.) Street & Suburban Railway, 96 ft.; Hagerstown (Md.) Railway, 125 ft.; Twin City Traction Company, Dennison, Ohio, 125 ft.

Connolly Frog & Switch Company, Memphis, Tenn., will build a plant in Port Arthur, Ont., for manufacturing railroad accessories for the Canadian trade. The city has furnished the company with a site for the plant and has also agreed to give the company a bonus. The company is to be required as its part of the bargain to spend at least $100,000 in constructing the plant and to employ not fewer than fifty men during 250 days each year.

Western Automatic Fender Company Seattle, Wash., recently conducted tests in Vancouver, B. C., with the Nelson automatic air-controlled fender on one of the cars of the British Columbia Electric Railway. This type of fender consists of a heavy wire apron and lifeguard attached to the bumper of the car in such a manner that it can be dropped instantaneously to the rail by the application of the air brakes, or it will work equally well on contact with any object on the track. The fender weighs about 175 lb. It has been installed in Portland, Ore., and Centralia, Wash.

Duff Manufacturing Company, Pittsburgh, Pa., has moved into its new factory located on Preble Avenue. The main factory building is 550 ft. x 125 ft., affording an area of over 68,000 sq. ft. The general office building is approximately 60 ft. x 85 ft. The factory and office buildings are fireproof throughout, being of steel, brick and concrete construction. The company also plans the erection of a factory in the Chicago district, to be operating by next fall, and another at either Windsor or Hamilton, Ontario, in order to handle more quickly the large business which the company has in Canada.

E. W. Clark & Company Management Corporation, Columbus, Ohio, has been organized to take over the engineering and management departments of E. W. Clark & Company, Philadelphia, Pa. In the past this company, which is one of the oldest in the public-utility field, has maintained operating and engineering departments for managing and making reports of public-utility properties. These departments will now be conducted as a separate corporation, the officers of which are: C. M. Clark, president; S. G. McMeen and M. S. Hopkins, vice-presidents; G. L. Estabrook, secretary and treasurer, and A. F. Burington, assistant secretary and assistant treasurer.

General Electric Company, Schenectady, N. Y., has received recent equipment orders from the following railways: Houston (Tex.) Electric Company, ten GE-203 50-hp two-motor equipments; Dallas (Tex.) Consolidated Electric Street Railway, equipping ten new cars with GE-201 60-hp two-motor equipments; Jacksonville (Fla.) Traction Company, ten GE-203 50-hp two-motor equipments; San Antonio (Tex.) Traction Company, fourteen GE-200 40-hp four-motor equipments; Northampton (Mass.) Street Railway, two GE-203 50-hp four-motor equipments and four straight-air-brake equipments with CP-27 compressors; Southern Pacific Company, New York, N. Y., thirty-six GE-201 60-hp two-motor equipments.

Union Switch & Signal Company, Swissvale, Pa., calls attention to the fact that the "Z" armature switch indicator which was recently brought out by the company and which was described in our issue of May 10 as a three-position instrument is really capable only of assuming two positions with the miniature semaphore arm. These positions can, however, be located in any part of the quadrant. The company has received an order from the Oakdale, Antioch & Eastern Railway, Oakland, Cal., to equip the system with automatic block signals from Oakland to Sacramento, covering a distance of approximately 83 miles. The company will use 167 one-way hooded light signals to be clamped to the trolley poles with all attendant apparatus except wire, conduit, etc. Alternating current at 2200 volts, 60 cycles, is transmitted throughout the system and stepped down for feeding the track circuits controlling and lighting the signals with this current, available at the several substations distributed along the road.

ADVERTISING LITERATURE

J. F. Donahoo, Birmingham, Ala., has issued a catalog illustrating and describing a new saftey railway tie.

Standard Steel Works Company, Philadelphia, Pa., has issued a catalog on its rolled steel wheels. The catalog contains a number of illustrations of cars and locomotives equipped with these wheels, also several views showing the process of making them. Several tables are contained in the catalog, giving dimensions of all standard size wheels, with a special number for each size, so that wheels may be ordered in this way, instead of by size, under which conditions mistakes are less liable to be made.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 34-L. This bulletin is one of the series covering its complete compressor line, and treats particularly of general engineering information of value to users of compressed air, It contains tables giving efficiencies of air compression at different altitudes, density of gases and vapors, mean effective pressures and horse powers, loss of pressure due to friction in pipes, and other data. Views of various types of compressors are shown, as well as illustrations showing the interior of the company's plant at Franklin, Pa.

General Electric Company, Schenectady, N. Y., has issued Bulletin A-4113, which illustrates and describes the company's oil-break switches, known as type F, forms P3 and P6. Bulletin A-4061 is descriptive of electric arc headlights. Bulletin A-4097 describes in considerable detail the company's ventilated motors for railway service. Bulletin No. 4084 is devoted to centrifugal compressors and supersedes the company's previous bulletin on this subject. Bulletin No. A-4110 describes and illustrates cloth pinions. While this bulletin supersedes the company's previous bulletin on this subject, it contains additional data relative to tooth dimensions and instructions for the selection of pinions.

NEW PUBLICATIONS

Transmission Line Formulas. By Herbert Bristol Dwight. Cloth, 133 pages. D. Van Nostrand Company, New York. Price, $2 net.

This work has been compiled, as stated by the author, with the object of furnishing a set of instructions for engineers which will enable them to make electrical calculations for transmission lines with the least possible amount of work. Among the various short methods included in the book is a chart to be used for estimating the regulation of any proposed transmission line of moderate length. The book, as it is intended for electrical engineers, is composed mainly of formulas and gives but brief space to explanation and demonstration, although the second part is devoted to the theory, in brief, of transmission phenomena. The book concludes with a series of eighteen tables, including figures for resistance reactance and capacity and summaries of the principal formulas given in the text. It is a concise, well-arranged volume and will prove of distinct value in the field of highly technical literature which is intended for use by busy engineers.

The Mathematics of Applied Electricity. By Ernest J. Koch, Jr. Cloth, 651 pages. John Wiley & Sons, New York. Price, $3 net.

As its title implies, this book is primarily a textbook in practical mathematics, but it has been developed with special reference to the needs of students in electrical engineering. While it is intended for those who have a good working knowledge of the elements of higher mathematics, including algebra and plane geometry and trigonometry, the author has introduced an introductory chapter dealing briefly with the fundamentals of these subjects for use by practical electrical workers who desire to advance themselves in the theoretical side of electrical engineering. Both direct-current and alternating-current problems are considered, and considerable space is devoted to graphical solutions. The numerous problems which are introduced throughout the work are generally of a thoroughly practical nature, and as they are where possible illuminated with conventional illustrations they should prove especially interesting to students. The absence of answers, however, detracts to some extent from the value of the work for those who seek self-instruction.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, MAY 31, 1913 No. 22

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.

Chicago Office..............................1570 Old Colony Building
Philadelphia Office......................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere; United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8100 *copies are printed.*

GEAR RATIOS AND POWER CONSUMPTION

The influence of railway motor gear ratios upon power consumption and schedule speed is unquestionably recognized, but it is doubtful whether the possible extent of the influence is thoroughly appreciated. On a run where but six or seven stops per mile are made and where schedule speed is moderate gear ratios may, of course, be relatively unimportant, but when the stops per mile rise to twelve or fourteen literally enormous savings or losses may be caused by comparatively small differences in the ratios used. This point was well brought out recently when it was found that on a certain run a car geared in the ratio of about 1:4.5 used some 20 per cent less power on the same run than one geared in the ratio of 1:3.5, the motors being of the same capacity in both cases. At first glance this seems to be unreasonable. Yet if it is known that the run required some twelve stops per mile with an interval between stops of 440 ft. the apparent discrepancy is explained at least in part. Allowing the small distance of 140 ft. for the retardation of braking before the stop, there is but 300 ft. left for acceleration, running and coasting, and as acceleration, with its controller losses, required 120 ft. with the high gear ratio against 70 ft. with the low one, the former nearly doubled the opportunity for wasting current in resistance and in reduced motor efficiency. In addition, the distance available for coasting, the most important means for saving power, was decreased 22 per cent.

THIS YEAR'S TECHNICAL GRADUATE

During the coming month a large number of new electrical engineers will receive their diplomas from the technical schools of the country and will be seeking occupation, many undoubtedly in the electric railway field. This industry is not growing so rapidly as it once was or, comparatively speaking, at as great a rate as some other fields of electrical enterprise. At the same time, the traffic carried by the electric lines of the country is increasing, even if there has not been recently a very large expansion in mileage, and the industry needs the services of every man who can help to solve its problems. If the new graduate should enter the electric railway field, he will soon find that the questions to be solved in it are not all of a technical character; indeed, some of the most important of them at present are, in our opinion, not directly allied to engineering, although an engineering education would be of considerable help to one who attempts their solution. Those who engage in such work as valuations, for instance, or some of the complicated problems of operation, must have a very much wider field of knowledge than that usually found in the engineering schools, and for valuations it is questionable whether a thorough training in finance and accounts is not a much more important preliminary qualification. It is unfortunate that an increase in the known facts in any branch of engineering necessarily means greater specialization in the technical schools where that branch of engineering is taught. To keep pace with the growth of the science itself subjects not closely allied with it are gradually lopped off from the curriculum, and the result is that the student emerges from his four years' course with more knowledge undoubtedly about one thing than that possessed at the same time by the graduate of ten years or more earlier but much inferior to the latter in his knowledge of related subjects. This, by itself, is not a handicap if the student recognizes the condition which exists, but he should realize that he must acquire either by study or practice the elements in which his training has been lacking. Otherwise he cannot be prepared to give as good service as if his education in the technical school had been of a broader character.

THE COMING PROBLEM OF VALUATION

The far-reaching possibilities of the forthcoming valuation of the railroads under the jurisdiction of the Interstate Commerce Commission were ably set forth at the May 22 meeting of the American Institute of Consulting Engineers, as noted in last week's issue. Ostensibly, the valuation is to be used as a basis for rate making, but more than one of the engineer economists at this meeting saw in this project the overture to the drama of public ownership. The possibility of this outcome again confirms Herbert Spencer's observation in "The Sins of Legislators" that laws which affect the social structure often result in changes undreamed of by their sponsors. The immensity of the task before the commission is evidently appreciated by men who have themselves led in the solution of problems calling for the highest degree of ability. To them the valuation of a railroad is not the cataloging of "a mass of inert objects," as aptly expressed by Mr. Wilgus, but an attempt to price a pulsating organism whose ganglia extend into every part of the body social. The great discrepancies between the valuation figures of traction and municipal representatives in the case of St. Louis and other cities is fair warning that in evaluating steam railroads much will depend upon the cultivation of a broad and fair-spirited point of view. The great desideratum is that the authorities should treat the railroad investor with the same degree of justice that they do the capitalist in other fields whose increment is not questioned. There is no doubt in our minds that many of the states will follow the example set by Congress and during the next few years will require valuations of all of the public utilities within their jurisdiction. Whether a person believes that such valuations will be worth their cost or not, there is certainly a popular demand for them, and with the precedent set for the interstate carriers local valuations will undoubtedly follow. For this reason it is advisable for all electric railway companies to be prepared for such a contingency and keep their accounts so that such valuations can be most easily made

RAILWAY PAPERS AT THE INSTITUTE

At the last meeting of the American Institute of Electrical Engineers two important papers on the electrification of main-line railways were presented by authors rich in experience of the heavier electric traction, Both attacked the problem in a broad way, taking account of the various elements of cost which enter the work of heavy electrification and particularly the effects of heavy grades in the freight traffic as handled by steam and by electric locomotives respectively. Finally, after a complete computation of the cost, both writers arrived at almost identically the same ratio between the complete operating cost with equal traffic by steam and by electricity. They agreed in setting the estimated cost of the electric operation at practically five-eighths of the cost of doing the same work by steam locomotives. This identity of results is the more interesting because Mr. Hobart was considering a special concrete case now on the way to completion, while Mr. Kahler considered another case, evidently also concrete, a road nearly five times the length of that considered by Mr. Hobart, with lighter average grades and more typical of main-line conditions as a whole.

Mr. Hobart reckoned on high-voltage d.c. locomotives and Mr. Kahler on the single-phase system, which makes their respective estimates all the more striking. One very noticeable feature of both is that they assumed the purchase of power from transmission systems at what is relatively a very low figure, 0.7 cent in one case and 0.75 cent in the other. In a large number of cases trunk-line roads will undoubtedly be able to secure transmitted power for their work, and in some instances at prices certainly as low as those quoted. It is perfectly plain, however, that the average road compelled to furnish its own power under the conditions of a scattered and none too heavy service would not stand a fighting chance of securing it, all charges paid, at the figures mentioned. Transmission from hydroelectric plants or from very large and favorably situated steam plants able to take the railway service as an incidental load are essential to the validity of the comparisons made in these papers. About the same general characteristics of performance are assumed for the locomotives in each case. Mr. Hobart on his assumptions of equipment and service found the transportation charges of the electric system about 85 per cent of those of the steam system. Mr. Kahler made the same relation about 67 per cent, a difference which is easily explicable on account of the differing nature of the two roads considered. In both cases the practical advantages of the electrical equipment are, first, the fact that the whole weight of the electric locomotive is on the drivers and available for tractive effort; second, that the electric locomotives can unquestionably make a greater mileage per year than the steam locomotives, and, third, that they also have a great advantage over the steam locomotives in the matter of repairs and continuity of service.

Now, as regards the first count, there is absolutely no doubt about the facts. The tractive effort of the locomotive, assuming full power supply, depends simply on the weight available for adhesion, and the electric locomotive here is most strikingly superior. For a given total locomotive weight it has about half as much again possible tractive effort as a steam locomotive of the same weight, and since the electric locomotive does not have to carry its power station on its back a very large power supply is available and considerable tractive effort at relatively high speed can be attained. As regards the second matter, as has just been shown, the practicable hauling power of the electric locomotive is available at a considerably higher speed, so that as regards daily mileage the electric machine can reasonably be counted on to make nearly double the distance per day practicable with the steam locomotive. Moreover, there seems to be no doubt, although this phase of the matter belongs in part to the next topic, that the electric locomotive will also be available for this duty a good many more days per year than a steam locomotive owing to the lesser amount of repairs, not necessarily of large repairs, but such as prevent its use on the road.

With respect to the serviceability of the electric locomotives data are scarce. We think there is absolutely no question that they can be depended on to be in service a considerably larger portion of the time than the steam locomotives, but, on the other hand, the only available data are those taken from roads which present anything but typical cases of trunk-line electrification, the only figures on any considerable scale being for work in and about the terminal systems of New York City. These are instructive in that the amount of service is considerable, but they throw very little light on the performance of even the same excellent locomotives in the rough-and-tumble work of everyday hard service doing the entire work of a through line. Admirable as these machines are, one must discount something for the contingencies of continuous and heavy service on an electrified trunk line or mountain division. We look, therefore, with a somewhat critical eye at the great difference in maintenance estimated in both the papers under consideration. This matter is one of the uncertain factors of the problem, and while there is little doubt that the electric locomotive has a material advantage, its magnitude cannot be predicted on any data yet available. The fact is, however, that the thing which checks the development of trunk-line electrification is not uncertainty regarding the performance of the equipment nor doubt as to the probability of a very material saving, perhaps not so great as here indicated but yet enough to be fully worth while. The fundamental difficulty is the cost of the electrical equipment added to the burden of fixed charges under which most roads are already staggering. The condition of the average reputedly prosperous American road, to judge from the disclosures made of late with reference to wages and rates, is not such as to admit the immediate possibility of adding to the fixed charges even so modest a sum as the $17 per mile figured by Mr. Kahler. On the engineering side of the matter there now remains no serious doubt. It is the financial difficulty which stands in the way of progress.

THE ISSUES IN CLEVELAND

The Cleveland Railway and the city of Cleveland are seeking a settlement of various questions arising in connection with the ordinance under which the company operates. The proceedings have not the benefit of the attendance of Judge Tayler, who acted as arbitrator for both the city and the company when the ordinance was drawn and who would have been a logical interpreter of the contract had he lived. The members of the board of arbitration upon whom the important duty of expounding the spirit as well as the letter of the contract rests are Mr. Duffy for the company, Mr. du Pont for the city, and Judge Killits, of the United States Circuit Court, who is the third member.

The board, of course, is not to go back of the arrangement which was embodied in the ordinance of 1910. It is not asked to question the reduction in capital value of the company upon which the low-fare arrangement now prevailing in Cleveland is primarily predicated. It will not analyze the method of valuation followed when this reduction in capital value was forced by the city. It will take no cognizance of the fact that the owners of the capital stock were obliged to have their securities reduced to 55 per cent of what they were previously. It simply accepts the conditions of capital value and of settlement named in the ordinance and proceeds to interpret them without relation to the heavy loss of the company which preceded the present working arrangement.

Taking the capital value of the Cleveland property at the point to which it was cut, the ordinance provides for arbitrary charges per car mile for maintenance, depreciation and renewal and for other operating expenses. The justice of the claim of the company regarding the question of increase in the so-called operating expense allowance has already been conceded in part by the city. Mayor Baker has signified consent to an increase from 11½ cents to 12 cents per car mile for this purpose. Under the ordinance this amount is designed to cover operating expenses exclusive of charges for maintenance, depreciation and renewal. The company asks for 12½ cents in order that it may have a margin above its estimated probable cost and may use that margin in reduction of the present deficit in this fund. The city states that the company has not shown why its operating expenses have amounted to as much as the books indicate, but the facts are that it granted a car-mile allowance of 11½ cents when the ordinance was drafted, that the wages of trainmen have been increased since that time and that the city does not object to the wages paid. These wages amount to one-half of the car-mile allowance available. The language of the ordinance with reference to the treatment of deficits is as definite as it can be. The amounts may be increased or decreased from time to time so as to enable the company to meet legitimate expenses of operation and "to prevent or make good any deficit on account of such expenses."

A question of equal importance is that of the allowance per car mile to be deducted from revenues for maintenance, depreciation and renewal. The company has not only expended all of the car-mile allowance, it has over-expended this fund and it has no reserve for depreciation. The contract specifically provides for a maintenance, depreciation and renewal account. It does not fix any arbitrary division in the application of this fund for these different purposes It does, however, by its inclusion of these terms recognize that depreciation is an element of expense that is allied with maintenance and renewal and that protection against its effect should be furnished. If the ordinance provided for maintenance alone, the question that the city raises as to whether the company has maintained the property in 70 per cent condition would be more appropriate. If the ordinance provided a car-mile allowance for maintenance and renewal alone, the application of this account still would be much less far-reaching than its framers apparently designed it to be. When the company shows that it has merely an empty deficit in place of a tangible balance it proves that it has no reserve whatever for future revelations of depreciation accruing daily.

In connection with the treatment of the operating expense fund, the city has raised issues in reference to the right of the company to set up reserves for insurance and damages. It asserts that these reserves have no right to existence beyond the close of each fiscal year. The amounts involved in each case are relatively small. The insurance reserve really seems to be a matter of administrative detail, and while its creation is necessarily more or less of an arbitrary procedure, since the company is carrying part of its own insurance, to the extent that it is doing so it is unprotected unless it has a reserve upon which to draw in the event of loss. The retention of an accident reserve represents an attempt on the part of the company to charge its current revenues with amounts approximating its unliquidated liability. This is much more than a matter of accounting procedure. No one who borrows without security at a bank is regarded as honest unless he lists his known liabilities. In the case of a street railway the liabilities are not determinable except as the experience of the past serves as a guide. The company is protecting itself properly against claims which may be presented late.

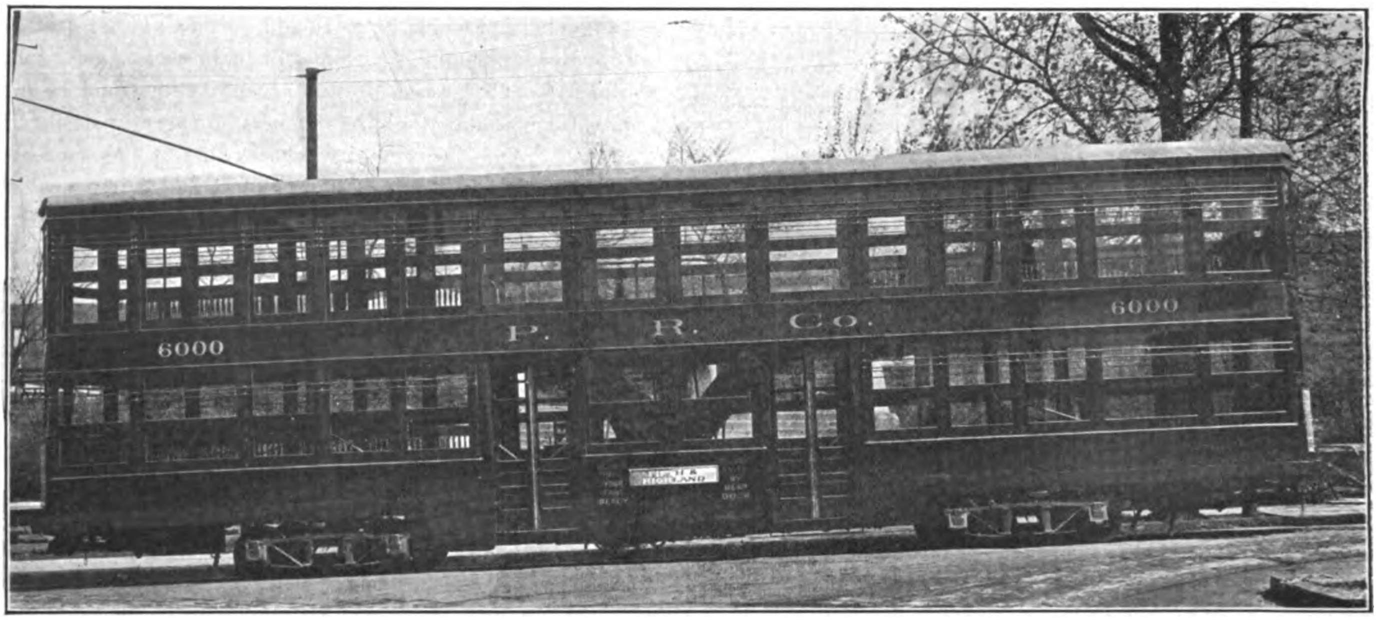
The wording of the ordinance is that the amounts at issue may be changed by agreement between the city and the company or, in the event of disagreement, by arbitration. This appears to imply that responsibility rests upon each party in the proceeding to prove its case and should relieve the extent of the burden upon the company in an arbitration. The proceeding, therefore, is not one in which the relations of the parties should be those of prosecutor and prosecuted, but one involving the definition of terms.

New Double-Deck Cars for Pittsburgh

The Double-Deck Principle, Which Was Revived by the Construction During the Past Year of Trial Cars of This Type for Several Different Cities, Has Now Passed the Experimental Stage, the Pittsburgh Railways Having Purchased Five of Them for Regular Service

The revival of interest in the double-deck car which occurred last summer on account of the simultaneous development of two widely different designs has been accompanied by much comment adverse to the practicability of the principle. These cars have been in experimental use for a year in various classes of service, and it is a significant fact that for certain traffic conditions in Pittsburgh the double-deck car has proved so advantageous that the Pittsburgh Railways has recently purchased five new cars of this type.

These cars are intended not alone for special service to parks, ball games, etc., but also for regular runs on one of the city lines. On this line, however, 75 per cent of the passengers are loaded at five points in the central part of the city. Contrary to the somewhat prevalent belief that the double-deck design involves an enormously high first cost, the quotations which were made for the five cars were found to be exceedingly low considering the increase in seating capacity. In fact, the actual price paid for each amounted only to approximately $1,500 more than the cost of a standard single-deck car.



Pittsburgh Double-Deck Cars—View of Original Car Showing Separate Exit and Entrance Doors

The general arrangement of the new cars follows quite closely the original design described in the Electric Railway Journal for Aug. 10, 1912, page 204, but as the original car was intended for experimental purposes only, a number of changes in the equipment and in the details of the design have been introduced by the inventor, P. N. Jones, general manager Pittsburgh Railways, who has applied for patents to cover the design.

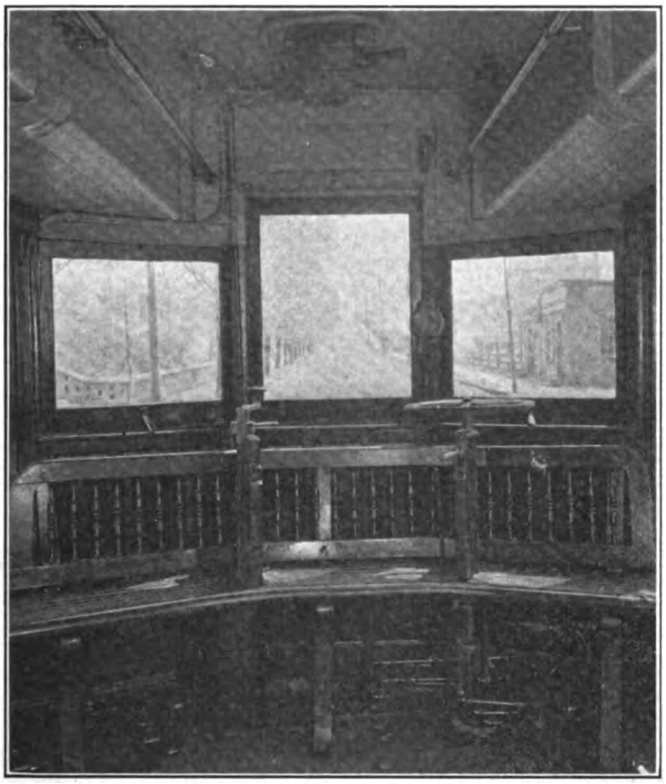
GENERAL ARRANGEMENT

As in the original design, the new cars are carried on small wheels to permit the use of a low main floor which is only 28¾ in. above the rail. The center portion of the main floor is depressed to form a well from which the stairs extend to the upper deck and which also provides space for separate entrance and exit doors. The two stairways are located on either side of the car but face in opposite directions, the exit stairway having its foot alongside of the front doorway, which is used only as an exit. The stairway for ascending passengers is, in consequence, on the opposite side of the car from the door, which is used as an entrance, and the fare box, behind which the conductor is stationed, is located near the foot of this stairway, as shown in the accompanying illustration. This arrangement provides a loading space having a length of approximately three-quarters of the width of the car and gives room for about eight entering passengers between the door and the fare box.

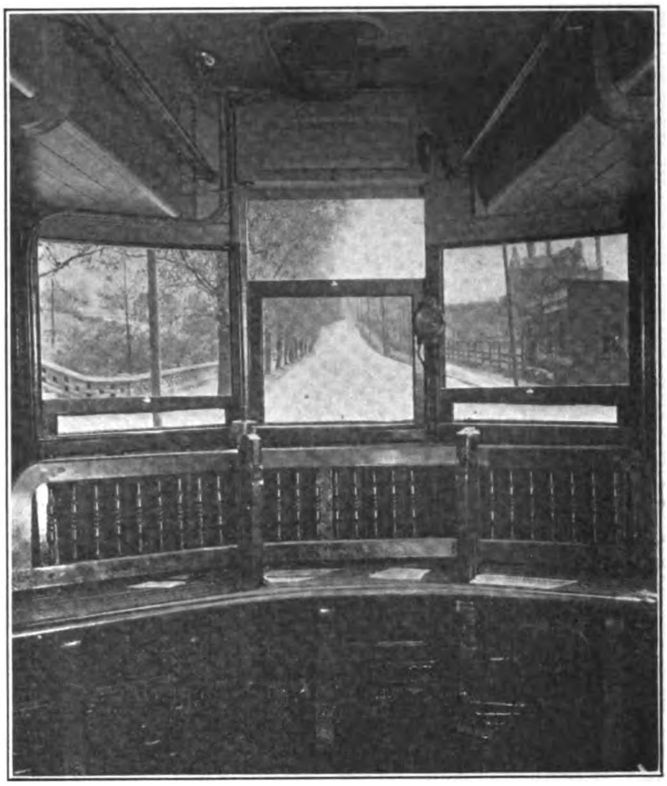
The seats on the upper deck are longitudinal and are arranged back to back in the center of the car the same as in the original car, the space underneath the seats providing a clear headroom for the first floor of 6 ft. ½ in. In the new design, however, these seats are curved outward at the ends of the car so that headroom for the motorman on the lower deck is provided across the full width of each end. In consequence the motorman can stand erect on the lower deck when operating the car without having his movements restricted, as on the original car, to a space equal in width to the aisle between the first-floor seats.

The over-all length of the new car is 47 ft. 2 in. and the width is 7 ft. 10 in., both dimensions being approximately standard with the newer single-deck cars of the Pittsburgh Railways. This makes the new cars shorter but wider than the original, which was built in the railway company's shop by fastening two small cars end to end and putting a second deck over them. The trucks are set on 22-ft. 2-in. centers and each end of the car is in consequence almost exactly balanced over one of the trucks. The over-all height is 13 ft. 8 in., 9 in. less than that of the original, and the clear heights for the upper and lower decks are respectively 6 ft. and 6 ft. ½ in. The headroom at the central wall is approximately 6 ft. 3 in.

The center part of the roof is made 4 in. higher than at the ends, since at the middle section of the car which is occupied by the well it is necessary to have a clear headroom of at least 6 ft. over the full width of the car for both decks. Except at the central well, however, this is not necessary as the clear headroom has to be maintained only in the aisles, and at the sides of the upper deck the floor is depressed 4½ in. to form a walking space in front of the longitudinal upper-deck seats. The depressed ends of the roof have been provided in order to permit the trolley pole to swing out over the edge of the roof on a curve under a low bridge and also to permit the installation of roof ventilators without adding to the over-all height of the car. These ventilators are less than 4 in. high and they do not extend above the level of the center part of the roof. They are installed instead of a forced-draft ventilating system because the experience obtained with the original car has indicated that they will be sufficient even in winter weather when the car is completely inclosed.

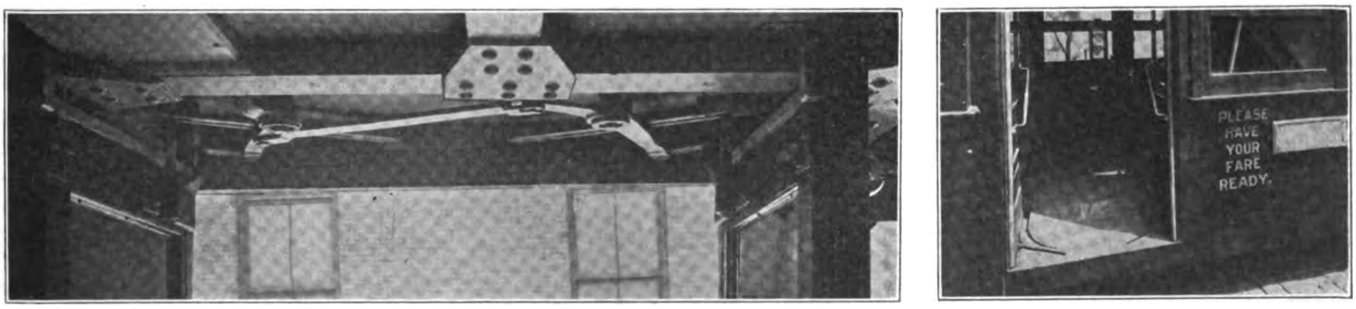


Pittsburgh Double-Deck Cars—View Showing Controller Under Stationary End-Seat with Extended Shaft for Operating Handle



Pittsburgh Double-Deck Cars—View at Rear End Showing Controller and Brake Handles Removed to Provide Room for Seated Passengers

Practically the whole side of the car is designed to act as a beam and the entire weight of the car is transmitted to this, no underframing being used outside of the two center sills for transmitting pushing and pulling strains. The portion of the car siding which carries out this beam action extends up to the window sills on the second floor, the siding between the upper and lower windows being made up of 3/32-in. plate with a 3-in. x 3/8-in. bar at the top and a 3/8-in. x 4-in. bar at the bottom to serve as reinforcement. This section of the siding is tied into the siding on the lower deck by the side posts, which are made of two steel plates on either side of a 3-in. channel iron and a wooden spacer. The lower section of the siding is formed by 3/32-in. plate, reinforced by a 3/8-in. x 3-in. bar at the top or just beneath the window sills on the first floor and reinforced at the bottom by a 3-in. x 3/8-in. angle which takes the place of the side sill.



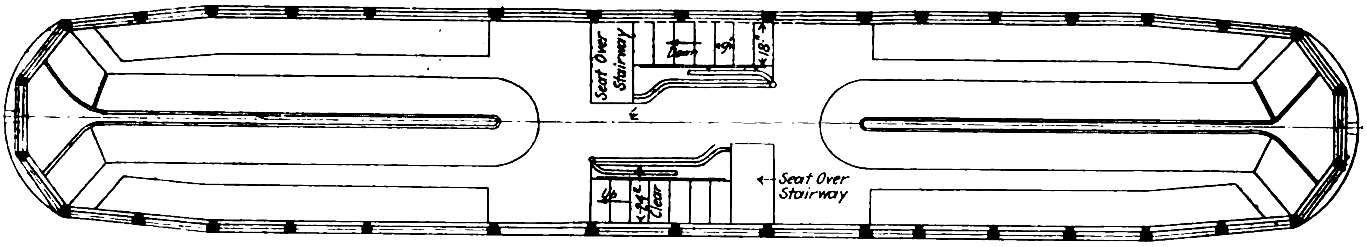
Pittsburgh Double-Deck Cars—Door Operating Mechanism and View Showing Guides for Bottom of Door

The body bolsters which transmit the load from the sides to the truck center plates are made up of pressed shapes to form a box girder, the diaphragms at the top and bottom being made of ¼-in. plate and ½-in. plate respectively and having a width of 15 in. The center sills, which serve only as a means to absorb pushing and pulling strains, are made up of two 4-in. channels set with the flanges vertical. At a point on either side of each bolster these two channels diverge, extending at a 45-deg. angle to the ends of the bolsters to take up any tendency of the frame to rack. In the center portion of the car where they are again brought parallel and close together they are bent downward under the central well and assist in supporting its floor. Floor beams, of course, complete the framing.

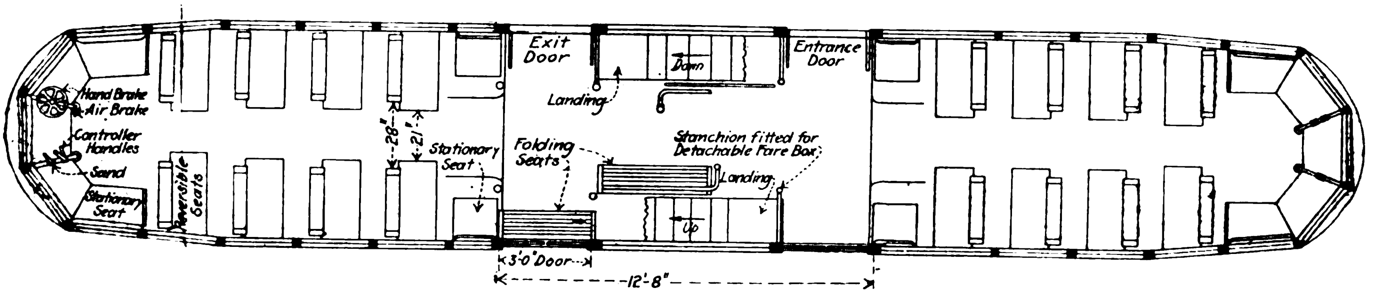
SEATING ARRANGEMENT

The seats on the lower deck are in general transverse, and as previously mentioned those on the upper deck are set longitudinally to provide headroom in the aisles for the first story, thus following the same principle used with the original design. Additional seats are, however, provided wherever space for them exists, so that on the lower deck two semi-circular seats for five passengers each are provided at either end of the car and four single seats are placed next to the well. Four longitudinal folding seats are provided in the center well, of which two, seating two persons each, are located opposite the doors on the blind side of the car. The other two, one alongside each stairway, seat three passengers each, but only one of these seats is used at one time. The semi-circular end seats at the extreme ends of the car are stationary and the one which is at the rear of the car is used to seat passengers, the one at the front being used for a space for the controller and brake handles as described later.

On the upper deck, in addition to the longitudinal seats, there are two transverse seats, each seating two persons, at the ends of the stair wells. These, together with the longitudinal seats, provide a seating capacity of fifty-six persons for the upper deck, and as the lower deck will accommodate fifty-four passengers, the total seating capacity of the car is 110. The weight of the car completely equipped is 38,700 lb., giving the unprecedented figure of 352 lb. per seat.

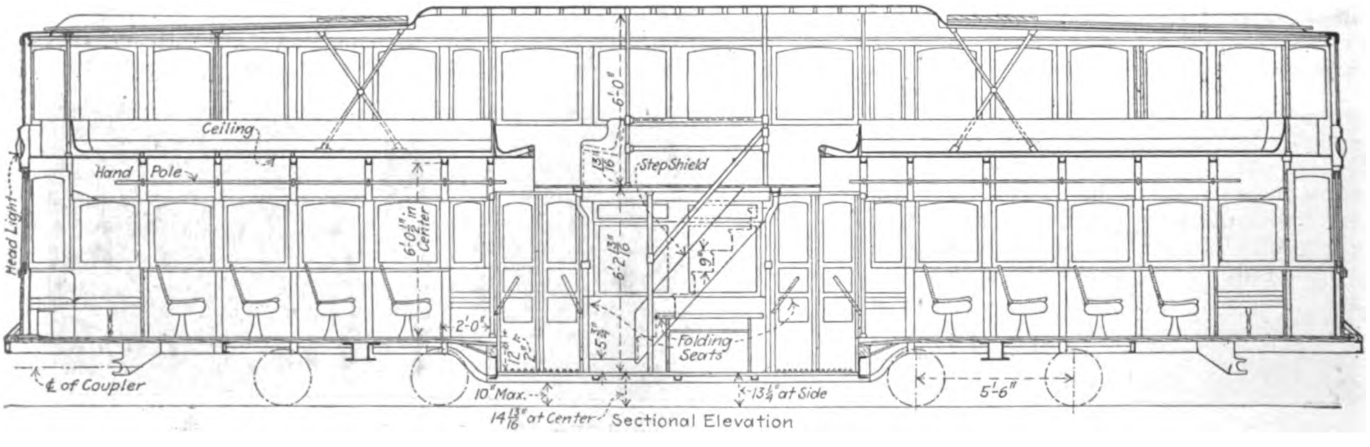

Seat Over Stairway
Down
9"
18"
Up
24" Clear
Seat Over Stairway

Second Floor Plan


Exit Door
Entrance Door
Down
Landing
Hand Brake
Air Brake
Controller Handles
Sand
Stationary Seat
Reversible Seats
28"
21"
Stationary Seat
Folding Seats
Stanchion fitted for Detachable Fare Box
Landing
Up
3'0" Door
12'-8"

First Floor Plan

Pittsburgh Double-Deck Cars—Plans of Upper and Lower Decks


Ceiling
Hand Pole
Head Light
6'-0"
18"
Step Shield
6'-0½" in Center
6'-2 13/16"
19"
2'-0"
12"
54"
Folding Seats
℄ of Coupler
10" Max.
13¼" at Side
5'-6"
14 13/16" at Center
Sectional Elevation

Pittsburgh Double-Deck Cars—Cross-Sectional Elevation

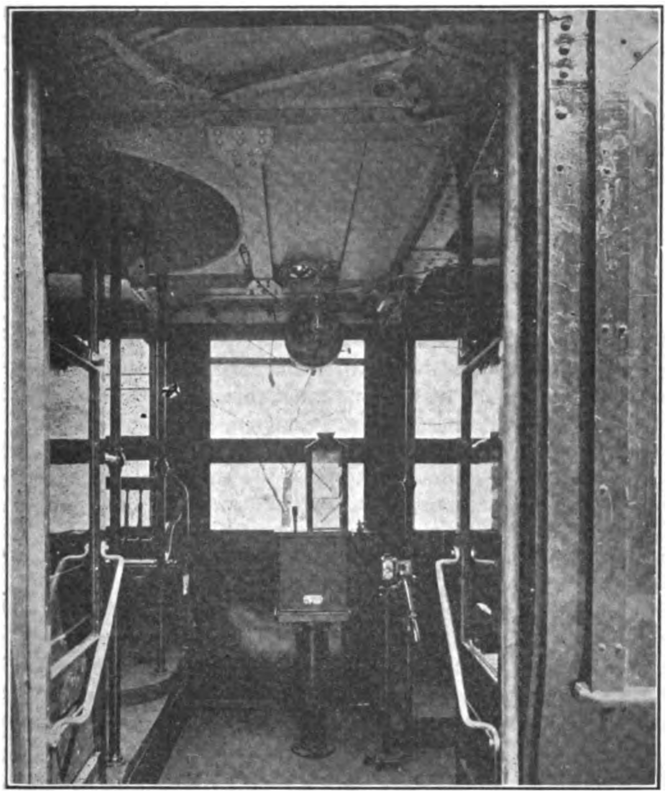
ENTRANCE AND EXIT FACILITIES

The feature of two widely separated doors, of which one is used for an entrance and the other is used for an exit, as developed in the original Pittsburgh double-deck car, is retained in the new design. The separation of the two doors by a distance of approximately 7 ft. has been found to be very effective in separating incoming and outgoing crowds of people and accounts to a considerable extent for the rapidity with which passengers have been handled in the trials, some of which were reported in the issue of Sept. 14, 1912, page 414.

One of the schemes for avoiding delay in unloading passengers from the upper deck is the elimination of the usual push buttons from that floor. There is, however, a push button at the head of the exit stairs, and signs are prominently displayed to call attention to its location. Upper-deck passengers are, therefore, required to be ready to descend the exit stairs before they can signal the car to stop and, as both the motorman and conductor control the exit door and see the feet of any descending passenger, the chance of carrying anyone past his destination is limited.

The depressed portion of the lower deck which forms the center well reduces the height of the step from the ground into the car to 13¼ in. From the doorways there is a slight slope upward to the center line of the car amounting to about 1½ in. and formed by gradually increasing the thickness of the floor strips, a safety tread being provided at the edge of the step. From the wall to the main floor of the lower deck there is a step of 12 in. and a short ramp 2 ft. long gives an additional rise of 2 in., bringing the main floor to a height of 28¾ in. above the rail. Access to the upper deck is effected by a series of eight 9-in. steps which start from a small landing 5¾ in. above the floor of the well. These stairs are restricted in width to 18 in. in order to prevent any possibility of double lines of passengers either ascending or descending, as the fact that the stairs are used only in one direction obviates any necessity for crowding or the passing of passengers while on them. Passengers thus have an opportunity to use hand-holds on both sides of the stairs if the necessity arises, and this minimizes any tendency toward an increase in the number of interior accidents due to the presence of the stairs.

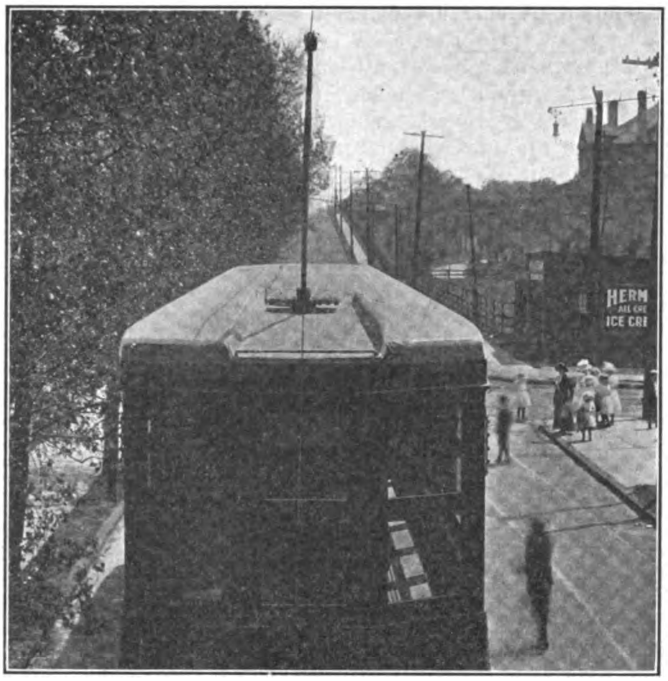
The doors are pneumatically operated by the system which has been made standard in Pittsburgh except that owing to the restricted headroom the apparatus has been reduced in size so that the mechanism takes up no more space than the channels which support the floor. With this device each doorway is provided with two doors, each one of which is equipped with roller supports and guides to define its movement. At the side of the door near the doorpost there is a pin sliding in a guide extending straight inward from the doorpost so that the outer edge of the door is compelled to travel straight in and out. At a point about one-third of the width of the door from the other edge is another pin which slides in a straight groove, making an angle of about 30 deg. with the plane of the doorway, and this compels this edge of the door to travel across the doorway as would a sliding door. The result of the combined movement of both ends is to make the door as a whole slide into open position around a sharp curve, taking its open position at right angles to the doorway and in line with the doorpost. The two doors in each doorway are mutually operated by means of a simple bell-crank arrangement as shown in the illustration on page 959.



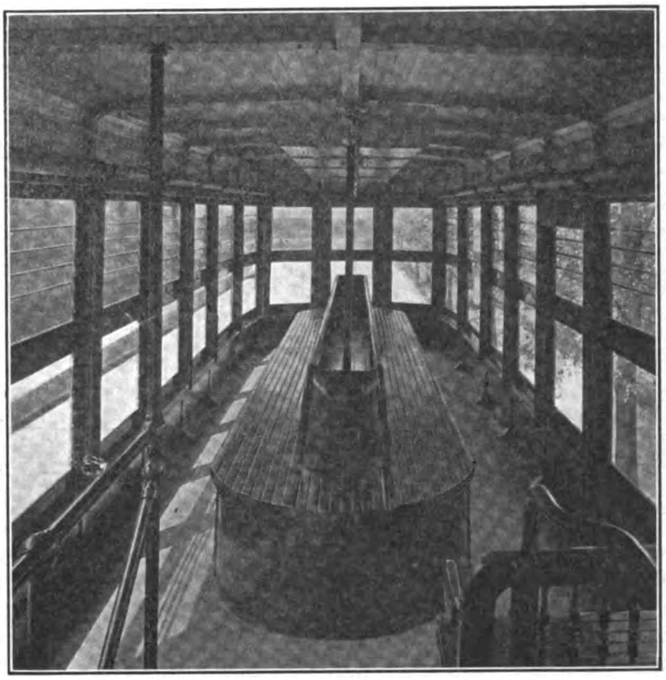
Pittsburgh Double-Deck Cars—Entrance Doorway and Fare Box

EQUIPMENT

The car is equipped with "low-floor" type of truck with 24-in. wheels and small motors, as described in the Electric Railway Journal for Aug. 3, 1912, page 154. Four of these motors are used, and for their operation a novel form of control has been developed. The master controller used with this equipment is so small that it is placed under the semi-circular end seat which is located at each end of the car. An illustration on page 959 shows the arrangement of controller and brake handles on the original type of double-deck car, and from this it will be seen that passengers are able to sit immediately over the controller so that no seats need be lost on account of its existence at the rear end of the car. When the controller handle and brake handle are removed from their shafts, as shown in the other illustration, no space is occupied outside of the vertical partitions, which are installed on the end seats and



Pittsburgh Double-Deck Cars—View Showing Trolley Harp Mounted in Depression in Roof

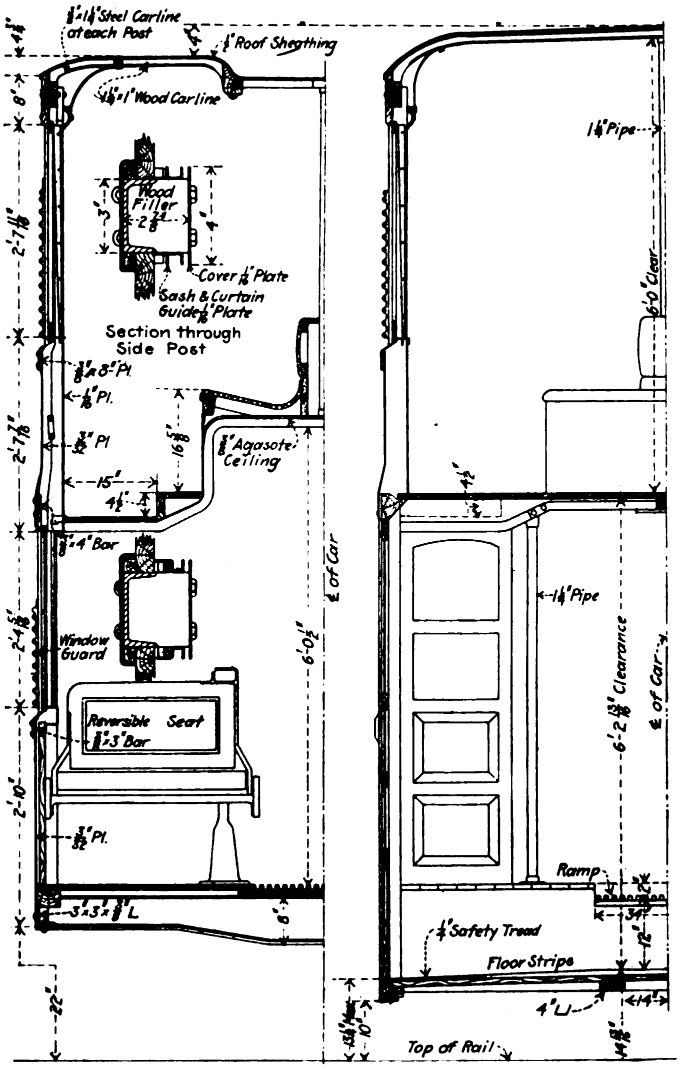


Pittsburgh Double-Deck Cars—Interior View of Upper Deck Showing Depression in Roof for Trolley Harp

which really serve as spacers to prevent any passenger from occupying more than a fair share of the seat.

It is reported that a number of tests of the new control have been made during the past three months, and these have shown that it saves an average of 10 per cent in the consumption of current compared with the standard resistance types. No resistance is used except at the first control point, and it has even been found that the car could be operated without resistance at all except for the fact that after the gears are somewhat worn the absence of resistance at the time when all motors are thrown on to the line in series causes the car to jerk. The resistance has been added to provide for back-lash in worn gears. A detailed description of this new device will be given in a later issue of the Electric Railway Journal.

Another novel feature of the car is the provision for keeping all parts of the trolley pole and harp below the high point of the roof, which enables the trolley to pass any overhead structures under which the car itself will go. This is effected by mounting the trolley harp and pole in a depression along the center line of the roof which extends from a point slightly ahead of each truck center to the ends of the car. As this depression follows the center line and is only 2 ft. 6 in. wide, it does not decrease the headroom except within a space extending over the longitudinal seats of the upper deck. At this point, of course, no necessity exists for full headroom because the passengers have no chance to stand upright when they are under it and thus cannot strike their heads against it.



Pittsburgh Double-Deck Cars—Cross-Sections at End and at Center

WORK OF THE SIGNAL DEPARTMENT

At a meeting of the Central Railway Club on May 9, a paper was presented by B. H. Mann, signal engineer Missouri Pacific Railroad, giving an outline of the work covered by railroad signal departments. An abstract of the paper is given herewith.

The signal force of a railroad generally takes care of apparatus as follows: interlocking plants, which are defined as assemblages of switches, locks and signals, so interlocked as to guard against the setting up of conflicting routes; manually controlled signals, and automatic electric block signals, each signal responding automatically by means of electric or other power, controlled through electric track circuits actuated by a train or other conditions affecting the use of a block.

The signal department also has charge of highway crossing gates operated either mechanically, electrically or by pneumatic power and highway crossing indicators which give visible or audible warning to users of the highway of the approach of a train. The supervision of hand lanterns, fusees and other signaling apparatus by the signal department is of quite recent origin, and careful, expert attention has not always been given to this equipment. The service of the fusee must be carefully followed up and both the ignition and burning efficiency tested. In a recent development test for ignition, types of fuses were immersed in water for a minute and then allowed to stand several minutes in pouring rain, after which an attempt was made to ignite them. One type showed but little effect from its mistreatment, but a large per cent of another type failed in ignition. Such an emergency signal must be fit for use in all kinds of weather.

In the beginning of signaling there were electrical inspectors, mechanical inspectors, mechanical repairmen, electrical repairmen, fitters, wiremen, blacksmiths, battery men, carpenters, painters and lampmen. Possibly there might be ten men in one small territory. With the growth of the art, one by one the various specialists were combined, until now, except for a general overhauling of any sort, customarily all the work of repairs is performed on any section by one man.

The usefulness of the self-confident, all-around repairman consists largely in the repair of the faults before they cause annoyance, the anticipation of causes of failures, or the quick return to service of a unit accidentally put out of working order. Except where the traffic is very dense and fast a repairman can reach any part of a 15-mile district in about an hour by velocipede or motor car. To be on the spot quickly after an accident is of great advantage both in the prevention of unnecessary damage to apparatus and in checking the working conditions.

The relatively low mileage assigned to each man in signal maintenance work and brought about by the combination duties developed makes for quick repair of apparatus out of order and for a minimum number of trains passing the apparatus while out of order, thus providing a relatively high efficiency. This does not include installations where, owing to highly important traffic, a continuous service of repairmen is maintained for the entire twenty-four hours.

On a lightly signaled division the repair force may spend as much as six hours in travel for every hour of work. Where this is the case there is an incentive to provide other duties for the signal force, so as to reduce to as great an extent as practicable the waste time on the road. This has been done by assigning to the signal men all miscellaneous blacksmith work on the division and all light repairs such as window glass setting and odd painting. A crew of three men under this assignment would regularly start at one end of the division and by moving forward a few miles daily would keep up all light repairs on track tools, switches, switch stands, frogs, crossings, buildings and signals, with but very little time spent in travel.

Convention of the Southwestern Electrical & Gas Association

At the Annual Meeting Held at Galveston, Tex., May 21-24, Papers Were Presented on a Number of Subjects of Interest to Electric Railways, Among Which Were Lightning Protection, Small Oil Engines, Boiler-Feed Water, Car Design and Standard Accounting Systems

The annual convention of the Southwestern Electrical & Gas Association was held at Galveston, Tex., on May 21-24, 1913. A number of papers were presented which were of special interest to electric railways and these are given in part in the following paragraphs.

PROTECTION OF HIGH-TENSION CIRCUITS AND APPARATUS

This subject was treated by E. E. Nelson, electrical engineer Northern Texas Traction Company, in a very complete paper, dealing with the present methods of insulating and arranging high-tension conductors and apparatus both within the power house and on transmission lines. With reference to lightning protection Mr. Nelson said that the trouble with insulators breaking from lightning surges increased with the voltage, but the trouble with the apparatus was more severe on moderate-voltage lines of from 5000 to 15,000 volts. For the protection of lines under 2500 volts lightning arresters should preferably be distributed out along the line, but for higher voltage they were needed at the apparatus only. The best type of high-tension lightning arrester on the market was, he said, the aluminum-plate electrolytic arrester, consisting of a number of aluminum trays placed one within the other, separated by small spaces, the trays being filled with an electrolyte and the whole placed in a tank filled with insulating oil. This had the peculiar and very important characteristic that a film which formed on the aluminum plates had a high resistance until, by high voltage, it was broken down by numerous small punctures making almost a short-circuit for the high voltage, but as soon as the voltage stress was removed the minute punctures sealed up and the arrester recovered its original high resistance. For voltages less than 13,000 non-arcing cylinders were used on the line side of this device. For higher voltages the horn gap was used. There was also required a fuse which would blow if the film on the aluminum plates did not recover its high normal resistance.

This arrester could be placed outdoors or indoors, but it had been found in Texas, during the extreme heat, that when placed in the sun it gave considerable trouble. In some cases it had been necessary to place shades over them and to paint the containing tanks white to keep them from absorbing too much heat. It was necessary to cause the arrester to work by bringing the gaps close enough together to enable the normal voltage of the line to jump across and operate the arrester about once in twenty-four hours.

To supply the demand for an inexpensive arrester for the protection of small transformers on the high-tension lines, where the revenue would not justify the expenditure for the best possible arrester, there had been recently developed a compression chamber type consisting of a number of metallic gaps inside of a porcelain tube connected to the line through a resistance rod inside of the same porcelain tube.

With ungrounded neutral, lightning arresters should be rated at the voltage between the wires. With grounded neutral, it was sufficient to use an arrester rated about 20 per cent higher than the maximum voltage between the line and the ground.

For protection against the breakage of line insulators, overhead ground wires and a metallic lightning rod at each pole, 5 ft. or 7 ft. above the highest insulator, had been found to give material protection. The best protection would be furnished by grounding these rods at each pole by a conductor running down the pole, but it was usual practice to ground the rods on wooden pole lines about every five or six poles.

OIL ENGINES FOR SMALL POWER PLANTS

A. L. Chase, secretary-treasurer Clarendon Light & Power Company, described in his paper a steam-driven electric-light plant of 150 hp capacity in which the fuel bill had been reduced from $225 per month to $164 per month by the substitution of two-cylinder, vertical, low-compression, make-and-break ignition oil engines. Texas Company No. 2 Solar oil was used, costing 4 cents per gallon delivered.

During the year 1912 the service was out for about four hours on account of trouble at the station. Very little trouble was had in starting the engines and the regulation was equal to that of any high-speed automatic cut-off steam engine. Few repairs were made and the only accident which occurred was due to neglect on the part of the engineer and was not the fault of the engine.

WATER FOR STEAM BOILERS

The subject of boiler-feed water was treated by A. C. Scott, Dallas, Tex., in a paper which described the various waters of the Southwest with regard to the material which they held in solution and in suspension. He also cited the common methods of reducing trouble from scale, saying that the hot-process system was particularly desirable for boiler plants where exhaust steam was available for heating the water, the whole scheme being virtually embraced in the ordinary operation of a feed-water heater with the introduction of soda ash into the hot water. Live-steam purifiers were useful as partial purifiers, but they were always subject to boiler pressure, wasted some heat, had to be placed higher than the boiler level and frequently gave trouble from water hammer.

Boiler compounds were more or less palliative in their action, and if composed for the most part of non-humbug constituents, would produce results by combining with the scale-forming impurities, breaking them up, precipitating scale-forming matter and entrapping it as it was precipitated from solution before it had formed a hard, adherent scale. Such compounds were recommended for use only in small plants whose capacity would scarcely justify arrangements to purify the water before it entered the boiler. If possible, the steam boiler should not be used as a "precipitation tank," but if it was, the feed water should be analyzed and the character and amount of the necessary chemical reagents determined. These should be pumped into the boiler with the feed water in the form of a solution made up of definite strength, the amount pumped in being proportioned to the operating conditions of the boiler.

The blowing-off process was important, but it should be done under low pressure. Undoubtedly some of the troubles that were recorded as due to scale-forming water were really attributable to the disregard of proper methods of blowing off and to the pumping in of cold water, thereby overstraining the boiler material. The use of kerosene oil as a remedy for scale trouble had many advocates. To be reasonably effective in any case the kerosene should be put in after the boiler is emptied and washed, and the refilling of the boiler should be done slowly from the bottom.

Boiler troubles due to foaming or priming apparently depended to a large extent upon the concentration of alkali salts in the water within the boiler, although the factors of silt, organic matter, loosened scale and lubricating oil all had an appreciable bearing upon this phenomenon. Surface blowing was, of course, a remedy where it could be applied, and in the majority of cases the proper use of the main blow-off would be a help.

CAR DESIGN

C. O. Birney, superintendent car construction Stone & Webster Engineering Corporation, said that specifications for city or suburban cars should be complete in every detail, leaving no chances for arguments between the contractor and the purchaser and should not be changed after contract was let. The purchaser should have a competent inspector empowered to act and should back him up in every way. The inspector should be in the drafting room when drawings were made, as he could thus save the car builder money, get a better car and eliminate many delays.

In the past, when many of the horse car lines were changed into electric lines, the old horse car bodies were changed over to accommodate the new conditions, and these in most cases proved to be too light and fragile to withstand the additional equipment and increase in speed. The operators after this experience wanted to be sure that the next cars they ordered would be strong and heavy enough to hold up, not taking into consideration the cost of power, wear upon track, special work and roadbed, caused by the increase in weight, as is done to-day, The contractors were willing to make the car heavy, as materials were cheaper than skilled labor, and as a consequence cars were being operated in the country that had enough material in them for two cars of the same dimensions, if properly designed and constructed.

In planning a car of to-day Mr. Birney said that designers studied climatic conditions and effects and made all cars for each section of the country as much alike as conditions would permit. They drew up complete detail specifications and thoroughly inspected all material and workmanship, insisting upon the car being built as specified. On account of present-day construction it was necessary to have the best material that the market affords, and the workmanship had to be first-class in every respect, requiring high-class and high-priced mechanics. Purchasers paid more for cars today on account of this and on account of the cost of safety devices and arrangements for the comfort of passengers. Cars were designed so that they would have the least possible weight in order to hold up and have a low maintenance cost, as the designers figured that they saved 5 cents per pound per year in power cost by so doing, and also that the lighter car was easier on the roadbed.

On the trucks, Mr. Birney said, all ordinary wearing parts should be applied so that they could be taken out and replaced with a minimum expenditure of labor and without having to take the body off the trucks or disconnect the electrical equipment. All holes that had any chance to elongate should have case-hardened bushings. Friction between truck and body center plates should be reduced as much as possible in order to save power, track and special work. Truck and body side-bearings should be not less than 3/16 in. apart. The body-bearing plates should be turned up at end to prevent them from passing under the truck-bearing plate when a car splits a switch. The distance from center to center of journals on a city truck of 4 ft. 8½-in. gage should be not more than 71 in., for it was reasonable to believe that the closer the bearing point was to the hub of the wheel, the stronger would be both journal and axle, and the shorter the distance over truck side frames the lighter the truck would be.

The hand brakes should be first class and kept in a working condition at all times. All holes in levers, both in air and hand brakes, should have case-hardened bushings and case-hardened key bolts.

Mr. Birney concluded with a brief specification to cover a car suitable for the Southwest, which included for a single-truck car seating thirty-two passengers a total weight with equipment not to exceed 24,000 lb. A double-truck car seating forty passengers, with two-motor equipment and straight-air brakes, should have a total weight not to exceed 31,000 lb.

STANDARD ACCOUNTING SYSTEM FOR SMALL AND MEDIUM-SIZED PUBLIC UTILITIES

A paper on this subject was read by H. E. Gordon, president Public Accountants' Society of Texas. He said that the system of accounts of any company should show first what a company owed and what was owing to it. After that it should show whether the company was making or losing money and, if the latter, when and where the money was lost. A good accounting system should be installed by every public utility company, whether such a system is required by the authorities or not. Many public utility properties have been sold by their owners at too low a price because the owners did not know the value of their property. The arguments for a standard system are, first, economy; second, convenience and, third, fairness of comparison. In the writer's opinion proportionally too little attention is given to the operating accounts compared with the property and security accounts. Mr. Gordon also emphasized the importance of elasticity in a standard classification to permit amplification when the system is applied to a large plant and yet keep it adaptable for the smaller plants. He believed that through the appointment of public utility commissions all public utilities would soon be required to establish standard systems of accounts. The speaker then defined some of the main accounts.

PUBLIC SERVICE RATES

A paper on this subject by William J. Norton briefly reviewed the bases used in the establishment of rates by different commissions. He said that while intangible values had formerly not been recognized by all authorities there had been a strong tendency to give more careful consideration to them within the last two years. Rate determinations are not necessarily dependent upon valuations, and none of those issued in the past by the Interstate Commerce Commission had been based upon valuations. Even if a valuation was made and used, the work of establishing the rate naturally divided itself into: (1) determination of the value for rate-making purposes, (2) determination of the rate of return profitable to the public utility concerned, (3) rate classifications and schedule of rates. Electric light and power cannot be considered as much of a "necessity" as either water or gas, hence an electric light and power company often had many development expenses in securing customers not required by a water or gas utility. Moreover, electrical energy cannot be stored like water and gas, and this increased the investment required. The writer believed that the electric light regulations of the various commissions showed a strong tendency on their part to encourage a high physical standard in the properties under their jurisdiction.

STANDARD ACCOUNTS FOR THE SMALL PLANT

A paper contributed by a "small-plant man" and written in an entertaining style described a classification which he used. It was simple and gave him all the information which he needed except that of a comparison of his accounts with those of other companies. He admitted this to be a serious defect and believed that a standard classification was desirable if it was not too expensive to conduct.

PROPOSED TYPE OF CONCRETE TRACK CONSTRUCTION

W. M. Archibald, superintendent of maintenance of way Houston Electric Company, described a system of concrete track construction now being considered in Houston. None has yet been laid. The conditions as to drainage and pavements and the character of the soil along the Texas coast makes concrete sub-construction desirable, and an effort was made to secure a design in which the rail could be renewed without great disturbance to the concrete foundation. Steel ties are used on 4-ft. centers. These ties are not punched with round holes for the bolts holding the rail clips. Instead, these bolts are passed through slots in the upper flanges of the steel tie and are held in place during construction by a ⅛-in. slotted steel strap over which the rail clip fits. Hence, when the rail is removed or replaced, it is necessary only to excavate for a few cubic inches of concrete around each bolt head. The bolts can then be slipped out. The rail clip is of the usual form. The concrete, which is 12 in. deep, is carried flush with the top of the steel tie, and the rail is braced midway between every tie by a rail brace. For initial construction of concrete track under this cross-section, Mr. Archibald says, the trench should be first excavated to grade and after the rail is laid and spiked to the ties, the anchor bolts and brace plates should be attached and tightened and the entire steel structure blocked to line and surface. The concrete should then be cast in a monolith around the ties, anchors, etc. Mr. Archibald uses a layer of ½-in. sand above the concrete but omits the usual layer underneath the paving brick. Instead, the paving brick is laid on a bed of 1:4 mortar.

TRAFFIC CHARTS

P. L. King, auditor San Antonio Traction Company, described a system of charts compiled by his company to show the actual loading of cars on different days. At first full-day charts were made for as many lines as was possible for one man to prepare. This plan was found too slow, and the company now prepares charts for the rush hours only for every day on all lines but a full-day chart for Saturday and Sunday for at least one line and occasional full-day charts during the week. One man only is required to do this charting. A saving has been made in operating expenses by these charts. They are plotted on cross-section paper with time as abscissas and passengers as ordinates. Where a line passes through the center of the city the conductor, after reaching a certain point, makes a note on his trip sheet of the number of fares registered. This gives the number of passengers "in," and when this figure is deducted from the total fares registered the number of fares on the second half of the trip is determined.

DISCUSSION

An account of the proceedings of the Galveston convention will be published next week.

GAS-ELECTRIC AND STORAGE BATTERY CARS

The fifth annual convention of the International Railway Fuel Association was held in Chicago on May 21, 22, 23 and 24. Among the six papers presented at the convention was that on "Self-Propelled Railway Passenger Cars," by S. T. Dodd and B. H. Arnold, which was abstracted on page 934 of the Electric Railway Journal for May 24.

The reliability of gas-electric cars was brought up in the discussion. Messrs. Buell, of the Union Pacific Railroad, and Hilton, of the Frisco system, practically removed all doubt on this score by their accounts of the service rendered on their roads. The only trouble which had been experienced with motor cars had been caused by the ignorance of the operators. Educational bureaus have overcome this difficulty to a marked degree.

F. E. Drake gave some interesting figures on gasoline-electric motor-car performance in Hungary, Europe, and in Oklahoma. On the Arad-Csanad Railroad in Hungary seventy-two trains are operated in both directions daily. The average car mileage per year is 1,000,000 miles and total annual mileage is 5,300,000 car miles, which, according to Mr. Drake, is considerably more than any steam locomotives in the United States are capable of. In Oklahoma the motor cars on the Muskogee Electric Traction Company's road operate 3.3 miles per gallon of fuel oil. Operating expenses and fixed charges amount to 16.4 cents per car mile.

In a written communication from J. H. Tracy, some data were given on the performance of storage battery cars as compiled from actual practice. The author asserted that gasoline or gasoline-electric cars offer the best solution to the problem of handling light, infrequent traffic when conditions call for long-distance hauls at relatively high speeds and with few stops, and that the storage battery car "has a useful and economical field for service which is within the scope of the battery." One hundred miles per charge at a free running speed of 30 miles per hour, with an equipment seating seventy passengers and providing a suitable baggage compartment, seemed to be entirely within the range of conservative operation.

The Lewisburg, Milton & Watsontown Passenger Railway Company in Pennsylvania had been operating since early last October a storage-battery car built by The J. G. Brill Company and equipped with an "Exide" lead battery from the operation of which data had been compiled. The car in operation on this line is 34 ft. 4 in. over the corner posts, has a seating capacity for thirty-two passengers in the passenger compartment and has a baggage room 11.5 ft. long. It is of standard construction, and while carefully designed for light weight, embodies no special features except that ball bearings are used to reduce the running friction. The car weighs 32,200 lb. complete with battery, the battery weighing somewhat less than 8000 lb. Between Oct. 9, 1912, and April 1, 1913, it ran more than 20,000 miles, regularly performing approximately 122 miles a day. During this time the car lost only 19 miles from the full schedule. This loss was due to a damaged charging plug which in turn damaged the car wiring. The entire care of this car, including charging the battery, cleaning, inspecting, etc., is assumed by two crews, each consisting of one motorman and one conductor.

During the six months of operation mentioned above, which it will be noted covers the winter months, the consumption of this car averaged approximately 4.25 amp-hr. per car mile. The battery equipment consists of eighty-eight cells having a rating of 420 amp-hr., the individual cells being identical with those which have been used successfully since September, 1910, on the Third Avenue Railway, New York. The battery averages 170 volts during discharge in this service, which gives an energy consumption of 722 watt-hr. per car mile. Assuming an average live load of 1.5 tons, the actual energy consumed from the battery amounts to 41 watt-hr. per gross ton mile. The ruling grade on this line is 0.7 per cent, there being a difference of 88 ft. in level between the two termini. The number of stops averages between one and one and one-half per mile, as the car is stopped at intersecting roads as well as at the regular passenger stations of the Pennsylvania Railroad Company. As the rating of the battery is 420 amp-hr. and the energy consumed in driving the car averages 4.25 amp-hr. per car mile, the mileage capacity on one charge of the battery is nearly 100 miles.

BERLIN ELECTRIFICATION MEASURE IN PRUSSIAN DIET

During April the lower house of the Prussian Diet passed by 192 votes to 143 a bill which will empower the government to make at a cost of $6,125,000 preparations for the electrification of the Berlin Stadtbahn, with certain temporary restrictions. The Prussian Minister of Public Works, Herr von Breitenbach, said that electrification would be $1,500,000 cheaper a year than steam. With electricity it would be possible to run forty trains an hour instead of twenty-four, and to increase accommodation for passengers by possibly as much as 100 per cent. The steam service would not be altogether abolished, but he regretted that opposition to the scheme had originated with manufacturers of steam locomotives. A representative of the War Office said the Ministry of War had no objections to the electrification of the railway. Very little use could in any case be made of the old steam engines in mobilization, because they were not adapted for heavy military loads.

RECENT PASSENGER STATIONS IN LOS ANGELES

The Pacific Electric Railway, of Los Angeles, has recently adopted the Mission style of architecture for its passenger stations, a style which is of course very appropriate for the region through which its lines operate. In all the company has about twelve standard types of stations, but the accompanying engravings of a modified Mission type "A" architecture will give a very good idea of the present practice of the company in this style of station. A very interesting feature of the plan followed is that these stations are arranged so that if the traffic increases and more room is required a station can be easily changed from one size to a larger one, and yet a symmetrical floor plan and architectural treatment are retained.

In the accompanying illustrations Figs. 1 and 3 show the front and end elevations of the Van Nuys station and Fig. 2 shows its plan. The accompanying halftones show end and front views of the station respectively.

The chimney is of brick. There is a tile roof supported on wooden rafters. The interior finish is in Oregon pine, and redwood is used for the exterior finish.

The foundations, walls, columns, etc., are of concrete in the proportion of one part of Portland cement, two parts of sand and four parts of crushed rock or screened gravel of size varying from ¼ in. to 2½ in.

The flooring of the waiting room and offices is of Oregon pine, that of the freight room of pine with the rough side up, and that of the toilet rooms of cement. The ceilings in the passenger portion are plastered.

Should the traffic grow, the station shown in Figs. 1, 2 and 3 may be extended to make the Mission type "A" station shown in Figs. 4 and 5. In this case the waiting room and offices remain the same, but the freight room is lengthened and a large open platform with a roof is built adjoining the closed freight room.

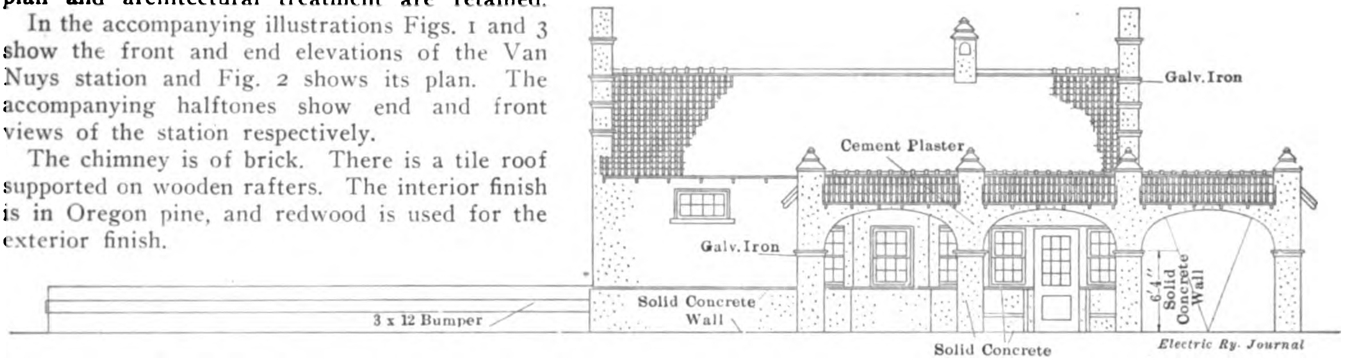

Galv. Iron
Cement Plaster
Galv. Iron
6'4"
Solid Concrete Wall
Solid Concrete Wall
3 x 12 Bumper
Solid Concrete
Electric Ry. Journal

Fig. 1—Los Angeles Stations—Front Elevation of Van Nuys Station

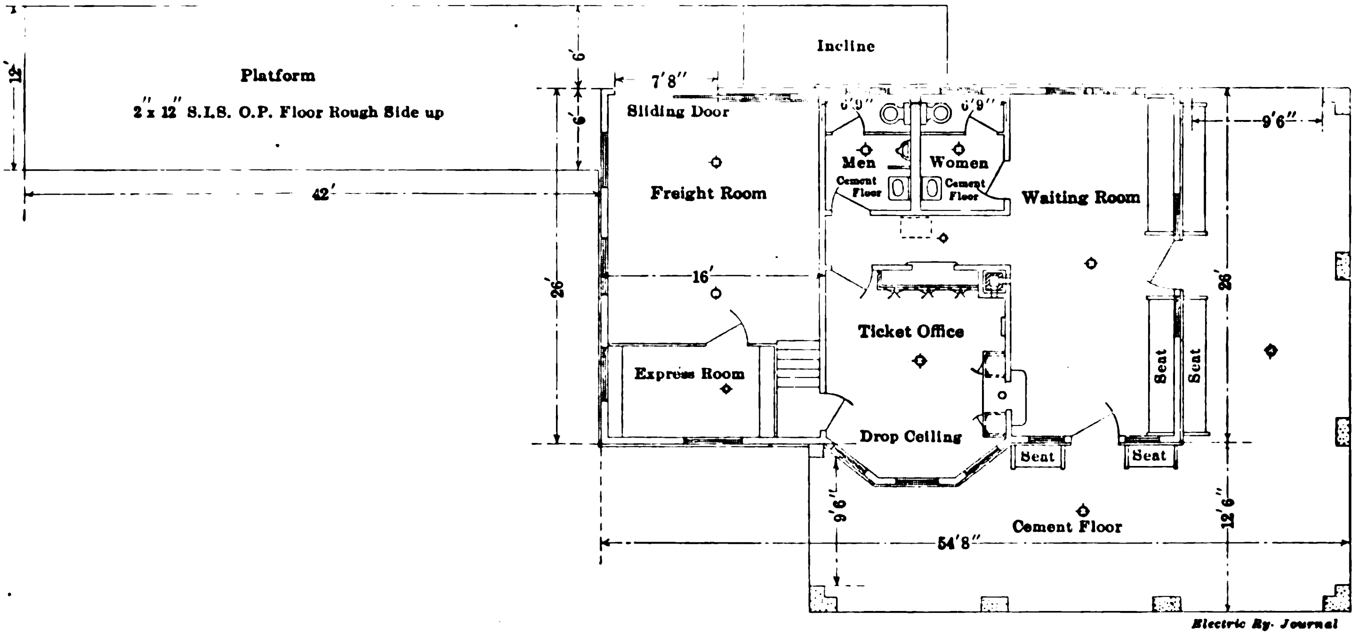

Platform
2" x 12" S.I.S. O.P. Floor Rough Side up
12'
42'
6'
6'
7'8"
Incline
Sliding Door
Freight Room
16'
26'
Express Room
6'9"
6'9"
Men
Women
Cement Floor
Cement Floor
Waiting Room
9'6"
Ticket Office
Seat
Seat
Seat
Seat
26'
Drop Ceiling
9'6"
12'6"
Cement Floor
54'8"
Electric Ry. Journal

Fig. 2—Los Angeles Stations—Plan of Van Nuys Station

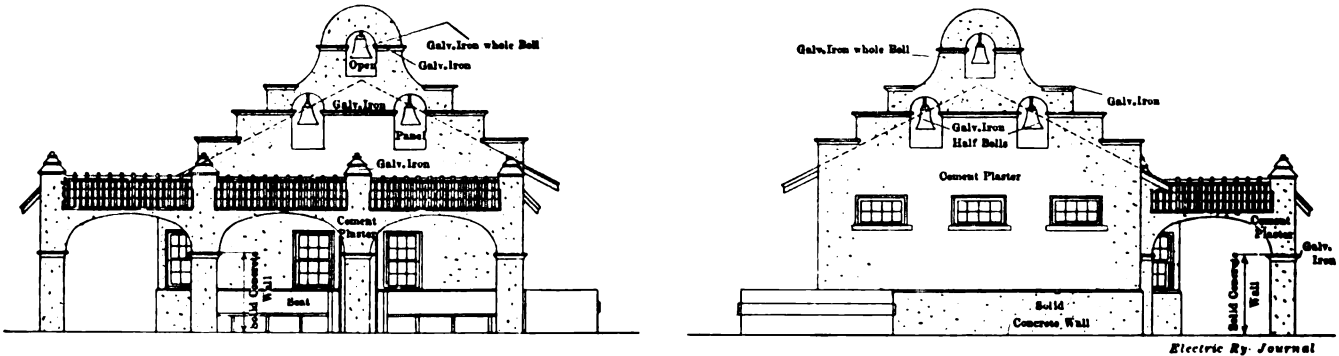
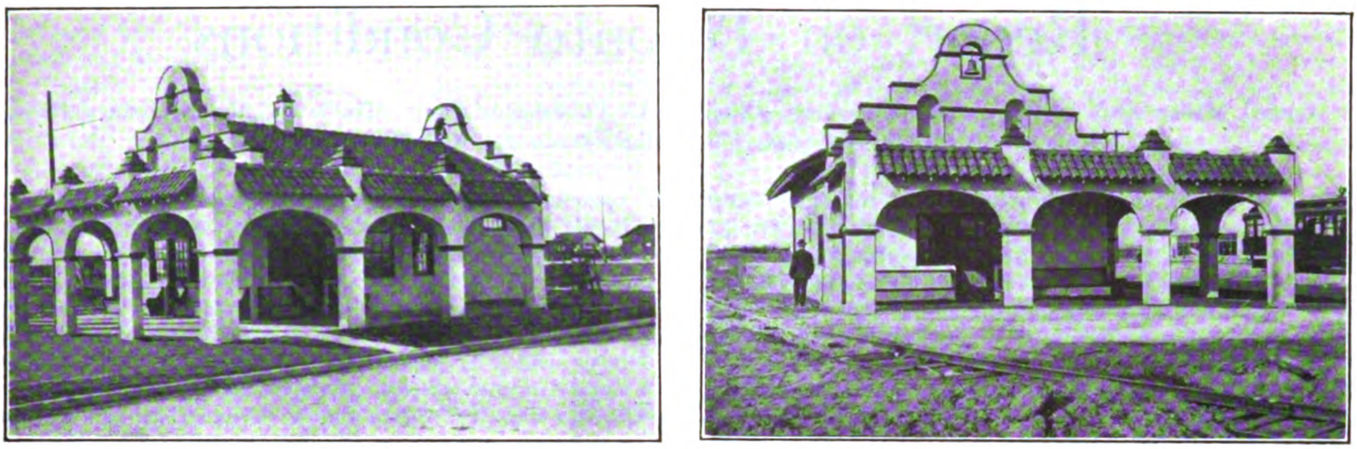

Galv. Iron whole Bell
Open
Galv. Iron
Galv. Iron
Panel
Galv. Iron
Cement Plaster
Solid Concrete Wall
Seat
Galv. Iron whole Bell
Galv. Iron
Galv. Iron Half Bells
Cement Plaster
Cement Plaster
Galv. Iron
Solid Concrete Wall
Solid Concrete Wall
Electric Ry. Journal

Fig. 3—Los Angeles Stations—End Elevations of Van Nuys Station



Los Angeles Stations—Front and Side Views of Van Nuys Station

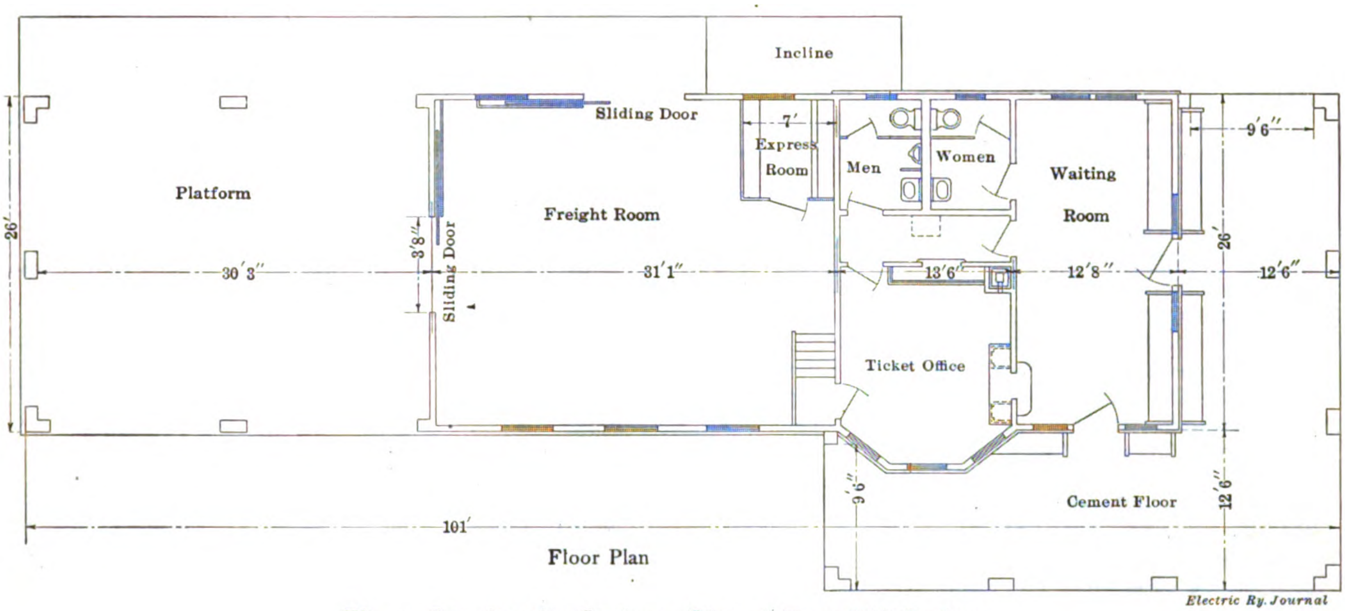
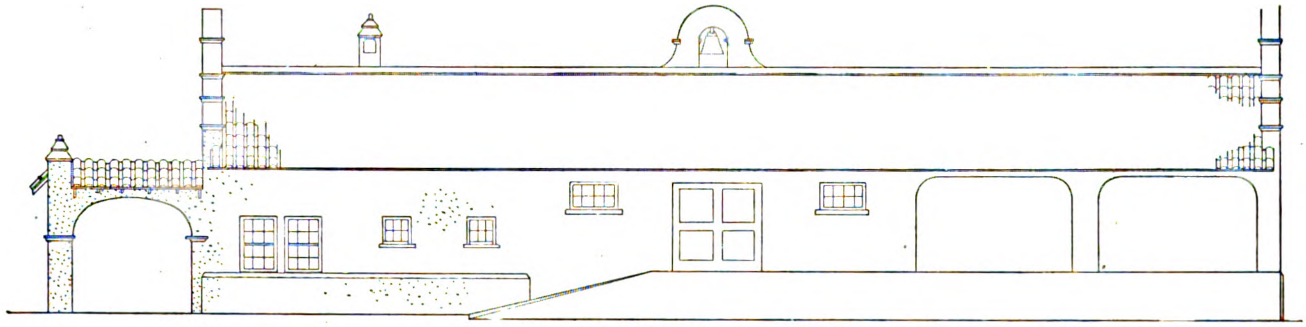
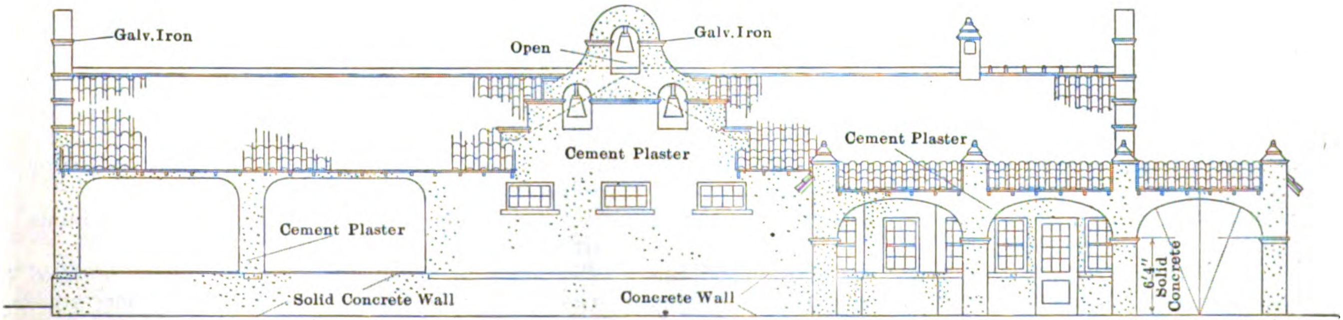

Incline
Sliding Door
7'
Express Room
Men
Women
Waiting Room
9'6"
Platform
Freight Room
26'
3'8"
Sliding Door
30'3"
31'1"
13'6"
12'8"
26'
12'6"
Ticket Office
9'6"
Cement Floor
12'6"
101'
Floor Plan
Electric Ry. Journal

Fig. 4—Los Angeles Stations—Plan of Type "A" Station



Rear Elevation


Galv. Iron
Open
Galv. Iron
Cement Plaster
Cement Plaster
Cement Plaster
6'4" Solid Concrete
Solid Concrete Wall
Concrete Wall
Electric Ry. Journal

Front Elevation

Fig. 5—Los Angeles Stations—Elevations of Type "A" Stations

Report on Toronto Conditions

Unified Management Is Strongly Recommended—Estimates Are Published of Future Traffic and the Equipment Required for It—A Subway and Motor Buses Are Considered

The report of Bion J. Arnold on traction improvement and development of the Toronto metropolitan district, made recently to G. R. Geary, K. C., corporation counsel of the city of Toronto, contains a number of recommendations relating to service and proposed construction.

In his letter transmitting the report Mr. Arnold says in part:

"The increasing demands and the opportunities for further traction development have been shown, and the necessity of a comprehensive plan for rehabilitation, betterments, extensions, re-routing and publicity has been, in my opinion, fully demonstrated. Two plans are submitted, one contemplating the operation of all lines in the Toronto district under one management, and the other providing an independent system with an entrance to the heart of the business district for many of the present and proposed civic lines, with the system so planned that it can eventually be co-ordinated with the lines of the present traction system when the franchises under which they are now being operated expire."

Section I of the report takes up Toronto conditions and is in part as follows:

"In some respects the service in Toronto is better than in many other cities, and the present deficiencies may be largely overcome by proper co-operative measures on the part of the city and the company, if the policy is such as to make this possible. Car congestion may be remedied by the re-routing of a few lines in the congested district, and overcrowding at certain rush-hour periods could be largely eliminated by the addition of a few cars on the trunk lines. Revised time-schedules based upon faster operation would greatly improve the service without the addition of a car to the present equipment. This may be greatly aided by a more careful training tending to produce alertness on the part of the conductors and motormen, and thereby inducing more activity on the part of the public when boarding cars and alighting from them.

"Cross-town lines in certain sections are needed for the proper transportation of passengers to and from their homes, and extensions to existing lines should be built into outlying territory. Subways have been advocated as a means of relief for present congestion. With the transportation affairs of the city under unified management subways would not be warranted at present. Subways should be looked upon in the nature of a last resort, a necessity forced by conditions for which there is no other remedy. Toronto does not at present need subways nearly so much as it needs more surface tracks and more and better and faster surface cars, preferably under unified management.

"Since 1907 the population of the city has increased over 45 per cent, according to official police records, or an average of 9 per cent per year. During that period car track mileage was increased from 101 miles to 113 miles, about 12 per cent, or 2.4 per cent per year. Car miles operated were 42,036 per day in July, 1909, and 43,878 per day in July, 1911, an increase of but 4.5 per cent in two years, or 2.25 per cent per year, plainly demonstrating that the track mileage and service have not kept pace with the increase of the population. During the period 1907-1911, inclusive, the gross income increased 38.2 per cent, or an average of 9.6 per cent per year.

"The Toronto system earned $1,661,017 in 1901 and $4,851,541 in 1911. Assuming this rate to be continuous, an increase of business of 192 per cent must be provided for in 1921, with estimated total gross earnings of approximately $14,000,000 per annum at that time. These figures may seem to be excessive, but at the present time over $12 per capita per annum is being used for street car transportation by the people of Toronto, and the city is growing quite rapidly. A general rule used frequently in estimating probable increases in city transportation earnings is that 'within reasonable limits the annual transportation income of any large center of population increases approximately as the square of the increase of population.' Applying this rule to the city of Toronto on the basis of 390,000 estimated population in 1911, with an annual increase to 1921 of 6 per cent and the expenditure in 1911 of $12.40 per capita for transportation, the estimate for earnings in 1921 does not appear to be too large. During the past decade the actual rate of increase of earnings has fallen below this law of the square of increase in population in spite of the growth of the city.

"Ordinarily for a system covering an entire city, under conditions similar to those herein outlined for Toronto, about 70 per cent of the income is required to operate and provide for taxes and depreciation. From the Toronto Railway Company's annual reports of 1911 these items, exclusive of renewals, consumed but 57.46 per cent of the gross income, demonstrating an ability on the part of the company to increase its service materially without sacrificing a fair return from the business, even if a liberal allowance is set aside for renewals.

TABLE I—STATISTICS OF POPULATION AND RECEIPTS OF TEN CITIES

	Miles Track per 1,000 Persons	Receipts per Capita	Receipts per Mile of Track	Population per Mile of Track
Washington	0.656	$19.18	$29.258	1,525
New Orleans	0.590	12.41	21,030	1,695
Baltimore	0.716	13.75	19.220	1,397
Cincinnati	0.610	13.72	22,540	1,640
Cleveland	0.437	10.93	24.990	2,286
Toledo	0.690	11.90	17,241	1,448
Seattle	0.790	15.44	19,470	1,261
Milwaukee	0.388	10.13	26.114	2.579
Toronto	0.289	12.44	42,929	3,451

"From the annual report for 1911 made by the company to the Ontario Railroad Board the total expenditure of the company for maintenance only is found to be 8.58 per cent of the gross receipts, a figure which compares favorably with that of the average of all the Chicago companies for 1910, i.e., 8.6 per cent, but the comparison is not so favorable when the amounts spent on maintenance of track and roadway alone are compared, i.e., 0.926 per cent for Toronto and 2.27 per cent for Chicago. An examination of the property shows that about 35 per cent of the tracks should be rebuilt and other improvements made. After the entire property is put in good physical condition there should be expended annually upon maintenance and renewals, in order to keep it in first-class operating condition, from 15 to 18 per cent of the gross receipts, depending upon the growth in earning capacity of the property.

"The power for the supervision of the maintenance of the physical property, as well as its operation, should be vested in a provincial or municipal board, clear of political bias and of unquestioned integrity and professional skill, and this board should be empowered by such legislation as is necessary to enfore its mandates fully."

Section II, dealing with present traffic conditions, is in part as follows:

"In order to handle the same amount of business other cities are provided with more cars and more tracks, the average for nine American cities being about one car for each 500 of population and one mile of track for each 1800 of population, or one mile of track for about $23,055 of receipts. Selecting several cities suitable for traction comparisons with Toronto, track mileage, population and receipts and their ratios are found to be as shown in Table I."

Sections III and IV outline recommended additions to existing lines and a plan whereby the construction of the necessary track work, part of which is already finished, could be completed in five years. Section V states that the construction of the trackage recommended would increase the mileage from the present 113 miles to 240 miles at the end of five years.

CAR AND SERVICE REQUIREMENTS

Section VI describes car and service requirements and estimates "that the transportation system outlined in the report, when completed, will require 1100 cars for the transportation of a population of 718,000 in 1921. With 500 of the present cars retained in service on light lines of travel or rebuilt, there will be required 150 new cars to replace trailers and the poorer class of single-truck motors. As fast as new lines are added to the system and population increases, new cars will be needed, the estimate being 250 for this purpose at the end of five years. The rest of the final requirements should be placed in service at the rate of fifty per annum."

The report suggests the reconstruction of the city cars of Toronto by additions to lengthen the platforms and by changes in the seating arrangement. In reviewing types of cars developed recently, the report says regarding the near-side car:

"While it has certain advantages, especially where used in conjunction with the near-side stop, it is a single-ended car requiring terminal loops and has not as great storage capacity on the platforms as the type of pay-as-you-enter car illustrated in the report. It therefore may, like the center-entrance car, be considered in the experimental stage."

CARHOUSES

Regarding carhouses Section VII says that "the present locations of carhouses in Toronto are quite convenient for the distribution of cars over the lines as they are. Generally speaking, no carhouse should be so constructed as to allow of more than twenty-five or thirty cars being subject to loss by fire at any one time, and all structures of this class should be as nearly fireproof as possible."

A plan is presented for a modern carhouse with a repair and storeroom bay and six storage bays containing three tracks each, with a total capacity of 191 cars inside the building and room for twenty-five cars on the special work at the ends of the buildings, which could be used for temporary storage. The report adds: "A carhouse according to these plans was constructed recently, in which inspection pits were provided under 59.5 per cent of the total tracks in the storage bays and under 76.6 per cent of the total trackage in the repair bay. Modern carhouse practice provides for fireproof construction and double-end operation, with the structure divided into bays or sections, and with reinforced concrete slab roofs. Carhouses of this character should be built, for the accommodation of 250 cars, for about $410,000, or $1,600 per car."

The total cost of the proposed additions to the present Toronto transportation system for 127 miles of new track (the city furnishing the roadbed and paving), 600 modern prepayment cars, additional carhouses, substations and other equipment necessary, would be in the neighborhood of $8,762,000, divided approximately as follows in Section VIII of the report:

"Track construction, 127 miles of single track (3.5 miles grooved rail; 123.5 miles T-rail), $2,127,000; overhead wires, poles and cables, $489,000; carhouses, $820,000; cars, $4,500,000; power stations and equipment, $726,000; miscellaneous equipment (work cars, snow and ice machinery, line wagons, sprinklers, etc.), $100,000; total, $8,762,000. An additional expense would be incurred should it be desired to place electrical feeder and return cables underground. Under Toronto conditions the cost of these ought not to exceed the following: manholes, $98; iron pipe laterals, 60 cents per foot; conduits, 41.6 cents for two ducts up to 10.17 cents for forty-eight ducts, per duct foot."

The report says on the subject of probable earnings:

"Presuming the completion of the proposed additions by the close of 1917, the financial showing for the year 1918 for the entire system of 240 miles of track in the Toronto district is estimated to be as follows: Gross earnings, $10,800,000; operating expenses, taxes, renewals, pavement charges, etc., at 70 per cent, $7,560,000; net earnings, $3,420,000.

"The above estimate is considered very conservative for the following reasons: (1) The earnings are based upon the present riding habit, which averages $12.40 for the city, as it is now covered by the present limited traction lines. Were the complete system considered by this report to be now in operation, there would unquestionably result a higher earning per capita. (2) Owing to the possibility of very cheap power being available for the operation of the entire system, an operating ratio as high as 70 per cent is probably the maximum (including pavement charges). With such power supply the actual operating ratio will probably be in the neighborhood of 65 per cent (exclusive of pavement charges). The minimum net earnings that would be expected, $3,420,000, capitalized at 5 per cent, would support an investment of $64,800,000, or, capitalized at 8 per cent, approximately $40,000,000. These figures may be assumed correct on the theory of a continuing investment on the part of the municipality or a company, but they should be reduced by whatever amount is found necessary to amortize the investment within the franchise life if the property is developed and operated by a company under a franchise for a fixed period."

Detailed suggestions for the re-routing of lines are made in Section IX.

ALTERNATIVE PLAN

Section X outlines an alternative plan in a subway terminal in the business center and is in part as follows:

"Should it be considered desirable or necessary for the transportation system of Toronto to be operated under more than one management for the next nine years, the greatest need for the new lines will be a terminal in the business center of the city; this provided, construction of the necessary service and development lines could follow as rapidly as desired and circumstances would warrant. The success of the civic undertakings in Gerrard Street, Danforth Avenue and St. Clair Avenue will depend largely on the answer to this question. Without proper outlets such isolated lines generally lead a precarious existence and in many ways prove a disappointment.

"Subways have their uses in congested areas where surface terminals are insufficient for traffic needs and where elevated structures would be objectionable. For the support of subways there should be densely populated districts some distance from the business center seeking rapid transit which other means of transportation are unable to provide. The subways of New York and Boston were not constructed until after all other classes of transportation had reached their limit of carrying capacity. Under these conditions only will a subway, as a subway, pay its way. As an inlet for an extended system of surface lines serving a large territory the governing reasons for the adoption of a subway change to such an extent that its construction is occasionally warranted."

Costs of a city terminal subway, surface lines, etc., are estimated in the report as in Table II.

"The financial success of this undertaking would depend entirely on the rapidity with which the territory to be served increased in population. At present the traffic to be had would not warrant the expenditure, but the guarantee of rapid transit within a short time should attract settlement at such a rapid rate as to double the population north of St. Clair and Danforth Avenues by the time the subway was completed. For quite a number of years after that time the increase should be from 12 to 15 per cent per annum, as many persons would move from less favored districts to the zone which is supplied with rapid transit.

"The population at present in the territory tributary to the proposed surface lines is estimated at 60,000, about 37,000 of which could be counted on for patronage for a subway system. With this doubled, by the time the downtown terminals were completed, there would be a population of 74,000 of probable patrons, which, at $12.40 per capita per annum, the rate Toronto is now paying (which would be a low rate for this outlying territory), would give an estimated income from passenger receipts for 1917 (if the completed system, costing $10,473,000, were operated) of $917,000. It is probable that the receipts per capita per annum would run from $15 to $18 for this outlying territory, as it is not within walking distance from the business district. Assuming this rate to average $16, the gross receipts from passenger service would be $1,184,000. Adding $20,000 for advertising and news-stand privileges, the gross receipts for the first year of operation would be $1,204,000. Allowing 62 per cent for operating expenses, including maintenance, during the first year of operation, there should remain $457,520 to meet fixed charges, renewals, taxes and amortization, if the latter is deemed advisable."

TABLE II—COSTS OF SUBWAY, ETC.

Double-track subway in Yonge Street	$4,328,000
Single-track subway loop	496,000
Danforth Avenue branch (Yonge to Broadview)	1,338,000
Carrying charges on terminal system (7½ per cent during construction, 2½ per cent per year)	462,000
Double-track surface lines (17 miles)	1,490,000
Single-track surface lines (10 miles)	472,000
Pay-as-you-enter steel cars (150 at $8,500)	1,275,000
Carhouses	320,000
Substations and equipment	242,000
Miscellaneous—work cars, line wagons, snow, ice and sprinkler equipment	50,000
Total	$10,473,000

An estimate of cost for part of the system is also given in the report.

MOTOR BUSES

The subject of motor buses and radial lines is taken up in detail in Section XI, which says in part:

"The use of motor buses from the nearest terminals of the civic lines to the business center has been suggested to cover the period between the completion of a surface line and the completion of the subway. This is not thought advisable. The motor bus can be profitably operated only in the districts where traffic is continuously heavy, on short hauls from one congested center to another, or by charging much more than the regular street car fare. Toronto conditions do not seem to warrant an experiment of this character.

"Reports from different cities where motor buses are being used do not offer much encouragement for engaging in the business under Toronto conditions. When competing with existing electric lines results have not been satisfactory, even when a higher fare has been charged. The principal difficulty seems to be on account of the large depreciation necessary on buses (generally 33 1-3 per cent) and the heavy tire renewal charges. In a certain Western city it was found necessary to double the fare to 10 cents per passenger on a route less than a mile long between two congested passenger centers, where transportation conditions were quite favorable. A gross business of $20 per day per bus was considered necessary to pay all charges, including interest on investment. The buses cost $4,500 each, averaged 50 miles per day, seated sixteen passengers and cost 36 cents per car mile to operate. The average daily receipts per bus were $14.22. The driver acted also as fare collector. A bus seating twenty-five passengers could be procured for $6,000, but the expense of a fare collector would be added."

A recent published analysis of the financial results of the New York bus lines gives the rate of speed at 7.2 miles per hour; average passenger capacity of buses, thirty-five; tire expense, $2.21 per day per bus; cars in regular service, fifty-four; total necessary to maintain the service, eighty; tire cost for the year for eighty cars, $844.55 per car; annual depreciation on buses, 33 1-3 per cent, and passenger fares at 10 cents. For the year 1911, on a gross business of about $500,000, a deficit of $38,000 was reported.

CARHOUSE PLANNING BY THE UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

The United Railways & Electric Company of Baltimore is notable as the first large electric railway in the United States to adopt a distinctive style of architecture in which graceful outlines have been combined with ample natural lighting, cleanliness, freedom from fire, durability and operating convenience. As the attainment of these ends demands the combined services of the operating man, car and way engineer and artist, the following statement from an official of the company, describing the way in which the company and its architects co-operate in the work of designing and erecting carhouses, will undoubtedly be of interest to other electric railways:

"In the first instance a track layout is prepared by the railway company indicating in a general manner the office accommodations. This plan is carefully gone over by the various departmental heads interested until all are unanimous in the opinion that it economically and advantageously meets the company's requirements. The architect is then requested to submit a sketch showing a design of the proposed carhouse, which is gone over in conference by the interested railway officials with the architect until a thorough understanding of the requirements of each is reached. The architect then prepares the final design on which he indicates the partition walls, the dimensions in each instance being noted, as it is very necessary to show the various column locations in their precise position. Simultaneously, while these matters are being handled by the architect, a large track work plan is prepared by the engineering department of the company on the same scale as that of the architect, in order to assure, when the two schemes are under consideration, proper clearances and other requirements.

"Specifications are then prepared by the architect, and, after they have been submitted to and approved by the officials of the company, requests for bids are sent to a number of responsible contractors.

"The bids are opened in the executive offices under the direction of President William A. House, after which they are tabulated. A thorough study is then made of the plans by the architects, operating officials and engineers with a view to effecting further economies if possible. Upon receipt in the executive offices of the joint report of those officials, the contract is awarded to the lowest responsible bidder, and the erection of the structure is proceeded with under the general supervision of this company.

"It has not been the company's practice to have the architect incorporate in the specifications the installation of either the sprinkler system or the furnishing and erection of the tank which provides the supply for the gravity operation of the sprinkler system. On the other hand, it has been its aim to have the company's forces handle direct as much work as possible, with a view to reducing to a minimum the amount on which the fees of the architect are based. The ordering and installation of all track and overhead work is handled direct by the executive and engineering departments of the company, and the architect receives no compensation therefor."

The Cleveland Hearing

L. P. Crecelius Discusses the Depreciation of Power Stations and T. Scullin the Depreciation of Rolling Stock—Other Testimony Presented by the Company at the Hearing Last Week

The hearing being conducted in Cleveland by an arbitration board to settle differences between the Cleveland Railway Company and the city in regard to allowances for maintenance, renewals and depreciation and for other operating expenses was adjourned on Wednesday of this week until June 3. An account of the early part of the hearing was published last week. On May 21, after the conclusion of the testimony of Henry C. Davies, reported last week, A. C. Ernst, of Ernst & Ernst, certified public accountants, was called and was examined by Andrew Squire, of Squire, Sanders & Dempsey, counsel for the company.

TESTIMONY OF MR. ERNST

Mr. Ernst said that his firm was first employed in the fall of 1908 by the creditors' committee, which sought information regarding the financial affairs of the company. It was next employed, about Nov. 12, 1908, by Receivers Scott and Bicknell and served under the receivers, obtaining instructions from Judge Tayler regarding various accounting matters, up to March 1, 1910, when it was retained to represent the city under the then city street railroad commissioner, Mr. Dahl, serving in that capacity up to Jan. 1, 1912. The firm worked out the system of accounting which went into effect with the Tayler ordinance, advising with Mr. Dahl and the officers of the railway and following largely the system prescribed by the American Electric Railway Accountants' Association. The system adopted was practically identical with the one followed for the receivers.

Under the receivers a reserve was left for accidents and damages but none for fire insurance. The reserve for accidents was 0.7 cent per car mile up to April, 1909, and 0.8 cent per car mile up to April, 1910. It was found that 0.7 cent did not provide a sufficient reserve to take care of the claims that were being presented and paid, and on the basis of 0.8 cent per car mile there was a final over-expenditure of $42,000. This deficit included an estimate from the claim department that $22,000 would be required to clear up the suits pending, and there was an actual deficit of $20,000. These made the total of $42,000. On March 1, 1910, there was an apparent surplus of $52,000 in the accident fund, and that was accumulated largely under the 0.7-cent charge per car mile, but the receivers' claims were not coming in during the first year of the receivership because time was necessary to litigate these claims, so that the larger part of the payments came in the latter part of the receivership. When the books were opened for the commissioner the amount was continued at 0.8 cent.

Mr. Ernst also testified in regard to the practice of other companies whose reports showed the existence of reserve funds. He mentioned the injuries and damages reserve held by the United Railways of St. Louis on Dec. 31, 1911, when the amount stood at $200,000. The New York Public Service Commission, Second District, permitted reserves for casualties and insurance under the heading "optional reserves."

Testifying in reference to the car-mile allowance for maintenance, renewal and depreciation in Cleveland, Mr. Ernst said that during the time when he acted for the receivers and for Mr. Dahl, commissioner for the city, there was not a sufficient balance left after maintenance and renewal charges were met to provide any reserve for depreciation. Mr. Ernst defined "depreciation" as that expense which was occurring every day on property which could not be renewed or made good by maintenance or repairs. It was a gradual and slow deterioration of the property, and corporations provided for it by setting aside a specific amount out of earnings each year for that kind of a shrinkage in the assets. It was above repairs and maintenance. His criticism was that either the company was spending too much or the 5 cents per car mile was not ample, because, as the company went on, there was certain to be a time when a large amount of the property would be depreciated and would have to be charged off, and no fund was provided against that time.

Under the cross-examination of Mayor Baker Mr. Ernst said that the only way to find out whether 5 cents per car mile was enough, too much or too little was to find out whether by the expenditure of that amount the property was in the standard of condition prescribed by the ordinance, better than that or not so good.

Mr. Ernst was asked by Mr. Baker whether in his experience as an accountant he had ever known a case in which so large an item as $800,000 was written off in a single year for a single thing. Mr. Ernst replied that he knew of no instance where any company confronted with a large item of loss, say $800,000, had continued to carry that as an asset and write off a proportion of the amount each year. He had had one case where a company had an inadequate power supply and built a new power house and equipment. The old one was good only for auxiliary purposes and the company immediately wrote off practically all of the investment, carrying the equipment at its scrap value. This was done in one year, and it amounted to 7 per cent or 8 per cent of the entire capital of the enterprise.

Mr. Duffy said that the capital value established in the franchise was $24,000,000. On March 1, 1910, the $800,000 value of the power plants was 3⅓ per cent of $24,000,000. Mr. Duffy then asked Mr. Ernst if, in case he were a stockholder of the company, he would feel disturbed over the operating allowance, whether it was 11½ cents or not, and whether or not there was a reserve for accidents and insurance, so long as he felt that the integrity of the investment was preserved and that he would get the 6 per cent dividend.

The witness said he would feel very comfortable about his 6 per cent dividends, but he would want some assurance that the city was going to take the property at the end of the franchise.

Mr. Ernst defined surplus as that amount remaining of excess assets over all liabilities, either due, not due, accrued or contingent; that is to say, the balance remaining above the capital stock and all liabilities, whether funded or otherwise. In determining the surplus in the operating expenses he would provide for all labor costs, including the last half of the monthly payroll payable on the tenth day of the following month, all material and supply charges, all items of taxes and insurance, expenses of every kind, including an amount for accidents and damage claims, and the balance would be either a surplus or a deficit from operating.

The witness thought that if the railway was to be operated on the basis of good service and with joint control on the part of the city over expenditures and the method of accounting, if it appeared from honest bookkeeping methods that a deficit was being accumulated in the operating and maintenance funds, as a car rider he should say that the quicker the deficit was made good the better it would be. If the deficit was permitted to accumulate indefinitely it seemed to him that the point would be passed where it could be made up by a small increase in the fare. The matter of the deficit was far more vital as a future proposition than it was as a temporary issue. He had had a wide experience in companies that did not provide for ample depreciation and had seen many companies where the stockholders were called upon to contribute in cash to a deficit. This deficit had not been a temporary matter. It was an accumulation from a series of years while the management was trying to make a showing, and all at once, after a number of years, everybody woke up, creditors and stockholders, and found that the property had depreciated to a very serious extent.

TABLE I—STATEMENT OF MAINTENANCE AND OPERATING RESERVES AS REPORTED BY TREASURER CLEVELAND RAILWAY

	Ten Months, 1910	1911	1912	Three Months, 1913	Thirty-seven Months
Maintenance Reserve:					
Allowance	$1,142,919.39	$1,390,079.90	$1,438,662.29	$280,230.92	$4,251,892.50
Expenses	1,369,897.65	1,506,651.71	1,387,427.47	337,378.09	4,601,354.92
Surplus or deficit	* $226,978.26	* $116,571.81	$51,234.82	*$57,147.17	*$349,462.42
Operating Reserve:					
Allowance	$2,561,207.11	$3,423,634.40	$3,347,558.13	$805,663.91	$10,138,063.55
Expenses	2,598,477.58	3,389,317.81	3,548,146.67	888,955.80	10,424,897.86
Surplus or deficit	*$37,270.47	$34,316.59	*$200,588.54	*$83,291.89	*$286,834.31
Maintenance and Operating Reserves:					
Allowances	$3,704,126.50	$4,813,714.30	$4,786,220.42	$1,085,694.83	$14,389,956.05
Expenses	3,968,375.23	4,895,969.52	4,935,574.14	1,226,337.89	15,026,252.78
Deficit	$264,248.73	$82,255.22	$149,353.72	$140,439.06	$636,296.73

*Deficit.

L. P. CRECELIUS ON THE POWER SITUATION

Lawrence P. Crecelius, superintendent of motive power of the Cleveland Railway, testified that his connection with the property began in June, 1907, when he entered the employ of the Municipal Traction Company. Mr. Squire asked Mr. Crecelius the effect upon the power plants and machinery arising from the contract with the Cleveland Electric Illuminating Company for power.

Mr. Baker objected to this question. Judge Killits ruled that the witness might state the result on the property of the company after the contract was entered into, saying that if this was a step toward establishing the claim of the company that these plants had nothing but scrap value, the witness might proceed.

Mr. Crecelius said that the plants were rendered absolutely useless. The Canal Road plant was shut down last November. Most of the machinery in question at the hearing was shut down at the Cedar Avenue plant about a month ago: The machines at the Viaduct plant were to be shut down on May 26. The Division Avenue plant would also go out of service on May 26. The Canal Road power plant was sold for $4,500; it was absolutely scrap. Much of the machinery in the Cedar Avenue plant would have to be handled in the same way, having only scrap value. A little of the machinery would bring a credit to this account, for it still had a little more than scrap value. The apparatus at the Viaduct plant was probably a little better than scrap. The Cedar Avenue battery plant was entirely scrap. The capital value these plants represented in the Tayler valuation was upward of $400,000. It was necessary to change because the equipment and its general arrangement and character were inadequate for the growing system.

TABLE II—CAR-MILE RESULTS OF OPERATION OF THE CLEVELAND RAILWAY, AS REPORTED BY THE TREASURER

	Car Miles	Expenses	Expenses per Car Mile, Cents	Allowances	Allowances per Car Mile, Cents	Surplus	Wages of Motormen and Conductors per Car Mile, Cents
March 1, 1910, to Aug. 31, 1910	13,296,674	$1,514,543.24	11.39	$1,529,117.52	11.50	$14,574.28	6.07
Sept. 1, 1910, to Feb. 28, 1911	13,218,851	1,615,281.19	12.22	1,520,167.88	11.50	*95,113.31	6.65
March 1, 1911, to Aug. 31, 1911	14,392,783	1,711,666.73	11.89	1,754,317.10	12.19	42,650.37	6.66
Sept. 1, 1911, to Feb. 29, 1912	13,983,695	1,733,592.53	12.40	1,702,624.06	12.18	*30,968.47	6.75
March 1, 1912, to Feb. 28, 1913	29,170,344	3,545,324.98	12.15	3,354,589.58	11.50	*190,735.40	6.67
March, 1913	2,410,847	304,489.19	12.63	277,247.41	11.50	*27,241.78	6.41
Total	86,473,194	$10,424,897.86	12.06	$10,138,063.55	11.72	*$286,834.31	6.53

*Deficit.

The equipment of the power plants was not in as good condition as when the property was taken over, March 1, 1910. The overhead lines were not much improved, if any. The return circuit was still very inadequate for its requirements, although it had been improved to some extent.

At the session on May 22 Mr. Crecelius gave Mr. Baker a copy of a letter which he sent to John J. Stanley, president of the company, on Jan. 30, 1913. The letter gave a list and values of power plant equipment which was rendered obsolete on account of the power contract. There were five items, and the total at which they were valued in the Goff-Johnson valuation—that is to say, the value at which the property was included in the capital value of the company—was $463,129. The total reproduction value, the value at which the company contended it had the right to charge it off out of depreciation in one year, was $802,604.

During the cross-examination conducted by Mayor Baker Mr. Crecelius said that neither of the main important boiler rooms was in as good shape now as when they were taken over from the Cleveland Electric Railway. This was due to wear and tear and other causes. Some of the depreciation in a plant could be taken care of by renewals or replacements, but the life of the equipment could not be extended indefinitely in this way. In reply to another question he said that the value of all the property of the company, used and usable, in the divisions under his control was greater than on March 1, 1910, on account of additions and betterments which had been made, but that excluding these betterments the property was not in so good condition as it was on the earlier date.

The cost of producing power at the Canal Road plant just before it was abandoned was around 1½ cents a kw-hr., whereas, power could be produced for 0.5 cent per kw-hr. with up-to-date equipment. The price paid the Illuminating company was about 0.75 cent per kw-hr. delivered to the substation. The additional cost of delivery to the trolley wire was about 0.3 cent. The cost to the trolley wire from the Division Avenue station that the company proposed to abandon was about 0.9 cent. This figure did not include interest charges.

Mr. du Pont asked whether, as the company had its value in the plant, the car riders did not have to pay the major part of that 0.1 cent per kw-hr. more.

Mr. Crecelius said that on the contrary the car riders gained largely. The Division Avenue power plant was located very close to the Viaduct plant, and its effectiveness was diminished by transmission of the power to the outlying districts. The price paid per kw-hr. for the current that was bought included all charges, and this current was delivered to the outskirts of the city where the company was ready to use it, which was not the case with the Division Avenue plant.

Mr. du Pont said he was not criticising the contract, but what he wanted to bring out was the fact that at the Division Avenue power plant or the Cedar Avenue power plant, or at any power house but the one at Canal Road, current could be produced at 500 volts or 600 volts at a lower rate than the contract provided. The witness said that was correct.

Judge Killits asked what the overhead charges, taxes, depreciation and other charges of that sort would aggregate per kilowatt-hour. The witness thought they would add 0.3 cent.

Mr. du Pont thought these charges would probably be more than that and would carry the total up to 1½ cents, with interest on the investment. He also thought the new system more reliable.

The question of obsolescence was brought up, and it was conceded on the records that the plants were obsolete.

TERANCE SCULLIN ON THE ROLLING STOCK

Terance Scullin, master mechanic of the Cleveland Railway, testified that he had been in the service of the company or its predecessors for over twenty-six years. He had been away for a year and one-half, but with that exception had been with the company continuously. Mr. Scullin testified that on March 1, 1910, the company had 973 cars, of which 820 were available for service. Excluding the betterments and additions which had been made, the cars were not in as good condition now as then. The company had now 1040 cars available for service. It was very difficult to determine the average life of a car. The progress of the art has been so fast that the cars would be changed and scrapped before the possible life could be determined. In fact, it seemed to be very hard to determine the life of any equipment in connection with traction properties. It was also impossible to prolong its life indefinitely by repairs.

Testifying in regard to the conversion of a car of a specified type for prepayment operation, Mr. Scullin said that the cost of conversion of a 30-ft. car was about $600, of which 25 per cent was charged against the maintenance fund and 75 per cent against capital. The witness said that including the money that was spent and charged to capital the condition of the cars was better to-day than it was in 1910. About 215 new cars had been added since March 1, 1910, and of this number twenty-five were motor cars and 190 trail cars. Arrangements had been made for more trail cars.

STATISTICS OF OPERATING RESULTS

Table I, published herewith, shows the maintenance and operating reserves, as compiled by Henry J. Davies, treasurer Cleveland Railway, from March 1, 1910, to March 31, 1913. Table II shows the results of operation, as reported by Mr. Davies, on a car-mile basis. These tables were presented by Mr. Davies during the early part of the sessions, reported in the last issue of this paper.

The next hearing is scheduled for June 3.

THURY MULTIPLE-UNIT SYSTEM

A new type of multiple-unit system, constructed under the Thury patents, has recently been placed on the market by H. Cuénod, of Geneva. It has been in trial operation for the past year on the Martigny & Chatelard Railway, near Chamonix. The ordinary controllers are used on each car, but by means of a synchronizing device these controllers are automatically operated and kept in synchronism by a master controller carried in the front cab of the first car. The synchronizing current used in the control system is obtained from a sixteen-cell storage battery. The master controller has a revolving cylinder and contact fingers, like an ordinary controller. and moves the several car controllers by means of small motors, of which there is one on the top of each car controller. This motor revolves the car controller to approximately the proper position required by the position of the master controller, and exact position is obtained by means of an interlocking tooth and gear. By a special attachment the controllers can be turned quickly from the series to the parallel position. Four wires are carried in the train cable, three for the work described and a fourth by which the circuit breakers can be opened from the cab in case of need

NEW ENGLAND STREET RAILWAY CLUB MEETING

Two hundred and twenty members and guests of the New England Street Railway Club assembled at the American House, Boston, on the evening of May 22 for the final meeting and banquet of the season, President Elton S Wilde being in the chair. The topic of the evening was the "Training of Motormen," and the principal speaker was Howard W. Irwin, assistant superintendent of equipment Bay State Street Railway, Boston, Mass. Mr. Irwin pointed out that the position of a motorman on an elevated or surface road is anything but a sinecure in view of the responsibilities resting upon the man behind the controller, that the company has intrusted to his careful handling a piece of apparatus whose money value far exceeds the product of many years of his labor and whose safety and continued usefulness depend for the time almost wholly upon his skill and foresight, and that the conditions under which the work is done are varied and often difficult.

The speaker said that the methods pursued by some railway companies in selecting motormen would be ludicrous were not the situation one of so serious a nature. "Motormen made while you wait" seems to be the motto in such cases. The fact is that good general health and the ability to understand signals are sufficient qualifications for a motorman's position with a good many companies, and a training of from three to nine days is often considered sufficient. At the close of the probationary period the green man is supposed to be able to run his car in a safe and efficient manner, and it is assumed that he will rise to the occasion whenever the emergency turns up. The chances are that such a man knows how to start, stop or reverse under favorable circumstances, but just how much he will remember in case of a sudden emergency, or just how much trouble he will get into when any little thing goes wrong. can only be guessed at. His blunders go into the repair or claim department and come out as "necessary expenditures."

Inexperienced and inefficient service of this kind is of advantage to the company in no respect. The number of suits annually brought against city railways for damage to persons or property resulting from the ignorance of employees is so appallingly great as to make it necessary for each organization to have always in its employ a number of lawyers whose sole duty is to fight or settle such litigation. The American jury is seldom fair to the railroad when the case is one of injury to a passenger or employee. and it is only necessary for the injured one to present his case in a sufficiently pitiable manner to get a substantial verdict. The consequence is that the claim department often presents a very large budget at the year's end.

The equipment of a modern electric railway is by no means a matter of small expense, especially with materials at their present high prices. Where delicate and highly sensitive machinery falls into the hands of unskilled and ignorant men it always follows that its deterioration is abnormal. Mr. Irwin contended that it is possible to go too far in endeavoring to make machinery "foolproof," and that adequate training of motormen is a better method of solving the problem of safe and economical operation. So-called "foolproof" equipment is enormously expensive, and while simpler in its handling from the outside, is necessarily of a highly complex nature internally. The present machinery is simple enough for a man of any intelligence to handle, provided he is properly trained. No matter how far the human element is reduced in the running of cars, in the end it is always necessary to have some kind of a man on hand, if only to press a button, and the bungler will often press the wrong button in emergencies. An efficient man can do his work better, more cheaply and with greater safety than his less intelligent brother, regardless of the simplicity of the machinery. No university course is needed for the making of a good motorman. All that is required of him is that he know perfectly his signals, realize to some extent the importance of starting and stopping cars properly in guarding the public safety and have some knowledge of the inner workings of his car. The training should be such as to cause the motorman to do the right thing subconsciously in emergencies, without stopping to reason out a long train of mental and manual processes.

The speaker then exhibited a large number of lantern slides of instruction cars and street railway schoolrooms taken in different parts of the country, following which a series of motion pictures were shown illustrating the methods of stopping runaway cars on down grades when the brakes are out of commission and the trolley off, through control by generation; the training of motormen inside the special instruction car of the Bay State company; the correct and incorrect methods of coupling cars and of starting a car with its wheels on a sanded rail; the method of resuscitating a person under the influence of an electric shock, and the operation of lifting jacks. On the Bay State system lifting jacks having a capacity of 15 tons with the application of 150 lb. 6 in. from the end of the handle are in use, the handles being carried on the car roof. The jacks weigh 95 lb. each, and car crews all over the system have been instructed in their use. Moving pictures were also shown of the handling of a car controller by proper and improper methods, an ammeter in circuit reading 400 amp when the handle was thrown too rapidly from notch to notch and only 150 amp maximum when proper pauses were made at the various points.

In a brief discussion which followed, C. S. Ching, chief inspector Boston Elevated Railway Company, emphasized the importance of proper training for conductors and touched upon the influence of employees upon the public. He advocated closer following-up of new men in the service and outlined the work of the employment department of the Boston company, with its facilities for trying out new men upon a spare track 1000 ft. long, the supervision of new men by chief division inspectors and experienced motormen, use of an instruction car, and testing methods adapted to bring out the ability of new men to handle cars on greased rails or with brakes purposely disconnected, with dummies unexpectedly thrown in front of the car, etc. In closing, he pointed out the vital importance of a neat personal appearance on the part of car service employees, who stand as the immediate personal representatives of the company to the public.

A. W. Senter, superintendent of one of the Boston divisions, gave a few reminiscences of his experience in charge of the company's employment office and urged the importance of exercising great patience and courtesy in dealing with new men. The offices where applications are received for employment should be as attractive as any on a road and should impress the applicant with the company's standards when he first appears at the door. In conclusion, he advocated following up the older men and their work on the cars in a tactful and progressive manner to better the quality of their work.

EXHIBIT OF NEW YORK STATE RAILWAYS AT SYRACUSE

A highly commended feature of the first Syracuse Industrial Exposition, which was conducted by the Syracuse Chamber of Commerce from April 21 to May 3, was the exhibit made by the New York State Railways, Syracuse Lines. This display not only embraced constructional features of railroad operation but also included publications relative to traffic and safety promotion.

As shown in the accompanying view, the company presented a 4-ft. x 7-ft. section of standard track, with concrete foundation 6 in. below the steel ties, 95-lb. T-rail and sandstone block pavement, the piece weighing between 1½ tons and 2 tons. A standard joint with the same rail and tie illustrated the bonding. The latest line construction was represented by standard concrete poles each containing 317 lb. of twisted steel bar reinforcement and weighing 3200 lb. each. The booth itself was arranged as a section of overhead construction with standard overhead double trolley of No. 0000 copper wire, span wire, guys and pull-offs, one 500,000-circ. mil feeder and one 1,000,000-circ. mil feeder, all supported by miniature concrete poles 10 ft. high. Specimens of the aluminum, steel and copper wires over which the 60,000-volt transmission current is received from Niagara Falls were also displayed.

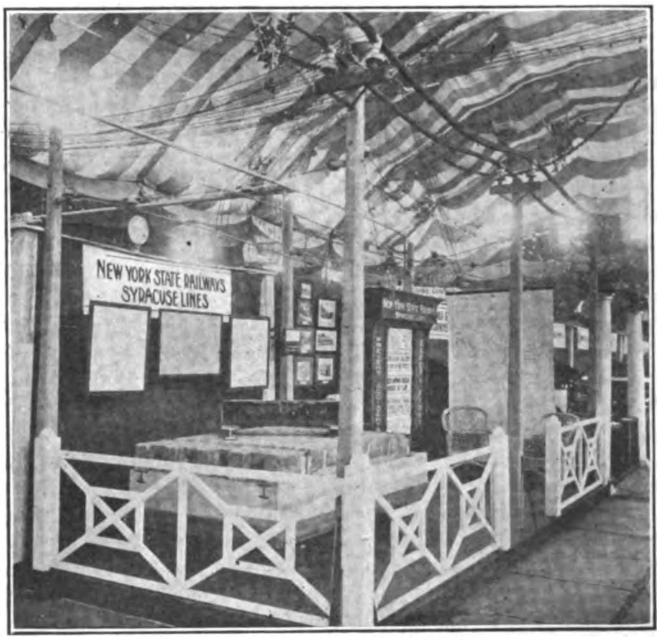


Exhibit of New York State Railways at Syracuse Industrial Exposition

The traffic division included a chart which showed the population of Syracuse from 1880 onward and the number of cars owned in the corresponding year. In 1880 one car was operated for every 1850 persons; 1890, one for every 2940 persons; 1900, 1620 persons; 1905, 830 persons; 1910, 690 persons; 1913, 650 persons. A traffic chart of the Dudley division showed the public the method which is used to determine where extra cars are needed. Other exhibits were a chart of the revenue and transfer passengers carried from 1897 to 1912, a large map of Syracuse, with small red squares to indicate the location of each car on the system at 6 p. m. and photographs of each type of car purchased for Syracuse since 1870. The attendants at the booth distributed vest-pocket celluloid time cards, one side of which carried the schedule of the limited trains over the Oneida Railway between Syracuse and Utica and the other side a map of the entire system from Syracuse to Little Falls and Rome.

The safety campaign of the company was strikingly emphasized by the use of a roller sign which contained a motor-driven endless belt for displaying cards containing sentences and pictures like the following: "When crossing car tracks look both ways." "Never pass behind standing car without looking for a car in opposite direction." "Safety first." "Caution will prevent accident." "Never get on or off a moving car." "Never allow children to play in the streets." "Look out for autos and other vehicles when alighting from car." "Wait until car stops before alighting." "Alight from car facing front." "Never board a moving car." "Keep arms and head inside of car." Illustration of an automobile accident, the result of reckless driving. Illustration showing alighting accident, the result of alighting from a moving car. Illustration of a woman with a child passing around the rear of the car from which she had alighted directly in front of another car coming in the opposite direction, the woman heedless of the approaching danger.

In connection with the safety campaign the company also distributed 15,000 buttons bearing such phrases as: "Caution will prevent accidents," "Avoid accident; look out for the cars," and "Don't play in the street." A booklet containing articles on public service and public safety was circulated. This publication reviewed the growth of street railways in Syracuse, showing how it had more than kept pace with population, and mentioned some of the expenditures which the company had made in recent years for the improvement and enlargement of its service.

HIGH SCHOOL BOYS AS CONDUCTORS IN DENVER

The grade conditions in Denver permit the operation of trailers, and in consequence the company has used trailers extensively during the rush hours for a number of years. Each trailer carries a separate conductor, and this condition has produced a demand by the company for trainmen willing to work for only part of the day. The morning rush-hour service lasts about two hours and the afternoon rush-hour service about two and one-half hours, so that trailer conductors put in only from four and one-half hours to five hours a day.

Two or three years ago several students who were working their way through college applied for the positions of conductors on these trail cars and proved so efficient that the company has been employing them in increasing numbers. At the beginning of 1912 it had thirty-five of these young men at work, and at the present time it has eighty. A minimum age limit of sixteen years is in force, and the applicant for a position must submit to the company a letter that this plan has the approval of his parents as well as the approval of the authorities of the high school or the university at which he is in attendance. These young men receive the same pay per hour as the regular trainmen; that is, 24 cents per hour during the first year, 27 cents per hour during the second year, etc., and this income has enabled a number of young men to pay their way through college. The school authorities have shown a willingness to co-operate with them and the company so far as they can in arranging the school duties to accord with this work.

In addition to the rush-hour business, the young men receive an opportunity to put in a regular day's work as an extra or as a regular on Sundays and holdays and also to do snow plow duty, and many of them take these runs. Regular men are not averse to this plan because it affords them an opportunity of getting off occasionally on Sundays and holidays. As all the conductors of the Denver City Tramway Company are also broken in as motormen, there is always a supply of motormen for Sunday and holiday operation with the boy conductors.

The "trailer boys," as they are called in Denver, are not confined to young men who are working their way through school or college. Many of them belong to prominent and wealthy families, as their parents consider the service an excellent business training. The boys make good employees and report as regularly for duty as the older men. They also learn their duties quickly. The number of applicants is always more than the number required. The successful applicants are selected by the superintendent and are always asked why they desire to enter the employ of the company. Their antecedents are also looked up. They are then told that the work is hard and not play. If accepted, they are then put through the regular course of instruction. The plan has reduced the extra list to a considerable extent, and after the trailer boys are engaged in other business they are good friends of the company as they understand the difficulties of railway operation.

REPORT OF COMMITTEE ON SCHEDULES AND TIMETABLES

A meeting of the committee on construction of schedules and timetables of the Transportation & Traffic Association was held at the headquarters of the association in New York on May 27. The following members of the committee were present. J. E. Duffy, chairman, Utica, N. Y.; T. F. Grover, Terre Haute, Ind.; Alexander Jackson, Newark, N. J., and J. J. Dempsey, Brooklyn, N. Y. W. O. Wood, Long Island City, N. Y., also met with the committee for a portion of the time.

The committee considered in some detail the compilation of data collected by means of inquiry form No. 101, and in view of the great amount of material on hand it was decided that the work could be handled more expeditiously by assigning specific subjects to the committee members present. In accordance with this plan, the following program was approved: Mr. Duffy will take up that section of the report to be devoted to methods of keeping time of trainmen. Mr. Dempsey will consider the development of forms of detention reports and also the matter of near-side stops, Mr. Grover will develop the matter of determining just what information should be shown on timetables, and Mr. Jackson will take up the subject of destination signs and forms of timetables for city operation. These gentlemen will submit their findings to the whole committee, and it is expected that the report in final form will be ready by July 1. In this report the committee will endeavor to submit definite recommendations on the subjects mentioned rather than merely a summary of the practice in vogue by the member companies.

PASSENGER TRAIN DELAYS IN NEW YORK

The Public Service Commission, Second District, New York, has recently issued a statement of passenger train delays which occurred in the State of New York during December, 1912. The totals from the figures given in the statement are as follows:

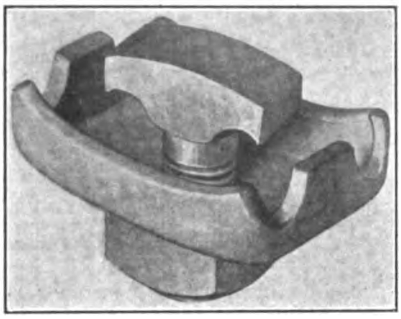
Total number of trains reported	64,788
Per cent of trains on time at division terminal	78
Per cent of trains late at division terminal	22
Average delay for each late train, minutes	28.2
Average delay for each train run, minutes	6.1

A summary of the principal causes of delay is shown in the following table, the results being expressed in percentages of the total number of delays:

	Per Cent
Engine failures	4.5
Other equipment failures	1.8
Wrecks	4.3
Unfavorable conditions of track	1.4
Waiting for trains on other divisions	37.0
Waiting for train connections with other railroads	20.2
Meeting and passing trains	4.8
Signals	1.3
Trains ahead	8.5
Waiting for orders	0.2
Train work at stations	11.1
Storms	0.9
All other causes	4.0

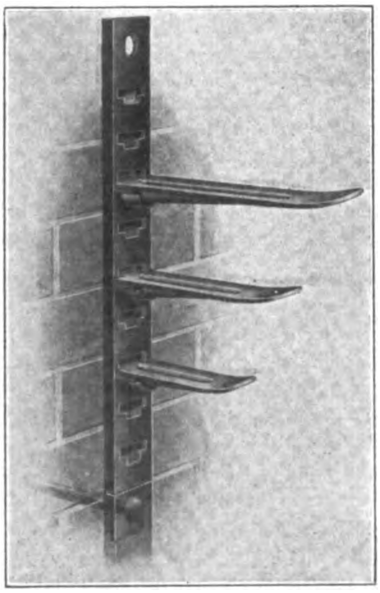
NOVEL DESIGNS OF CABLE CLAMPS AND CABLE BRACKETS

Among the various cable-line accessories which recently have been placed upon the market by the Barnes & Kobert Manufacturing Company, New Haven, Conn., two radically new devices are included. One of these, a guy clamp, is based upon the obviously effective principle of introducing a slight bend in the cable which is to be gripped, the clamp being thus enabled to exert a vastly greater holding power than could be established by means of the friction grip alone. This device, as shown in the accompanying illustration, is made from pressed steel and consists of but one piece in addition to the bolt and nut. In operation it is laid upon the two strands which are to be clamped together, each strand fitting into the two recesses provided on either side and the T-headed bolt being turned into the position shown in the cut. When the steel strands are in place the bolt head is turned at right angles and is pulled down onto the cables by setting up the nut. This puts a slight bend in each strand and gives a holding power generally in excess of the strength of the rope.



New Cable Accessories—Single-Bolt Guy Clamp

This method of application avoids the necessity for removing the bolt when the clamp is applied and reduces materially the time and labor required for application. Since the device is made of pressed steel, the weight is extremely low and this serves as another means for keeping down the cost of shipping, handling and erecting the clamps when they are used in large lots. The design shown in this illustration is of the single-bolt type, good for a pull of 1200 lb. and intended for ¼-in. and 5/16-in. rope used for trolley span wire, but a two-bolt type good for ⅜-in. and 7/16-in. strands is also made, the difference being that the latter type in addition to the extra bolt has a bridge in the center between the bolts to put a double bend in the strand when the bolts are set up. This gives it a holding strength which under test has been found to be in excess of 15,000 lb.



New Cable Accessories—Adjustable Bracket

The cable bracket which has been brought out as a part of the same line of accessories as the cable clamp is also made of pressed steel throughout and is composed of a slotted rack into which are inserted any desired number of bracket arms. The rack, as shown in the accompanying cut, is in the form of a channel iron and is furnished with an offset end at the bottom which permits a number of racks to be placed one above the other to form a continuous piece extending up the side of a tunnel or wall upon which it is desired to support cables. The T-shaped slots are located in the racks at intervals of 1½ in. and the bracket arms can in consequence be set at any desired elevation with a close degree of adjustment. The arrangement permits the insertion or removal of a bracket arm with a vertical movement of only 5/16 in., and as all pieces are stamped out of steel in the process of manufacture complete interchangeability is assured and any arm can be inserted in any slot.

The bracket arm is made with a T-shaped head, the wings of which catch in the narrow part of the T-shaped slot in the rack when the arm is down in place, and a groove is pressed into the arm to give it transverse strength as a beam in carrying its load. At the inner end of the arm a heel-piece of steel is electrically welded on, and this rests against the face of the rack, serving to take the thrust set up by the presence of a weight at the end of the arm. The arms are made in 10-in., 7-in. and 4-in. lengths to suit different conditions, and they are made wide enough to prevent any cold-flow of lead cable sheaths resting upon them. The bracket is strong enough to hold a 200-lb. weight on the end of the 10-in. arm so that there is no danger of damage if it should happen to be used as a ladder by employees working on the cables which it carries.

Other accessories in pressed steel made by the manufacturers of the above-described devices are wood-strain insulators with steel caps crimped on to the wood and sectional mushroom guy anchors designed to eliminate the bulk and weight of the wooden blocks often used for this purpose. All of these cable accessories receive a heavy galvanizing coat to prevent deterioration by rusting.

NEW REPAIR SHOPS FOR NEW HAVEN ELECTRIC LOCOMOTIVES

Repair ships designed to handle all of the now extensive electrical equipment of the New York, New Haven & Hartford Railroad are approaching completion at Van Nest, Bronx Borough, New York City. It is expected that they will be in operation by Aug. 1, or a short time before the electrification of the road from Stamford to New Haven is finished.

The new shops at Van Nest represent an outlay of about $650,000, and they will be complete in every detail. Until now repairs to the electric locomotives have been made at the Stamford shops, but the increase in electric equipment due to the electrification of the road as far as New Haven has necessitated a more elaborate plant where the repair work could be done to better advantage. The new location at Van Nest, on the Harlem River Branch, was decided upon mainly because of its nearness to the great Harlem freight terminal of the road, which is already electrified and where a large part of the electrical equipment must necessarily be employed.

The new shops cover two acres of ground. They are made up of an inspection shed, a repair shop proper, a lye vat house, a blacksmith shop, a storehouse and a heating plant. The inspection shed has four pit tracks, 375 ft. long. The repair shop proper covers nearly an acre and a half of ground and is two stories high. The heating plant covers 3000 sq. ft. of ground and the storehouse 7500 sq. ft. All are built of red brick.

The new shops will handle the repairs on sixteen switching locomotives, forty-seven passenger locomotives and thirty-six freight locomotives, a total of ninety-nine, and in addition part of the work on twenty-three multiple-unit cars. Not all of these locomotives are in service as yet, most of the new freight engines being held in storage at Van Nest. However, after the completion of the electrification to New Haven it is planned to have all trains, both passenger and freight, operated by electric power between the Harlem terminal and New Haven.

News of Electric Railways

Verdier Act Constitutional

On May 21 the Circuit Court at Detroit, Mich., handed down a decision declaring the Verdier home rule act, under which the municipal ownership charter amendment was adopted, to be constitutional. On the other hand, an order was issued compelling the Common Council to rescind its action in appropriating $250,000 to be used in building a crosstown bus line in opposition to the rights of the Detroit United Railway, which claimed that, under its franchise, it had the right to make the first proposition on any extensions or additional lines to be built.

The decision as to the constitutionality of the Verdier act was rendered in the case brought by George H. Barbour, Fred T. Moran and Charles A. Ducharme, who asked that Mayor Marx of Detroit be restrained from appointing a commission and that the issue of bonds under the charter amendment be prevented. The court spent much time in the consideration of the constitutionality of the Verdier act. The judges were unanimous in their opinion as to the constitutionality of the act, but Judge Hally dissented as to the right of the city to issue $10,000,000 of bonds. The majority opinion was signed by Judges Hosmer, Van Zile and Mandell. It follows:

"I agree with Judge Hally that the Verdier bill was printed as required by the constitution; that the question as to whether it was immediately necessary for the preservation of the public peace, health and safety was for the Legislature and not for the courts; that it is the duty of the Legislature to fix the general bonding limits of cities; that this power cannot be delegated to the people, and that a city can issue bonds on its faith and credit only to the extent of the difference between its debt and its borrowing limit.

"Still it would seem that a perfectly natural and constitutional construction can be given to the section under consideration. Section 4, before amendment, prohibited cities from pledging their credit for street railways except to the amount of the margin between existing indebtedness and 4 per cent of the assessed value of the real and personal property in the city.

"By successive amendments to the charter a city might raise its borrowing power to the legislative limit of 8 per cent and yet be prohibited from purchase of a street railway by any issue of bonds other than those which imposed no liability upon the city. It was to change this that the Verdier bill was enacted.

"I fully agree with Judge Hally that the constitutional convention expected the cities to procure funds for street railways by bonds which did not impose a liability on the city, but I am unable to find anything in the constitution which prevents the Legislature from giving cities the authority to use the borrowing power between the debt and general limit of bonded indebtedness for this purpose.

"In leaving to the Legislature the bonding limit, the constitution has empowered that body to open the door to the purchase of public utilities on the credit of the city if it sees fit, and the finding of the act unconstitutional in nowise tends to prevent this. The Legislature may raise the limit so that the margin is sufficient.

"Subject to the restriction that a city's debt must not exceed 8 per cent of the assessed value of property exclusive of special assessment district bonds, and 10 per cent inclusive of all bonds, subject to the provision that the charter of a city shall not be changed by increasing the limit of its indebtedness oftener than once in two years, and subject to the further provision that no single increase shall exceed 2 per cent, a city may use any borrowing power which remains, not exceeding 2 per cent, for street railway purchase or installation.

"The bill should be dismissed without prejudice to the right to attack the charter amendments should they prove to be beyond the scope of the act."

The case will be carried to the Supreme Court, and until a decision is secured the $10,000,000 of bonds provided for in the charter amendment cannot be sold. Mayor Marx said that as soon as the Supreme Court has passed upon the matter bonds will be sold to provide funds for the work of investigating conditions.

The court held that there is no reason for placing $250,000 on the budget of the park commissioner for general transportation purposes and that he had no right to make the request. Even if it had been legal for him to have the amount placed to the credit of his fund he could not spend it under the present laws. The judges were unanimous in their decision with respect to this matter.

Mayor Marx of Detroit has decided upon John F. Dodge and Joseph F. Stringham, Republicans, as two of the members of the city street railway commission, under the plan provided by the charter amendment adopted on April 7, 1913. The other candidates, whose names have been suggested by labor organizations and the Municipal Ownership League, are William D. Mahon, president of the Amalgamated Association of Street and Electric Railway Employees; John Clarken, Frederick F. Ingram, George William Moore, Thomas L. Dalton and John McVicar. The Federation of Labor wants either Mr. Mahon or Mr. Clarken, while the advocates of municipal ownership will be satisfied with any one of the other four.

On May 20 it was discovered that Mayor Marx had neglected to submit a request to the board of estimates for $100,000 to be used to defray the expenses of the street railway commission in its endeavor to unravel the tangle into which the railway question has been thrown. It is possible that this will temporarily delay effectual work in that direction.

Carriers' Committee Confers with I. C. C. on Valuation

Twelve presidents and several vice-presidents of railways, headed by Samuel Rea, president of the Pennsylvania Railroad, met in Washington on May 26, 1913, to confer over the proposed physical valuation of the properties of the American railways which Congress has directed the Interstate Commerce Commission to make. These officials constitute the physical valuation committee of the interstate carriers of the country, and they met the members of the Interstate Commerce Commission to exchange views on the character and extent of the work and to express their willingness to co-operate in the preparation of all data required. The board of engineers appointed by the commission, the personnel of which was given in the Electric Railway Journal of May 3, 1913, page 823, has been meeting since May 1 and conferring with the commission as to plans for the work of valuation. As soon as working plans are approved by the commission forces will be organized for active operations in the field.

The tentative valuations reached by the commission must be submitted to the railway carriers, the Department of Justice and the governors of the states in which the railroad properties are located, and to such other persons as the commission may name. After such a tentative valuation has been made, thirty days will be allowed for filing a protest. If no protest is filed, the valuation will become final. But if a protest is filed the commision will proceed with hearings at which testimony, briefs and arguments will be received.

Rapid Transit Matters in New York

The Public Service Commission for the First District has called for bids, to be opened on June 24, 1913, for the construction of Section No. 4 of the Broadway-Fourth Avenue Rapid Transit Railroad. This railroad will be operated by the New York Municipal Railway Corporation under the dual system contracts. The Broadway subway is now under construction from Trinity Place and Morris Street to a point in Broadway midway between Houston and Bleecker Streets. Section No. 4 extends from this point north under Broadway to a point 390 ft. north of the southerly line of Fourteenth Street. It will be a four-track subway, and the section includes a local station at Eighth Street and half of the express station at Union

Square. The contractors will bid for construction only, which will not include the laying of tracks or the finishing work in stations.

The first plans for elevated railroad improvement under the dual system contracts were submitted by the New York Municipal Railway Corporation for the proposed connection of the existing Myrtle Avenue and Broadway elevated lines in Brooklyn. The Public Service Commission approved the plans, on the condition that the company will invite competitive bids for the construction work. The plans call for the alteration of the existing structures and their connection so that trains may operate freely from one line to the other.

Department of Public Utilities Suggested for Cleveland

In a printed explanation of the provisions incorporated in the proposed new charter for the city of Cleveland the Charter Commission states that a department of public utilities should be established to control all municipal enterprises which derive no revenue from taxation. The reports of this department are expected to show clearly the results of the operation of the enterprises under municipal ownership. The power of the city to own and operate public utilities, as granted in the home rule amendment, would be left unrestricted by the commission, but the charter will require that the business and the accounts of all such utility enterprises shall be kept separate and distinct. As to franchises, the charter will provide that no exclusive grants shall be permitted. The Council may, by ordinance, grant franchises, but all ordinances making grants or renewals shall reserve to the city the power to regulate, the right to terminate the grants and to purchase the property. The commissioner of the division of franchises will be charged with the enforcement of the provisions of the utility grants. The voters of the city must adopt the charter that has been framed by the commission or continue to be governed under the code which was formulated for those cities which fail to make new provisions or prefer to operate under the state plan.

Wages and Hours to Be Arbitrated in Buffalo

According to E. G. Connette, president of the International Railway, Buffalo, N. Y., the representatives of the employees of the company and the officers have succeeded in adjusting all the questions at issue between the men and the company except the rate of wages and the section covering the number of hours in which runs shall be completed. Mr. Connette is quoted as follows:

"The company and the committee representing the employees who are members of the association have had many conferences and have succeeded in adjusting a majority of the complaints which were presented, each party showing a desire to settle all questions, without arbitration, and practically all have been settled with the exception of the rate of wages and the section covering the number of hours in which the runs should be completed. Being unable to agree upon the wages and the number of hours in which the runs shall be completed, we have decided that the matter should be left to arbitration, as prescribed in the agreement which was made in the presence of the Mayor on April 11, 1913."

The men have selected Assemblyman Edward D. Jackson as their representative on the board of arbitration.

Franchise Negotiations at Des Moines

E. G. Schmidt, president of the Des Moines (Ia.) City Railway, was quoted in part as follows recently in regard to the development plans of the company:

"We plan to operate a system that will cover the territory contiguous to Des Moines like a net. We have surveyed as far as Indianola for the Osceola line. This will serve a territory which is not reached by railroad and which lies between the Osceola and the Albia branches of the Burlington. Farmers along the line already have come to the offices of the company here to ask us to start work on this line. Under the new state law they can vote taxes to help in the construction of the line and they are anxious to get busy on the proposition.

"Action along this line must await the determination of the franchise issue here. We cannot build the spokes of the wheel until we have the hub. When we have the Des Moines City Railway on a firmer basis we will be ready to begin work on the proposed interurban system. I can say nothing about the franchise question except that we are seeking a franchise and that we wish a 5-cent fare."

Work Begun on Cleveland & Youngstown Line

Construction work has begun on the Cleveland & Youngstown Electric Railroad. At the head of the syndicate which promoted the road are W. S. Hayden, president of the Chamber of Commerce; Otto Miller, of Hayden, Miller & Company, Cleveland, Ohio, and J. R. Nutt, secretary of the Cleveland Savings & Trust Company. The company is reported to have purchased a right-of-way wide enough for four tracks through to the new terminal station, which will occupy a site bounded by Ontario Street, Prospect Avenue, West Third Street and Canal Road, Cleveland. The road will run almost entirely on a private right-of-way, its general course following the brink of Kingsbury Run.

The plan to build the Cleveland & Youngstown Railroad originated with O. P. and M. J. Van Swearingen, of the Van Swearingen Company, Marshall Building, Cleveland. W. H. Gratwick, Buffalo, who owns large lake shipping interests and is conected with the Ontario Power Company, is associated with them.

New Road Opened in Georgia.—The Albany (Ga.) Transit Company has completed and placed 4½ miles of line in operation in Albany.

To Report on Municipal Line.—The city commissioners of Edmonton, Alberta, Can., have been instructed to report in regard to the means which should be adopted to make the Edmonton Radial Railway, a municipal line, pay.

Tramway for Guayaquil.—It is reported from Panama that R. W. W. Hebard, head of the Panama Tramway, will make preliminary studies in connection with the construction of a tramway system for the city of Guayaquil, Ecuador.

Differences Between Company and Employees at New Haven Adjusted.—It is announced that the differences between the officers of the Connecticut Company and the representatives of the trainmen on the company's New Haven lines in regard to the recent discharge of shop employees have been adjusted. The trainmen were reported to have voted to strike if necessary to enforce their demands in regard to the shop employees.

Increase in Wages in Louisville.—The Louisville (Ky.) Railway has announced an increase in wages for all of its employees who are paid by the hour and whose compensation does not exceed 23 cents an hour. The increase is 1 cent an hour for all those falling in this classification. All of the motormen and conductors are paid by the hour, a sliding scale, depending on the length of service, being used to determine the rate of pay. The increase is effective on June 1, 1913.

Investigation of New Haven Railroad by Department of Justice.—An investigation of the New England railroads to determine if they are violating the Sherman law has been begun under orders from Attorney-General McReynolds. This investigation follows the inquiry of the Interstate Commerce Commission into the regulations and practices of the New England roads. The Department of Justice will look into alleged traffic agreements and the holdings of the railroads in subsidiary companies, including electric railways and steamship lines.

Riot at Jamestown.—The Jamestown Street Railway and the Chautauqua Traction Company, Jamestown, N. Y., are reported to have been compelled to suspend service on May 27, 1913, on account of rioting by trainmen of the companies who are on strike and by strike sympathizers. The rioters conducted a demonstration in front of the residences of A. N. Broadhead and S. B. Broadhead, who are the principal owners of the companies. Considerable damage is reported to have been done at the Broadhead

Woolen Mills. Some of the saloons were closed on May 27, 1913, at the request of Mayor Carlson.

Chicago Surface Railway Merger Status.—The local transportation committee of the City Council of Chicago, Ill., voted on May 24 that it would not approve a clause in the proposed merger ordinance guaranteeing the surface railway companies the rate of return which they now receive. When this decision was reached by the committee, L. A. Busby, president of the Chicago City Railway, announced that the companies would not consolidate unless they were protected by a rate of return stipulated in the ordinance. The committee thereupon voted that the Board of Supervising Engineers, Chicago Traction, report to the committee what improvements in service can be effected by action of the City Council.

Differences Between Employees and Company Adjusted in Springfield.—The differences between the Springfield (Mass.) Street Railway and its employees have been settled, but the details of the adjustment have not been made public. According to the Springfield *Republican*, "the settlement of the matter without resorting to a strike closed one of the most interesting cases that ever came up in labor circles in this city." The differences between the officers of the company and the representative men are said to have been caused by the question of the interpretation of the phrase "any member of the association" as contained in the agreement between the company and the men, the organization among the men having extended its influence recently from the trainmen to members of the clerical force.

Arbitrators Chosen in Cincinnati.—Walter A. Draper, secretary of the Cincinnati (Ohio) Traction Company; John P. Frey, editor of an iron molders' paper, and Herman Schneider, dean of the engineering department of the University of Cincinnati, are the arbitrators who will decide the wages to be paid the employees of the company. Mr. Draper was selected by the company and Mr. Frey by the men and Dean Schneider was the choice of these two men as the third member of the board. The Cincinnati & South Covington Street Railway has recognized the union formed by its men. An attempt will be made by the officers of this company and representatives of the employees to reach an agreement in regard to wages, but if this is found impossible the matter will be submitted to arbitration.

Agreement Between Buffalo & Lake Erie Traction Company and Employees.—The conferences between the officers and representatives of the employees of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., have resulted in an agreement between the company and the men in regard to wages and terms of service which is to be in effect for three years. The employees of the company went on strike at the same time as the employees of the International Railway and like the employees of that company they returned to work under an agreement for the settlement of the differences at conferences between the men and the officers of the company with arbitration as a last resort. A minimum wage of 23 cents an hour and a maximum of 30 cents an hour are provided for trainmen except those employed on the Dunkirk belt line, who are to receive 2 cents an hour additional while working under the one-man system. New men are to receive 23 cents an hour. After six months the pay is to be 24 cents an hour and at the end of the year 25 cents an hour. From then on the rate is to increase until a maximum of 30 cents an hour is reached. Men employed on snow plows and men who work overtime are to receive pay on a basis of time and a half.

"Rate Research."—Within the year a new publication, *Rate Research*, published by the rate research committee of the National Electric Light Association, has entered the technical field and is doing a good work in compiling and digesting the decisions of the courts and commissions upon matters relating to the public service regulation of electric properties. This committee started out more than a year ago to supply certain members of the National Electric Light Association with current information upon this subject, and the need of a regular printed publication manifested itself. The committee has just completed its first printed volume, which is No. 2, containing 420 pages, the last number being a complete classification and index, which renders all of the information readily available. This index is probably the best bibliography of rate regulation information that is published and should be very useful in preparing briefs and other memoranda upon regulation matters. One interesting feature of this publication is the fact that it is not published for profit and carries no advertising and therefore is in no sense a rival of the technical papers. It supplements the work that such papers are doing by calling attention to all of the important articles which such papers publish on the subject of rate regulation. The commission announces that the publication is already on a self-supporting basis.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

Senator Clark introduced by request on May 21 Senate bill No. 644, which authorizes the purchase, lease, sale or consolidation of street railways, prescribes the mode, terms, conditions and effect thereof and provides for the acquisition of the stock of any dissenting stockholders. Any street railway within or partly within and partly without any incorporated municipality has the power to acquire any or all of the property rights, privileges, immunities and franchises of any other such corporations, or to dispose of its own property, etc., to another corporation, or to arrange for the operation of both systems under one management and control. Before a merger takes place the municipal authorities within which the greater part of the street railway is operated shall by ordinance declare that the public interest requires a unified system. The agreement to merge must be submitted to the stockholders of the affected corporations at a regular or special meeting. Two-thirds of all the outstanding capital stock of each of the corporations is required for a merger. The corporation acquiring all or substantially all of the property of any other corporation is liable for all the then outstanding debts of the other corporation. For the purpose of upholding rights each of the corporations merged or consolidated will be deemed severally to continue in existence. It is necessary for all merged or consolidated railways first to secure a franchise from the municipality. Stockholders must file notice of dissent within thirty days from date of the meeting at which the transfer was authorized and upon surrender of the certificate are entitled to the fair cash value of the stock at that date. If they refuse to part with the stock or the value cannot be agreed upon, the corporation within ninety days from the stockholders' meeting is to acquire the stock by the exercise of the power and right of eminent domain. Notices of sales or merger are required to be published for three weeks.

The Senate has passed the bill to authorize cities on a referendum vote to acquire and operate public utilities. This is one of the Dunne utilities measures.

The street car employees labor bill has been reported out with a favorable recommendation by the committee on labor and industrial affairs of the House. As amended by this committee, interurban employees are eliminated from the operation of the bill and street railway employees are not to be employed more than ten hours out of fourteen hours in any one day. The original bill called for not more than ten out of twelve consecutive hours and it was passed by the Senate with this provision. The amendments were adopted by a vote of ten to seven and the favorable recommendation by a vote of fifteen to two.

Senator Hurburgh's anti-pass bill to prevent the issuance of free transportation by steam or electric railroads has been reported out with a favorable recommendation by the committee on miscellaneous subjects of the House with a recommendation that it be passed. Amendments have been made to permit members of the Legislature, their families and one clerk or secretary to receive passes. Another amendment struck the words "in uniform" from the section referring to the free transportation of policemen while on duty. This amendment will give policemen, deputy sheriffs and coroners the right to ride free on street railways. Other amendments allow free transportation to the families of attorneys and physicians for railways. An amendment to exempt members of Congress and their families and judges of courts of records and their families was voted down.

Conductors and motormen on the Mattoon (Ill.) City Railway have petitioned their representatives in the Legislature to vote against the bill providing that ten hours' employment for street railway employees must be within fourteen consecutive hours. They assert that the passage of the bill would mean a reduction in wages of about $100 a year for each man.

MASSACHUSETTS

The so-called "nine hours in eleven" bill continues to be a storm center of discussion in the Legislature. The committee on street railways recently reported a bill providing that a day's work for motormen and conductors shall not exceed nine hours in twelve consecutive hours, with a possible emergency extension to nine and a half. Representative Stevens of Marblehead has endeavored to substitute a straight nine hours in eleven bill for that favored by the committee and passed to a second reading in the House. Representative Duncan of Clinton opposed the demand for substitution. He said that a few years ago when a bill was passed restricting the hours but permitting the men to work longer if they desired it was found that many men preferred to work longer hours than those indicated in the bill. President Bancroft of the Boston Elevated Railway has sent a statement to the members of the Legislature protesting against the passage of the nine hours in eleven bill and stating that if it goes through it will be necessary to employ 1700 more men than at present. He also asserted that the attempt to settle the hours of employment is a plain violation of the agreement between the company and the employees' union.

NEW YORK

Governor Sulzer has vetoed the Yard bill to permit the construction of an electric railway on the Albany Post Road in Westchester County. The Governor has signed Senate bill No. 340, amending the general corporation law by adding a new Section 91-a, providing that "the Supreme Court shall have jurisdiction in equity at the suit of a corporation or of a receiver or trustee in bankruptcy thereof to compel one or more trustees, directors, managers or other officers of the corporation to account for injury to or losses of the funds, assets or property of the corporation caused by or through any neglect or failure of the defendants to perform, or by a violation of, their duties, and must upon application of either party make an order directing the trial by jury of the issue of negligence, and for that purpose the questions to be tried must be prepared and settled as prescribed in Section 970, Code of Civil Procedure." The Governor has vetoed the bill to amend the railroad law in relation to extending the time within which in certain cities a railroad may be constructed where there has been a receiver. The Governor has disapproved the bill to repeal the act for the preservation of the macadamized public highways of Queens County. The Governor said: "A repeal of this act would be solely, simply and purely a grant of unrestricted and unlimited power to the street surface railroads in Queens and Nassau Counties to monopolize the use of each and every macadamized public highway in both of those counties, without any regard to the public sentiment of the citizens thereof."

The Governor on May 28, 1913, vetoed the Murtaugh hydroelectric bill designed to permit the utilization of the surplus waters of the canal for the development of electric power by the State, and the Walters bill, which would have permitted quasi-public corporations to impound waters through the construction of dikes, watersheds, etc., and to market the water. The Governor has announced that he will appoint a committee of experts to investigate the question of water power development in the State and report to the next Legislature. The Governor has signed the Pollock bill providing that no stage routes or alterations or extensions of such routes in New York City shall be operated until a franchise has been obtained from the Board of Estimate and Apportionment.

PENNSYLVANIA

By a vote of 185 to 9 the House passed the public utilities commission measure on May 19. The bill was at once sent to the Senate, where it passed first reading and was made a special order for second reading on the evening of May 26. It is believed that it will now speedily pass the Senate and be signed by the Governor. Opposition to the bill in the House was led by Representatives Allen, Pittsburgh, and John R. K. Scott, Philadelphia, who charged that the influence of the State administration had been unduly exercised to defeat certain amendments which they had offered, including the granting to the commission of control over the issuance of stocks and bonds by corporations and requiring the commission to pass upon these securities before they could be offered to the public. Framers of the bill were against this amendment because they claimed it would nullify the purposes of the measure and should be covered in a separate bill. The amendments offered at the instance of Mayor Magee of Pittsburgh were designed to give municipalities the right to pass upon the extension of public utilities through the highways of these municipalities. An attempt by Mr. Allen to insert his amendments to the bill before final passage through unanimous consent, that the House go into committee of the whole for the purpose of considering the amendments, was defeated by a vote of 108 to 78. The bill as passed is a compromise measure between the Republican State Convention's legislative committee's bill and the state administration's bill. The Democratic bill was not seriously considered in the framing of the composite measure.

The Clark commission government bill for third-class cities, which has passed the Senate, was reported favorably to the House with an amendment designed to prevent the "ripping" of mayors and other regularly elected city officials out of office before their terms have expired.

As a result of the visit of A. M. Taylor, transit adviser to Mayor Blankenburg of Philadelphia, to Harrisburg the section of the all-Philadelphia revenue-producing bill limiting the use of the money received to the building of subways and other permanent improvements will be eliminated and provided for in a new measure to be introduced at once into the Senate. Both bills are scheduled for passage, it is stated. The main bill provides that all of the personal property tax, now divided between the county and State, shall go to the county, which would add $40,000,000 to the borrowing capacity of the county of Philadelphia.

PROGRAM OF ASSOCIATION MEETING

Central Electric Railway Association

The hotel and arrangement committee of the Central Electric Railway Association has made the following arrangements for the June meeting, which will be held on board the D. & C. steamship *St. Ignace*, which has been chartered for the exclusive use of the association members and families, for a two days' continuous trip from Lake Erie through the connecting rivers and Lake St. Clair into Lake Huron:

The steamer will leave the dock at the foot of Madison Street, Toledo, Ohio, at 3 p. m. sharp, on June 25, 1913, and will return to the same place at the corresponding hour on June 27, 1913.

The fare from Toledo for the round trip, including stateroom berth and meals, will be $12 per person.

Reservations can be made by applying to L. J. Drake, Jr., 410 Traction Terminal Building, Indianapolis, Ind., chairman of the hotel and arrangement committee. All reservations must be accompanied by remittance and the name and address of person or persons desiring accommodations, so as to comply with marine regulations

Each stateroom is equipped with an upper and lower berth. On account of the large attendance expected at this meeting, it will be necessary to place two persons in each stateroom; therefore it would be well for persons who desire to share the same stateroom to make reservations together. In making reservations, preference should be named for inside salon room or outside corridor room. Full fare will have to be charged for all children.

No applications received by mail after June 21 can be acted upon. Applicants at the boat on June 25 will be assigned space if any is left. A cordial invitation is extended to railway men who are not members of the association.

Financial and Corporate

Stock and Money Markets

May 27, 1913.

The market opened strong in New York to-day, but weakness developed suddenly in the forenoon and stocks were offered at substantial concessions. The railroad issues were affected by the developments in connection with the St. Louis & San Francisco receivership. New low records were established for all the securities of that system. Railroad and other bonds were irregular. Rates in the money market to-day were: Call, 2½@3 per cent; sixty days, 3¾@4 per cent; ninety days, 3¾@4¼ per cent; four months, 4@4½ per cent; five months, 4½@4¾ per cent.

The market in Philadelphia to-day was broad, but the volume of transactions was small. The demand for bonds was good.

The Boston market to-day was irregular during the early part of the session. Boston Elevated recovered on a small volume of transactions, up 1⅛.

The Chicago market continued narrow and extremely dull to-day. The demand for bonds has improved.

The market for stocks in Baltimore continued very narrow and dull to-day. The demand for bonds was good.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 21	May 28.
American Brake Shoe & Foundry (common)	92	93
American Brake Shoe & Foundry (preferred)	130	130
American Cities Company (common)	37½	37½
American Cities Company (preferred)	70⅛	70
American Light & Traction Company (common)	370	370
American Light & Traction Company (preferred)	106	106
American Railways Company	38	38
Aurora, Elgin & Chicago Railroad (common)	42	41½
Aurora, Elgin & Chicago Railroad (preferred)	84	84
Boston Elevated Railway	85¾	87
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	66	*66
Boston & Worcester Electric Companies (common)	a8	*8
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	91¼	91⅛
Capital Traction Company, Washington	120	120
Chicago City Railway	*150	*150
Chicago Elevated Railways (common)	*25	*25
Chicago Elevated Railways (preferred)	*87	*87
Chicago Railways, ptcptg., ctf. 1	89½	92½
Chicago Railways, ptcptg., ctf. 2	20¾	21¼
Chicago Railways, ptcptg., ctf. 3	6	7
Chicago Railways, ptcptg., ctf. 4	*3½	3
Cincinnati Street Railway	115	112
Cleveland Railway	103¼	103¾
Cleveland, Southwestern & Columbus Ry. (common)	*5½	*5¼
Cleveland, Southwestern & Columbus Ry. (preferred)	*28¼	*28¼
Columbus Railway & Light Company	18	18
Columbus Railway (common)	a69½	69½
Columbus Railway (preferred)	83	83
Denver & Northwestern Railway	109	109
Detroit United Railway	72	85
General Electric Company	138⅞	139⅜
Georgia Railway & Electric Company (common)	117	116
Georgia Railway & Electric Company (preferred)	84	84
Interborough Metropolitan Company (common)	14½	14⅜
Interborough Metropolitan Company (preferred)	50¾	50½
International Traction Company (common)	*40	*40
International Traction Company (preferred)	*95	*95
Kansas City Railway & Light Company (common)	..	..
Kansas City Railway & Light Company (preferred)	..	..
Lake Shore Electric Railway (common)	9	*9
Lake Shore Electric Railway (1st preferred)	91	*91
Lake Shore Electric Railway (2nd preferred)	25	*25
Manhattan Railway	129½	130
Massachusetts Electric Companies (common)	16	14½
Massachusetts Electric Companies (preferred)	72½	72
Milwaukee Electric Railway & Light Co. (preferred)	100	*100
Norfolk Railway & Light Company	26½	*26½
North American Company	71	70
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	44	44
Philadelphia Company, Pittsburgh (preferred)	40½	40½
Philadelphia Rapid Transit Company	23¼	23⅞
Portland Railway, Light & Power Company	67½	*67½
Public Service Corporation	114	106
Third Avenue Railway, New York	34	16
Toledo Railways & Light Company	a12	a12
Twin City Rapid Transit Co., Minneapolis (common)	104	103
Union Traction Company of Indiana (common)	7½	*7½
Union Traction Company of Indiana (1st preferred)	82	82
Union Traction Company of Indiana (2d preferred)	32	32
United Rys. & Electric Company (Baltimore)	27	..
United Rys. Inv. Company (common)	22	22
United Rys. Inv. Company (preferred)	44	43¾
Virginia Railway & Power Company (common)	53	55¾
Virginia Railway & Power Company (preferred)	90	92
Washington Ry. & Electric Company (common)	90	89
Washington Ry. & Electric Company (preferred)	90	89
West End Street Railway, Boston (common)	72½	72
West End Street Railway, Boston (preferred)	88	88
Westinghouse Elec. & Mfg. Company	62	65½
Westinghouse Elec. & Mfg. Company (1st preferred)	110	111

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*Last sale. aAsked.

ANNUAL REPORTS

Mexico Tramways

The statement of income, profit and loss of the Mexico Tramways, Mexico City, Mex., for the year ended Dec. 31, 1912, follows:

Earnings from traffic	$6,639,484
Miscellaneous earnings	183,191
Gross earnings	$6,822,675
Less operating and general expenses, maintenance and taxes	3,206,899
Gross profit from operation	$3,615,774
Less rentals and fixed charges	596,824
Net profit	$3,018,950

The report submitted by W. E. Davidson, secretary, says in part:

"The net revenue in gold for 1912, after paying all expenses and fixed charges, amounted to $1,830,480, which with the balance brought forward from 1911 makes a total credit balance to the profit and loss account for the year of $2,617,046, out of which the directors have during the year paid to the shareholders four quarterly dividends at the rate of 7 per cent per annum, leaving a balance in the profit and loss account of $1,462,928, which has been carried forward. The ratio of operating expenses to gross income for the year 1912 was 47 per cent as compared with 48.57 per cent in 1911.

"In order to insure proper protection of the company's properties and the continuous operation of its service during the recent disturbance in Mexico, the management was obliged to incur a considerable amount of extraordinary expenditure, and as a result the directors are glad to report that the company was able to maintain its services in a very satisfactory manner and did not sustain any serious damage to its property.

"On Dec. 31, 1912, the tramway system consisted of 208.30 miles of single track, of which 193.30 miles were operated by electricity and 15 miles by mules—the electric track mileage having been increased by 17.80 miles and the mule track mileage having been reduced by 4.55 miles.

"The first sections of the suburban lines to Toluca and Puebla respectively have been placed in operation, the Toluca section as far as Cuajimalpa, a distance of 5.405 miles from Santa Fé, and the Puebla section as far as Tulyehualco, a distance of 6.878 miles from Xochimilco. The mule lines were electrified during the year from Ixtacalco to Ixtapalapa, and from Tacubaya to Santa Fé. The property has been maintained in excellent condition and repair, and for this purpose $735,074.72, Mexican currency, has been expended during the year. The company has constructed during the year eleven first-class electric passenger cars, as well as eight other cars."

The accompanying table of comparative statistics was included in the report:

	1910	1911	1912
Average earnings per passenger per car per day	$57.15	$65.79	$72.36
Average passenger receipts per car mile	44.98	42.47	48.61
Operating expenses, not including taxes, per car mile, passenger and freight service	23.73	22.16	24.40
Daily average earnings from operation	15,985.59	16,887.05	18,614.88
Daily average operating expenses	7,626.55	7,901.08	8,468.37
Percentage of gross expenditures, including taxes, to gross earnings and income	49.06	48.57	47.00

West Penn Traction Company

The report of the West Penn Traction & Water Power Company, Pittsburgh, Pa., and subsidiary companies for the year ended March 31, 1913, just issued, shows an increase over the previous year of 56.5 per cent in gross earnings and 41.6 per cent in net earnings. Comparative statements of earnings for the two years ended March 31, 1912 and 1913, follow:

	1912	1913
Gross earnings	$2,427,481	$3,801,324
Operating expenses and taxes	1,216,797	2,086,224
Net earnings	$1,210,684	$1,715,100
Fixed charges	570,433	923,995
Balance	$640,251	$791,105
Guaranteed dividends	235,000	235,000
Surplus earnings	$405,251	$556,105

Report on Depreciation and Maintenance Charges in Louisville

The Louisville (Ky.) Railway has made public a report of a special committee of directors, of which Charles T. Ballard is chairman, appointed several months ago to examine into the accounting system used by the company. The committee found that in the ten years from 1902 to 1911 the charge to depreciation was $309,885 and for maintenance $3,460,483, a total of $3,770,396, against gross revenue of $24,326,410, or 15.5 per cent. During the past two years this amount has been increased to 16.66 per cent, but, the committee stated, this rate is under rather than over what is set aside by other conservatively managed electric railways. The committee added:

"We are not prepared to say just what percentage of gross revenue should be expended for maintenance or for depreciation, or for both together, but will give this matter our careful consideration, and we suggest that each member of the board also do so."

The committee also dealt in its report with minor matters of bookkeeping, with special reference to showing the condition of affiliated interurban properties. It also pointed out from figures in the report of the Second District Commission in New York that Louisville has more miles of track per 1000 of population than a number of other cities of about the same size. The committee called attention to the great drain on the resources of the company arising out of damage cases, characterizing a great many of them as little short of blackmail. It was stated, however, that whereas this item amounted to 9.3 per cent of the gross receipts in 1910, it had fallen to 8.3 per cent in 1912, and it is hoped that the results of the use of pay-as-you-enter cars, the use of safety gates and stopping at the first intersections will be still more favorable.

The present report is a summary of one made to the directors last November which was not made public at that time.

Opposition to Terms of Columbus Consolidation

Near the close of the hearing before the Public Service Commission of Ohio on May 20, 1913, on the petition for authority to exchange the stock of the Columbus Railway & Light Company for stock of the Columbus Railway, Light & Power Company, attorneys for the Columbus Light, Heat & Power Company objected to the basis of exchange for the stockholders of that company and demanded that the terms of the consolidation be readjusted. Attorney Joseph Clark, representing the Clark interests, replied that the selection of the directors was made by vote of proxies from the stockholders and that the large holders of stock of the company had been placed upon the board. The original petition for consolidation was filed on Feb. 12, 1913.

The stockholders of the Columbus Heat, Light & Power Company ask that they be placed upon the same basis as those of the Columbus Edison Company, while stockholders of the latter company intimate that they may withdraw from the plan if this is done. The commission has taken the matter under consideration.

Statistics of Electric Railways from Report of Public Utilities Commission of Connecticut

According to the report of the Public Utilities Commission of Connecticut for the year ended June 30, 1912, there are thirteen electric street railways operating in that State. The outstanding capital stock, representing the 1,020.326 miles of street railways owned, is $62,670,100. Of this amount $40,000,000 represents 471.667 miles owned by the Connecticut Company and $17,120,100 the 234.381 miles of the Connecticut Railway & Lighting Company, whose property is operated by the Connecticut Company. The remainder of $5,550,000 is the capital of the 314.278 miles of the other companies.

The amount of bonds issued and outstanding as reported by the various companies is $10,217,000, being $20,571 per mile of single track owned. The amount of floating indebtedness on 691.088 miles of single track owned is $2,011,579, or $2,910 per mile of road covered by such indebtedness. No indebtedness is reported as existing on the Bristol & Plainville Tramway, the Connecticut Railway & Lighting Company and the Providence & Danielson Railway.

The gross earnings of the nine operating companies for the year ended June 30, 1912, were $9,288,092, an increase of $490,563 over the earnings of the previous year. The gross earnings per mile of main track operated were $9,427; per car mile they were $0.2785, and per car hour, $2.594.

The operating expenses were $5,998,421, being $117,213 less than the expenses of the previous year, and were $6,088 per mile of main track operated, $0.1799 per car mile and $1.703 per car hour. The operating expenses were 64.58 per cent of the gross earnings. The net earnings for the year were $3,289,671, an increase of $607,776 over the previous year.

From the above net earnings the following deductions were made: The amount paid in dividends upon the stock of nine of the companies was $2,267,354. The interest amounted to $990.316. The taxes paid the State were $455,165. The car miles run were 33.348.849, an increase of 762,595 miles over the preceding year.

The number of fare passengers carried was 175,434,119, an increase of 9,231,935 over the number carried the previous year. This total compares with 85,960,797 passengers carried by the steam railroads for the same period. The average fare received from revenue passengers was $0.04983 and the average fare of all passengers, including those with transfers, $0.04199.

The average number of employees during the year was 5002, a decrease of 265 in the number reported last year.

Demand for Public Utility Bonds

An interesting article by Lawrence Chamberlain is published in the May issue of *Moody's Magazine* on the subject of why the public is leaning toward the purchase of public utility bonds rather than those of seasoned railroads or municipalities. As Mr. Chamberlain sees the situation, it is a result of a theoretically correct distribution of risk from the investor's viewpoint. To invest properly and to distribute the risk properly, a mere scattering of one's interest is not sufficient, for, aside from the risk of loss through the default of any particular securities, a further risk of loss exists through the chance of being compelled to liquidate at a time when the securities are suffering a general decline. The best way to eliminate this second risk is to invest in different types of bonds with the idea that should a subsequent decline come some types would be affected only moderately if at all.

To illustrate this method, Mr. Chamberlain shows that since 1905, irrespective of investment values, forces which have been at work have depressed railroad bonds 7 per cent, municipal bonds 16 points and public service bonds only 1⅛ points. According to bond men, the reason for the moderate decrease in public utility values is the fact that the demand for public utility securities has increased more rapidly than the demand for railroad and municipal bonds and is not because the railroads and municipalities have increased their obligations in greater ratio than the public service corporations. The demand for public utility bonds is based on the knowledge of the public that the purchasing power of a dollar has decreased in recent years and that public service bonds yield more on the cost than other types, the net return in 1905 being 1 per cent higher and in 1912 four-fifths of 1 per cent higher. The advantage of this superior yield is sought to offset in part the inefficiency of money. Then, too, public service bonds are growing in demand because the security fluctuates less than is the case with railroad bonds. This is not true of municipal issues, but at the average price level municipal bonds yield less than railroad bonds of equal security.

On the basis of these facts the market for public service securities is well founded and should continue to be so. To avoid the danger of being forced to liquidate at a loss due not necessarily to a weakened security but to the growing money inefficiency, it is wise for an investor not to confine his field to several issues of the same type but to scatter his holdings among several types of bonds, and on the basis of the last seven years, as Mr. Chamberlain says, presumably less chance for loss in liquidation will occur if an investor favors public utility bonds in dividing his funds among the three types.

Earnings of Illinois Traction System for Quarter

For the last quarter of 1913 the Illinois Traction System, Champaign, Ill., reports the largest gross and net earnings in five years. The comparative statement of gross and net earnings for the past five years follows:

	Gross	Net
1909	$1,262,739	$533,286
1910	1,427,326	582,127
1911	1,650,698	635,602
1912	1,790,361	717,275
1913	1,880,460	766,338

Beaumont (Tex.) Traction Company.—Stone & Webster, Boston, Mass., have arranged to purchase property of the Beaumont Traction Company conditioned on the company securing an amended franchise from the City Council of Beaumont. The plan is to merge the Beaumont Traction Company with the Jefferson County Traction Company, which is building the interurban railway between Beaumont and Port Arthur. The Beaumont Traction Company desires an extension of its franchise for fifty years from Jan. 1, 1911, making the tenure of its rights the same as those of the interurban company.

Boston & Worcester Street Railway, Boston, Mass.—The Massachusetts Railroad Commission has approved an issue of $150,000 twenty-year 4½ per cent bonds of the Boston & Worcester Street Railway, the proceeds to be used to fund the floating debt and to secure new equipment.

Boston Suburban Electric Companies, Newtonville, Mass.—The shareholders of the Boston Suburban Electric Companies have authorized the cancellation of the 32,387 shares of cumulated preferred stock outstanding and the issue of notes in place of the same, holders of the preferred stock to have the option of taking cash or notes, or both, for their stock. Dividends to the amount of $10 a share have accumulated on the preferred stock, which bears $4 a share cumulative dividends. At present there are $1,100,000 of coupon notes outstanding.

British Columbia Electric Railway, Ltd., New Westminster, B. C.—The London (Eng.) Stock Exchange has listed a further issue of £750,000 of 4¼ per cent perpetual consolidated debenture stock of the British Columbia Electric Railway, making the total amount listed £2,787,155.

Brooklyn (N. Y.) Rapid Transit Company.—The directors of the Brooklyn Rapid Transit Company have placed the stock on a 6 per cent basis by declaring a quarterly dividend of 1½ per cent, an increase of one-quarter of 1 per cent. The dividend is payable on July 1, 1913, to holders of record of June 9.

Calumet & South Chicago Railway, Chicago, Ill.—The Calumet & South Chicago Railway has sold another $500,000 of its general mortgage 5 per cent bonds to the First Trust & Savings Bank, Chicago, Ill. This makes the total of that issue now outstanding $4,725,000.

Chicago (Ill.) Railways.—The Chicago Railways has sold to the First Trust & Savings Bank, Chicago, Ill., $1,500,000 of its first mortgage 5 per cent bonds. This brings the total of that issue now outstanding to $28,700,000.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—On May 23 the Cleveland, Southwestern & Columbus Railway was authorized by the Public Service Commission of Ohio to issue first mortgage thirty-year 5 per cent gold bonds of the aggregate principal sum of $5,103,000, first preferred capital stock of the par value of $1,500,000 and second preferred capital stock of the par value of $2,412,000, a note of which proposed issues was made in the ELECTRIC RAILWAY JOURNAL of April 26, 1913. These bonds to the principal amount of $5,000,000 and the first preferred stock are to be sold for the best price obtainable and for not less than 90 per cent of the par value thereof, it being the opinion and finding of the commission that the issue of all of the stocks and securities and the money to be secured by the sale of such portion thereof as is proposed to be sold are reasonably required for the proper purposes of the corporation. The proceeds from the sale of $5,000,000 of the bonds and the first preferred stock must be devoted to the payment, discharge and retirement of its outstanding funded indebtedness and floating indebtedness, secured by the pledge of its first consolidated mortgage bonds. The new first mortgage bonds, of the principal sum of $103,000, are to be issued to reimburse the company's income, on the basis of $500 par value of bonds for each $1,000 so expended, for moneys by it expended therefrom for the improvement and betterment of its plant and property since Sept. 1, 1912, and to be so expended, which improvements and betterments are estimated by the company to cost, completed in good and workmanlike manner, the sum of $129,758. The second preferred capital stock is to be exchanged, share for share, for the present outstanding preferred capital stock, of total principal amount of $2,412,000, provided the holders of the present outstanding first preferred capital stock waive, cancel, release and discharge any and all claims against the company for or on account of dividends accumulated or to accumulate upon the present preferred stock. The meeting of shareholders postponed from May 17 is to be held in the near future for the purpose of ratifying the above plans.

Columbus, Marion & Bucyrus Interurban Railway, Marion, Ohio.—Further details are available in regard to the incorporation of the Columbus, Marion & Bucyrus Interurban Railway to succeed the Columbus, Marion & Bucyrus Railway, which was noted in the ELECTRIC RAILWAY JOURNAL of May 24, 1913. Of the capital stock of $350,000, $100,000 is to be given to the purchasers of $100,000 of first mortgage 6 per cent gold bonds and $250,000 to holders of the present first mortgage 5 per cent bonds of the Columbus, Marion & Bucyrus Railroad. First mortgage 6 per cent twenty-year gold bonds, redeemable all or partly on any interest date at 102½ per cent and interest, are issued to be used as far as necessary to pay receivers' certificates, outstanding claims, receivers' and foreclosure expenses and to build a power house and additional trackage if such construction should be desired. All holders of the present bonds are allowed to subscribe for the new bonds in amounts equal to 20 per cent of their present holdings, with a bonus of 100 per cent in stock. There are also to be issued general mortgage gold bonds in the amount of $250,000, interest for the first and second years at 3 per cent, for the third and fourth years at 4 per cent and thereafter at 5 per cent. To the holders of the present first mortgage bonds who subscribe for their 20 per cent in the new first 6's there is to be allotted an amount equal to 50 per cent of their present holdings in these general mortgage bonds and 50 per cent in new stock. The subscribing holder of a thousand-dollar bond of the old company would thus receive $200 in new first 6's, $500 in stock and $500 in 3-4-5 per cent bonds of the general issue. This reorganization will require net earnings for the first two years of $13,500, for the third and fourth years $16,000, and thereafter $18,500, but the company expects that with improvements the net earnings will more than meet the interest. The committee in charge of the reorganization is composed of James H. Caldwell, Peter McCarthy, J. J. Tyler, Wells Campbell, Francis Henderson and James F. Livingston.

Commonwealth Power, Railway & Light Company, Saginaw, Mich.—The stockholders of the Commonwealth Power, Railway & Light Company and Union Railway, Gas & Electric Company have subscribed to $6,033,500 of the $7,500,000 of five-year 6 per cent convertible bonds of the former company, noted in the ELECTRIC RAILWAY JOURNAL of May 24, 1913, which leaves unsold $1,466,500, or less than 20 per cent of the entire amount.

Evansville (Ind.) Railway.—The Evansville Railway has purchased the Evansville & Mount Vernon Electric Railway and the Evansville Terminal Railway and has leased the Evansville, Henderson & Owensboro Railway. The transfer is shown by deeds which have been recorded in Evansville. The Evansville, Henderson & Owensboro Railway recently began the operation of a line between Evansville, Ind., and Henderson, Ky., its cars being ferried over the Ohio River. The company also operates in Henderson. The deed filed by this company leases its lines, bridges, buildings and boat to the Evansville Railway.

Lake Erie, Bowling Green & Napoleon Railroad, Bowling Green, Ohio.—On May 17 the Union Trust Company of Detroit instituted foreclosure proceedings in the United States District Court at Detroit against the Lake Erie, Bowling Green & Napoleon Railway. The amount due on the first mortgage 5 per cent bonds of 1903 is stated as $429,500.

Lehigh Valley Transit Company, Allentown, Pa.—The stockholders of the Lehigh Valley Transit Company are to vote on June 12, 1913, on a proposition to increase the present indebtedness in connection with the purchase of the stock of the Easton Consolidated Electric Company, noted in the ELECTRIC RAILWAY JOURNAL of April 1, 1913, and for other purposes. The agreement for the purchase of the 30,000 shares of the Easton Consolidated Electric Company stock called for the issuance in payment therefor of $30.33 per share in 6 per cent collateral trust bonds, aggregating, if the entire stock is acquired, $909,900 of a possible $1,000,000 issue.

Massachusetts Northern Railways, Greenfield, Mass.—A statement has been filed by the Massachusetts Northern Railways with the Massachusetts Railroad Commission relative to the number of shares in street railway companies owned or controlled as follows: Athol & Orange Street Railway, 4000 shares; Connecticut Valley Street Railway, 4891 shares; Concord, Maynard & Hudson Street Railway, 2219 shares. In March, 1913, the Athol & Orange Street Railway was authorized by the commission to issue $185,000 of common stock in exchange share for share for the capital stock of the Gardner, Westminster & Fitchburg Street Railway and 905 shares of common stock at par and 1500 shares of 6 per cent cumulative preferred stock to provide in part for indebtedness incurred in purchase of the Massachusetts Street Railway. On May 3 the name of the Athol & Orange line was changed to the Northern Massachusetts Street Railway Company. Application is also pending to enable that company to make an issue of $500,000 of first and refunding bonds, of which $255,000 is to take up the floating debt and $245,000 to refund $60,000 bonds due Jan. 1, 1915, and $185,000 Gardner, Westminster & Fitchburg bonds due Feb. 1, 1920.

Mexico, Santa Fé & Perry Traction Company, Mexico, Mo.—The property of the Mexico, Santa Fé & Perry Traction Company has been sold at receiver's sale for $37,500 to D. Bates, W. W. Botts, Shan Brown, Baxter Guthrie, Ashby Botts and William Munday. The transaction covers 13 miles of railroad and equipment, besides 60 miles of right-of-way for extensions and $20,000 of subscriptions which are said to be collectible for the construction of the proposed road. W. W. Botts was treasurer of the company, of which M. Crum was president. The line was designed to connect Mexico, Parry and Hannibal, Mo.

New Orleans Railway & Light Company, New Orleans, La.—Bertron, Griscom & Company, New York, N. Y., and E. H. Rollins & Sons, Boston, Mass., are offering at 99½ and interest, to yield more than 6.15 per cent, the unsold portion of the present issue of $2,500,000 of three-year 6 per cent gold debentures of the New Orleans Railway & Light Company, one-half of the issue having been sold abroad. The debentures are dated June 1, 1913, and are due June 1, 1916, but are redeemable at 101 and interest on any interest date, par value $1,000 and $500. They are guaranteed as to principal and interest by indorsement by the American Cities Company, which owns 96 per cent of the common stock and 87 per cent of the preferred stock of the New Orleans Railway & Light Company. The authorized amount of the debentures is $4,000,000, of which $2,500,000 is to be issued at once to pay existing construction indebtedness and to provide about $1,000,000 for new construction work during 1913. The remaining $1,500,000 is reserved to meet the anticipated construction requirements of 1914 and 1915. The indenture under which these debentures are issued forbids during the life of these debentures (1) any new mortgage, except purchase-money mortgages, unless these debentures be secured thereby as fully as any obligations issued thereunder; (2) any other indebtedness except for current operating accounts without the written consent of the holders of two-thirds of the outstanding debentures, except that the company may issue not over $1,975,000 additional refunding and general lien 5 per cent bonds as collateral for a loan, but may not sell them to the public.

New York, Auburn & Lansing Railroad, Auburn, N. Y.—The receivers of the New York, Auburn & Lansing Railroad have received permission to issue $120,000 of receivers' certificates to purchase and improve the power plant at the Remington Salt Works. Of the proceeds $85,000 will be used to purchase the plant and the remainder for improvements.

Oskaloosa Traction & Light Company, Oskaloosa, Ia.—W. B. McKinley, president of the Illinois Traction System, Champaign, Ill., has exercised the option which he took recently on the property of the Oskaloosa Traction & Light Company. He will take over the property on June 1, 1913.

Philadelphia (Pa.) Rapid Transit Company.—E. T. Stotesbury, chairman of the board of the Philadelphia Rapid Transit Company, is quoted as saying that the plan of financing as contemplated by that company provides for the sale of $4,500,000 of 5 per cent sinking fund bonds due 1962, with the option to the company, extending over a period of two and a half years, to repurchase the bonds should the company desire to make other use of them during the said period.

Plymouth & Sandwich Street Railway, Plymouth, Mass.—The Massachusetts Railroad Commissioners on May 27, 1913, authorized the Plymouth & Sandwich Street Railway to issue 1400 shares of common and 570 shares of 6 per cent preferred stock at $100 per share. The proceeds of 270 shares of the preferred are to be used to pay the floating debt and the remainder of the stock to defray the cost of building and equipping extensions of the line.

Springfield, Clear Lake & Rochester Interurban Railway, Springfield, Ill.—Judge James A. Creighton, of the Sangamon County Circuit Court at Springfield, Ill., has confirmed the decree of Master in Chancery Pfeiffer that the Springfield, Clear Lake & Rochester Interurban Railway should be sold at auction, as stated in the ELECTRIC RAILWAY JOURNAL of May 17, 1913, page 909. According to the decree, workmen employed on the road six months before and six months after the filing of the foreclosure proceedings have prior liens on the sale.

Stockton Terminal & Eastern Railroad Company, Stockton, Cal.—The California Railroad Commission recently sanctioned the issue of $345,000 of first mortgage 6 per cent bonds by the Stockton Terminal & Eastern Railroad, partly to be sold and partly for collateral. The total authorized issue is $500,000, dated April 1, 1911, and due April 1, 1941, but redeemable at any time in any amount of 110, par value $1,000 and $500, interest April and October. The proceeds, it is stated, will be used to extend the railway from its present terminus in Stockton to Stockton Channel, to improve the line from Stockton to Bellota and to extend the railway from Bellota to Jenny Lind, and for equipment.

United Properties Company, Oakland, Cal.—The committee appointed to take charge of the United Properties Company, noted in the ELECTRIC RAILWAY JOURNAL of May 24, 1913, requested by a letter mailed on May 14, 1913, that all the creditors of F. M. Smith deposit their notes, claims and securities, including the collateral therefor, with the Mercantile Trust Company, San Francisco, before May 25, 1913. The substance of the committee's report is as follows: "The committee finds, after such investigation as it has been able to make, that the properties of many of the companies in which F. M. Smith was a large stockholder are of great value, but that they require careful administration and in some instances further financing to prevent them from being sacrificed. Any attempt at this time on the part of individual pledge holders to realize upon the securities held by them could not but result in making the securities comparatively worthless and bringing disaster upon all concerned. There is practically no market for these securities at the present time, and unless they can be handled as a body it is not likely that there will be any [adequate] market for them in the future. As soon as the success of the plan is assured, interest will be paid to you on your notes at the rate of 6 per cent per annum; otherwise your notes and collateral will be returned to you.

In any event there will be applied upon your notes, while held by the trust company, all dividends or interest which may be collected on account of the collateral deposited by you, and when this collateral is disposed of, which will be done as rapidly as the committee can safely do so, you will receive all of the proceeds realized from the collateral so deposited up to the amount of your claim." National Bank Examiner H. N. Norris and Superintendent of Banks W. R. Williams advise creditors to co-operate with the committee, Mr. Norris adding: "The assets are of great intrinsic value, and ample, under reasonably favorable conditions, to pay all creditors and leave a large surplus."

United Railways & Electric Company, Baltimore, Md.—There has been listed on the Philadelphia Stock Exchange $19,568,800 of common stock, par value $50, full-paid and non-assessable, and $110,000 additional first consolidated 4 per cent gold bonds, due March 1, 1941, of the United Railways & Electric Company.

Wheeling Traction Company, Wheeling, W. Va.—The shareholders of the Wheeling Traction Company on May 17, 1913, authorized a new $10,000,000 mortgage to provide for refunding the present $2,500,000 of bonds and for additions and extensions.

Dividends Declared

Chicago (Ill.) Elevated Railways, quarterly, $1.50, preferred participating shares.

Norfolk Railway & Light Company, Norfolk, Va., 3 per cent.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1 per cent, common.

Virginia Railway & Power Company, Richmond, Va., quarterly, 2½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.					
1 mo. April '13	$45,594	*$28,357	$17,237	$12,542	$4,695
1 " " '12	43,315	*27,000	16,315	12,911	3,404
12 " " '13	552,157	*324,912	227,245	151,263	75,982
12 " " '12	486,964	*285,276	201,688	154,327	47,361
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO					
1 mo. March '13	$93,289	*$62,921	$30,367	$34,954	†$4,587
1 " " '12	92,120	*58,945	33,174	34,758	†1,594
3 " " '13	282,342	*187,697	94,645	104,829	†10,184
3 " " '12	261,391	*170,795	90,595	104,193	†13,598
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE					
1 mo. March '13	$48,595	*$32,882	$15,713	$14,596	$1,117
1 " " '12	42,510	*31,427	11,183	14,447	†3,264
12 " " '13	637,244	*390,124	247,120	173,296	73,824
12 " " '12	596,384	*372,496	223,888	170,063	53,825
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.					
1 mo. March '13	$174,934	*$106,831	$68,103	$37,632	$30,471
1 " " '12	168,647	*101,156	67,491	34,957	32,534
12 " " '13	2,112,525	*1,211,068	901,457	442,034	459,423
12 " " '12	1,988,258	*1,146,602	841,756	408,904	432,852
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1 mo. March '13	$227,146	*$147,406	$79,739	$45,214	$34,525
1 " " '12	215,888	*125,278	90,610	43,820	46,790
3 " " '13	687,181	*427,785	259,396	135,082	124,313
3 " " '12	628,487	*367,370	256,117	131,466	124,651
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.					
1 mo. March '13	$544,896	$276,148	$268,748	$160,998	$107,750
1 " " '12	543,138	285,050	258,088	131,153	126,935
12 " " '13	6,677,595	3,295,576	3,382,019	1,820,884	1,561,135
12 " " '12	6,424,341	3,144,975	3,279,366	1,546,641	1,732,725
PORTLAND (MAINE) RAILROAD					
1 mo. March '13	$73,943	$60,931	$13,012	$10,298	$2,714
1 " " '12	68,030	59,011	9,019	10,166	†1,147
12 " " '13	997,252	698,774	298,478	123,381	175,097
12 " " '12	965,334	721,092	244,242	113,294	130,948
ST. JOSEPH RAILWAY, LIGHT & POWER COMPANY, ST. JOSEPH, MO.					
1 mo. March '13	$103,807	$55,650	$48,157	$20,198	$27,959
1 " " '12	94,320	52,202	42,118	19,710	22,408
12 " " '13	1,198,143	678,133	520,010	237,448	282,562
12 " " '12	1,126,004	686,968	439,036	232,703	206,333
SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS, OAKLAND, CAL.					
1 mo. March '13	$402,140	$255,972	$146,168	$99,772	$46,396
9 " " '13	3,484,184	2,147,207	1,336,977	905,716	431,260

*Includes taxes. †Deficit.

Traffic and Transportation

Safety First—First Safety

T. P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., contributed to the current issue. of the *Interborough Bulletin*, published in the interest of the employees, an article "Safety First—First Safety" in part as follows:

"The habit of exercising care and diligence is a primary imperative duty which each employee owes to himself, his family, his fellow-employee and his family, his employer, the traveling public and to society.

"To be careless, thoughtless or reckless inevitably means injury and sorrow, not only to one's self but to those most dear to him, and not infrequently to others as well.

"One of the greatest risks the 'careful' man runs is the possibility of injury resulting from the acts of a 'careless' fellow-worker. Therefore, when the 'careless' man will not endeavor to do better and mend his ways, he should, for the protection of all, be weeded out of the service, and those most directly and vitally concerned in this process of elimination are his fellow-workers.

"Every accident is a 'notice' that something is wrong with methods, material or man and should be investigated at once to ascertain the cause and necessary remedy. To accomplish this requires the full and hearty co-operation of employees among themselves and with officials of the company as well. Nothing should be overlooked—everything should be reported, with suggestions looking toward possible improvement.

"If at all times we will strive to do and encourage others to do the safe and sane thing, we shall add to the sum of human happiness by subtracting from the sum of human woe, and all-sufficient will be our reward, if through this united effort, gladness, not sorrow, may live in the hearts of our fellow-workers.

"Remember always that:

"In the transportation business 'human failures' are the chief cause of accidents and injuries. The remedy is greater caution in the individual.

"No one has the right to take a chance. The other fellow may have to suffer the consequences.

"Because an accident has never happened is no reason preventing it ever happening.

"It is an easy matter to adjust a knuckle the second time, but a mangled or mutilated hand or foot can never be replaced.

"A minute of good judgment may frequently be worth many times a day of energy.

"Through the careful use of good judgment we develop efficiency, and upon efficiency depends the success and happiness of all.

"Great is the power of repetition. It is hoped, therefore, employees will read, re-read and thoroughly digest the good advice recently issued in circular form to employees on the 'safety first' habit.

"To further instill 'safety first' ideas in each other, let us talk 'safety' at every opportunity and freely discuss among ourselves recent accidents and causes of injury and consider methods for their prevention."

Increase in Wages in Montreal.—The Montreal (Que.) Tramways has increased the pay of its motormen and conductors 1 cent an hour.

Increase in Wages in Kewanee.—Employees of the Galesburg & Kewanee Electric Railway, Kewanee, Ill., have obtained an increase in wages from 22 cents to 26 cents an hour.

Prizes for Neat Stations.—Prizes aggregating $60 have been offered by W. B. McKinley, president of the company, for the neatest appearing stations and substations along the Illinois Traction System, Peoria, Ill.

Through Freight Between Canton and Peoria.—The Illinois Central Electric Railway, Canton, Ill., and the Minneapolis & St. Louis Railway, a steam railroad, contemplate establishing through freight service between Canton and Peoria by way of Farmington.

Complaint to Ohio Public Service Commission.—T. C. Davis, city solicitor of Massillon, has filed complaint with the Public Service Commission of Ohio to the effect that the cars operated by the Northern Ohio Traction & Light Company on the local line in that city are unsafe and that the terms of the franchise agreement between the city and the company have been violated by the company.

Freight Service Out of Syracuse.—Sixteen freight cars now leave Syracuse, N. Y., daily, except Sunday, over six interurban electric railways. There are about the same number of incoming freight cars over the same lines. Freight which originates in Syracuse is carried direct by the electric railways as far as Rochester, Little Falls, Oswego and Auburn, and there is a transfer service extending to Cooperstown and Oneonta.

Fare Case Before United States Supreme Court.—The arguments have been heard before the Supreme Court at Washington, D. C., in the suit brought by the Portland Railway, Light & Power Company, Portland, Ore., to set aside the rates of fare fixed by the Railroad Commission to be charged by the company on its so-called Milwaukee and Oak Grove lines. The District and the Supreme Courts of Oregon sustained the rates as fixed by the commission.

Elgin Safety Campaign Broadened.—The "safety first" campaign in Elgin, Ill., conducted by H. B. Adams, claim agent of the Aurora, Elgin & Chicago Railroad, has been broadened. The Illinois Watch Case Company and the Young Woman's Christian Association have requested that addresses be made at those places. The principal of one of the schools in Elgin had her pupils write essays on the talk delivered by Mr. Adams, and these papers have been forwarded to the claim agent.

Increase in Wages by Tri-City Railway.—Mechanics of the Tri-City Railway employed at the shops in Davenport, Ia., the carhouse in Davenport, the shops in Rock Island and at the Davenport and Muscatine shops in Muscatine have received an increase of 10 per cent in pay, effective on June 1, 1913. Motormen and conductors of the company affiliated with the union are asking an increase of 4 cents per hour over the present scale of 26 cents. The present contract affecting 350 men expires on June 1, 1913.

Proposals for Relief of Congestion in Montreal.—As the result of a conference with the Board of Control, the directors of the Montreal (Que.) Tramways have made proposals intended to afford immediate traffic relief and have suggested that permanent and elastic plans be drawn later to provide for the future growth of the city. The company asks permission to re-route several lines in the down-town district and has suggested a number of new routes in the northeastern section. The plans also provide for three new routes to accommodate St. Catherine Street traffic.

Activities of Public Service Corporation in Employees' Interest.—An illustrated feature article was published in the Newark *News* of May 18, 1913, under the caption "How Public Service Is Looking After Its Men as Well as Its Cars." The article dealt with the methods adopted by the Public Service Corporation of New Jersey, Newark, N. J., to further the interests of its employees, and was illustrated with half-tones showing a lunch counter in one of the carhouses, the theater used by the employees, the new athletic field for the men, a typical pool, card and reading room for the railway employees and a view in one of the machine shops and one in a carhouse.

Strawberry Specials.—The Louisville & Northern Railway & Lighting Company, operating north from New Albany, Ind., has put its "strawberry" specials into service and has captured practically all of the business going into Indianapolis by reason of the conveniences which it has to offer, although the rates are the same as those charged by the old-line express companies. The express cars taking care of the strawberry business stop at numerous points in the growing district and enable the shippers of strawberries to load their fruit with a minimum of hauling from the field, while at the same time the cars stop in front of the commission houses in Indianapolis. The express cars leave New Albany at 9 p. m. and arrive at Indianapolis at 1 a. m. Four cars, holding 1000 crates each, are being run.

Kansas City-St. Joseph Fares.—Chairman Atkinson of the Missouri Public Utility Commission is quoted as follows in regard to the rates now in force over the Kansas City, Clay County & St. Joseph Railway: "The rates are apparently fair. If they should prove to be unjust either to the public or to the company, the matter can easily be remedied by an appeal to the commission. The necessary action can be taken at any time. It now seems, however, that fares charged are such as to do justice to the public and to permit the company to make a fair return upon its investment. Those are the two vital points to be considered. The commission is not a destructive but a constructive body and its aim is to safeguard the interests of the public, at the same time encouraging capital to find investment in Missouri."

"The World's Greatest Traffic Problem."—Isaac F. Marcosson has contributed to *Munsey* for June, 1913, an article, "The World's Greatest Traffic Problem," dealing with the handling of traffic in New York City. The text is accompanied by reproductions of photographs showing traffic congestion, subway work in progress, crowded cars and one of the last horse cars. Portraits are also published of Edward E. McCall, chairman of the Public Service Commission of the First District; William R. Willcox, formerly chairman of the Public Service Commission of the First District; Mayor Gaynor, Comptroller Prendergast, Borough President McAneny, President Shonts of the Interborough Rapid Transit Company, President Williams of the Brooklyn Rapid Transit Company and Vice-president and General Manager Hedley of the Interborough Rapid Transit Company.

Transfer Inquiry in Washington, D. C.—The Public Utilities Commission of the District of Columbia has decided formally to investigate the alleged failure of the Capital Traction Company and Washington Railway & Electric Company to enter into an arrangement, as prescribed by Congress, with the Metropolitan Coach Company respecting the issuance of reciprocal transfers between the lines of the three concerns at Fifteenth Street and Pennsylvania and New York Avenues Northwest. Legal proceedings to test the constitutionality of the law have already been instituted by the Commissioners of the District of Columbia, but the commission will conduct an independent investigation. A hearing on the complaint of the Metropolitan Coach Company, which was filed with the commission some time ago, will be held on June 2, 1913.

President Bancroft on Hours of Labor.—William A. Bancroft, president of the Boston (Mass.) Elevated Railway, has addressed each member of the Massachusetts Legislature in a pamphlet discussing the proposed "nine-hours-in-eleven bill" offered by labor interests at the present session, and pointing out the superiority of House bill No. 2476, reported by the committee on street railways in its stead. The latter bill provides that a day's work for all car service employees shall be arranged on the basis of nine hours' platform time, with a leeway of half an hour at additional pay; that as many days' work of approximately nine hours shall be arranged to be performed within twelve consecutive hours as are possible in view of the number of hours and trips necessary to care properly for the traffic; that work which cannot be so arranged shall be performed within fourteen consecutive hours, and that the Railroad Commission shall, if necessary, fix any schedule which in the judgment of the men might be arranged to show more runs to be completed within twelve hours. General Bancroft points out that last year's act permitted the nine hours' platform work of a man to be distributed with his consent over a period of sixteen hours. The new bill (House 2476) provides an unbroken rest period of ten hours instead of eight hours and is more favorable to the men than those prescribed by law in any other State or established in any important city. The communication further outlines the hours of labor in force in New York, Cleveland, Chicago and Pittsburgh; explains the inability of the "nine-hours-in-eleven" bill to meet the traffic conditions in connection with the handling of morning and evening peaks; states that 1700 additional men would have to be added by the Boston Elevated Railway if the labor bill should pass, and contends that the taking of the whole matter to the Legislature is inconsistent with the agreement between the employees and the company made last summer.

Personal Mention

Mr. J. Antonisen, city engineer of Moose Jaw, Saskatchewan, Can., has been appointed superintendent of the Brandon (Man.) Municipal Street Railway.

Mr. George F. Yeatman, for many years cashier of the Nashville Railway & Light Company, Nashville, Tenn., has resigned to become a special agent of the Germania Life Insurance Company in Nashville.

Mr. Henry G. Pearce, of the Standard Steel Works Company, Philadelphia, Pa., has been appointed chairman of the entertainment committee for the 1913 convention of the American Electric Railway Association, to be held at Atlantic City.

Mr. Warren C. Earle, who has been with similar boards in several states and in practical work with several railroads in the United States, has been appointed chief engineer of the California State Railroad Commission, vice Mr. R. A. Thompson, resigned.

Mr. William W. S. Butler, vice-president and general manager of the Western States Gas & Electric Company of California, Stockton, Cal., since its formation, has resigned. Mr. Butler was formerly general manager and engineer of the Newport News & Old Point Railway & Electric Company.

Mr. C. W. Kellogg has been appointed general manager of the Beaumont and Port Arthur properties of Stone & Webster, Boston, Mass., which include the lighting plants at Beaumont and Port Arthur, the electric railway system at Port Arthur and the interurban railway being constructed between Beaumont and Port Arthur by the Jefferson County Traction Company.

Mr. John W. Howley, who has been clerk at the East Weymouth carhouse of the Bay State Street Railway, Boston, Mass., for several years, has been appointed to the position of superintendent of the Bay State Street Railway at East Weymouth to succeed Mr. Timothy J. Donahue, whose appointment as superintendent of the Newport division of the company is referred to elsewhere in this column.

Mr. Edwin W. Winter, formerly president of the Brooklyn (N. Y.) Rapid Transit Company, has been appointed one of the receivers of the Chicago & Eastern Illinois Railroad, which is controlled by the St. Louis & San Francisco Railroad, placed in the hands of receivers on May 27. Mr. Winter entered steam railroad service in 1867 and continued in that work until 1902, when he was elected president of the Brooklyn Rapid Transit Company.

Mr. J. M. McElroy, general manager of the Manchester (Eng.) Corporation Tramways, and Mr. Henry Mattison, engineer of way of the same system, are in this country to inspect American electric railway practice and also to study the methods of caring for traffic congestion, which is a subject of growing interest in Manchester. They expect to spend about a month here and will visit a number of the important cities in the Eastern and Central States and in Canada.

Mr. A. Merritt Taylor has been appointed by Mayor Blankenburg of Philadelphia, Pa., director of the new department of transit recently created for Philadelphia by the Legislature. His salary will be $10,000 a year and he will assume office on July 1. Mr. Taylor has been serving for the last year without pay as the head of a commission engaged in studying the city's transit needs. In a recent report to the Mayor he outlined a comprehensive plan for the construction of additional subway and elevated lines.

Mr. Timothy J. Donahue, who has been connected with the East Weymouth division of the Bay State Street Railway, Boston, Mass., has been transferred to the Newport division of the company as superintendent to succeed Mr. C. L. Bisbee, who in turn succeeded the late A. E. Holmes as superintendent of the Fall River division. Mr. Donahue became connected with the Bay State Street Railway at East Weymouth in 1905. Previous to his appointment at East Weymouth he was employed by the company on its North Abington division.

Mr. S. J. Kehoe has resigned as superintendent of the Norwich & Westerly Traction Company, Norwich, Conn., to become superintendent of the Norwich Gas & Electric Company, Norwich, Conn. Mr. Kehoe has been superintendent of the Norwich & Westerly Traction Company since March, 1912. Previous to that he was master mechanic of the company for six years. Mr. Kehoe was also connected with the Michigan United Railways, Lansing, Mich., and the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.

Mr. George H. Green has been appointed general agent of the Northern Texas Traction Company, with headquarters in the interurban station of the Northern Texas Traction Company at Dallas, Tex. He will devote his time to passenger traffic and other matters connected with the operation of the interurban and Oak Cliff lines of the company and fill a position which the company has long contemplated creating. Mr. Green has for the last fourteen years been United States marshal for the Northern District of Texas, with residence in Dallas.

Mr. J. M. Read, who has been appointed superintendent of the Ogden (Utah) Rapid Transit Company, has been assistant superintendent of the company since September, 1911. Previous to becoming connected with the Ogden Rapid Transit Company Mr. Read was with the Utah Light & Railway Company, Salt Lake City, Utah, which he served for four years in the capacity of dispatcher. He succeeds Mr. P. D. Kline as superintendent of the Ogden Rapid Transit Company, Mr. Kline, as previously noted in the ELECTRIC RAILWAY JOURNAL, having been appointed general manager of the company.

Mr. Harry E. Vordermark, formerly auditor of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has been elected secretary of the company to succeed Mr. Henry Rainey, Philadelphia, Pa., who has been elected assistant secretary of the company. Messrs. John J. Collier, Philip L. Saltonstall, Robert W. Watson, E. B. Robinette and Henry Rainey, who resigned as directors of the Fort Wayne & Northern Indiana Traction Company, have been succeeded by Messrs. S. L. Morris, Sam W. Greenland, Harry E. Vordermark, Frederick H. Schmidt and J. J. Brennan, all of Fort Wayne, Ind.

Mr. Albert S. Reed, who has been connected with the Binghamton (N. Y.) Railway with headquarters in Endicott, a suburb of Binghamton, has resigned. Mr. Reed was formerly manager of the sales department for the Rutland Railway, Light & Power Company, Rutland, Vt., and he has resumed work with that corporation as manager of new business of the eastern territory of the company. He will also act as assistant to Mr. W. H. Lawson, superintendent of the gas department. Mr. Harry L. Edwards, who has recently been in charge of new business for the company, will henceforth be in charge of that work for the Western Vermont Power & Light Company, which is affiliated with the Rutland Railway, Light & Power Company.

Mr. James M. Barrett, who was elected president of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., at the meeting of the board of directors on April 30, 1913, to succeed Mr. J. Levering Jones, Philadelphia, Pa., resigned, was born on a farm in Lasalle County, Ill., on Feb. 7, 1852. He entered the University of Michigan in 1871 and was graduated in the academic department in 1875. He studied law at Chicago and Princeton, Ill., and afterward at Fort Wayne, Ind., and was admitted to the bar in 1876. In 1881 Mr. Barrett was elected a director and appointed counsel for the local street railway system in Fort Wayne, and thereafter he continued as director and counsel until the organization of the Fort Wayne & Wabash Valley Traction Company, which acquired the local street railway systems in Fort Wayne and the interurban lines running from Fort Wayne to Peru and Lafayette and from Fort Wayne to Bluffton, Ind. He was then appointed general counsel for the Wabash Valley company and continued as such until its property and franchises were acquired by the Fort Wayne & Northern Indiana Traction Company, after which he became vice-president, director and general counsel of that company until his recent election as president. Mr. Barrett is one of the most prominent lawyers of the State. He served as a member of the Indiana Senate in the sessions of 1887 and 1889 and was a trustee of Purdue University, Lafayette, Ind., for fourteen years.

F. E. Bowman

Mr. F. E. Bowman, who was elected president of the Gas, Electric & Street Railway Association of Oklahoma at the meeting held in Oklahoma City on May 6-8, 1913, is vice-president, treasurer and manager of the Ada Electric & Gas Company, Ada, Okla. Mr. Bowman was born in Wooster, Ohio, and entered the electrical field in 1892 as bookkeeper and cashier with the Huntington Light & Fuel Company, Huntington, Ind., which generated electricity and produced artificial gas, natural gas and petroleum. He advanced through various positions with the Huntington Light & Fuel Company to the office ot treasurer of the company. Five years ago he resigned from the Huntington Light & Fuel Company to accept his present position as vice-president, treasurer and manager of the Ada Electric & Gas Company. The company with which Mr. Bowman is now connected serves Ada, which has a population of 6000, and the surrounding territory.

Mr. Alfred H. Lovett has been appointed general agent of the traffic department of the Iowa & Illinois Railway and the Davenport & Muscatine Railway, Davenport, Ia., reporting to Mr. P. P. Crafts, general traffic manager, and Mr. George M. Cummins, freight traffic manager. Mr. Lovett was born at Barnes Corners, N. Y., on Dec. 2, 1875. He learned telegraphy on the Rome, Watertown & Ogdensburg Railroad in 1889. In 1892 Mr. Lovett went to Davenport with his parents and was employed by the Western Union Telegraph Company as an operator and studied at the public schools in Davenport. Later he attended Pillsbury Academy, Owatonna, Minn., and Colgate University, Hamilton, N. Y., where he studied in the preparatory department during 1898 and 1899. He was next employed by the Long Island Railroad near New York for three years and by the Atchison, Topeka & Santa Fé Railway in Kansas in 1901 and 1902 as operator, towerman and ticket agent. In March, 1903, he entered the employ of the Chicago, Rock Island & Pacific Railway in Chicago as stenographer to Mr. L. M. Allen, then general passenger agent of the lines east of the Missouri River. He worked for the last-mentioned company in various sub-departments until March 1, 1906, when he was appointed city passenger agent at Davenport. He was subsequently appointed traveling passenger agent of the Chicago, Rock Island & Pacific Railway, with headquarters at Davenport, and later was appointed contracting freight agent at Davenport, in which capacity he continued until appointed to the Iowa & Illinois Railway and the Davenport & Muscatine Railway on May 19, 1913.

Mr. R. W. Perkins, whose election as president of the Shore Line Electric Railway, Norwich, Conn., was noted recently in the ELECTRIC RAILWAY JOURNAL, was formerly treasurer and general manager of the Norwich & Westerly Traction Company. Mr. Perkins has had a general training in commercial, manufacturing and banking lines, but his railroad career has been comparatively brief. Upon the election of Mr. Perkins as executive head of the Shore Line Electric Railway the announcement was made that Norwich is to be the center from which all the so-called Plant lines are to be operated. The properties that have come under one management through the consolidation are the Shore Line Electric Railway with its western terminus in New Haven, extending east along the shore to Saybrook Junction and north to Deep River; the New London & East Lyme Street Railway, operating from New London to East Lyme and Niantic and building so as to connect with the Shore Line Electric Railway and make possible through service from New Haven to New London, and the properties of the Connecticut Company known as the New London division, which include the New London city lines, the Montville Street Railway between New London and Norwich, the Norwich city lines, the line from Norwich through South Windham and Willimantic to South Coventry, also the electric service on the Norwich & Worcester division of the New York, New Haven & Hartford Railroad between Tafts, Jewett City, Plainfield and Central Village, and the electric railways to Wauregan, Danielson, Dayville, Putnam and West Thompson with connections through to Worcester. Combining these with the Norwich & Westerly Traction Company, which operates its own line from Norwich through Preston, Ledyard, North Stonington and Westerly, R. I., to Watch Hill and Weekapaug on the Atlantic Ocean, and from Westerly east to Ashaway, R. I., west along Fisher's Island and south through Pawcatuck, Stonington, Mystic, Old Mystic, Noank, Midway and Groton to New London, rounds out a system of about 240 miles, embracing all of the eastern end of Connecticut and a portion of western Rhode Island. Mr. Perkins was selected as the executive head of the operating company because of the excellent results accomplished by him in the reorganization and upbuilding of the Norwich & Westerly Traction Company. When this property was purchased by the bondholders' committee, in July, 1911, Mr. Perkins was elected treasurer and general manager by the new owners. The Norwich & Westerly Traction Company has since taken over by purchase the Pawcatuck Valley Street Railway and purchased all of the common stock of the Groton & Stonington Street Railway.

OBITUARY

Edward Glavin, of the Boston (Mass.) Elevated Railway, died on May 22, 1913, at the age of sixty-three. Mr. Glavin had been in the service of the company for forty-six years and was the only man in the employ of the company wearing nine gold chevrons, each of which represented five years' service. For the last twenty-five years he was a starter. He was well known to the traveling public, his post being outside the North Station, one of the busiest points in the city.

George Glover Crocker is dead. Mr. Crocker was born in Boston in 1843 and was graduated from Harvard in 1864, where he later took the degree of LL. B. in 1866 and of M. A. in 1867. From 1887 to 1892 he was chairman of the Massachusetts Board of Railroad Commissioners, and from 1894 to 1899 was chairman of the Boston Transit Commission, which supervised all of Boston's elevated and subway construction. From 1909 to 1910 he was chairman of the Joint Board on Metropolitan Improvements. He was a director of the Samson Cordage Works.

According to figures made public by the National Highways Protective Society, traffic accidents in New Jersey for the first four months of 1913 showed a gratifying decrease from the figures for the same period of last year. From Jan. 1 to April 30, 1913, automobiles killed twenty-three and injured 108. For the same months of 1912 the figures were twenty-three and 189. The electric railways killed nine and injured forty-nine this year against thirteen killed and seventy-three injured last year, and the figures for wagons were four killed and twenty-two injured against five killed and twenty-four injured for the same months of 1912. Children sixteen years of age or less were seven of those killed and thirty-two of those injured by automobiles, none of the killed and six of the injured by electric railways, and three of the killed and five of the injured by wagons. Automobile accidents include those due to motor cycles, and wagon accidents those caused by runaways. These figures show, when compared with those for New York State, inclusive of New York City:

	Automobiles		Trolleys		Wagons	
	Killed	Injured	Killed	Injured	Killed	Injured
New Jersey	23	108	9	49	4	22
New York	99	461	64	256	38	138

The populations of the two States in 1910 were approximately: New Jersey, 2,500,000; New York, 9,100,000. Using this as a basis for comparison, the number of fatal accidents per million of population, for the two States for the first four months of this year is, for all classes of traffic:

	New York	New Jersey
Automobiles	11.0	9.0
Electric railways	7.0	3.6
Wagons	4.1	1.6

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Peoria, Galesburg & Western Railroad, Peoria, Ill.**—Incorporated in Illinois to build an electric railway from Peoria to Galesburg. Capital stock, $5,000. Headquarters, Peoria. Incorporators: William T. Irwin, Clifford Ireland, John W. McDowell, George J. Jobst and William M. Allen, all of Peoria.

Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y.—Incorporated in New York on May 28, 1913, to succeed the Geneva & Auburn Railway, plans for the reorganization of which are now before the Public Service Commission of the Second District. Capital stock, $450,000.

***Devil's Lake & Chautauqua Electric Railway, Devil's Lake, N. D.**—Incorporated in North Dakota to build an electric railway between Devil's Lake and Chautauqua. Capital stock, $50,000. Incorporators: C. A. Stotiar, W. H. Horton and W. E. Hocking, all of Devil's Lake.

***Memphis & Lake View Railway, Memphis, Tenn.**—Incorporated in Tennessee presumably to succeed the Lake View Traction Company. Capital stock, $50,000. Incorporators: T. H. Tutwiller, Memphis; L. E. Wright and L. P. Niles.

FRANCHISES

Norwood, Ala.—I. C. Beatty has received a franchise for a line in Norwood. [E. R. J., March 29, '13.]

Little Rock, Ark.—The Little Rock, Pine Bluff & Eastern Traction Company has received a fifty-year franchise in Little Rock and permission to use the free bridge.

Burnaby, B. C.—The British Columbia Electric Railway has received a thirty-six-year franchise in Burnaby. The Council has petitioned the company to extend its lines 6 miles into Port Moody. Work will soon be begun on an extension from Vancouver to Burnaby, 2 miles.

Glendale, Cal.—Sealed bids will be received up to June 9 by the Board of Trustees of Glendale for a fifty-year franchise for an electric railway in Glendale.

Los Angeles, Cal.—The Pacific Electric Railway has asked for a twenty-one-year franchise for an extension of the Hollywood line in Los Angeles.

***Santa Barbara, Cal.**—Sealed bids will be received by the City Council up to June 12 for the purchase of a fifty-year franchise for an electric railway in Santa Barbara.

San José, Cal.—The Peninsula Railway has asked for a franchise to extend its line in San José to the Toyon station.

Vallejo, Cal.—The Northern Electric Railway has asked the Railroad Commission of California for permission to construct its lines at grade over highways in Solano County and on certain streets in Vallejo.

Galesburg, Ill.—The Peoria, Canton & Galesburg Railway will apply for a franchise to construct an electric railway in Galesburg. Horace Clark, president. [E. R. J., May 17, '13.]

Taylorville, Ill.—The Decatur, Sullivan & Mattoon Transit Company has asked the Council for a new fifty-year franchise to build an interurban railway on Franklin Street. John G. Thode, Mattoon, secretary. [E. R. J., March 22, '13.]

Bettendorf, Ia.—The Tri-City Railway, Davenport, has asked the Council for a franchise on State Street in Bettendorf.

Helena, Mont.—The Helena Light & Railway Company will extend its line across the bridge to East Helena if the Council will permit a straight fare of 10 cents on all cars to East Helena.

Lincoln, Neb.—The Lincoln Traction Company has received a franchise to extend its Tenth Street line in Lincoln.

El Paso, Tex.—The El Paso Electric Railway will ask the Council for a thirty-year franchise to extend its lines over certain streets in El Paso.

Tacoma, Wash.—The Seattle-Tacoma-Olympia Railway, Seattle, has received a franchise from the Council to build a temporary system on local tideflats in Tacoma. [E. R. J., Sept. 28, '12.]

Charleston, W. Va.—The Charleston, Parkersburg & Northern Railroad, Parkersburg, has received a franchise from the County Court from the western limits of Charleston to the Jackson County line, via Sissonville. [E. R. J., May 24, '13.]

TRACK AND ROADWAY

Birmingham & Chattanooga Railroad, Birmingham, Ala.—Surveys have been completed and construction will be begun by this company during the summer on its 147-mile electric railway to connect Birmingham and Chattanooga via Oneonta and Boaz, Ala., and Wanhatchie, Tenn. The railway will be built for passenger and freight service. The grades will nowhere be more than 1 per cent and 85-lb. rails will be used. A bridge will be built across the Tennessee River near Chattanooga. W. W. Shortridge, Birmingham, secretary. [E. R. J., May 3, '13.]

Birmingham-Tuscaloosa Railroad & Utilities Corporation, Birmingham, Ala.—This company is making surveys for its 55-mile railway between Birmingham, Tuscaloosa and Bessemer. The line is being built by the Tidewater Construction Company, Birmingham. C. R. Carter, Birmingham, president, and G. Q. Brown, Birmingham, chief engineer. [E. R. J., March 29, '13.]

British Columbia Electric Railway, Vancouver, B. C.—This company has offered to construct a 4-mile line across West Vancouver municipality, this being an extension of the company's North Vancouver lines. This company has awarded a contract to Hoge & Peterson, New Westminster, to build an elevated trestle at Granville Street in Vancouver.

Northern Electric Railway, Chico, Cal.—This company has placed in operation its line into Colusa.

Fresno (Cal.) Traction Company.—Work will be begun at once by this company on a 9-mile extension from the Wishon Avenue line in Fresno to the San Joaquin River.

Pacific Electric Railway, Los Angeles, Cal.—A decision has been rendered granting the application of this company to construct its track at grade across ten public highways in Bay City, across certain streets in Los Angeles and across the tracks of the San Pedro, Los Angeles & Salt Lake Railroad on Pasadena Avenue, Los Angeles.

San Francisco, Cal.—The Board of Supervisors has authorized a bond issue of $3,500,000 to build the municipal electric railway lines on Van Ness Avenue, Stockton, Church and California Streets; also for the reconstruction of the Union Street lines in San Francisco.

Shore Line Electric Railway, Norwich, Conn.—Work will be begun at once by this company on a 1-mile extension from Ferry Road Crossing to the Connecticut River Bridge in Old Saybrook.

Covington & Orford Street Railway, Covington, Ga.—It is reported that this company plans to increase its capital stock from $10,000 to $50,000 and convert the line into an electric railway. It is also intended to extend the line 3 miles to Porterdale.

***Jackson, Ga.**—C. S. Maddox, Parham Smith and J. D. Jones are considering plans to build an electric railway in Jackson.

Fort Wayne & Northwestern Railroad, Fort Wayne, Ind.—This company, formerly the Toledo & Chicago Interurban Railway, plans to extend the line to Toledo, either by building its own track from Waterloo or through the extension of the Toledo & Indiana Traction Company from Bryan to Waterloo. The company will also build an extension to Goshen.

Eastern Railway, Cedar Rapids, Ia.—Preliminary surveys have been completed by this company for its electric railway to connect Iowa City, West Liberty and Muscatine. The company will furnish power for lighting purposes. Its power house and repair shops will be located at Cedar

Rapids. Officers: F. A. Groeltz, president; C. S. Woodward, secretary; Isaac B. Smith, treasurer; John A. Reed. and J. D. Wardle, chief engineer, all of Cedar Rapids.

***Atchison, Kan.**—Plans are being considered by Atchison capitalists to build an electric railway to connect Atchison. Hiawatha, Effingham, Horton, Everest, Kennekuk, Willis and Banker. The names of those interested in the proposition have not yet been made public.

Union Traction Company, Independence, Kan.—The citizens of Coffeyville have voted bonds to the amount of $30,000 to assure the construction of the line between Coffeyville, Bartlesville and Nowata.

United Water, Light & Traction Company, Somerset, Ky.—It is reported that this company plans to build a 6-mile extension from Somerset to Burnside.

Cheboygan Electric Light & Power Company, Cheboygan, Mich.—This company states that the proposition to build the 38-mile line between Cheboygan and Petoskey is still in the preliminary stage and there are no definite plans as to when its construction will be begun. F. B. Spencer, general manager. [E. R. J., May 10, '13.]

Trans-St. Mary's Traction Company, Sault Ste. Marie, Mich.—During the next few weeks this company will build a 500-ft. extension of its line in Sault Ste. Marie.

Interstate Power & Light Company, Duluth, Minn.—Plans are being made by this company for improvements to its lines in Duluth.

Electric Short Line Railway, Minneapolis, Minn.—Plans are being considered by this company for an extension to Glenwood and Alexandria.

Kingston & Excelsior Springs Electric Railroad, Kingston, Mo.—Surveys are being made by this company for its 25-mile line from Kingston to Lawson and Excelsior Springs. The plans include two 30-ft. bridges, one over Log Creek near Kingston and the other over Crooked River near Elmira, besides four or five smaller bridges. John W. Johnson, secretary. [E. R. J., May 3, '13.]

International Railway, Buffalo, N. Y.—Work has been begun by this company on the surveys for double-tracking its 12.6-mile line between North Tonawanda and Lockport.

Hornell (N. Y.) Traction Company.—Plans are being made by this company to build a 1-mile extension from Seneca Street to the new site of the Hornell Country Club via North Hornell.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—Plans are being considered by this company to double-track its line between Lockport and Middleport. The double track will also be extended westward from the Rochester terminal.

Geneva & Auburn Railway, Seneca Falls, N. Y.—This company expects to extend its line to Auburn, where it would connect with other electric lines going east and west.

Brazil, Devil's Lake & Minneapolis Electric Railway, Brazil, N. D.—This company has laid 5 miles of track from Devil's Lake to North Chautauqua and is now making preliminary surveys from North Chautauqua to Fort Totten, 9 miles. This railway will connect Brazil, Devil's Lake and Bismarck, N. D., and Minneapolis, Minn. A. B. Fox, Brazil, president. [E. R. J., Feb. 22, '13.]

Fostoria & Fremont Electric Railway, Fostoria, Ohio.—Preliminary surveys are being made by this company for an extension from Fremont to Port Clinton.

Middletown, Reading & Cincinnati Interurban Railway, Middletown, Ohio.—At a recent meeting of the directors of this company it was decided to build its line between West Chester and Dayton. Michael Klaiber, Jr., Reading, is interested. [E. R. J., March 22, '13.]

Berlin & Waterloo Street Railway, Berlin, Ont.—The citizens of Berlin have voted to raise $30,000 for a double track from Wellington Street to the Waterloo boundary line.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont.—This company has received permission to build its line from Hamilton to Galt.

Kingston, Ont.—The Hydro-Electric Power Commission of Ontario has been asked by the Kingston (Ont.) civic utilities committee to furnish information regarding the cost of building an electric railway from Kingston to Cornwall.

Ottawa (Ont.) Electric Railway.—Work will be begun at once by this company double-tracking several of its lines in Ottawa.

Mount Hood Railroad, Portland, Ore.—This company is just completing a trestle 600 ft. long and 32 ft. high on the extension of its line into the Lost Lake country.

Oregon-Washington Railroad & Navigation Company, Portland, Ore.—Plans are being considered by this company to build an electric railway between Kennewick through Richland. J. P. O'Brien, vice-president.

Portland Railway, Light & Power Company, Portland, Ore.—This company has been asked to consider plans to build a line in Portland to be known as the East Side cross city line. The matter is now in the hands of the City Council. Work has been begun on the extension of the Hawthorne Avenue line. About 1 mile of track will be laid through the South Mount Tabor district.

Schuylkill County Railway, Harrisburg, Pa.—Surveys have been made by this company to connect Frackville with the company's line at Mahanoy Place. [E. R. J., April 5, '13.]

People's Street Railway, Nanticoke, Pa.—During the next few weeks this company plans to build 3700 ft. of track with 7-in. high T-rails. It has purchased the rails from the Pennsylvania Steel Company.

Philadelphia (Pa.) Rapid Transit Company.—This company is asked to consider plans to extend the Bridesburg, Front and Tioga Street branches of the Second and Third Street lines from Dock Street to South Street in Philadelphia.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—Work will be begun at once by this company on the line from Ellwood City to Beaver Falls. The company has received a ninety-nine-year franchise for this proposed extension.

***Punxsutawney, Pa.**—Plans are being considered to build an electric railway to connect Punxsutawney, Rossiter, North Rossiter, Frances Mines and Cloe. No names are yet given of the people interested.

Titusville (Pa.) Electric Traction Company.—About 2 miles of track out from Titusville have been laid by this company on its line from Cambridge Springs to Meadville. It will take 19 more miles to make a connection with the Titusville end of the old line at a point near Tyronville. The track is standard-gage and 80-lb. rails are being used. Gasoline cars will be operated.

Wilkes-Barre & Wyoming Valley Traction Company, Wilkes-Barre, Pa.—Work has been begun by this company on the extension of its North Main Street line in Wilkes-Barre to Brockside, where it will connect with the present line.

Sioux Falls & Southern Minnesota Traction Company, Sioux Falls, S. D.—This company has secured nearly all the right-of-way for its 110-mile line between Sioux Falls, S. D., and Albert Lea, Minn. W. H. Knight is interested. [E. R. J., March 8, '13.]

Memphis & Rugby Railway, Memphis, Tenn.—Work has been begun by this company on its 4-mile electric railway to connect Memphis with Rugby. Officers: Luke Seawell, 1416 Tennessee Trust Building, Memphis, president and treasurer; W. J. Francis, vice-president, general manager and purchasing agent; Henry Wetter, secretary, and W. J. Ferree, 11 South Second Street, Memphis, chief engineer. [E. R. J., April 23, '11.]

Barre & Montpelier Traction & Power Company, Montpelier, Vt.—During the next few weeks this company plans to lay 100-lb. girder rails for 1722 ft. of paving on Main Street in Barre.

Virginia Railway & Power Company, Richmond, Va.—This company has awarded a contract to Louis Lawson for grading its line on Bute Street and York Street in Norfolk. It plans to begin construction at once on the extension of its Hull Street line in Richmond from the present terminal to Broad Rock Road via New Road.

Wheeling (W. Va.) Traction Company.—This company will spend a considerable sum in improvements to its properties in the Wheeling district. A mortgage to secure an issue of $10,000,000 of bonds was authorized recently to provide funds to retire outstanding bonds and for improvements. The improvements include extensions from Barton to St. Clairsville, from Bellaire to Neffs and from Wheeling to Weirton and Brilliant.

Beloit, Delavan & Clinton Railway, Beloit, Wis.—Preliminary arrangements are being made by this company to begin the construction of its 22½-mile line between Beloit, Clinton, Delavan and Darien in the fall. The company will furnish power for lighting purposes and will operate two cars. The power house and repair shops will be located at Beloit. W. Bradley Tyrel, Beloit, is interested. [E. R. J., May 24, '13.]

Chicago & Wisconsin Valley Railway, Madison, Wis.—Work will soon be begun by this company on the line between Portage and Prairie du Sac via Madison.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company has asked Westinghouse Church & Kerr Company, New York, N. Y., to prepare plans and estimates for the construction of new repair shops in Burnaby.

Southern Pacific Company, San Francisco, Cal.—It is reported that this company has purchased property between Fourth, Fifth, Oak and Pine Streets in Portland on which it plans to build a new terminal building.

Central Illinois Public Service Company, Mattoon, Ill.—During the next few weeks this company will build a new carhouse at Taylorville. The structure will be 35 ft. by 100 ft.

Illinois Traction Company System, Peoria, Ill.—This company has awarded a contract to English Brothers, Champaign, to build its new three-story passenger station in Champaign. The structure will be 50 ft. x 125 ft. of Blackstone brick and terra-cotta construction. The cost is estimated to be about $60,000.

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—During the next few weeks this company plans to build a new carhouse.

Southern Traction Company, Dallas, Tex.—Plans are being prepared by this company to build extensive machine shops to be located at some point in the vicinity of the southern limits of Dallas. The plant and its facilities will be ample to do all of the work required on the Dallas-Corsicana and Dallas-Waco interurban lines and part of that required by the Dallas-Denison line.

POWER HOUSES AND SUBSTATIONS

Birmingham-Tuscaloosa Railway & Utilities Company, Birmingham, Ala.—This company has recently purchased equipment for its power house and substation for electrifying the Tuscaloosa Belt Railway.

St. John's Electric Railway, St. Augustine, Fla.—This company has purchased superheaters for three boiler sets for its power house in St. Augustine.

Fort Wayne & Northwestern Railroad, Fort Wayne, Ind.—Plans are being made by this company to secure a location for a new substation in Auburn.

Iowa & Illinois Railway, Clinton, Ia.—Work has been begun by this company on its new substation at Bettendorf. Power will be obtained from the Moline plant of the People's Power Company.

Charlotte (N. C.) Electric Railway.—This company has placed a contract with the Allis-Chalmers Company for six 290-kw. 2300-volt generators direct-connected to six vertical hydraulic turbines, also for two hydraulic governors. This installation is to be made at the company's Yadkin River plant.

Columbus, Marion & Bucyrus Interurban Railway, Columbus, Ohio.—During the next few weeks this company plans to build a new power station with a capacity of 1000 kw.

Wheeling (W. Va.) Traction Company.—Plans are being made by this company to build a new power house on the site of the present building at McMechen, and substations will be maintained at this point and at Warwood. New equipment will be purchased.

Manufactures and Supplies

ROLLING STOCK

Duquesne & Dravosburg Street Railway, Duquesne, Pa., is in the market for two cars.

Ogden (Utah) Rapid Transit Company is reported as expecting to purchase two cars.

Trans-St. Mary's Traction Company, Sault Ste. Marie, Mich., expects to purchase two new cars.

Birmingham Railway, Light & Power Company, Birmingham, Ala., is in the market for twenty cars.

Charlotte (N. C.) Electric Railway has placed an order with the Southern Car Company for four city cars.

Cape Breton Electric Company, Sydney, N. S., is reported as expecting to purchase new cars for its different lines.

Athens Railway & Electric Company, Athens, Ga., has ordered two closed city cars from the Southern Car Company.

Dallas (Tex.) Electric Corporation has ordered fourteen city cars, through the Wendell & MacDuffie Company, from the St. Louis Car Company.

Port Arthur & Fort William Electric Railway, Port Arthur, Ont., has placed an order with the Ottawa Car Company for twelve cars. It is reported that the company will order additional cars in the near future.

Pittsburgh (Pa.) Railways, noted in the Electric Railway Journal of April 19, 1913, as having ordered fifty all-steel side-entrance semi-convertible prepayment cars from the St. Louis Car Company, has specified the following details for this equipment:

Seating capacity	56
Bolster centers, length,	21 ft. 8 in.
Length of body	30 ft. 8 in.
Length over vestibule,	45 ft. 0 in.
Width over sills	7 ft. 11 in.
Width over all	8 ft. 2 in.
Height, rail to sills	22 in.
Sill to trolley base,	8 ft. 9¼ in.
Body	semi-steel
Interior trim	bronze
Headlining	bird's-eye maple
Roof	monitor
Underframe	semi-steel
Bumpers	5-in. channels
Car trimmings	St. L.
Conduits and junction boxes,	St. L.
Couplers	Van Dorn
Curtain fixtures	Cur. S. Co.
Destination signs	St. L.
Gongs	12 in. St. L.
Hand brakes	St. L.
Headlights	Union
Paint	Flood & Conklin
Sanders	St. L.
Sash fixtures	Edwards
Seats	St. L.
Seating material,	canvas-lined rattan
Step treads	Carborundum
Trucks	St. L.

TRADE NOTES

Peter Smith Heater Company, Detroit, Mich., has received an order from the Beaver Valley Traction Company, New Brighton, Pa., for twelve heaters.

Ackley Brake & Supply Company, New York, N. Y., has received an order from the Danville (Ill.) Street Railway & Light Company for 279 ft. of automatic trolley guard.

Baldwin Locomotive Works, Philadelphia, Pa., have begun construction on their new plant at Calumet, East Chicago, Ind. The main building will be 1150 ft. long and 600 ft. wide.

C. W. Hunt Company, Inc., New York, N. Y., has been chartered in Albany, N. Y., with a capital of $500,000 to deal in hoisting machinery and appliances for handling coal and broken stone.

Engineering Construction Company, Chicago, Ill., has been organized to do a general engineering and contracting business. The officers of the company are: I. J. Crowley, general manager; E. A. Clark, chief engineer, and James X. Gunning, secretary and treasurer.

The J. G. Brill Company, Philadelphia, Pa., has recently received orders for 21-E trucks from the Tidewater Power Company, Wilmington, N. C.; Lewiston, Milton & Watsontown Passenger Railway, Milton, Pa., and the New Orleans Railway & Light Company, New Orleans, La.

Drake Railway Automotrice Company, Chicago, Ill., announces that the "Dracar" has been selected by the French government as the most advantageous self-propelled unit service in connection with the government arsenals and the port of Brest. The Paris office of the company will supply five cars.

F. A. Thayer & Company, New York, N. Y., have been appointed exclusive American selling agents for the Chillingworth Works, Nurnberg, Germany, manufacturers of sheet-steel gear cases. Each half of this seamless gear case, which is made by a patented process of construction, is drawn from one piece of sheet steel. The case is now in use by over 200 European tramways.

Pyrene Manufacturing Company, New York, N. Y., has received orders for fire extinguishers from the Berkshire Street Railway, Pittsfield, Mass.; Fort Dodge, Des Moines & Southern Railway, Boone, Ia.; Interborough Rapid Transit Company, New York, N. Y.; Michigan United Traction Company, Jackson, Mich.; Pennsylvania Railroad, Philadelphia, Pa., and West Penn Railway, Pittsburgh, Pa.

Westinghouse, Church, Kerr & Company, New York, N. Y., have been engaged as consulting engineers by the British Columbia Electric Railway, Vancouver, B. C., in connection with the building of its repair shop, just outside the city of Vancouver. The company is now engaged in preparing plans, with the idea that this plant shall do all the heavier repair work for all the lines operating on the southern mainland of British Columbia.

Ohio Brass Company, Mansfield, Ohio, has received orders from the following railways for couplers complete with spring carriers and anchorages: New York State Railways, Rochester, N. Y., 55; Detroit (Mich.) United Railways, 100; Cleveland (Ohio) Railways, 60; United Railways of St. Louis, St. Louis, Mo., 210. An order has also been received from Cataluña, Spain, for fifty-two automatic air connecting couplers and draft-gear equipments.

Wendell & MacDuffie Company, New York, N. Y., has been appointed exclusive sales agent for the Waugh Draft Gear Company, which has purchased from Forsyth Bros. the following railway specialties: buffing device, draft gear, radial device, yoke device, centering device and the truck actuating device. The company has received an order for 604 Waugh draft gear equipments, to be used on all subway and elevated cars of the Boston (Mass.) Elevated Railway.

Edison Storage Battery Company, Orange, N. J., has appointed W. C. Andrews and W. W. Coleman its sales engineers. Mr. Andrews was formerly associate editor of the ELECTRIC RAILWAY JOURNAL, and later accepted a position with the engineering and sales department of the General Electric Company. Mr. Coleman has been connected with the designing, engineering and construction department of the Union Switch & Signal Company for the past twelve years.

Curtain Supply Company, Chicago, Ill., has received an order to equip the thirty-six center-entrance stepless cars now being built by The J. G. Brill Company for the Pacific Electric Railway, Los Angeles, Cal., with curtains, using ring No. 88 fixtures and Rex all-metal rollers. Another order has also been received to equip the twenty cars of the Toronto (Ont.) Civic Line now being built by the Niles Car & Manufacturing Company with the same type of curtain. The Atlantic City & Shore Railway, Atlantic City, N. J., has also specified this type of curtain for its six new cars, now being built by the Southern Car Company.

Western Electric Company, New York, N. Y., has received an order from the Iowa Railway & Light Company, Cedar Rapids, Ia., for telephone train-dispatching apparatus for equipping its entire line, which runs from Cedar Rapids to Iowa City, Ia., a distance of approximately 30 miles. Ten way stations will be equipped with telephones and selective signaling apparatus. The No. 102 selector sets containing the Western Electric No. 50 type selector will be used for signaling way-station operators. The company also states that at the beginning of 1913 there were over 70,000 miles of road in the United States and Canada using this method of controlling the movements of trains.

Eureka Company, North East, Pa., has recently established an Eastern branch office at 253 Broadway, New York, in charge of George E. Austin, president of the American General Engineering Company, for the purpose of taking care of its increased business in the various electric traction materials manufactured by it for the Eastern States. The company will carry a complete stock of standard railway materials in New York in order to give prompt and efficient service. The Eureka Company has recently enlarged its manufacturing facilities and has added three new buildings to its present plant. The establishment of this branch should assure the Eastern customers of the Eureka Company of prompt shipments and careful attention. As the American General Engineering Company has for the past twelve years manufactured special repair shop appliances for electric railways, it has a large clientage in the Eastern States, and it is believed that the mutual co-operation between the two companies under the management of George E. Austin will serve the best interest of both.

ADVERTISING LITERATURE

Beaudry & Company, Inc., Boston, Mass., have issued a booklet illustrating and describing the different types of Beaudry power hammers.

H. M. Byllesby & Company, Chicago, Ill., have recently issued Department Bulletin No. 4, on "Expert Assistance in Cases Before Commissions."

Tate, Jones & Company, Inc., Pittsburgh, Pa., have issued their second bulletin on blacksmithing and drop forging, which takes up particularly the subject of heavy forgings.

Westinghouse, Church, Kerr & Company, New York, N. Y., have issued "Work Done" No. 5, which describes and illustrates the railway shops recently constructed by them.

Pyrene Manufacturing Company, New York, N. Y., has published the *Pyrene Bulletin* for May, 1913. It contains several interesting articles and illustrations of fires put out with its extinguisher.

The R. Haas Electric & Manufacturing Company, Springfield, Ill., has issued Bulletin No. 1101, illustrating and describing the Ideal alternating-current gong. The gong is made in both 8-in. and 10-in. sizes.

Union Switch & Signal Company, Swissvale, Pa., has issued Bulletin No. 66, describing in detail its apprenticeship course. The bulletin also contains a large number of views of the various departments at the works.

Edward B. Smith & Company, Philadelphia, Pa., has printed an interesting booklet describing over fifty short term bond and note issues maturing from 1913 to 1917 and arranged according to the date of maturity.

N. W. Halsey & Company, New York, N. Y., have prepared and are offering for distribution a pamphlet dealing with the laws of the State of New York governing savings bank investments. The pamphlet contains a list of municipal and railroad bonds in which savings banks may legally invest their funds.

The J. G. Brill Company, Philadelphia, Pa., prints in its May, 1913, issue of the *Brill Magazine* an illustrated biography of W. R. Alberger, vice-president and general manager of the San Francisco, Oakland Terminal Railways, Oakland, Cal. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Oakland, Cal.," "Interesting Rolling Stock for New Peruvian Electric Road," "Interesting Cars for Syracuse & Suburban Railroad," "Prepayment Cars for St. Thomas, Ontario," "The New Pittsburgh Autobus Line" and "Unusual Air-Controlled Sand Cars for Philadelphia."

General Electric Company, Schenectady, N. Y., has issued Bulletin No. A-4116, describing isolated and small-plant alternating-current switchboard panels, both generator and feeder, for three-phase, 25-cycle to 60-cycle circuit. The bulletin is made up principally of dimension and connection diagrams and miscellaneous data referring to the various panels and equipments. The company has also issued Bulletins Nos. A-4035, A-4109, A-4114 and A-4122, illustrating and describing "Series Luminous Arc Lamps," "Belt-Driven Revolving Armature Alternators," "Central-Station Oil Switches" and "Carrier Bus Arc Panels for Brush Arc Generators," respectively.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JUNE 7, 1913 No. 23

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office..............................1570 Old Colony Building
Philadelphia Office.......................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere; United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8200 *copies are printed.*

A CONVENTION AFLOAT

The next meeting of the Central Electric Railway Association, which is to be held June 25 to 27 inclusive, will offer a marked novelty in convention gatherings as all of the sessions will be held on a boat. The geographical position of the association and the season of the year combine to make this departure especially attractive. The beauties of the Great Lakes and the high-class accommodations of the great passenger steamers which ply upon them are known and appreciated by every traveler, while the substitution of a breeze-swept deck for a warm and often stuffy hotel parlor calls for no apology. From a pleasure standpoint, the delegates and their families are assured of comfortable quarters, pleasing changes of lake and river scenery and that increased good-fellowship peculiar to a condition where all present form a little world in themselves. From a business standpoint, it is certain that more will be accomplished in less time because every delegate will be within call of the chairman. Last but not least, the entire boating expense will be so moderate as to be practically no more than if the meeting were held at the point of departure. Necessarily, great trouble has been incurred by undertaking to charter so commodious a steamer for exclusive use. It is to be hoped, therefore, that the attendance will be commensurate with the progressive spirit which has been shown by the Central Electric Railway Association.

THE ERIE SINGLE-PHASE ELECTRIFICATION

When part of the Rochester division of the Erie Railroad was electrified some years ago there was considerable interest in the installation on account of its novelty. The railroad company installed the equipment presumably as an experiment to give actual data in case electrification on a larger scale should be considered later. During the six years since electric operation began there has been uninterrupted satisfaction with the performance of all parts of the equipment. The traffic has doubled and has presumably been profitable. An exceedingly important factor in the economy is the low cost of maintenance. A supervisor and four men attend to all parts of the motive power work, including light car repairs and some extensions. That this small force can handle the work is evidence of the durability of the catenary construction and the single-phase motors. Unfortunately the increase in the number of trains under electric operation required a disproportionate increase in the expense for signal service, but in spite of this the low total cost per car mile makes the installation a thoroughly satisfactory example of electrification.

STEAM RAILROAD ELECTRIFICATION IN AMERICA

The résumé of progress in electrification in this country published elsewhere in this issue displays the rather striking fact that the electrified lines actually in operation or projected are not confined to any particular region. Quite as much is being done in the mountains of the West and on the Pacific Coast as in the level alluvial country of the Atlantic seaboard. The latter section naturally offers great advantages for the use of electricity owing to the very general density of traffic and, in fact, might easily be considered as the only place where the load factor could be maintained at a sufficiently high point to warrant the outlay for overhead construction and electrical equipment. Yet the projects of the Chicago, Milwaukee & Puget Sound and of the Denver & Rio Grande, together with the possible new line of the Great Northern, show that dense traffic, as the term is usually understood, is not a necessity. Nevertheless, one principal reason for electrification applies in all cases, and that is to reduce track congestion or the number of train hours per mile of track. Other reasons apply in each case. Thus, at New York City the underlying purpose was to provide adequate and suitable terminal facilities; on the New Haven the end sought was economies with extremely dense, mixed traffic; on the Norfolk & Western it is a matter of handling enormous coal trains; in the Rocky Mountains cheap power is available; in one Great Northern electrification a long tunnel was the cause, while on the projected line for Dakota and Montana the almost prohibitive difficulties of poor coal and bad water can be eliminated completely. Summed up, it would almost seem as if any operating difficulty could be overcome by electrification.

THE CHOICE OF ELECTRIC SYSTEMS

A great deal was said several years ago about the battle of the systems. At that time the advocates of direct current, the single-phase system and the three-phase system used to insist upon the merits of each for universal use. The same differences of opinion exist to-day, and one or two additional systems have developed, but there is general recognition that each has undeniable advantages for certain classes of work and certain conditions and that there is no serious objection to the use of two or more of them even upon the same railroad. For those who have not closely followed all of the recent developments of the direct-current and single-phase systems, the description by Dr. Louis Bell of the different types of single-phase motors, his comments upon the use of rectifiers on locomotives and the article in this issue on the first large 2400-volt locomotive to be built in this country will prove of interest. As the last candidate for favor, the mercury-arc rectifier will attract special attention, as it permits the advantages of high-voltage distribution with the well-known merits in design and construction of the direct-current motor. Whether these advantages are associated with serious disadvantages remains to be seen after more extensive tests have been made with the combination. Some at least are apparent, such as the increase in weight necessitated by the use of a rectifier as well as a transformer on the locomotive and the probability that a special type of direct-current motor may have to be used, owing to the fluctuations of voltage in the rectified current corresponding to the alternations on the line. On the other hand, if the use of the rectifier should prove practicable on the locomotive it might be even more useful in the substation. All in all, the improvements made in electrical apparatus during the last two years have undoubtedly extended the field of its application to traction purposes.

STRIKE DAMAGES CLAIMED AT BUFFALO

We are glad to note that the International Railway has brought claim against the city of Buffalo for damages caused through failure of the authorities to protect the property of the railway company during the recent strike. The entire propriety of claims of this kind was set forth in a recent issue of this paper, and we believe that if such claims were brought in other cities where corporations or individuals suffer loss through dereliction of duty on the part of the authorities there would be more respect for law and order in this country. We admit that where the city can prove that it did its best to protect property or where the authorities took all of the precautions to enforce the law which reasonably could be expected of them, the responsibility of the city for damage might be lessened. But that was not the case in Buffalo because the company notified the authorities prior to the actual damage that various threats and attempts to destroy its property had been made and demanded protection. There is no reason either in law or morals why a city should be held less responsible for performing its obvious duties than a private corporation or individual, and we should have better government if a few cases of this kind were followed up vigorously. In this connection we remember that a good many years ago a certain town in New England was lax in regard to paying the interest on its funded debt. One of the bondholders secured a writ from the court which authorized him to levy on any property found in the town belonging to any citizen of it, and accompanied by a constable he drove off with the equipage of one of the leading residents. The incident was sufficient to awaken the community to a realization of its obligations, and whether the act could be defended at law or not there was no more talk about repudiation. Similar aggressive tactics in the case of strike damages would be an eye-opener to many citizens and municipal authorities who now think more of politics than of justice.

DEVELOPMENTS IN POWER GENERATION

The reports of the N. E. L. A. committees on prime movers and on electrical apparatus constitute a remarkably complete résumé of the developments in apparatus for the generation of electrical power in central stations. Neither committee has hesitated to go on record with its opinions, and for that reason the reports are perhaps of more interest than a merely academic description of new devices.

The committee's implied approval of the use of steam turbines for driving auxiliary apparatus is logical enough as it follows out the modern idea of obtaining simplicity in the smaller items of the equipment even at the expense of economy, especially when the total amount of steam used under any circumstances is small. To a large extent this follows the same principle which has brought into use so many centrifugal feed pumps. This type of pump may have the inherent disadvantages of inability to prime itself and low efficiency except at or near its rated load, yet it cannot be denied that the advantage which it offers in its simplicity and in the absence of wearing parts constitutes a strong argument in its favor. The small steam turbine is shown by the curves in the committee's report to be, at least in units larger than 200 kw, almost as economical as the small non-condensing engine, and it is quite possible that the elimination of reciprocating motion and complication of moving parts in the small turbine will offset any small increase in steam consumption.

The statement on troubles with turbine blades and nozzles showed about half of the cases reported to be free from blade trouble of any kind. Strange to say, the matter of erosion did not appear at all. It is true that this early difficulty does not seem to be very much in evidence at present. Yet with the impulse type of turbine having a very high steam velocity through the blades, erosion, especially with wet steam, must and does occur to a certain extent, although its influence on the repair bill of a comparatively new turbine may be somewhat limited. The report of one company that its turbine blades became clogged with mud and scale is interesting, but it certainly does not show very satisfactory boiler conditions. It is hardly possible for dry steam to carry mud or scale, and superheated steam certainly does not. The incident is another argument for the use of moderate superheats, although in a plant where enough water is carried over to clog up the turbine blades with mud it is quite likely that the interposition of a superheater between the boiler and the prime mover would only result in burnt tubes.

That part of the report dealing with the boiler room offers some very important suggestions which may well be applied to almost any plant. The investigation of the adequacy of openings for admitting air into the boiler rooms led to the startling but perfectly correct statement that if in a boiler room containing 10,000 hp of boilers the air was compelled to enter through a 7-ft. x 7-ft. doorway the velocity of the blast would reach 50 m.p.h. Of course, this is a very forcible way of expressing the committee's meaning. Under such conditions if the opening was restricted to 49 sq. ft. no hurricane would blow through it, for the draft necessary to produce such a velocity is nearly equivalent to 2 in. of water column, more than the ordinary chimney could produce. Instead, the relative draft at the furnace would be cut down very materially, and the surplus would be expended in setting up a much reduced velocity through the small doorway. With the diminished draft it is easily possible that the boilers could not be made to give even half of their rated capacity. The matter is one of great importance and well worthy of investigation in every boiler room. In fact, there is no doubt that in many plants where lack of draft is a continual complaint during the winter months much of the trouble is due to restricted openings for letting air into the boiler room.

The perennial question of feed regulators is again brought up by the committee on prime movers, which takes the rather unusual ground of approving them. In another part of the report the committee advocates the use of the flow meter in preference to the CO_2 recorder. The reasons are somewhat obscure, for the CO_2 recorder is solely a device affecting economy by indicating the presence of excess air, and within reasonable limits the existence of a considerable amount of excess air has comparatively little effect, provided the draft is ample, upon the boiler output, the only thing measured by the flow meter. Another interesting opinion of the committee is that on account of the recent large increase in the productive oil fields of the world oil will soon regain its former position as one of the steam-producing fuels.

The statement that the use of direct-coupled exciters is on the increase will undoubtedly come as a surprise to many engineers, as it has been the prevalent opinion that the direct-connected machine, while used to some extent in Europe, was not suitable to American practice or to American ideas. As the committee on electrical apparatus says, mounting the exciter upon the turbine shaft simplifies the installation, but this increases the length of the complete machine. In consequence the direct-connected exciter involves a larger building, ties up each exciter to the operation of its own turbine and splits up the exciter installation into small units. In addition, it handicaps the exciter operation by the fact that when the turbine speed goes down through overload the excitation voltage falls with it, so that, altogether, the disadvantages are a distinctly high price to pay for a possibly small gain in simplicity.

The description of the motor converter, a device consisting of an induction motor and a rotary converter rigidly connected mechanically and with the rotor winding and armature winding connected in parallel, is interesting. The efficiency of the new machine is reported to be within 1 per cent of that of the rotary converter together with its transformer, and its efficiency is from 2½ per cent to 8 per cent better than that of the motor generator, depending upon the percentage of rated load. Ease of starting, synchronizing and regulating are qualities which the motor converter appears to have to an equal or greater degree than either the rotary or the motor generator, and in addition it has a very distinct advantage over the rotary in not reversing its polarity under extraordinary fluctuations.

RESPONSIBILITY FOR CONVENTION SUCCESSES

May and June are pre-eminently the months of conventions, and it may be worth while to point out at this time some of the ways in which the maximum benefit may be obtained from these gatherings. Some meetings of this kind reach nearly 100 per cent of their possible efficiency, others, from one cause or another, are less productive, but the matter is so important that we believe an effort should be made all along the line to get the most possible out of conventions. Otherwise, there is a serious loss of energy and time which could just as well be saved.

The two elements which make up a technical convention are the papers and the discussion which follows them. The responsibility for the papers and choice of speakers rests almost entirely upon the association as represented by its executive committee and secretary. The responsibility for making the discussion of value is almost entirely that of the individual members. Each has a duty in the matter, and if either shirks the result reacts upon the success of the meeting. Our observation has been that the individual members are much less apt to do their full part than the executive committee or secretary.

In large organizations, where the papers are printed in advance, each member should familiarize himself with their contents so that he may come to the convention prepared to discuss them. At the last meeting of the Southwestern Gas & Electrical Association this point was emphasized by the secretary, who sent a notice to each member with the advance copies of the papers. This notice asked the member to give the papers "careful reading and study before you come to the convention so that you may be prepared to ask questions and bring up points for further elucidation and discussion at the convention." If a good program has been arranged, good speakers secured and advance papers sent out early, where that plan is followed, there is very little more that the secretary or the executive committee can do. Then the responsibility falls on the individual members.

At the meeting there is often a disinclination on the part of representatives of the small companies to participate in the discussion, partly because of their less experience and partly perhaps because they think themselves not so competent to discuss matters under consideration as the representatives of larger companies. The facts are that their experience is often of more value to most of the members in attendance than that of representatives of the larger companies. The latter necessarily consider the subject from the viewpoint of a large road, and this may be quite different from that of the smaller roads. The members in attendance are usually by a large majority from the smaller roads, and the information which a delegate from another small road can give is therefore of the greatest help to them. Even a question asking for information on a certain point often brings out matter of value. Practice in speaking at a meeting is something which can easily be cultivated, and the more one does it the easier it becomes, so that when a person takes part in the technical discussion he may not only feel that he is benefiting himself but also that he is helping to secure the maximum amount of efficiency from the meeting.

THE ELECTRIFIED STEAM RAILROAD

On Jan. 25, 1907, Lewis B. Stillwell and Henry St. Clair Putnam presented before the American Institute of Electrical Engineers a paper entitled "On the Substitution of the Electric Motor for the Steam Locomotive." This classic study boldly generalized the problem of electrification for the United States as a whole and even ventured to estimate in millions of dollars the financial benefits that would follow a universal change from steam to electricity. The paper was remarkable not only for its imposing array of data but also for the confidence of the authors that electricity would be cheaper than steam for other conditions than those peculiar to the suburban zones of large cities. Unfortunately, the arguments of Messrs. Stillwell and Putnam did not create among steam railroad men the great interest that they deserved, one reason being perhaps that the discussion on the paper was confined to electrical engineers, who at that time seemed to be concerned with the systems rather than with the savings of electrification. At last, after five years of waiting, it is possible to announce that the electrification on economical grounds of continental lines, both mountain and plain, will soon be a reality. Electrification has now gone beyond the stage of gratifying passengers to that of furnishing better and cheaper facilities for handling the more profitable freight business. The great single-track railways west of the Mississippi will electrify either because they must increase the capacity of the road at some critical section like the continental divide or because a world of cheap water-power is at their disposal in place of low-grade fuels.

Coincident with this expansion of the field of electrification has come the adoption of high-tension direct current. Equipment for 2400 volts is under construction for one line and is being seriously considered for others, while 5000-volt d.c. machinery has already "been designed, built and tested with gratifying results," according to the statement made by Mr. Armstrong at the May 20 meeting of the American Institute of Electrical Engineers. It is also worth mention that this high-tension d.c. apparatus is being selected strictly on its merits for long-distance work without regard to the possibility of alternate operation on high-tension and low-tension circuits as worked out for 1200-volt and 1500-volt d.c. interurban railways. With this addition, the distribution systems in use on American electrified steam railroads will comprise direct-current potentials at 500 volts to 2400 volts, three-phase at 10,000 volts and single-phase at 3300 volts and 11,000 volts. The summary published elsewhere in this issue shows that the steam railroads have electrified to date approximately 919 miles for low-tension d.c. and 186 miles for high-tension d.c., 534.4 miles for single-phase and 6 miles for three-phase operation. The total of, say, 1650 miles plus the 1200 miles which has been approved for construction is a little more than 1 per cent of the steam railroad mileage of the United States. These figures are encouraging to the electrical engineer in opening to him an almost limitless field for endeavor, but even if electrification does proceed in an ever faster ratio, it is evident that for many years to come the steam locomotive is not very likely to go a-begging for work.

THE COMMERCIAL STAGE OF THE DOUBLE DECK

The advance of the double-deck car beyond the experimental stage is indicated by the purchase of five new cars of this type by the Pittsburgh Railways. These cars, as described in last week's issue, are of marked peculiarity only in the fact that they are equipped with widely separate exit and entrance doors, a feature which undoubtedly lowers the time of passenger interchange but which can do no more toward maintaining schedule speed than is effected by reducing the total time during which the car is actually stopped. The period during which a car is at rest, in ordinary city service, may be said, as a very rough approximation, to amount on an average to about 10 per cent of the running time. If this time, therefore, should be cut in half, it would increase the schedule speed only 5 per cent, a very material consideration under ordinary circumstances, but not necessarily enough to offset the possible loss of time due to the increased number of stops per mile which is certain to accompany the great increase in seating capacity.

The traffic conditions in Pittsburgh are unusual in degree if not in character, the great majority of the rush-hour passengers being loaded at night, or unloaded in the morning, in a remarkably restricted business district. From this section many lines radiate to the various residential sections of the city, in some cases being almost suburban in character with comparatively few stops for the first mile of route, although the grades are extraordinarily severe. In fact, there is good evidence for the belief that the new cars can be operated successfully upon half of the lines in the city, because on many of them 70 per cent to 80 per cent of the passengers are collected at five or six loading points in the downtown district.

On tripper runs to handle shop crowds and for ball games or other special services where excessive crowds board at one point the success of the double-deck principle from an operating standpoint has been thoroughly demonstrated by the experimental car of last year, so that there is no question that the new cars will remain in use regardless of the results which develop on regular runs. Their cost, which amounts to less than 20 per cent in excess of that of standard single-deck cars, will manifestly be no bar to their availability for occasional service.

As the total of six double-deck cars in Pittsburgh will by no means be enough to handle alone the traffic on any one of the city lines, they will not be able to reduce track congestion to any appreciable degree, and they will in consequence be handicapped for the present to that extent in their operation on regular runs. As an offset to this condition, however, the ingenious scheme of placing a second conductor on each car during its run through the congested business district will be carried out by the management if necessary. The extra man would thus help the regular conductor collect fares at the five or six loading points and would then drop off, to go through the same procedure with another car. As all cars are looped through the downtown section, the extra man would be picked up by an incoming car without having to make an extended journey from one car to another.

The extent to which these new cars will prove available is, of course, still to be settled by experiment. Yet, from the experience with the original double-deck car, it is believed that at least fifty cars of the type can be advantageously used in Pittsburgh. Certainly as an operating unit the double deck affords many advantages over the train, not only in track space occupied, platform expense, first cost and maintenance but also in loading time, as the great distance between the two entrances of the train is undoubtedly a handicap. The weak point of the double-deck principle appears to lie in the stairway. This has given no trouble as yet, but whether a great increase in the number of interior accidents will take place when the novelty has worn off and passengers become careless still remains a very serious question.

OBSOLESCENCE AND DEPRECIATION FOR LOCOMOTIVES

One of the important considerations in the estimates of possible savings of a projected electrification is the allowance which should be made both for the second-hand value of the old locomotive equipment and for the rate of depreciation of the new. In one of the recent A. I. E. E. papers on the possibilities of saving by the substitution of electric power for steam, the steam locomotive was credited with a scrap value of 20 per cent on its original cost and a useful life of twenty-seven years, while to the electric equipment was assigned a scrap value of 30 per cent at the end of thirty-five years of service.

The figures appear exceedingly high not only in the case of the steam locomotive but also for the more modern machine. A steam locomotive sells to-day for approximately 10 cents a pound, assuming that the design involves no unusual features of extreme costliness and that the standards of the locomotive builder are followed to a reasonable extent. A scrap value of 20 per cent would necessitate selling a combination of wrought and cast steel scrap with a negligible amount of brass thrown in for a price of 2 cents a pound, or $40 a ton. As a matter of fact, the seller would be lucky to get $16 a ton for it, even in a time of good prices, which of course could by no means be assured at the time of sale. Eight per cent would indeed be a liberal allowance for the scrap value of a steam locomotive.

With the electric locomotive the pound price of the completely worn-out machine would, of course, be higher on account of the larger percentage of copper entering into the total weight. No figures are obtainable upon such prices, for obvious reasons, yet if it amounted to 50 per cent more than the scrap price of the old metal making up the steam locomotive it would still fall short of a figure which would offset the higher pound price of the electric locomotive when new.

The sales of old locomotives for scrap are, of course, few and far between. They can by periodical overhaulings be kept in running condition for an almost indefinite period, and strange to say there appears to be an irresistible desire on the part of railroad companies to keep engines in some kind of service so long as their wheels can be made to turn. Yet such a procedure does not necessarily mean that the locomotive is worth any more than its scrap value, for obsolescence of equipment cannot be avoided any more successfully than death or taxes. To-day we see engines built in the early nineties used for various odd jobs, double-heading over minor grades, drilling in small yards or pulling occasional light trains on branches whose sparse traffic could better and more economically be handled by trolley or storage battery cars.

During the past decade the major cause of obsolescence has been lack of size. The enormous increase in train loads has called for larger and larger locomotives, and that this growth of the locomotive is still under way is shown by the most recent Mallet engines. Yet the next ten years may see a complete change in the steam locomotive development, and economy of operation may easily be placed above capacity or tractive effort. The Mallet types, again, are an indication of this tendency, for, in addition to their compound cylinders, the feed-heating devices and superheaters with which numbers of them have been equipped —"jimcracks" to the conservative mechanical man, but still very material means for saving coal—have even staved off in many cases the inevitable necessity for extra firemen in addition to effecting really appreciable reductions in the fuel bills.

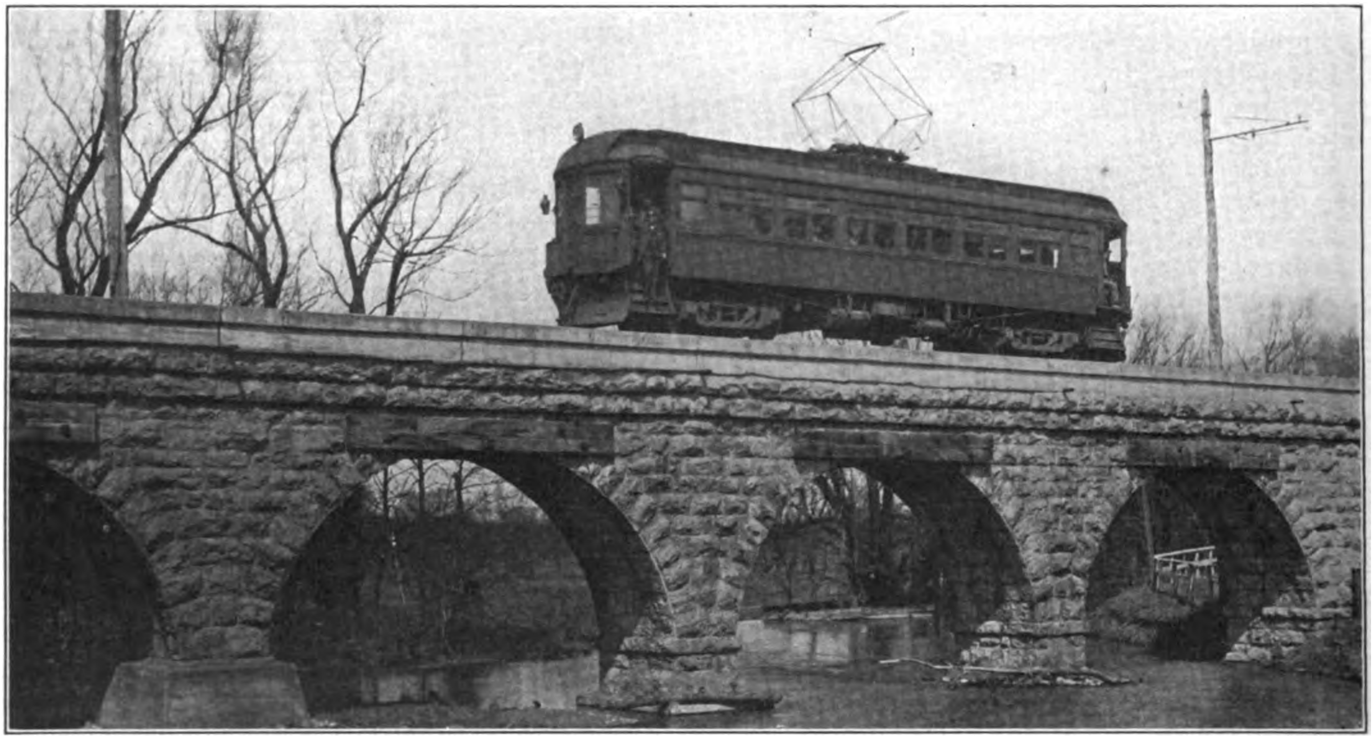
If this sign is a correct indication, and lack of economy becomes the cause of obsolescence rather than lack of tractive effort, it is safe to say that old engines will be scrapped very much more promptly after outliving their usefulness than they have been in the past. The wastes of operating obsolete equipment will be too tangible, too manifest, even to escape the eye of the average railroad president. In consequence, the life of a locomotive may be expected to become a period very much more definite, and probably very much shorter, than it is to-day. Yet to-day it would be idle to prophesy what this term of life should be. The next twenty years will certainly involve very radical changes, in all likelihood sufficient to render obsolete every steam locomotive of the present day. Ten years' time could hardly do this, but if improvements in economical operation were made, equivalent to the growth in capacities which took place between the years of 1894 and 1904, the improved types would save enough to pay easily the interest charges on their first cost, as well as the increased depreciation charges involved by the shortened life of the old equipment.

The same argument applies, of course, with more force to the electric locomotive, although it is impossible to predict now the direction in which improvements will be made. For anything subject to such rapid progress as equipment for electric traction the assumption of a life of thirty-five years is impossible. Twenty might be accepted, but fifteen would be safer. This, however, can be said, that the margin for improvements in the present electric locomotives, which have an efficiency now around 90 per cent, are small compared with the steam locomotive which is working at the lower end of the efficiency scale; nor does there seem in the direction in which invention in the design of electric locomotives is trending the probability of any radical changes in design which would have a corresponding effect on the true value of the existing types.

Maintenance on the Electrified Section of the Erie Railroad

The First Steam Railroad Electrification with Single-Phase Current Was Made Near Rochester, N., Y., Six Years Ago—An Outline of the Present Condition of the Installation Is Presented

The electric division of the Erie Railroad has now been in operation for six years, a length of time sufficient to demonstrate its durability and popularity. In the issue of the Electric Railway Journal for June 19, 1909, some notes on the progress up to that date were given, and these showed that even then the main elements of weakness had been eliminated. During the past four years a few additional improvements have been made and others are projected, but on the whole the working of the system has been eminently satisfactory. In fact, so smooth and uneventful, from the public's standpoint, has been the operation of the road that it is difficult to realize now how much courage was necessary for the selection of a motor which was at the time of installation hardly out of the experimental stage. The popular appreciation of the service is shown by the fact that the present traffic is twice what it was in the days of steam operation.

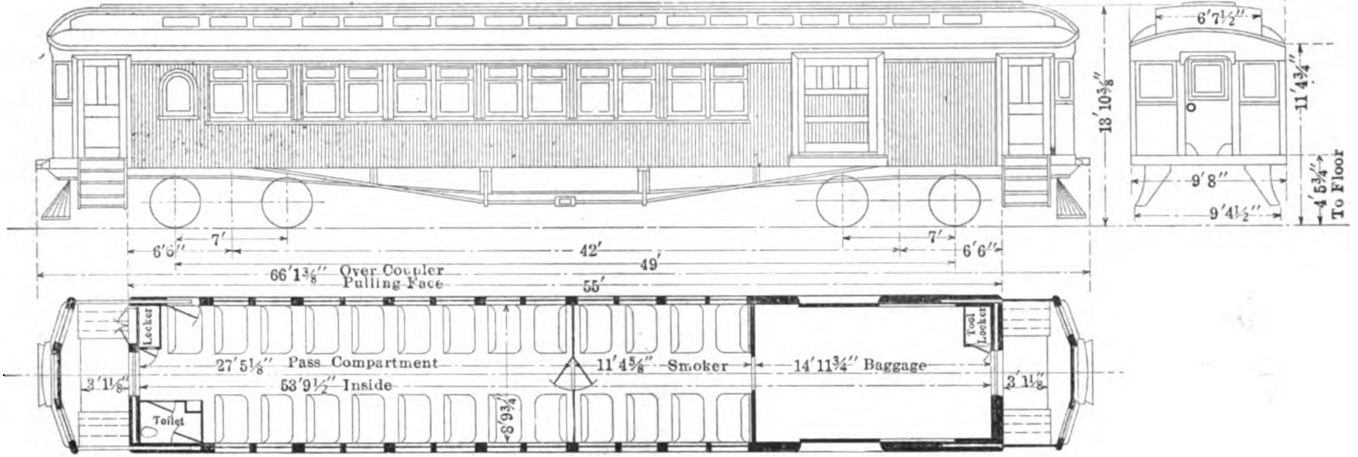


Erie Electrification—Five-Arch Bridge on the Line Near Ashantee

Electric service was begun on this road on June 18, 1907, and the road was taken over from the contractors three months later. The electrified section is part of the Rochester division and extends in a southwesterly direction from Rochester to Mount Morris, a total distance of 34 miles. It is equipped with catenary overhead construction with a trolley voltage of 11,000 and was the first section of a steam railway in this country on which single-phase current was employed. Niagara Falls power in the form of three-phase, 60,000-volt, twenty-five-cycle current is received at the substation at Avon, 19 miles from Rochester, and is there reduced in two V-connected transformers to 11,000 volts. One transformer secondary feeds a section in the Rochester side of the substation, and the other feeds the Mount Morris section, the division into sections, however, being made ½ mile north of Avon, which is not quite midway between the terminals. The cars are operated singly and in trains at frequent intervals, the schedule giving seven round trips daily between Rochester and Mount Morris and one and one-half additional trips between Mount Morris and Avon, a car being returned empty to Avon each day. A schedule speed of about 28 m.p.h. is maintained, stops being made at way stations located 3 to 4 miles apart.

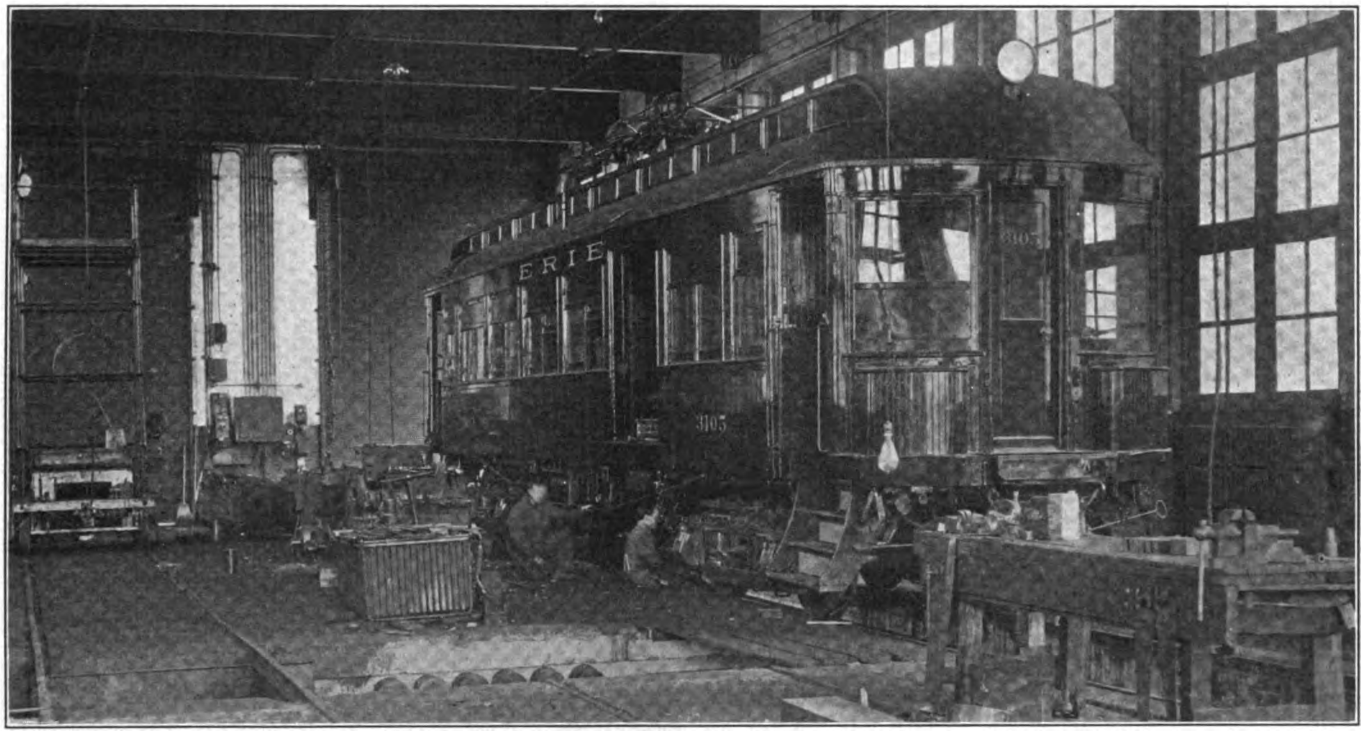
The original equipment of rolling stock consisted of six motor cars, each 53 ft. 4 in. long over bumpers and 8 ft. 9 in. wide over sheathing. Four of the cars have two passenger compartments, the others two passenger and one baggage compartment. The bodies are mounted upon heavy M.C.B. trucks with 6½-in. axles. On each car are four 100-hp, single-phase Westinghouse series motors geared to the axles in the ratio of 63 to 20. These motors have nose suspension. They are controlled by the Westinghouse electro-pneumatic control with unit switches. The voltage is reduced from that of the line, 11,000, to that required for the motors in a 200-kw transformer provided with three primary and eight secondary taps, giving a wide range of operating voltage. The normal voltage of the motors is 300. The emf used for lighting, heating, etc., is 110 volts.

Electrical energy is purchased from the Niagara, Lockport & Ontario Power Company under the standard contract of that company. The Erie Railroad Company agrees to purchase a certain "firm" power which is paid for whether the load reaches this value or not. If the demand exceeds the firm value an additional charge is made. This is based upon the monthly average of the highest daily peaks which last for one minute or more and is paid each month. The monthly average of the peaks is, however, never considered as less than the firm power, and if it exceeds the firm power beyond a certain percentage the firm power which must be paid for whether used or not is automatically increased by an amount sufficient to maintain this percentage. The rate varies with the amount of firm power and with the load factor. In this case the load factor is about 25 per cent and the average cost of energy is slightly over 1 cent per kw-hr. delivered at the substation.



Erie Electrification—New Standard Combination Car

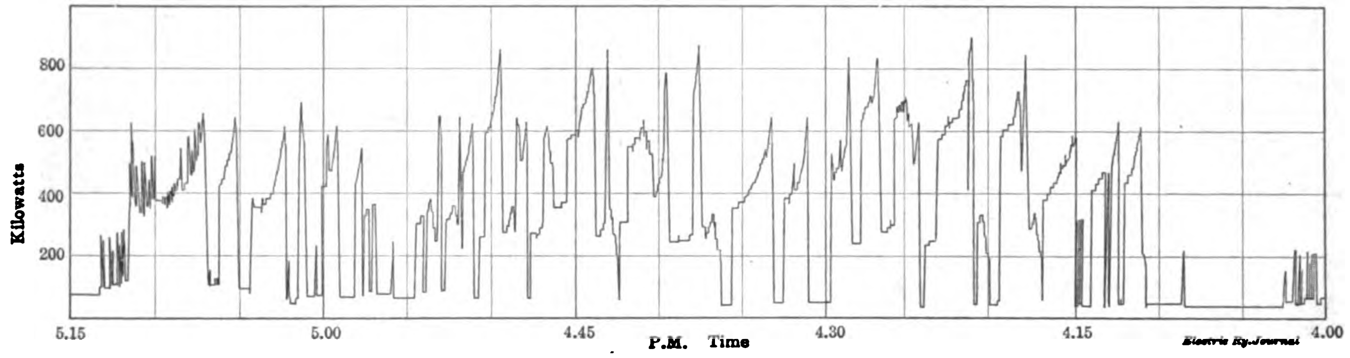
All work of the electrified section including car repairs and line maintenance is under the charge of the supervisor of electric service, who is assisted by two electricians, one line inspector and one line and signal repair man, a total of four men. Attached to the Avon substation is a well-lighted repair shop with two tracks which accommodate four cars, one track being equipped with a full-length pit. The shop has facilities for making repairs, although heavy work, such as wheel turning, gear replacements and the like, is done at the Buffalo shops of the Erie Railroad. This also applies to painting. At least one man is always present in the building to replace circuit-breakers and to inspect the operation of the recording instruments. The opening of a breaker is indicated by the ringing of a bell in the shop. In the shop is also kept, in readiness for use, a gasoline-engine-driven line car equipped with a telescope tower built up of iron pipe after the design of R. C. Thurston, supervisor-in-charge. The line-car engine is of 12 hp, with double, opposed cylinders, and it is geared to the axle to produce a speed of 15 m.p.h. The tower consists of two parts, the frame and the platform. The latter is supported on pipes in the four corners which slide in larger pipes forming the corners of the frame. The platform is raised by means of a winch and is held in place by pins placed in holes drilled through the corner pipes of the frame. The platform may be raised to a height of 18 ft. from the rail. This car has saved much expense in labor and material, as it is always ready for use and can reach the scene of line trouble in a short time. With this equipment and the small force of four men the supervisor is able not only to maintain the road in excellent operating condition but also to make improvements without extra cost for labor.



Erie Electrification—Interior of Repair Shop at Avon

Train delays from electrical causes seldom occur. In December, 1912, the delays amounted to one for every 4600 motor car miles, or one for every 5800 total car miles including trailers. The total train delays in December from all causes amounted to ninety-eight minutes, or one minute delay per 231 motor car miles or per 295 total car miles.

Train delays are recorded on a large chart on which are vertical columns for the various possible causes of delay and horizontal columns for the days of the month. Delays are reported by the train crews at the office of the superintendent of the Rochester division of the road and each day the supervisor of electric service is notified of them on a printed form.



Erie Electrification—Typical Load Curve During Rush Hour

The electrical causes of the delays are as follows:

Erie Railroad Company

Number of Delays and Detentions in Minutes from Electrical Causes in 1912

	11,000-Volt	Motor Circuit	Control Circuit	Main Motors	Trolley
January	1—68 min.	1— 18 min.	1—30 min.	....	....
February	1—10 min.	....	1—15 min.	....	....
March	2—68 min.	....	....	....	....
April	1—28 min.	2—120 min.	1—60 min.	....	....
May	1—29 min.	....	....	....	5—166 min.
June	....	1— 10 min.	1—15 min.	....	2— 30 min.
July	1—30 min.	1— 27 min.	....	....	2— 51 min.
August	1—20 min.	....	2—25 min.	....	2— 32 min.
September	3—76 min.	....	1—15 min.	1 min.	1— 35 min.
October	3—72 min.	2— 50 min.	....	....	1— 35 min.
November	....	....	....	....	2—125 min.
December	....	2— 26 min.	....	....	....
Motor miles					251,189
Trail miles					72,169
Total					323,358

Under the head of material in this table are included costs of electric energy, lubricants and other supplies for road locomotives, cleaning cars, heating and lighting cars, supplies for electric cars, repairs to trolley line, power plant supplies and expenses, repairs to electrical buildings and sundry expenses of the supervisor of electric service. To this amount are credited labor and materials charged to work not directly connected with the department of electric service.

Under labor items are the salary of the supervisor, the wages of the four mechanics carried on the Avon shop roll, the wages of motormen, conductors and trainmen, of car cleaners and of engine house men employed on work for the electric service. In addition, a heavy expense for labor is necessitated by the rules of the Interstate Commerce Commission regarding block signal and dispatching requirements. The change from steam to electric service increased the number of trains and imposed a considerable additional burden for this reason. There are charged to electric service operation, therefore, the wages of the additional signal operators and the increase in pay of other operators made necessary by electric service. This increase includes wages of block signal operators, dispatchers, agents, division clerks, timekeepers, etc.

The usual daily mileage is about 654, although the average is somewhat greater than this owing to occasional very heavy days. The largest mileage recorded recently was 1400 for motor cars and trailers. On July 4, 1912, there were 1306 miles run, made up of 887 motor and 419 trailer car miles. In December, 1912, the respective mileages were 28,920, 22,775 and 6145.

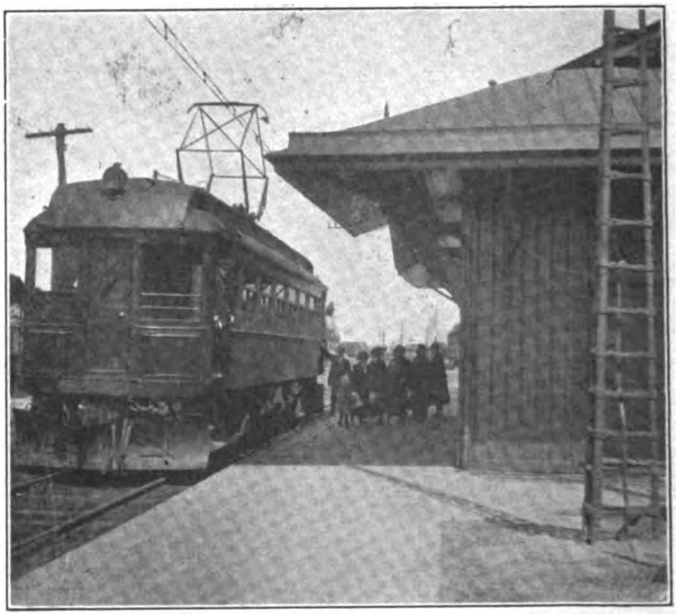
As the electrical section is a small part of the Erie system, it is somewhat difficult to estimate exactly what the electrical operation actually costs since the proportion of overhead charge is uncertain. However, the cost per car mile is not excessive considering the fact that the capacities of the cars are greater than those of average interurban cars. The costs during the past year are given in the accompanying table. These include a large expense for electrical material for the cars due to the armature changes mentioned hereafter. The figures are based on the total car mileage including trailer operation.

Erie Railroad, Rochester Division

Cost of Electric Service in 1912

	Approximate Cost in Cents per Car Mile
Supervision and inspection	1.80
Train crews	4.26
Electrical energy	4.47
Expenses of signal operation, stations, etc., incident to electrical operation	3.57
All other expenses of operation and maintenance	4.90
Total	19.00

The most important changes in the equipment of the road have been the addition of two new cars, the rebuilding of the armatures of the motors and the application of steady strains on all brackets. During the coming spring the overhead construction will be improved by the addition of a steel contact wire.



Erie Electrification—Standard Car at Avon Station

The new cars are 15 ft. longer than the original ones. They have steel underframes with built-up girder center sills and trussed side sills. The sides and roof are of wood. The total weight is 117,000 lb., or 850 lb. per seated passenger. The deep center sills necessitate a different arrangement of apparatus under the car body, the transformer being placed on one side of the center sill and the remainder of the auxiliary equipment on the other side. A larger size of transformer is used and provisions have been made for installing ventilating fans for the motors, but the fans will not be put in at present. The motors on the new cars are of the Westinghouse 132-F type. These differ from the 132-A type motors used on the other cars in that the compensating winding is short-circuited on itself instead of being connected in series with the main winding.

Line Car

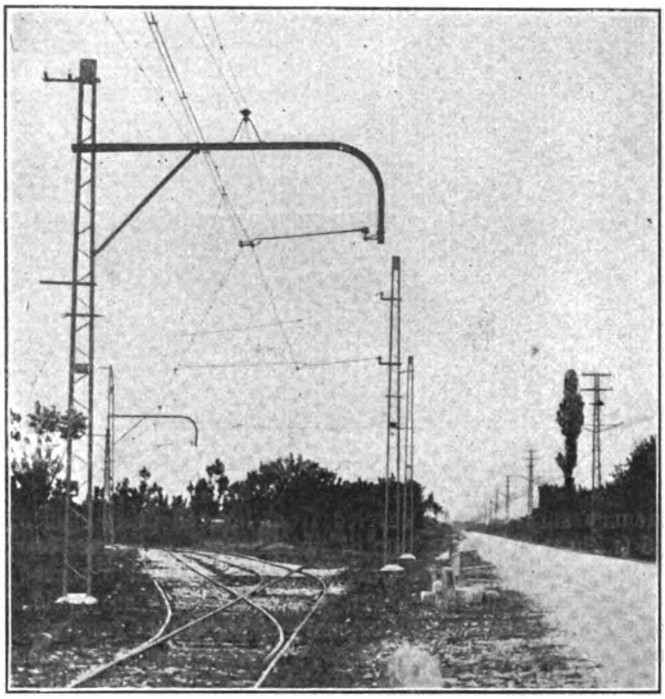
The original motor armatures contained German silver resistance strips between the windings and the commutator bars. The connections at the commutator originally gave some trouble but all armatures have now been rewound using resistance strips of monel metal with the result that a very satisfactory durability is secured. Monel metal contains 68 per cent nickel, 2 per cent iron and 30 per cent copper. Its specific resistance is twenty-five times that of copper. To have this work done the armatures were sent back to the factory a few at a time so that the remodeling was accomplished without in any way interfering with the service.

The use of steel contact wire has been found desirable not because the old hard-drawn wire has not worn well but because there is a hammering of each support by the pantograph. This is similar to the trouble experienced by the New Haven Railroad, although, as the service is much lighter than on that system, the effect has not been so noticeable. A No. 000 grooved, mild Siemens-Martin steel wire will be used. Its conductivity is 13 per cent that of copper. Its elongation is 3½ per cent and its ultimate strength and elastic limit are 75,000 lb. and 50,000 lb. per sq. in. respectively. The contact wire will be suspended below the conductor wire by means of single bolt hangers. These hangers are similar to those used by the New Haven Railroad except that a bolt with spring washer is used in place of flat-head machine screws. The supervisor estimates that, working when power is off each night, it will require fifty days to install the new wire. This will be done with the regular force and without in any way interrupting service.

In an address before the convention of the National Association of Manufacturers, May 21, at the Hotel Pontchartrain, Detroit, Mich., Gilbert H. Montague, of the New York bar, assailed the Oldfield bill and other efforts at patent reform as endangering the present satisfactory and useful system on which the industrial prosperity of the country is foundationed. Mr. Montague insisted that the Sherman law, properly administered, will cover all the points in the Oldfield bill and declared that any tendency to restrict invention must undermine American supremacy in the industrial arts. At the present time, he pointed out, the 35,000 United States patents being issued annually constitute more than one-third of those granted by all the countries of the civilized world. Forty years ago, said the speaker, an effort was made to amend the United States patent system so that anyone by paying a fixed royalty to the patentee might carry on the manufacture of an invention, but the perils of such a policy were even then considered too great.

AN ITALIAN 1300-VOLT D. C. RAILWAY

The electrified Verona-Caldiero Railway is a 1300-volt direct-current line in Northern Italy. For part of its length it parallels for a short distance the main steam line between Venice and Milan. It is of standard-gage construction, consisting of 13.64 miles of single-track with turnouts about 2.5 miles apart. About one-half the mileage, that between Verona and Caldiero, is on the highway, but private right-of-way is used from Caldiero to San Bonifacio. The maximum operating speeds of the electric passenger cars or trains, therefore, vary from 24.8 m.p.h. to 31 m.p.h., according to the way conditions. The freight service is still being handled by means of steam locomotives, but these will in the future be replaced by electric locomotives of an approved design.

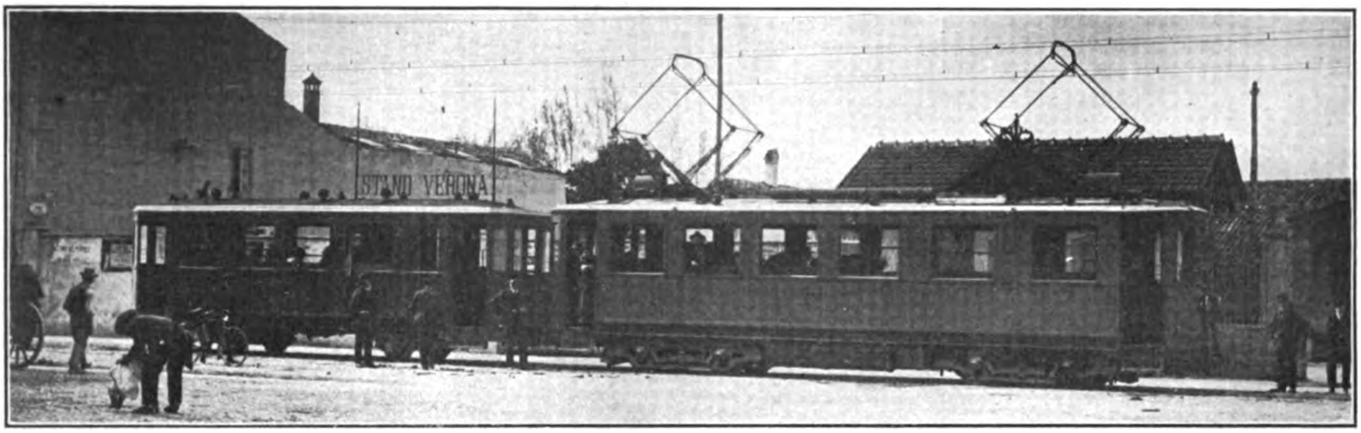


Verona-Caldiero 1300-Volt D. C. Railway—Construction on Right-of-Way

Verona-Caldiero 1300-Volt D. C. Railway—Construction on City Streets

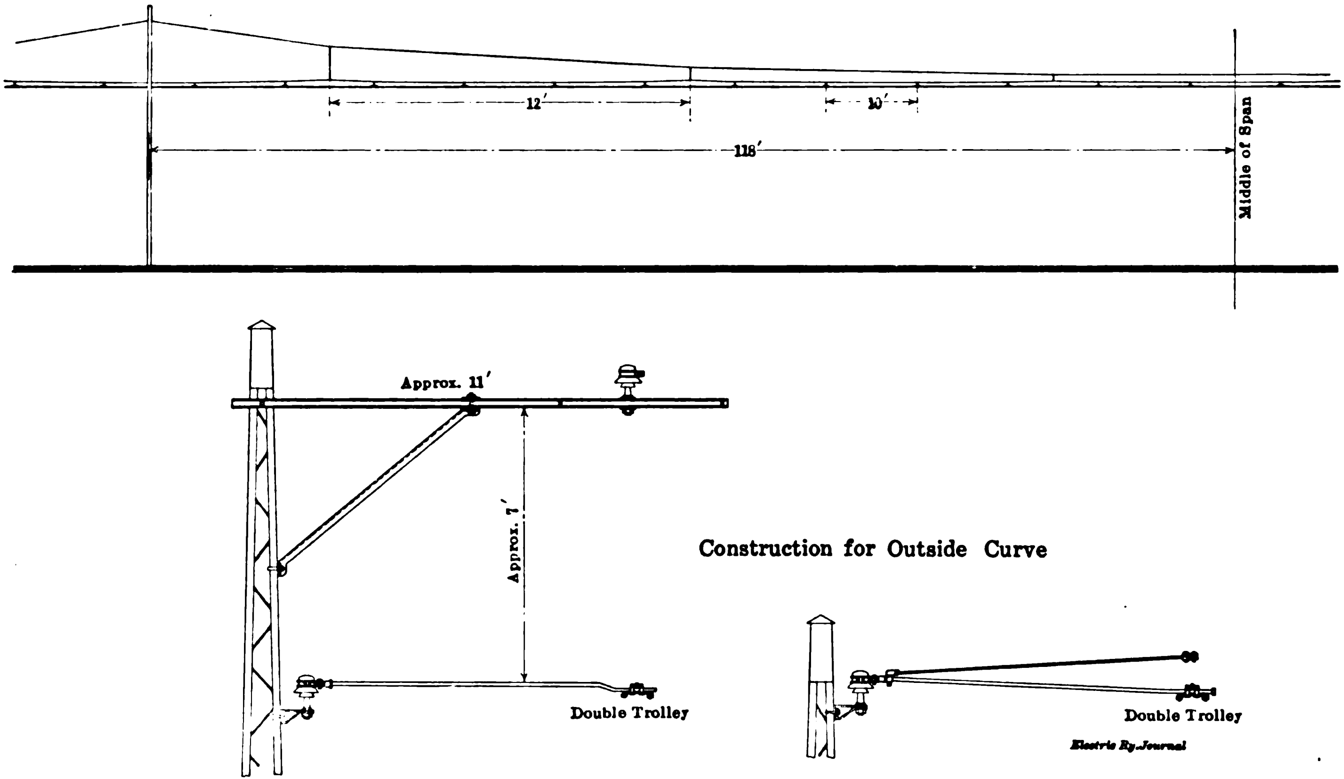
The overhead construction is of the Siemens-Schuckert double-catenary type in open country and of double-span type in the towns. In both instances, however, two trolley wires are used, and these are of figure-eight profile of 80 sq. mm (approximately No. 000 B. & S.) cross-section.

This double trolley was preferred to a single wire of larger area for several reasons; namely, the erection was easier, if one wire broke the other would still be available, and the wear of trolley wires and collector bows was decreased because a bow tension of 6.6 lb. to 8.8 lb. could be used instead of 13.2 lb. to 17.6 lb.



Verona-Caldiero 1300-Volt D. C. Railway—Motor Car and Trailer

The actual cost of assemblage and erection for the two wires was no greater than for one. The multiple catenary suspension is carried from latticed poles spaced 236 ft. through the medium of two brackets, the upper one of which consists of two channels about 3.2 in. high, placed back to back, and the lower of piping. This suspension consists of a seven-strand catenary of 50 sq. mm (approximately No. 0 B. & S.) cross-section, an auxiliary steel catenary of 6-mm diameter (approximately No. 3 B. & S.), hangers between main and auxiliary catenary 39 ft. apart, the two trolley wires already named and sliding clamps hung at intervals of 10 ft. between the auxiliary catenary and the contact wires. The main catenary is continuous while the auxiliary is anchored about every 0.9 mile at the poles, where the weights used in the automatic tension regulation of the line are installed. All insulators are interchangeable.



Verona-Caldiero 1300-Volt D. C. Railway—Multiple Catenary Construction for Tangents and Curves on Right-of-Way and on Highways

The cars are also operated at 1300 volts in passing through towns. The line construction in this case consists of the double-span catenary illustrated, the span wires being attached to rosettes in buildings on opposite sides of the street and insulated from the walls by means of two spool insulators. The average clearance of the trolley wire throughout is 19 ft. 8 in. above the top of the rails. Three sets of horn-type lightning arresters are used for protection of the circuits. The line is operated with purchased hydroelectric power, which is transformed to 1350 volts d.c. by means of two 300-kw motor-generator sets installed in Verona. There are no substations of any kind on the line. The rolling stock consists of new double-truck motor cars, each carrying two pairs of 650-volt motors, each pair being permanently connected in series.

The Palermo (Italy) Tramway has been granted a concession to construct an electric tramway in Palermo, from Pallavicino to Mondello.

Single-Phase Railway Motors

Principles of Some Common Types of Single-Phase Traction Motors and a Comparison of Rectifier Systems

BY LOUIS BELL, PH.D.

At a certain stage in the development of any art it is worth while to look over what has been done with the idea of getting a general view of the situation rather than studying petty details. The present discussion is for this purpose—to show the general principles which have been adopted in building single-phase motors for traction and the general results that may reasonably be expected.

To begin with, any electric motor consists of three essential parts, a fixed magnetic field, a rotatable magnetic field and means for preserving these two fields in the same relative direction, so that the stress between them shall be continuous instead of ending with the first angular displacement. In traction motors the fixed field is commonly provided by the ordinary field magnet. The rotatable field is that which is established by the current which traverses the armature, and the means for holding the two fields thus established in position to secure continuous rotation is, in the single-phase motors used for traction, some description of commutator. This is reducing the matter to its simplest terms. Further, in any motor, direct current or alternating, the torque between field and armature is proportional to the field magnet strength multiplied by the total strength of the magnetic field established by the current flowing through the armature conductors. It is this torque when arranged for continuous rotation that determines the output, whether uniform or pulsatory, of the motor. The direction of the rotation of the initial torque and the subsequent rotation is determined by the relative signs of the two magnetic fields set up. If of different sign, the torque is equivalent to attraction; if of the same sign, it is repulsion, as in the case of any magnetic poles. In the case of d.c. motors the field strength and the armature strength are nearly constant and depend on the uniform values of the currents through field magnet and armature. In a.c. motors the torque at any moment is approximately proportional to the instantaneous values of these fields, and the total output, other things being equal, is proportional to the summation of the various instantaneous values that occur throughout a complete cycle. In the former case the torque is constant, in the latter it is pulsatory to a greater or less degree.

Further, in the d.c. motor, the current flowing is determined, in effect, only by the applied electromotive forces and the resistance of the field and armature windings. In the a.c. motor it is, as in every case of alternating circuits, determined by the reactance as well. In the ordinary series d.c. motor the current is determined by the resistance of field and armature, but in such a motor the simultaneous reversal of direction of current in both armature and field does not affect the direction of the resulting torque, because both fields change signs together; hence a.c. applied to such a motor will give torque in a uniform direction, and this is the basis of one important group of a.c. motors for traction. But the reactance of an ordinary d.c. motor imposes a serious limitation on the current that can pass through it, and since, as in any other motor, the useful energy is determined by the motor electromotive force, it is necessary to make this large compared with the resistances of the armature and field. To do this it is necessary to increase the number and velocity of the armature wires and also to keep down the reactances. The first condition calls for a motor having a relatively simple field winding and a very powerful high-speed armature, while the second condition is favored by low frequency and general careful design to reduce reactance. Furthermore, in every a.c. machine parasitic currents in the structure must be kept as low as possible, so that a series motor to run on a.c. should have the field magnet laminated as well as the armature.

The type then of the series a.c. motor is that shown diagrammatically in Fig. 1, with a relatively weak field and a very powerful armature connected in series, the whole magnetic structure being laminated. In point of fact, such a motor will run, but not very well. One important reason is that in every motor a relatively weak field and a relatively very powerful armature do not work well together, since the armature field tends to produce immense distortion of the field-magnet field, so that the torque-producing conditions change violently with change of load. Another difficulty is that if the conditions for commutation are good at one load the distortion will render them bad at other loads, besides which, with a rapidly alternating current supply, there are certain to be abnormally heavy currents in the coils short-circuited under the brushes which tend to produce serious heating and sparking. To obtain a motor which will work well on a.c. it is therefore necessary to provide means of preventing abnormal field distortion and for holding down the current in the short-circuited coils.

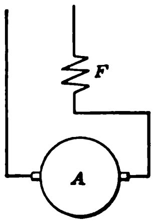


Fig. 1—Straight Series Motor

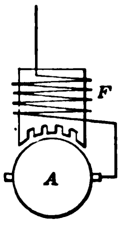


Fig. 2—Finzi Motor

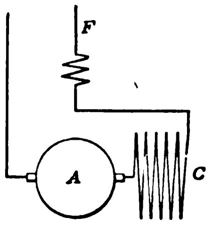


Fig. 3—Compensated Series Motor

Perhaps the simplest means of doing this, quite laying aside for a moment the historical development of this type of motor, are those provided in the Finzi construction successfully tried out in Italy more than a decade since. This is shown diagrammatically in Fig. 2. The method adopted for checking field distortion due to the armature was to slit the pole piece at right angles to the laminations so as to present a magnetic circuit of high reluctance to the cross-magnetization due to the armature. In addition, Finzi used somewhat high resistance in the commutator leads to keep down the short-circuit current, a device long familiar in d.c. apparatus. In small sizes at least this construction did passably well, and the performance of the early Finzi motors was highly creditable and was one of the things which went far to encourage further work in the line of single-phase railway motors. For large and powerful machines, however, and particularly those in which the output must be forced, these devices were not wholly sufficient, and the next logical step was the compensated series motor now very largely used.

In this machine, shown in Fig. 3, one finds the field *F* and the armature *A* as usual, but in addition a coil *C* in series with both and cross-magnetizing the armature so as to check the distortion, lessen the heavy armature reactance which produces it and hold the conditions of commutation fairly constant. High-resistance commutator leads are also generally used in this construction. Such motors have played a very important part in the development of a single-phase system, and thanks to the compensation, run with very little sparking even under violent changes of load, have an admirable speed-torque characteristic and perform, as everyone knows, excellently on direct current, so that with suitable controlling apparatus they can be used indifferently on a.c. and d.c. service.

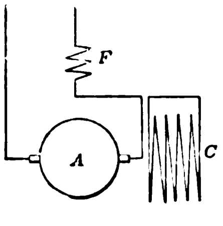


Fig. 4—Eickemeyer Motor

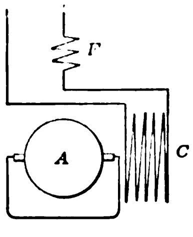


Fig. 5—Thomson Repulsion Motor

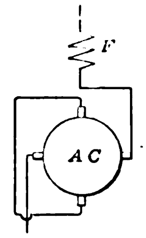


Fig. 6—Latour and Winter-Eichberg Motor

Now, in any alternating motor it is obviously possible to supply current to the field, to the armature or to both by induction as in a static transformer or induction motor. So long as the currents in the two fundamental elements are suitably timed with respect to each other so as to give the necessary torque conditions, it is a matter of little consequence whether they are led into the coils through brushes or induced in the coils as in the secondary of a transformer. Hence the motor of Fig. 4, one of the very earliest forms of compensated series motor devised by the late Rudolph Eickemeyer, whose masterly ingenuity left its mark on the early stages of electric railway development. In this motor the field and armature are in series as before, but the compensating coil *C*, wound in suitable direction to cross-magnetize the armature, is short-circuited upon itself and acts as a secondary of a transformer. This particular motor has not had an important application in practice but is extremely interesting as a forerunner of later developments.

Next in logical sequence of development, although very early in date, comes Fig. 5, the repulsion motor of Prof. Elihu Thomson. In this the field *F* and the compensating coil *C* are in series, but the armature is short-circuited upon itself through the brushes and the armature currents are produced by induction. The original motor of this type had the field coil and compensating coil united and disposed obliquely with respect to the brushes. The two components of the resulting magnetization with respect to the armature served the same purpose as the two coils in quadrature, shown in Fig. 5. In this case the working currents are induced in the armature, setting up a magnetization which reacts with the field *C*, which serves the double purpose of inducing armature current and steadying the working magnetization. From this repulsion motor, so called from the fact that in its fundamental form the closed circuit in the armature formed by the short-circuited brushes was thrust away from the magnet field, have been derived some of the most interesting and valuable types of single-phase traction motors. Indeed, the plain compensated repulsion motor of Fig. 5 is capable of doing very good work in this line, although the arrangement is commonly used only in starting.

Fig. 6 represents diagrammatically the circuits of the motors devised by Latour and by Winter and Eichberg. In these a composite magnetization is set up in the armature, the field and armature being in series as in Fig. 1, but the compensating field being provided by the armature winding itself in virtue of a second pair of brushes short-circuited upon each other and set 90 deg. from the series brushes.

It will be seen that all these arrangements carry out the same fundamental idea of weak field and powerful armature, of low reactance which is kept down and the distortion and commutation conditions controlled by the cross-magnetizing field of a compensating coil. This coil is in series with both field and armature of Fig. 3, short-circuited in Fig. 4, in series with the field alone and reacting with an armature in which the current is induced in Fig. 5, and produced by part of the armature winding itself in Fig. 6.

Fig. 7, the Déri motor, somewhat resembles Fig. 6 but has its brushes short-circuited in pairs, of which at least one is movable, and one pair may be conceived to furnish the proper armature field and the second pair the compensating field.

Finally, there is the so-called series repulsion motor of Mr. Alexanderson, which has come with various modifications into large use. It is perhaps best described as a series motor in which the compensating coil is independently excited, the current being induced in the two elements of the winding as in the secondaries of two transformers or the branches of an auto-transformer. It belongs unmistakably to the series type of motor, but the independence of the compensating coil not found in the other designs here noted gives a certain freedom in design which is found to be advantageous from a practical standpoint.

Fig. 8 has its connections left open and represents the running condition of the motor, which starts with *F* and *C* in series and an auxiliary short-circuit around *A*, reducing the motor to a repulsion form equivalent to Fig. 5. In all these motors the compensating winding magnetizes the armature virtually in quadrature with the field, and the coil *C* is frequently actually wound so as to surround the armature at right angles to the main field flux. Those forms which work with an armature regularly short-circuited may often be most conveniently treated as induction motors with elliptical rotary fields, a view which is not here developed in order more closely to show the fundamental relationships between all these forms. Practically all motors can be considered from the rotary field standpoint if it is desirable for clearness of view, and, on the other hand, practically all motors can be considered from the standpoint of two independent magnetizations affecting the armature. There is nothing mutually exclusive in the two viewpoints, and the one here taken brings out some of the relations which exist in practical railway motors more simply than the other.

There are divers modifications of the same fundamental ideas, such as modifications introduced between the starting and running of the same machine, for which the connections are sometimes materially different, as has just been noted. Special commutating pole fields have also been introduced, as if auxiliary coils were to be wound on part of the field magnet of Fig. 2. But essentially all the single-phase commutator motors are laid out along the lines here set forth of a beautifully laminated magnet structure with a relatively weak field and very powerful armature, of which the field distortion with its resulting evils is controlled and the reactance held within bounds by a cross-magnetization, due either to separate compensating

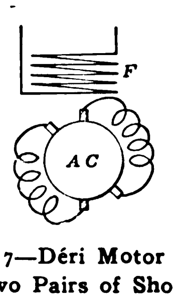
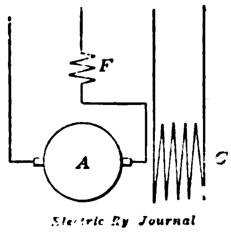


Fig. 7—Déri Motor with Two Pairs of Short-Circuited Brushes



Electric Ry Journal

Fig. 8—Series Repulsion Motor

coils or to the utilization of part of the armature winding for the same purpose.

High-resistance commutator leads are quite generally used to simplify some of the details of design, although they are not always necessary. All these motors work best at decidedly low frequency, which is important in reducing the reactance. Fifteen cycles or thereabout is the favorite frequency, although in some instances a frequency as high as twenty-five is employed, as in the St. Polten-Mariazell line of the Austrian State Railways.

As regards the relative qualities of these various forms of commutator single-phase motors, the results obtained are due more to finesse in design than to any radical differences between the principles involved. The motors of Figs. 3, 6 and 8 are probably more widely used than the others. They all start well, run well, commutate well and result in motors of about the same general working characteristics, differing mainly only as they exemplify greater or less skill in the details of the design. Any motor is a series of compromises, and this is particularly true of the single-phase commutator type. The question of weight, output, efficiency and cost of such motors is a somewhat indeterminate one. As to the practical design, gains may be made in one of these features at the expense of one of the others.

Broadly the a.c. commutator motor may be expected to give less output with respect to its weight than a d.c. motor constructed with the same skill, merely because of the pulsatory character of the energy supply. High output can, however, be secured by sacrifice in other particulars, and the same is true of other features. It is merely a question of what particular characteristics one can best afford to sacrifice a little in order to produce a motor possessing the especial qualities which are desired as a matter of practical working.

The big salient fact which is here intended to be brought out is that in one or another of a few closely related forms an a.c. commutator motor can be built which is a thoroughly practical working machine for heavy electric traction. Such motors actually do start and run well, and the difficulties with commutation, at first greatly feared, have been for all practical purposes overcome. Powerful and successful locomotives of at least three of the types here shown are in actual use doing heavy work and giving good results, but a consideration of the differences in principle and practice as between one form and another may well be left for the manufacturers to fight out. The intention of this article is merely to indicate in the broadest general terms the various lines along which this interesting and valuable type of motor has been worked out. The actual and sometimes important details of design are, from the standpoint of the user, of much less consequence than the certainty of getting a powerful and reliable traction motor for large work.

THE RECTIFIER IN ELECTRIC RAILWAY PRACTICE

One of the most important modifications of the single-phase system in heavy traction work lies in the use of a.c. distribution, even clear up to the locomotives, with d.c. motors fed from some form of converter, either static or rotary, which will enable the advantages of the two systems to be united. This phase of the matter has been considerably discussed recently, but there seem to be regarding it as many shades of opinion as with respect to the relative merits of d.c. and a.c. motors. The general scheme runs back to the proposition for using the well-known Ward-Leonard system of control with a.c. distribution and high tension on the working conductors and a motor generator set with reducing transformers on the locomotive. At least one powerful machine of this kind was built and tried, we believe successfully, abroad. There stood, however, against this system the necessarily considerable weight of the converting apparatus. In principle it should, however, give most beautiful control, coupled with very low distribution losses and substantially no attention necessary outside the locomotive other than would be involved in the ordinary patrol of the line. Practically all heavy railway work is now carried on by an a.c. distribution up to the working conductor, and the main question to the front is whether it pays to extend the a.c. distribution clear up to the moving units.

Besides the Ward-Leonard system it has been proposed to use ordinary d.c. motors with a cascade converter, or with a permutator, or still more recently with the static mercury rectifier. The cascade converter is, of course, materially lighter than the motor generator; the permutator is still lighter, while the mercury rectifier should give even a much greater reduction in weight. The permutator locomotive has actually been tried on a large scale on the Midi line in France, and other experimental locomotives of various allied types have been built, including recently some experiments with the static rectifier.

To compare the systems briefly, the first three require, in addition to the rotary converting apparatus, static transformers of the full output of the locomotive as well, while the fourth, the mercury rectifier, is subject to the inconvenience that in order to get high efficiency the output voltage must be rather high and on the other hand cannot be conveniently made high enough to get along without a static transformer on the locomotive if the evident advantages of the high voltage on the working conductor are to be retained. It is this fact, perhaps, which has led some engineers to the view that if the static rectifier is to be used it might better be installed in stationary substations as on the locomotive, since the motor voltage must be somewhat abnormally high. From this view one would simply have the present familiar system with high-voltage motors adapted for perhaps 2000 volts or 2400 volts on the working conductor and static rectifiers instead of synchronous converters in the substations. This would lead to some reduction of cost in substation apparatus but would leave the distribution problem about where it now is. The only system which can be of great importance in simplifying the electrification of long lines for heavy service is one which carries high voltage clear up to the locomotive. For this service any of the four devices already mentioned is available besides the ordinary plan of using a.c. motors and dropping the rectifier matter altogether.

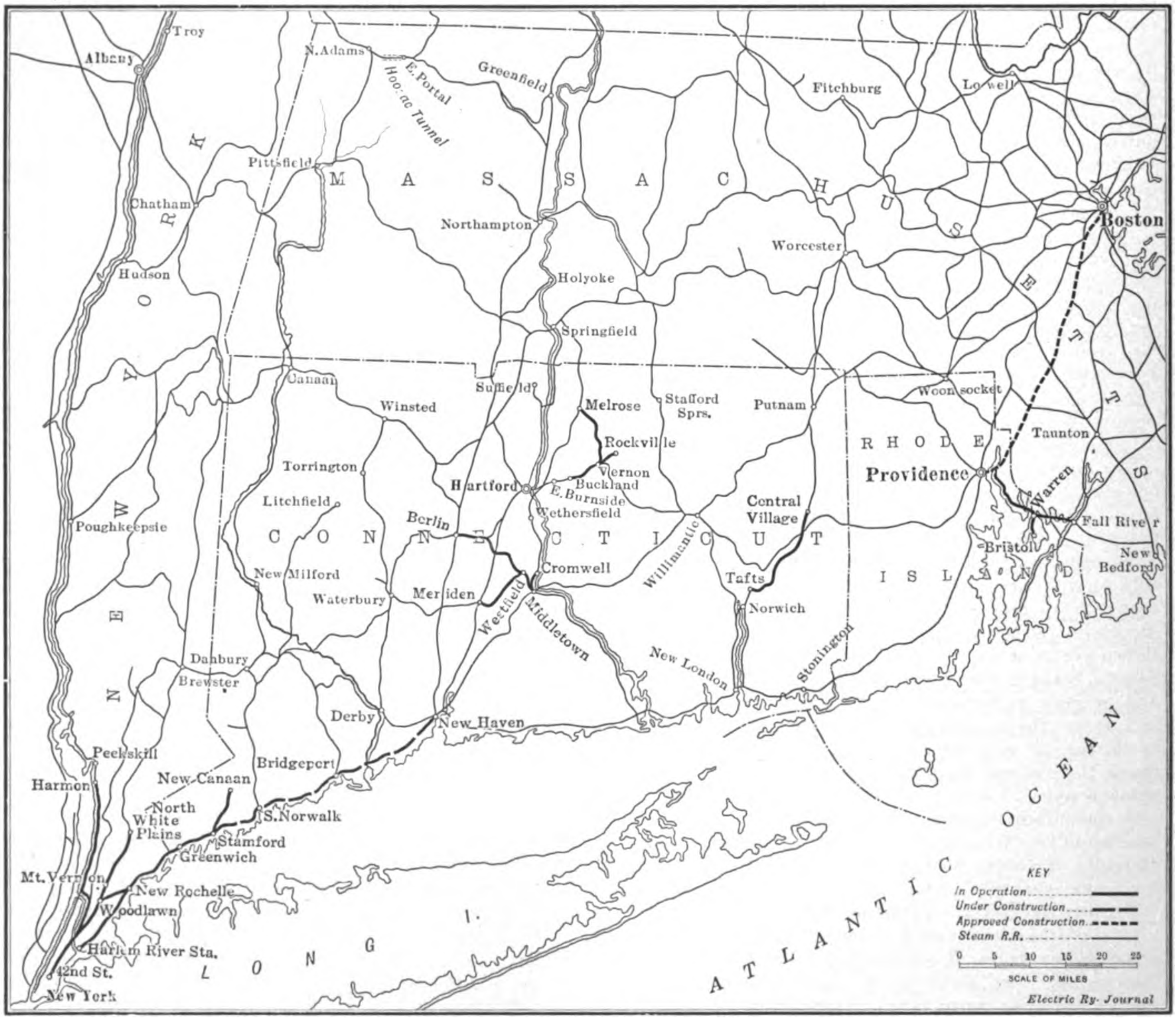
On the score of simplicity and high output per pound of weight the permutator and the mercury rectifier appear to be especially promising, with the permutator having the advantage as respects the voltage at the motors themselves. Just what the performance of ordinary motors would be when operated from the static rectifier current remains to be seen. The appearances would rather indicate that such a current would require a motor of somewhat special design, trending in the direction of the straight a.c. motor. From the standpoint of output it seems altogether likely that a commutating a.c. motor fed by a static transformer from a high-voltage working conductor would be at least the equal of any of the systems using rectified current. The static rectifier itself may prove to be a useful substitute for the synchronous converter in ordinary substation work. As respects the other systems, it remains to be proved whether from a practical working standpoint they have any substantial advantage over the use of straight a.c. motors. A few years ago the a.c. motor was in so dubious a state that current transformed to d.c. on the locomotive seemed a very desirable end. To-day it is at least an open question whether the game was worth the candle.

It is expected that Glenwood Park, near New Albany, Ind., owned by the Louisville & Northern Railway & Lighting Company, will be the scene of the celebration on Oct. 12-16, 1913, which will commemorate the one hundredth anniversary of the victory of Commodore Perry over the British on the Great Lakes.

Electrification Progress in the United States

This Article Reviews the Progress in Steam Railroad Electrification from the Earlier Tunnel and Terminal Work to the Long Distance and Mountain Railway Projects Now in Hand

Steam railroad electrification, in one sense, is almost as old as the electric railway itself, for among the first lines to be electrified were the dummy roads in the suburbs of the larger cities and the shorter steam railroad branches which had become part of urban traction systems. However, as all of these installations were independent of trunk-line service they will be omitted in the following review. An earlier table and bibliography of all classes of steam railroad electrifications will be found on page 539 of the Street Railway Journal for Oct. 12, 1907.


Troy
Albany
N. Adams
E. Portal
Hoosac Tunnel
Greenfield
Fitchburg
Lowell
Pittsfield
M A S S A C H U S E T T S
Chatham
Northampton
Boston
Worcester
Hudson
Holyoke
N E W Y O R K
Springfield
Canaan
Suffield
Winsted
Melrose
Stafford Sprs.
Putnam
Woonsocket
Rockville
Taunton
R H O D E I S L A N D
Torrington
Vernon
Hartford
Buckland
E. Burnside
Wethersfield
Providence
Warren
Litchfield
Central Village
Fall River
Poughkeepsie
Berlin
C O N N E C T I C U T
Bristol
New Bedford
Cromwell
Willimantic
New Milford
Waterbury
Meriden
Westfield
Middletown
Tafts
Norwich
Stonington
Danbury
New London
Brewster
Derby
New Haven
Peekskill
Bridgeport
Harmon
New Canaan
North White Plains
S. Norwalk
Stamford
Greenwich
Mt. Vernon
New Rochelle
Woodlawn
Harlem River Sta.
42nd St.
New York
L O N G I.
A T L A N T I C O C E A N
KEY
In Operation
Under Construction
Approved Construction
Steam R.R.
0 5 10 15 20 25
SCALE OF MILES
Electric Ry. Journal

American Electrifications—Lines of the New York Central, New Haven and Boston & Maine Railroads

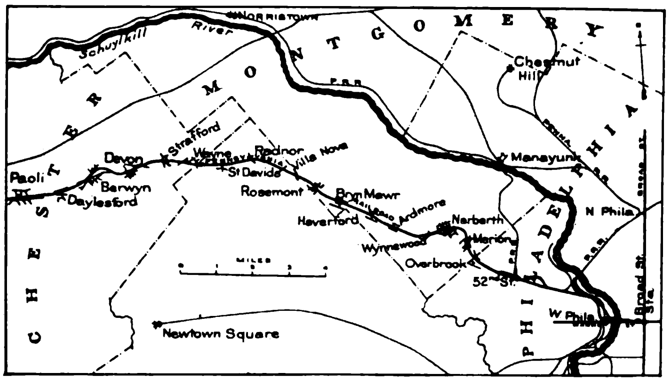
BALTIMORE & OHIO RAILROAD

It is an interesting coincidence that the Baltimore & Ohio Railroad which in 1828 placed in service the first American-built steam locomotive on its initial 3 miles out of Baltimore should also have been the pioneer user of heavy electric locomotives. Its Belt Line tunnel at Baltimore, comprising 7.4 miles of single track, was electrified on the third-rail system in 1895 to eliminate ferriage and give this railroad direct entrance to Baltimore. Performance records of the original equipment were presented by J. E. Muhlfeld, general superintendent of motive power Baltimore & Ohio Railroad, on Feb. 16, 1906, before the New York Railroad Club and published in the Street Railway Journal for Feb. 24, 1906. Two electric locomotives, as described in the Electric Railway Journal for Nov. 26, 1910, were added in the latter year to the original four machines named by Mr. Muhlfeld.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD

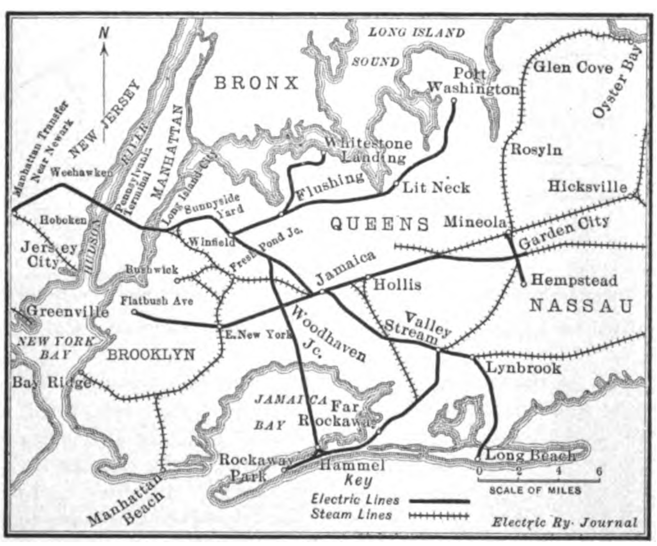
The New York, New Haven & Hartford Railroad, which holds the lead in length of electrified track, entered the electrification field in 1895, when it equipped with electric power for d.c. overhead operation a total of 16.8 miles of single track between Nantasket Beach and Pemberton, Mass., on a peninsula about 10 miles southeast of Boston, as described in the Street Railway Journal for July, 1895. This line is operated with electricity now only in summer.

The company's first heavy interurban electrification, and the first undertaken by any trunk line in the United States, was the equipment in 1902 of the Providence-Warren-Bristol-Fall River branch with the 550-volt d.c. simple overhead system. This Rhode Island line was described in the Street Railway Journal for March 1, 1902, and its location and route are also shown in the accompanying general map of the New Haven company's electrifications. It is 38.5 miles in length, measured as single track, and consists of a double track from Providence to Warren, a single track from Warren to Bristol and Fall River respectively, sidings at Providence, etc. The service is of standard interurban character and includes the handling of baggage. Electrification of this line made it possible to give a faster schedule despite an increase in the number of stops made by local trains.


MONTGOMERY
CHESTER
PHILADELPHIA
Schuylkill River
Norristown
P.R.R.
Chestnut Hill
Manayunk
N Phila
Paoli
Berwyn
Daylesford
Devon
Strafford
Wayne
Radnor
St Davids
Villa Nova
Rosemont
Bryn Mawr
Ardmore
Haverford
Narberth
Merion
Wynnewood
Overbrook
52nd St.
W Phila
Broad St.
Newtown Square
Miles

American Electrifications—Approved Paoli Suburban Line, Pennsylvania Railroad, Out of Philadelphia

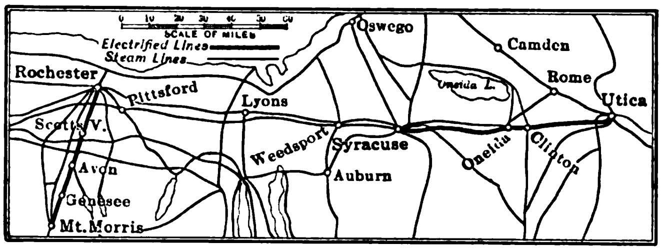
During 1907 the New Haven company added to its branch electrifications the Middletown-Berlin-Meriden and Hartford-Vernon-Melrose lines in Connecticut. The Middletown-Berlin section, 10.4 miles long, and the Middletown-Meriden section, 7.2 miles long, are of 600-volt d.c. plain overhead construction. They were electrified to give more profitable feeders for the trunk lines and to build up the towns served by providing connections with the local street cars. A description of the Middletown electrification was printed in the Street Railway Journal for Sept. 21, 1907.


N
LONG ISLAND SOUND
BRONX
NEW JERSEY
MANHATTAN
Manhattan Transfer Near Newark
Weehawken
Hoboken
Jersey City
Greenville
NEW YORK BAY
Bay Ridge
BROOKLYN
Pennsylvania Terminal
Long Island City
Sunnyside Yard
Winfield
Bushwick
Flatbush Ave
E. New York
Fresh Pond Jc.
Woodhaven Jc.
Jamaica
QUEENS
Flushing
Whitestone Landing
Lit Neck
Port Washington
Glen Cove
Oyster Bay
Rosyln
Hicksville
Mineola
Garden City
Hempstead
Hollis
NASSAU
Valley Stream
Lynbrook
JAMAICA BAY
Far Rockaway
Rockaway Park
Hammel
Manhattan Beach
Long Beach
Key
Electric Lines
Steam Lines
0 2 4 6
SCALE OF MILES
Electric Ry. Journal

American Electrifications—Long Island Railroad and Pennsylvania Terminals

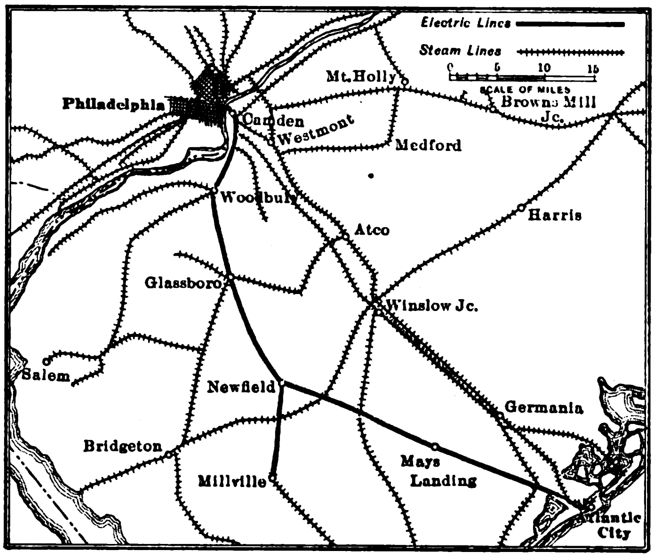
The Vernon and Melrose lines follow the tracks of the Hartford street railway system of the Connecticut Company for 2.5 miles to East Burnside, where the cars are deflected to the steam railroad right-of-way from Buckland, Manchester and Talcottville to Vernon Junction, a distance of about 16.8 miles single track. At Vernon Junction the line swings to the north and passes to Rockville and Melrose over single-track branches totaling 14.7 miles of single track. The electrification of these lines made it possible to bring passengers into the business section of Hartford and to improve the headway through the operation of single cars. This line, which is of the d.c. catenary type, was described in the issue of the Street Railway Journal for Dec. 7, 1907.

In addition to these d.c. electrifications, the New Haven company's tracks between Middletown and Cromwell, Tafts and Central Village, etc., carry trolley cars of its subsidiary, the Connecticut Company, besides the regular steam service.


0 10 20 30 40 50 60
SCALE OF MILES
Electrified Lines
Steam Lines
Oswego
Camden
Rochester
Pittsford
Lyons
Oneida L.
Rome
Utica
Scotts V.
Weedsport
Syracuse
Oneida
Clinton
Avon
Auburn
Geneseo
Mt. Morris

American Electrifications—Erie and West Shore Railroads, Central New York

The 11,000-volt, single-phase, twenty-five-cycle main-line electrification of the New York, New Haven & Hartford Railroad is too well known to require any description, numerous articles on this subject having been published in the Street Railway Journal and the Electric Railway Journal since 1905. A general review of the locomotive development on this system was published in the issue of Feb. 17, 1912. The section now in operation comprises 21.5 miles of route, or 109.3 miles of single track, between Woodlawn at the New York City line and Stamford, and the Harlem River branch as shown has just been completed with 63.4 miles of main line and 78 miles of yard track, a total of 141.4 miles of single track. The main line electrification for the 41 miles between Stamford and New Haven now nearing completion will comprise 170 miles of main-line track and 40 miles of yards and sidings, or 210 miles in all. Furthermore, the board of directors has approved the electrification of the four-track main line

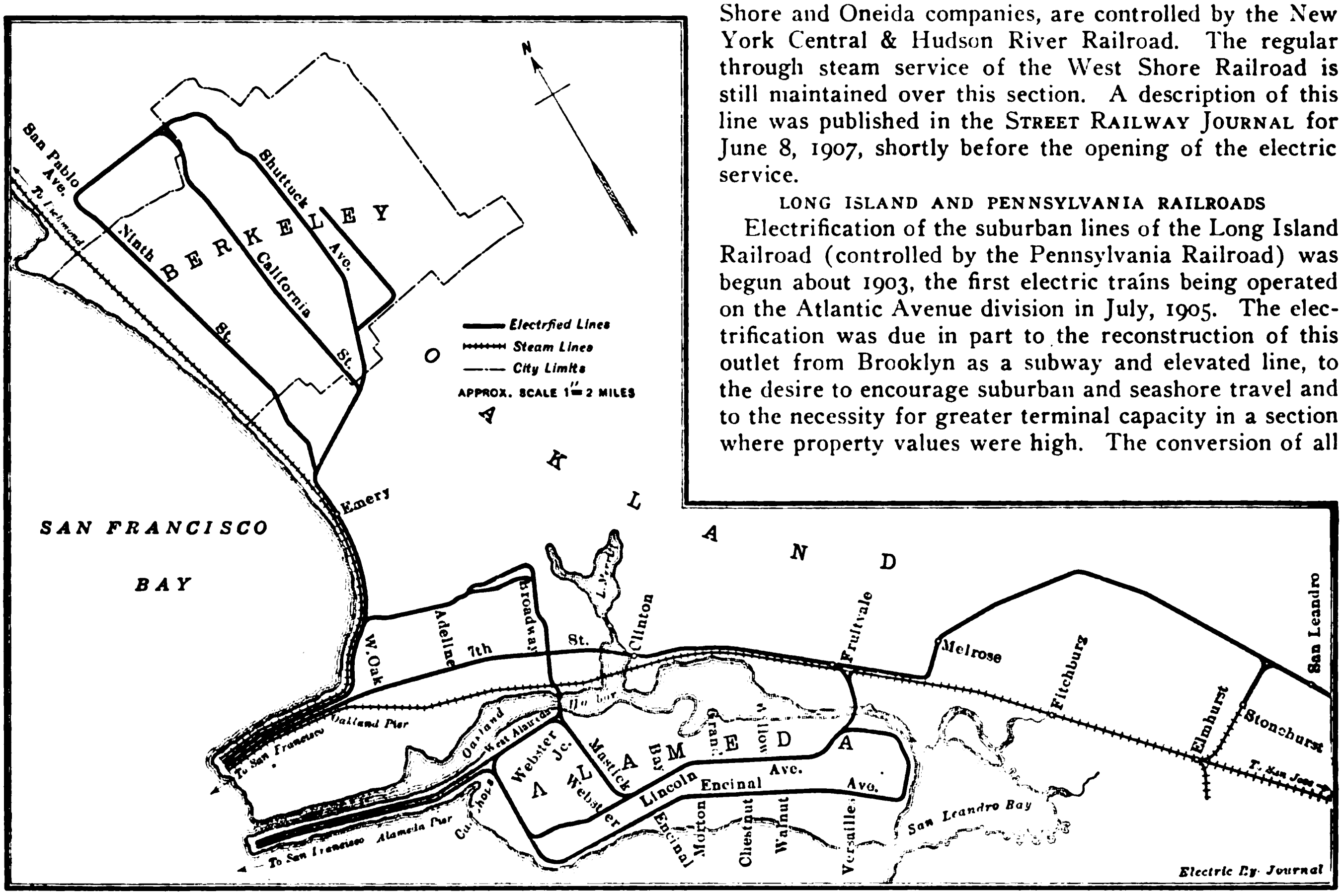

Electric Lines
Steam Lines
0 5 10 15
SCALE OF MILES
Philadelphia
Mt. Holly
Browns Mill Jc.
Camden
Westmont
Medford
Woodbury
Atco
Harris
Glassboro
Winslow Jc.
Salem
Newfield
Germania
Bridgeton
Millville
Mays Landing
Atlantic City

American Electrifications—West Jersey and Seashore Division, Pennsylvania Railroad

between Providence and Boston, a distance of approximately 50 miles. This work will call for 196 miles of main-line track and 20 miles of yards and sidings, a total of 216 miles. The figures for the Providence-Boston electrification are subject to change as the plans are not yet matured, but the single-phase mileages of the Harlem River and Stamford-New Haven divisions are approximately correct. The total single-phase electrification of this character with the completion of the Providence-Boston line will be about 700 miles of single track.

This company also operates a single-phase cross-country line of light catenary type between Stamford and New Canaan, comprising 7.7 miles of single track. This road carries electric passenger cars and steam freight, the latter being handled at night.

On May 27, 1911, the Boston & Maine Railroad placed in service the Hoosac Tunnel, which had been electrified for 11,000 volts, twenty-five cycles, single-phase, in conformity with the practice of the New York, New Haven & Hartford Railroad. This line, comprising 22 miles of track, was described in the Electric Railway Journal for July 1, 1911.



American Electrifications—Southern Pacific Railway's Suburban Lines at Berkeley, Oakland and Alameda, Cal.

NEW YORK CENTRAL & HUDSON RIVER RAILROAD

As is well known, the New York Central and New Haven electrifications were accelerated by the compulsory conversion of the joint viaduct and tunnel entrance to the Grand Central Station via Park Avenue, New York. Unlike the a.c.-d.c. electrification of the New Haven company, the New York Central equipment is direct-current, third-rail throughout. The latter electrification comprises two lines out of New York City, the Harlem division to North White Plains, 24.4 miles northeast, and the Hudson (main-line) division to Harmon, 34 miles north of New York, a total of 234.4 miles of single track. The New York Central & Hudson River Railroad has no immediate plans for additional main-line work, but a plan to electrify its freight entrance along the Hudson River in New York City is now being jointly considered by the railway company and a committee of the Board of Estimate and Apportionment of New York. The latest data on the operations of the electric zone of the New York Central company will be found on pages 586 and 587 of the Electric Railway Journal for March 29, 1913.

The electrification of the Detroit River tunnel, 19.2 miles of single track, was completed in October, 1910, by the Michigan Central Railroad, a subsidiary of the New York Central & Hudson River Railroad. This is a 650-volt direct-current third-rail line, as described in the Electric Railway Journal for Jan. 14 and 21, 1911.

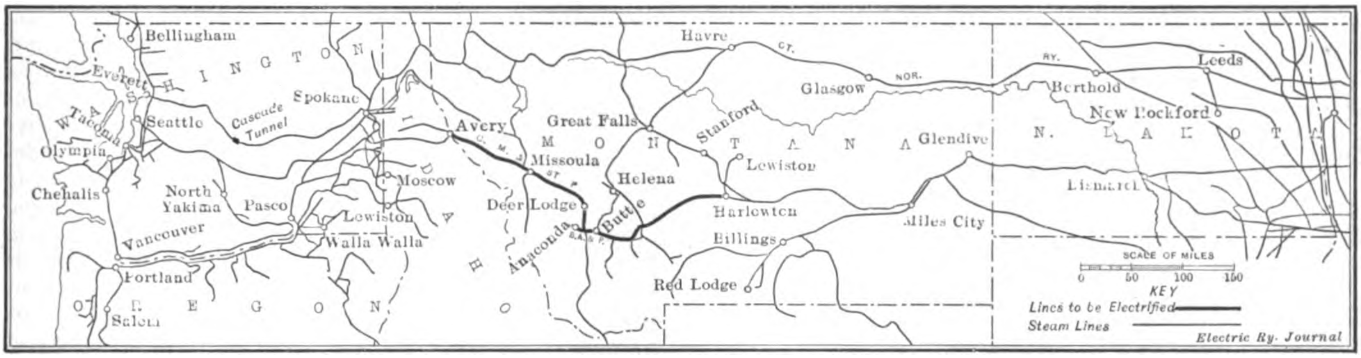
The Oneida Railway is a 600-volt direct-current third-rail line, comprising 44 miles of route or 118 miles of single track. It is an electrification of the main line of the West Shore Railroad between Utica and Syracuse, New York. The passenger cars operated by the Oneida Railway over this section also are run over the tracks of the Utica and Syracuse street railway systems, which, like the West Shore and Oneida companies, are controlled by the New York Central & Hudson River Railroad. The regular through steam service of the West Shore Railroad is still maintained over this section. A description of this line was published in the Street Railway Journal for June 8, 1907, shortly before the opening of the electric service.

LONG ISLAND AND PENNSYLVANIA RAILROADS

Electrification of the suburban lines of the Long Island Railroad (controlled by the Pennsylvania Railroad) was begun about 1903, the first electric trains being operated on the Atlantic Avenue division in July, 1905. The electrification was due in part to the reconstruction of this outlet from Brooklyn as a subway and elevated line, to the desire to encourage suburban and seashore travel and to the necessity for greater terminal capacity in a section where property values were high. The conversion of all parts of the suburban system for third-rail, 600-volt operation has not yet been completed, but the electric lines, as indicated on the map, now total 1868 miles of single track. Articles on this electrification appeared in the Street Railway Journal for Nov. 4, 1905, April 7 and June 9, 1906, and in the Electric Railway Journal for March 26, 1910, and June 10 and 17, 1911.

During 1910 the Pennsylvania Railroad completed its New York terminal, comprising 98.4 miles of d.c. third-rail construction from Manhattan Transfer station opposite Newark to Long Island City, via a new route to Bergen Hill and through tunnels under the Hudson River, Manhattan Island and East River. The principal articles on this installation appeared in the Electric Railway Journal for June 3 and June 10, 1910, and an article on the maintenance of these locomotives in the issue of March 15, 1913. It may be added that by arrangement made in 1911 with the Hudson & Manhattan Railroad cars of the latter company are operated electrically over the right-of-way of the Pennsylvania Railroad between Newark and Jersey City.

The West Jersey & Seashore division of the Pennsylvania Railroad between Camden (opposite Philadelphia) and Atlantic City comprises 150.3 miles of 700-volt d.c. third-rail construction. This electrification was due chiefly to the desire to encourage seashore travel on high-speed trains. The electric service was opened Sept. 18, 1906. Articles describing this line or presenting operating data were published in the following issues: Nov. 10, 1906; Oct. 12, 1907; March 26, 1910; July 1, 1911.

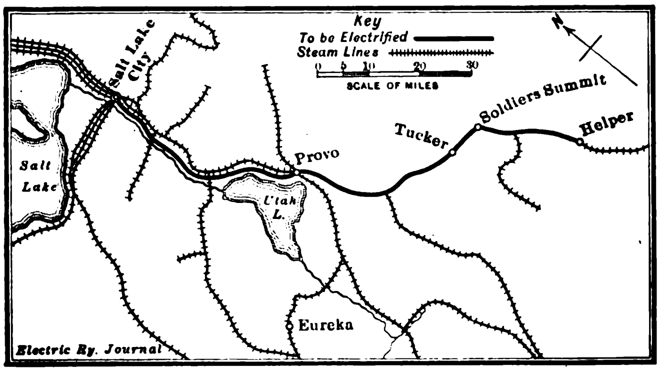

Bellingham
Everett
Seattle
Tacoma
Olympia
Chehalis
Vancouver
Portland
Salem
W A S H I N G T O N
Spokane
Cascade Tunnel
North Yakima
Pasco
Lewiston
Walla Walla
Moscow
Avery
Missoula
Deer Lodge
Anaconda
B. A. & P. R. R.
Butte
Helena
Great Falls
M O N T A N A
Havre
Glasgow
Stanford
Lewistown
Harlowton
Billings
Red Lodge
Miles City
Glendive
Berthold
New Rockford
Leeds
N. D A K O T A
Bismarck
I D A H O
O R E G O N
C. M. & St. P.
GT. NOR. RY.
SCALE OF MILES
0 50 100 150
KEY
Lines to be Electrified
Steam Lines
Electric Ry. Journal

American Electrifications—Map of Electrified Lines in the Northwest, Showing Route of Chicago, Milwaukee & Puget Sound Railway

Another map shows the route of the approved Philadelphia-Paoli electrification, a distance of 20 miles. As noted on page 515 of the Electric Railway Journal for March 15, 1913, this line is to form the beginning on a general electrification of the Pennsylvania's lines in and about Philadelphia. The length of the electrification, measured as single track, will be approximately 90 miles, according to the number of sidings converted.

ERIE RAILROAD

In June, 1907, the Erie Railroad completed the electrification of its Mount Morris division between Rochester, Avon, Geneseo and Mount Morris, N. Y., a route distance of 34 miles, equivalent to 40 miles of single track. This line, which is of interurban passenger character, is operated at 11,000 volts, twenty-five cycles, single-phase, with Niagara power. Two articles on this line appeared in the Street Railway Journal for Oct. 12, 1907. Operating results were presented in the Electric Railway Journal for June 19, 1909, and the most recent data will be found elsewhere in the current issue.


Key
To be Electrified
Steam Lines
0 5 10 20 30
SCALE OF MILES
Salt Lake City
Soldiers Summit
Tucker
Helper
Provo
Salt Lake
Utah L.
Eureka
Electric Ry. Journal

American Electrifications—Denver & Rio Grande Company's Line in Utah

SOUTHERN PACIFIC RAILROAD

During 1911 the Southern Pacific Railroad converted 96 miles of suburban steam track in and about Oakland, Alameda and Berkeley, Cal., to overhead 1200-volt d.c. overhead operation. Descriptions of this work appeared in the Electric Railway Journal for Oct. 21 and 28, 1911, and Oct. 5, 1912. The last article describes the electric locomotives, which are to be used chiefly for freight service.

GRAND TRUNK RAILWAY

The electrification of the Grand Trunk Railway, as carried out in 1908 under the name of the St. Clair Tunnel Company, comprises 4 miles of tunnel track at Port Huron, Mich., operated at 3300 volts, twenty-five cycles, single-phase. This work was described in the Electric Railway Journal for Nov. 4, 1908.

GREAT NORTHERN RAILROAD

The electrification of the Great Northern Railway's Cascade tunnel, between Leavenworth and Skykomish, about 100 miles east of Seattle, was completed in July, 1909, for three-phase, twenty-five cycle, 10,000-volt operation. This is the only three-phase line in the United States. It has 6 miles of single track, including the approaches. The distance between Leavenworth and Skykomish, the proposed completed three-phase electrification, is 57 miles. The line was electrified to eliminate smoke troubles and increase the capacity. A description of this installation was published in the Electric Railway Journal for Nov. 20, 1909.

Electrified Steam Railroads in the United States in Operation or Under Construction

Railway	Miles of Single Track	System of Electrification	Total Mileage
Baltimore & Ohio	7.4	Low voltage d.c.	....
N. Y., N. H. & H. and B. & M.	104.4	Low voltage d.c.	....
New York Central lines	371.6	Low voltage d.c.	....
Pennsylvania system	435.5	Low voltage d.c.	....
Total of low voltage direct current			918.9
Butte, Anaconda & Pacific	90.0	High voltage d.c.	....
Southern Pacific	96.0	High voltage d.c.	....
Total of high voltage direct current			186.0
Grand Trunk	4.0	Single-phase	....
Erie	40.0	Single-phase	....
N. Y., N. H. & H.	490.4	Single-phase	....
Total of single-phase			534.4
Great Northern	6.0	Three-phase	....
Total of three-phase			6.0
Grand total			1645.3

Lines Approved for Electrification.

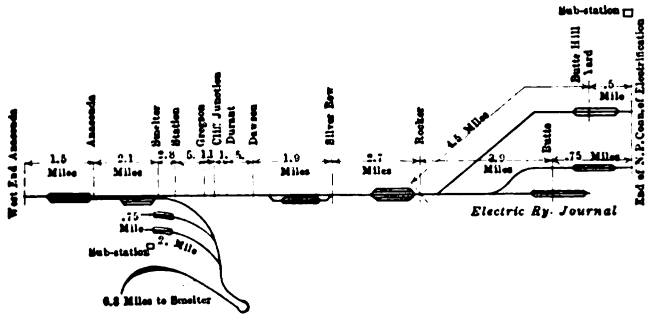
Railway	Miles of Single Track	System of Electrification	Total Mileage
Pennsylvania	90*	Not decided	....
Norfolk & Western	75	Not decided	....
Denver, Rio Grande & Western	114	Not decided	....
Chicago, Milwaukee & Puget Sound	440	Not decided	....
Great Northern	530	Not decided	....
Grand total			1249

* Paoli electrification, mileage approximate.

This company is also said to be considering the electrification of a 530-mile line between New Rockford, N. D., and Lewistown, Mont., for which roadbed and other construction contracts have been awarded. In this case electrification is said to be favored owing to the poor coal and water conditions for locomotives. A discussion of this subject was published on pages 117 and 118 of the Electric Railway Journal for Jan. 18, 1913.

CHICAGO, MILWAUKEE & PUGET SOUND RAILWAY

The Chicago, Milwaukee & Puget Sound Railway has already contracted for hydroelectric power to operate its line from Harlowton, Mont., to Avery, Idaho, a distance of 440 miles. It is probable that a 2400-volt d.c. system will be used. Avery is 2495 ft., Harlowton 4163 ft. and the intermediate town of Deer Lodge 4520 ft. above sea level. The distance between Avery and Deer Lodge, the proposed initial electrification, is 211.5 miles and between Avery and Harlowton 439.3 miles, all single track. Articles on this mountain project were published in the ELECTRIC RAILWAY JOURNAL for Jan. 11, 1913, and Feb. 15, 1913.



American Electrifications—Diagrammatic Map of Butte, Anaconda & Pacific

DENVER, RIO GRANDE & WESTERN RAILWAY

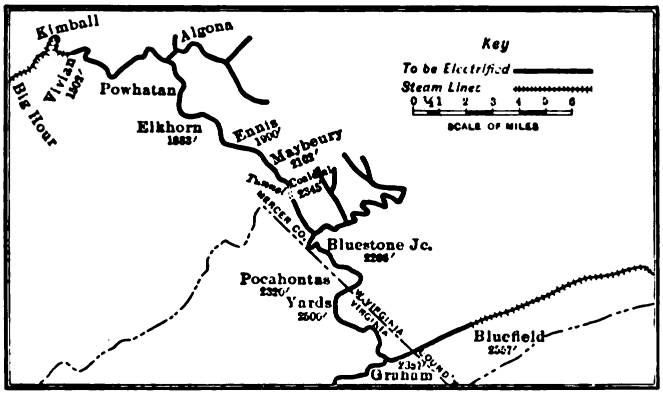
The Denver, Rio Grande & Western Railway has decided to electrify one 114-mile mountain division. The distance from Helper to Soldier Summit, which is to be the initial electrification, is 29 miles and from Helper to Salt Lake City, 114 miles. Helper is 5840 ft., Soldier Summit 7454 ft. and Salt Lake City 4224 ft. above sea level. Preliminary articles on this electrification appeared in the ELECTRIC RAILWAY JOURNAL for Nov. 23 and Nov. 30, 1912.

BUTTE, ANACONDA & PACIFIC RAILROAD

The Butte, Anaconda & Pacific Railroad is an ore-carrying mountain line comprising 114 miles of single track, 90 miles of which are being electrified for 2400-volt d.c. operation. Articles on this installation have appeared in the ELECTRIC RAILWAY JOURNAL for Feb. 10 and Aug. 31, 1912, and on page 20, Jan. 4, 1913. A description of the locomotives appears in this issue.

NORFOLK & WESTERN RAILWAY

The latest mountain electrification is that of the Norfolk & Western Railway for the heavy coal-carrying line between Vivian and Bluefield, W. Va., comprising 30 miles of route or 75 miles of single track. The operating conditions on this line were described in the ELECTRIC RAILWAY JOURNAL for May 3, 1913. and the general course of the line and topographical conditions are shown in the accompanying map. The system of electrification has not yet been selected.



American Electrifications—Norfolk & Western Railway

Plans have been prepared for a proposed narrow-gage electric railway in Switzerland between Arzier and St. Cergue and to La Cure and Morez. The line would be about 25 miles long, about 8 miles of which would be in French territory.

LOCOMOTIVES FOR THE BUTTE, ANACONDA & PACIFIC

The electrification of the Butte, Anaconda & Pacific Railway is of exceptional interest because it is the first in this country where direct-current locomotives operating on as high a potential as 2400 volts will be employed. Construction work necessary to effect the change from steam to electric equipment is now practically completed, and the road is at present being operated to some extent by electric power.

The section of line that has been electrified lies between Butte and Anaconda, Mont. It comprises 30 miles of main-line single track and numerous sidings, yards and smelter tracks, aggregating a total of about 90 miles on a single-track basis. The haulage of copper ore from the Butte mines to the smelters at Anaconda, which is the principal traffic, together with all mine supplies, lumber, etc., moving in both directions, amounts to practically 5,000,000 tons of freight per year. The freight trains, weighing 3400 tons and made up of fifty loaded ore cars, will be handled against a ruling grade of 0.3 per cent by locomotives consisting of two of the units illustrated. Single units will be used for making up trains in the yards and for spotting cars.

The initial equipment consists of seventeen units, fifteen for freight and two for passenger service. Each unit weighs approximately 80 tons. The two units forming the freight locomotive in each case will be coupled together and operated in multiple, and combination locomotives will haul the 3400-ton train at a maximum speed of 15 m.p.h. against the ruling grade and at 21 m.p.h. on level tangent track.

The passenger locomotives are the same design as the freight locomotives, except that they are geared for a maximum speed of 45 miles per hour on level tangent track. A schedule of eight passenger trains per day, four each way, is maintained, the average train being composed of a locomotive and three standard passenger coaches. All the locomotive equipment, as well as the substation apparatus and overhead line material, was designed and built by the General Electric Company. One of the locomotives will be exhibited at the Master Mechanics' and Master Car Builders' conventions at Atlantic City.

The general design is of the articulated double-truck type, all weight being on the drivers. The cab, containing an engineer's compartment in each end and a central compartment for the control apparatus, is carried by the two truck frames on center pins. It is of the box type, extending the entire length of the locomotive, and is provided with end and side doors. Friction draft gear mounted on the outer end frame of each truck transmits the hauling and buffing stresses directly through the truck frame, diverting these strains from the center pins and underframe.

The trucks are built of heavy steel castings. The side frames are of a truss pattern with heavy top and bottom members and pedestal tie bars. They are connected by end frames and a cast-steel center transom. The entire weight is carried on semi-elliptic springs suitably equalized. On each axle is mounted a motor of the twin-geared type.

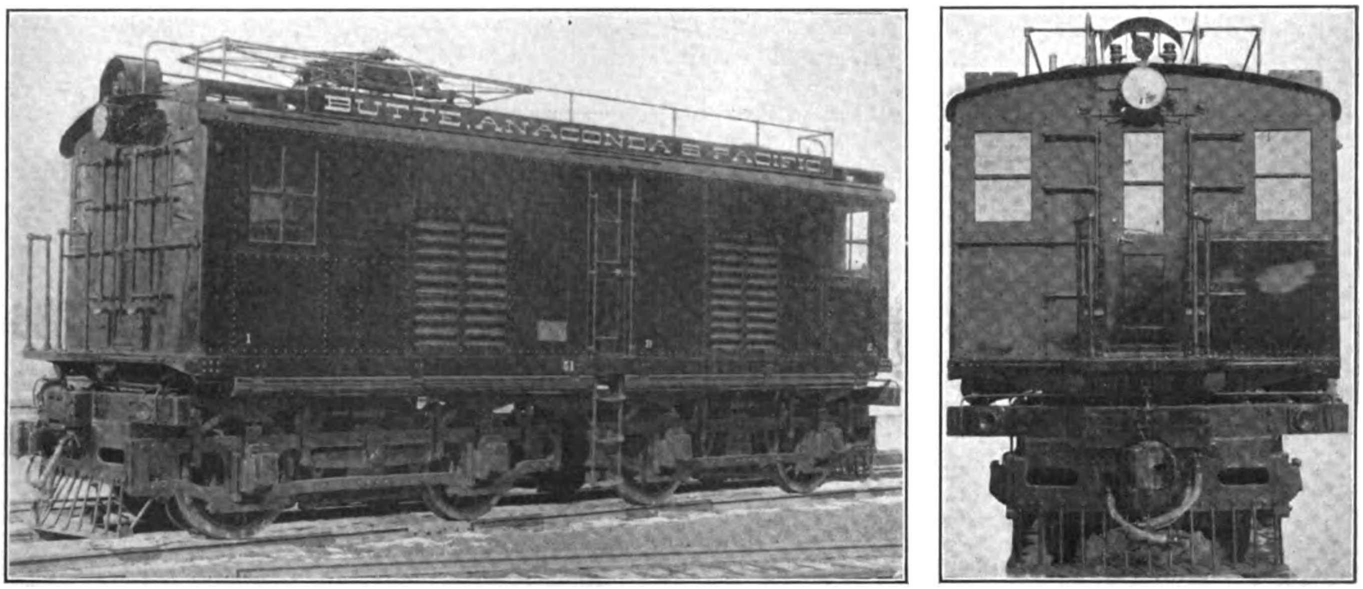
The cab underframe consists of two 12-in. longitudinal steel channels on either side of the center and two 6-in. x 6-in. steel angles along the outer edge. The central channels are inclosed and form a distributing air duct for forced ventilation. Air is conducted through the center pins, which are hollow, into the truck transoms and thence to the motors. The engineer's compartment, at either end of the cab, contains the operator's seat, controller, air-brake valves, bell and whistle ropes, ammeter, air gages, sanders and other control apparatus that should be within immediate reach of the engineer.

In the central section is grouped the control apparatus. The contactors, reverser and rheostats are mounted in two banks running lengthwise of the compartment and are arranged with ample space between them to afford convenient access for cleaning, inspection and repair. All parts and circuits carrying 2400 volts are thoroughly protected from accidental contact. A dynamotor is employed to furnish 600 volts for the operation of the contactors, lights and air compressor.

The principal data and dimensions applying to the locomotives are the following:

Length inside of knuckles	37 ft. 4 in.
Height with trolley down	15 ft. 6 in.
Width over all	10 ft. 0 in.
Total wheelbase	26 ft. 0 in.
Rigid wheelbase	8 ft. 8 in.
Total weight	160,000 lb.
Wheels, diameter	46 in.
Tractive effort at 30 per cent coefficient	48,000 lb.
Tractive effort at one hour rating	30,000 lb.
Tractive effort at continuous rating	25,000 lb.

The motors are of the GE-229-A commutating-pole type, wound for 1200 volts and insulated for 2400 volts. A forged pinion is mounted on each end of the armature shaft and meshes into a corresponding gear mounted on the wheel hub, providing a gear reduction of 4.84 on the freight locomotives and 3.2 on the passenger locomotives. The motor is designed especially for locomotive service, is inclosed and provided with forced ventilation. Air is circulated over the armature and field coils and over and through the commutator, through longitudinal holes in the armature core, and thence exhausted through openings in the bearing head. The continuous capacity of each motor is 190 amp on 1200 volts under forced ventilation, and the input is 225 amp on 1200 volts for the one-hour rating. For the double unit the continuous rating is equivalent to an output of 2100 hp.



Butte, Anaconda & Pacific Equipment—Side and End Views of 2400-Volt Freight Locomotive

The operating equipment on the locomotives includes the Sprague-General Electric Type M multiple-unit control, and it is designed to operate the four motors in series and series-parallel. The pairs of motors with their respective resistances are all connected in series on the first point of the controller. The resistance is varied through nine points on the controller and finally short-circuited on the tenth or running point. The pairs of motors are then operated similarly in series-parallel and all resistance is cut out on the nineteenth point, which is the full-speed running point. This provides a control with ten steps in series and nine steps in series-parallel.

The transition between series and series-parallel is effected without opening the motor circuit, and there is no appreciable reduction in tractive effort during the change, the smooth transition between control points permitting acceleration close to the slipping point of the wheels. A switch having manually operated handles for cutting out either pair of motors is provided so that the locomotive can if necessary be operated with one pair of motors in the usual way. The contactors are actuated by the 600-volt circuit obtained from the dynamotor and are of a design similar to that employed in the standard Type M control.

The main switch is provided with a powerful blow-out so that heavy currents can be opened. The three smaller switches, one for each of the two heaters and one for the dynamotor circuits, are designed specially for 2400 volts. The blades are controlled by levers attached to the grounded part of the locomotive frame and insulated from the live parts of the switch by rods of treated wood.

There are two fuses for the motor circuits and one main fuse for the trolley circuit, all of the copper-ribbon type and fitted with hinged covers to facilitate fuse renewals.

An ammeter is located at each engineer's position and indicates the current in the circuit of one pair of motors. The ammeter and air gages are illuminated by a gage light connected in the headlight circuit, so that the headlight switch turns on simultaneously the headlight and gage light at the same end of the locomotive.

The main motor rheostats are formed of cast-iron grids assembled in a frame and insulated by mica. Twenty resistance units are provided for each passenger locomotive and twenty-six for each freight unit locomotive, the units being mounted in an inclosed compartment above the banks of contactors.

Current is collected by overhead trolleys of the pantograph type. They are pneumatically operated and can be put into service from either engineer's compartment by a hand-operated valve. Each passenger locomotive is equipped with two collectors and each freight unit with one collector. A 2400-volt insulated bus line connected direct to the pantograph is run along the center on the roof of the cab, and the bus lines are connected by couplers between the two units of the freight locomotive, so that current may be obtained from both collectors or from a single collector as desired. The collectors and bus lines are adequately guarded by railings.

The locomotives are equipped with arc headlights and the interior illumination of the cab is provided by ten incandescent lamps arranged in two circuits, one lamp being placed in each engineer's cab and the others in the central compartment. In each lamp circuit is a portable lamp with an extension cord. One lamp switch is located in each engineer's cab, so that one lamp circuit can be controlled from each end of the locomotive. A 600-volt bus line is provided on the passenger locomotives for lighting and a 2400-volt bus line for heating the passenger coaches.

Papers at the N. E. L. A. Convention

Abstracts Are Published of a Number of the Papers Read and Reports Presented at the Convention of the National Electric Light Association in Chicago on June 3-6

The annual convention of the National Electric Light Association was held at the El Medinah Temple in Chicago this week. The meeting began with a general session on Tuesday in the main auditorium. The association then divided into its different sections and there were technical, commercial, accounting, hydroelectric and public policy sessions. Abstracts of a number of the papers and reports of committees presented at the meeting follow.

PRIME MOVERS

The committee on prime movers submitted a 100-page report covering the development of water, steam and gas units during the past year. It was stated that there has been no striking development in any of the various forms of prime movers applicable to central-station use. However, much thought has been given to improving the efficiency of waterwheels and steam turbines, and an earnest effort has been made to develop an internally fired heavy-oil engine.

Optimistic letters from the General Electric Company and the Westinghouse Machine Company published in full in the report indicated that the trend of rotative speed in steam turbines was upward and that the several minor changes that had been made in design had helped to improve the efficiency. Steam turbines for driving station auxiliaries were reported to be bidding fair to supersede all other competitive apparatus. In connection with high-pressure turbines the committee called attention to the statement of Dr. S. Z. Ferranti, who had said that he expected to be able to produce a high-superheat turbine capable of operating on less than 6 lb. of steam per brake-hp-hr. It was the suggestion of the committee that a condenser should be designed to get the steam to and not through the cooling surface. The use of baffles was regarded unfavorably as they established an undesirable back pressure in the condenser.

The question of adequate opening for admitting air for draft to boiler houses led to calculations with rather startling results. It was stated that if in an assumed boiler room containing twenty 500-hp boilers the air for the draft was compelled to enter through a 7-ft. by 7-ft. doorway the velocity of the blast would reach 50 miles an hour. These figures were presented as an argument for adequate draft opening both in winter and summer. The value of apparatus for determining flue gas composition seemed subject to a wide divergence of opinion. It was the opinion of the committee that a steam-flow meter could perform essentially all of the functions claimed for the CO_2 meter. Because of the high calorific value of petroleum oil and its great adaptability to boiler work it was almost the ideal fuel and the comparatively recent discovery of oil fields in Mexico was looked upon as an important factor in placing it again among fuels.

The committee in presenting for discussion the term "myriawatt" in an effort to get rid of the term boiler-horse-power suggested that the question of adoption of such a unit be put into the hands of the national engineering societies.

In the report on gas power it was stated that the market for gas and oil engines had been unusually quiet in the past twelve months and this was attributed to the great trend toward the centralization of generating stations. Owing to the relatively large investment and maintenance cost even the smaller units had suffered a loss in the prestige accorded them by the industries a few years ago. There were approximately 300 installations of medium and heavy-duty oil engines, aggregating 75,000 hp. in operation in the United States, indicating that the oil engine had assumed a definite part in the production of power in this country. Although no gas turbine had yet been developed, engineers engaged in the development of the internal-combustion engine had long realized the advantage of substituting rotary movement for reciprocating motion. So far the practical difficulties had not been surmounted. Much useful knowledge, however, had been obtained by able experimenters.

ELECTRICAL APPARATUS

The committee on electrical apparatus reported upon the progress made and the tendency of developments of electrical apparatus for use in central-station service. It was stated that more attention than ever before was being given to details that would insure satisfactory operation. With the continuation of the tendency of manufacturers toward units of greater rating, higher relative speeds were being adopted, thereby necessitating the use of improved types of insulating materials suitable for withstanding high temperatures and severe mechanical strains.

The past year had been marked by progress in the design of turbo-generators and it was reported that several companies had placed orders for 25,000-kw units. Manufacturers now indicated their ability to build large high-potential generators without employing auto-transformers. Reactors were being introduced for protection against high-frequency disturbances, for voltage regulation and synchronizing power, and for limiting current rushes into a short-circuit. With the latter class their use with such apparatus as generators and transformers, for insertion on busbars of substations and in feeders was becoming more widespread.

With regard to the higher speeds of rotative apparatus instances were cited in which 5000-kw units operated at 3600 r.p.m., 19,000-kw units at 1875 r.p.m. and 20,000-kw units at 1500 r.p.m., and it was apparent that the final limit had not yet been reached. The adoption of commutating poles had assisted materially in making it possible to develop high-speed direct-current apparatus, and twenty-five-cycle converters of recent design were now operated at approximately twice the number of revolutions of the old non-commutating-pole designs, although peripheral speeds had not increased in the same proportion. There seemed to be a tendency at present to equip generators with directly coupled exciters. Chief among the advantages of this idea were simplicity, economy and elimination of wiring and switching connection. In spite of the fact that the rotary converters of recent date showed greater speeds and increased outputs due to inauguration of commutating poles, the committee believed that proposals to change over existing rotary converters should generally be discouraged. In summing up the situation the committee recommended the use of sixty-cycle machines for railway service. The use of synchronous converters for securing better regulation on transmission lines and for correcting the power factor on distribution systems was commented upon, and although in the former case installations have met with much success, it was the opinion of the committee that other methods should be employed for power factor correction. The data concerning the application and operation of types of brushes on commutating apparatus which were presented were said to be authoritative and accurate. The hard-carbon brush, treated hard-carbon brush, graphite brush and copper graphite brush were discussed at some length and were mentioned in connection with the class of operation to which they are best suited.

DISTRIBUTION PROBLEMS

The report of the committee on distributing lines, of which P. M. Downing, of the Pacific Gas & Electric Company, San Francisco, was chairman, dealt particularly with Western and Pacific Coast conditions, where during recent years there have been big changes in the methods of transmitting and distributing electrical energy. Principal among those noted was the increase in transmission voltages from 200 to 300 per cent or more. Distribution voltages have also been raised to a third or a half of the values formerly used. Star connection of transformers was favored up to 15,000 volts, although many companies prefer the delta connection. The type of line construction was thought to have stayed fairly constant during recent years, although improvements in insulators have been rapid. Pin-type insulators were considered better for low voltages and suspension type on voltages of 60,000 or over and for special climatic conditions. It was stated that there are portions of the Pacific Coast where salt fogs and dust storms combine to form conducting films on the surfaces of insulators. For such cases the suspension type of insulator was recommended; these must be wiped clean at certain intervals. Economic considerations in the extension of lines and fixing of development rates were mentioned in closing.

POLES AND POLE PRESERVATION

A paper by Russel A. Griffin, of the Western Electric Company, Chicago, briefly discussed the subject of wood decay, concluding with brief descriptions of the various methods now in vogue for preserving timber in order to insure maximum life at minimum investment. In the opinion of the author coal-tar creosote is the best timber preservative.

SWITCHBOARD INSTRUMENTS

In an interesting paper entitled "Switchboard Instruments," Paul MacGahan, of the Westinghouse Electric & Manufacturing Company, stated that errors in switchboard instruments may be divided into three classes, namely, electrical, mechanical and observational. Because the mechanical defects affect the life of the instruments and increase with time they are, generally speaking, of more importance than the electrical errors. The leading American meters are satisfactory with regard to temperature, self-heating, and phase-angle errors, but the errors resulting from external magnetic fields, residual magnetism and the wave form of rectified direct current are too large to be neglected. The mechanical sources of error are excessive weight of moving element, insufficient ruggedness of moving element, insufficient controlling force and insufficient insulation. It is suggested that to obviate the trouble occurring with direct-current instruments due to stray magnetic fields in the vicinity of busbars, the instrument of this type should be mounted so that the direction of the busbar field is at right angles to the permanent magnet, as a demagnetizing field passing through permanent magnets at right angles to the direction of the permanent magnetic flux has little or no effect upon the magnet. This method has been found more successful than that of employing iron shields for instruments, especially where short-circuits produce excessive current in the busbar. In the new alternating-current protective relays the inverse-time-element characteristics are obtained by the action of a permanent magnet upon a disk. These relays are made in the following types: (1) current or overload, inverse-time-element, operating instantaneously at heavy overloads; (2) current or overload, inverse-time-element, operating non-instantaneously at heavy overloads, the minimum time-element for any overload being adjustable; (3) overload and reverse relays, inverse-time-element, tripping on heavy loads in the normal direction or light loads in the reverse direction, provided the voltage or the power factor does not fall to a low value; (4) reverse-power, selective-type relays, operating on reverse power but having a selective wattmeter element in the same case so connected as to keep the trip circuit open whenever energy flows in the normal direction. It is an axiom that relays located at the substation terminals of transmission lines should be arranged so that tripping can never take place because of energy flowing into the substation. Following this law, the reverse relays described solve the problem of reverse-power protection, even in cases where voltage and power factor drop to low value during short-circuits. They are particularly useful at the incoming ends of transmission lines.

HIGH-TENSION UNDERGROUND CABLES

The committee on underground construction, of which W. L. Abbott, of Chicago, was chairman, confined its annual report to the subject of high-tension transmission cables. The periodical high-potential break-down testing of such cables was condemned as they were thought in general to increase the liability to subsequent break-downs and often not to disclose existing points of weakness. The majority of the companies report that such tests are not applied. Considerable space was given to the discussion of carrying capacity of cables. This was stated to be limited by the temperature of the insulation, and it was held that the life of the cable varied in inverse ratio with this temperature. Hence the three factors to be considered in determining the safe current load of a cable are temperature of inclosed conductor, temperature of surrounding air and objects, and heat generated in the insulation itself due to current leakage through the dielectric. The committee recommended that a very decided increase be made in the rating during the winter and also that the current rating be varied inversely with the voltage on account of the heating of the insulation due to leakage of current. The committee also suggested that use might be made of a graded paper insulation formed by saturating successive sections with oils so chosen as to give specific inductive capacities varying in the proper proportions. Such a step, it was explained, would allow of a smaller diameter of cable with the same factor of safety, or of a higher voltage, the diameter and factor of safety remaining the same. With the increasing size of rotary converters and with the resulting increase in the size of the conductor, in order that a line may have sufficient capacity for one converting unit, some companies have reached the maximum size of three-conductor cables (with round conductors) that can be installed in a duct nominally 3 in. in diameter. To secure a cable with larger copper cross-section or thicker insulation, or both, cables have been developed with conductors of clover-leaf or sector form. Some attention was given in the paper to the discussion of methods for protection of cables in manholes and to trouble reporting. In closing, the author suggested standard form specifications for paper-insulated high-tension cable and for rubber-insulated, lead-covered cable for pressures in excess of 2000 volts.

LIGHTNING ARRESTERS

According to Prof. E. E. F. Creighton, of the General Electric Company, the multi-gap arrester still holds a predominant position in distribution work at or about 2300 volts, because of its lesser cost and because it can be made insensitive to arcing grounds and at the same time sufficiently sensitive to protect transformers. To get a high degree of protection for lighting transformers an arrester should be placed at each one, since if it is located only a few poles distant it will be ineffective against the concentrated and localized potentials due to lightning. With aluminum arresters, a charging resistor represents a good investment. It can be placed in series with the arrester without preventing the latter from taking its full charging potential. This solves the problem of limiting the charging current to a reasonably small value, even though the films are badly dissolved. Another measure found advisable, in order to prevent arcing across the horn-gaps while charging, is the use of spring clips. Previous to January, 1912, an organic electrolyte was used in which a fungus growth was apt to appear accompanied by the formation of vinegar which had a deleterious effect on the film. Since that date the operation of this type of arrester has been greatly improved by the use of an inorganic electrolyte. Speaking of the grounding of apparatus, Professor Creighton stated that ordinary pipes driven into earth well salted will give as good a ground connection as can be obtained. Most of the resistance of an earth connection lies in the immediate neighborhood of the pipe. Moisture is necessary to reduce the resistance, and the salt supplies this conducting moisture.

WIRE FOR OVERHEAD DISTRIBUTION CIRCUITS

T. K. Stevenson, of the Duplex Metals Company, described a copper-clad steel wire for certain classes of overhead distribution circuits. This wire is made by dipping a steel billet into a bath of supermolten copper where it actually absorbs a certain amount of copper. When the billet is withdrawn its surface is wet down with a copper-iron alloy. Later a coating of copper is cast around it, the copper welding to the copper-iron alloy. By this process there is no surface contact between the pure copper and pure steel, the former grading into the latter through a series of copper-steel alloys. Three varieties of this reinforced wire are made, having conductivities of 30, 40 and 47 per cent that of pure copper. Wire of this kind finds its field of usefulness in those cases where fair electrical conductivity has to be combined with great mechanical strength and resistance to corrosion.

TRANSMISSION-LINE CONSTRUCTION

A paper by R. D. Coombs, of New York, gave an outline of the author's views relating to lines designed for operation at 2300 volts or more and discussed the structural features of tower and pole lines. In the author's opinion many of the lines being erected are using poles that are too high. It is far better, he thinks, to trim a few scraggly trees and lower the telephone and low-tension wires than to try to acquire the proper clearance with 60-ft. or 70-ft. poles. Co-operation between existing companies with a view to securing joint ownership of pole line should be encouraged. Although the loading on lines sometimes exceeds that assumed in the specifications of the joint committee, yet these specifications for loading are thought to be sufficiently rigid. The transmission lines do not need to be absolutely immune from failure. If the factor of safety will eliminate nearly all the failure due to ordinary manipulation and provide for a reasonable variation in the assumed load and for such deterioration as may be assumed in the material, it has served its purpose. Any decrease in such a factor would be dangerous, but an increase would be extravagant. Owing to the varying conditions of different soils the depth to which foundations for towers must be placed cannot be determined accurately and readily by a mathematical formula. As it is impracticable to make advance tests of soil conditions for a long transmission line, it is necessary either to have two standards or to design a single foundation which will provide safety for ordinary variations in the soil. Results obtained from test towers on rigid foundations are sometimes deceptive as a horizontal movement at the ground line may induce stresses not foreseen by the designer. The relative merits of galvanizing and painting can be discussed only as a local issue, since the weather and atmospheric conditions determine largely which should be used. The practice of installing a ground wire or sky wire in a shoddy fashion above high-potential lines is to be severely condemned. The use of a small U-bolt or hook bolt which bites into the ground wire and causes failure should be especially discouraged, as the failure of the ground wire is certain to cause failure of the circuit beneath it. Between the limits of 5000 volts and 20,000 volts wooden cross-arms will find favor, but for the higher potentials metal arms are probably preferable. In the transition which transmission structures are undergoing from wood to metal the excellent record of wooden poles in line work should not be overlooked. It is the author's opinion that the wide-base tower and the semi-flexible pole when properly designed provide the maximum security against service interruption. The greater strength possible in such structures allows the use of larger spans with a subsequent reduction in the number of insulators and hence in the number of insulator failures. In conclusion, the author appended informally his views on desirable detail requirements, in order to promote discussion upon proper line construction for potentials in excess of 6600 volts.

SUSPENSION INSULATOR DESIGN

According to A. O. Austin, of the Ohio Brass Company, the factor of safety in suspension insulators is abnormally small. Even a very slight increase in this safety factor means, he said, an appreciable gain in reliability. The ordinary insulator under load was compared by the author to a steel spring working near its elastic limit on a fluctuating load. He also showed that there is a very close relation between the electrical and the mechanical stresses in an insulator of this type. The factors spoken of as exercising an influence in the puncturing of insulators were the suddenness, frequency and amplitude of the surge or disturbance, the physical proportions of the insulator, the dielectric strength of its material, and the mechanical strain upon it. Some attention was given to the proper design methods to care for these factors. Testing was advocated as an effective way to eliminate weak insulators, and it was suggested that the tests be carried to the point where "spilling over" occurs. A diagram was shown of a suggested apparatus for subjecting the insulators to very sudden stresses. The effect of time lag on puncture was shown, and a report was given of an investigation made of the distribution of the stress in a series of insulators of the suspension type. Some attention was also paid to the subject of protective air gaps.

CIRCUIT-BREAKERS AND LIGHTNING ARRESTERS

J. N. Mahoney, of the Westinghouse Electric & Manufacturing Company, said that three factors were of controlling importance in the construction of oil circuit-breakers: (1) They must be insulated for the voltage at which they are rated; (2) they must have sufficient carrying capacity for their rated current, and (3) they must have sufficient circuit-breaking capacity to meet the conditions at the point where they are applied and to suit the character of the service. Extensive treatment of the last requirement was given embracing the various classes of oil circuit-breakers. The same points were also considered in regard to carbon-break circuit-breakers. Details of the electrolytic type of lightning arresters were given at length, and the author favored the use of this class of arrester whenever the value of the apparatus to be protected would warrant it. Recent investigations of the effects of daily charging were explained to have resulted in producing a great improvement in operating characteristics. These arresters are at present available for use with voltages up to 165,000, the highest thus far adopted commercially.

UNITS AND TERMINOLOGY OF POWER MEASUREMENTS

Several of the power measurement units in use in this country and abroad were noted in the report of the committee on measurements, of which Dr. A. E. Kennelly, Harvard University, was chairman. The committee favored the adoption of the myriawatt, about which there has been considerable debate during the past year. The advantage pre-eminently associated with such a step was held to be that of a unified system of measuring both the input and the output of steam engine-generator sets, making the important item of efficiency more readily apparent. The use of the term "kelvin," to displace the established kilowatt-hour, was opposed on the ground of ambiguity and because Lord Kelvin's name is being proposed for an important electrostatic unit.

ELECTRIC RAILWAY LOADS FOR CENTRAL STATIONS

Because of its notably good load factor and power factor and of its effect in improving the diversity factor, the electric railway load, both urban and interurban, was pointed out in a paper by E. P. Dillon, of the Westinghouse Electric & Manufacturing Company, to be a particularly good one for the central stations to obtain. The facts that it represents a large block of energy sold to one customer, that it is generally a growing load, and that the customer is one of known credit, were stated to be additional advantages in favor of this load. A number of instances were cited, mainly in the larger cities, where the railway systems are operated by central station energy. It was shown that, important as this demand is, its requirements are overshadowed by those of the lighting and motor loads, so that, although twenty-five cycles is a very desirable frequency for traction purposes, the sixty-cycle frequency required for lighting and ordinary motor loads is nearly standard. A simple and interesting chart was given, showing that the railway peak occurs at all seasons from about 5:30 to 6 p. m., while the lighting and motor peaks occur between 4 p. m., at the end of December, and 7:30 p. m., at the end of June, depending on the length of day at the various seasons. Leaving out of consideration, then, those days that are dark through stormy or cloudy conditions, there are only two periods of less than a month each per year—that is, at the end of March and at the end of September—when the railway and lighting peaks are likely to occur at the same time. Finally, it was stated that a very considerable advantage gained by the combination of the lighting motor-service power and the railway loads consists in the ability to use larger generating equipment, with its increased efficiency.

ACCOUNTING FOR DEPRECIATION

Frank A. Birch, of the Philadelphia Electric Company, explained that since local conditions, the earning capacity of the plant and, in some cases, the supervision exercised by public service commissions must be taken into consideration, it was difficult to present a treatise of wide application on the subject of accounting for depreciation. Certain things, however, could be done. The accounts should show the cost to the company of all properties. This should include the separate cost of each generating station, substation, line and all units of construction. The accounts of overhead and underground construction should be kept in such manner as will show at all times the complete cost of any particular line or portion thereof, so that upon retirement or replacement the amount to be charged to the depreciation reserve account may be readily determined. Accounts of a general nature should not be maintained in the general ledger unless subsidiary books are also kept which will show in detail the properties and lines included in such general accounts with individual costs of each. By charging against depreciation reserve account the cost of entire plants, lines and poles, or the cost of any item of construction retired, and charging directly into the property accounts the cost of plants or lines reconstructed, the accounting end of the proposition is kept clear and plain. The author considered depreciation in connection with the construction of a new plant or the installation of new equipment, and reviewed briefly the operations that are involved under the work-order system.

PREPAID AND ACCRUED ACCOUNTS

A paper by Franklyn Heydecke, of the Public Service Electric Company, Newark, N. J., contained a brief explanation of the methods employed in scientific cost accounting for keeping various classes of prepaid and accrued accounts. The particular accounts which the author indicated as requiring this treatment were taxes, rentals and income on investment, and he showed clearly that without such methods the actual condition of the business could not be correctly given in the usual monthly statements. He indicated furthermore that these special accounting methods act as a safeguard against unexpected financial embarrassment since they are essentially neither more or less than an equitable distribution of a lump expense or income over the period in which it is incurred or earned.

MECHANICAL AIDS TO OFFICE ROUTINE WORK

H. B. Lohmeyer, of the Consolidated Gas, Electric Light & Power Company, Baltimore, Md., presented a paper in which were described the more important machines at present available for saving time and labor in carrying on office routine work. Some of these machines have become so common as to rank with the telephone as necessities. Of this class are the typewriter, adding and listing machines and the slide rule. Among the less commonly used devices are the tabulating machine, the duplicating devices of various kinds, mail opener, addressing machine, counting machine and automatic cashier. Mr. Lohmeyer discussed each of these special devices and gave an outline of its development and of its field of usefulness in modern office procedure.

HANDLING FREIGHT BILLS

A. S. Scott, of the Public Service Company of Northern Illinois, described the method for handling of railroad freight bills employed by his company and by the Illinois Northern Utilities Company. Receipted original freight bills on delivery to local superintendents are paid immediately by drafts made payable to the railroad company, and these bills attached to the duplicates of the drafts are sent to the purchasing or fuel department for approval and from there to the auditor. The system is arranged so that the company is protected from loss through cashing of irregular drafts, and the railroad companies readily agreed to entertain claims for incorrect charges after the items had been paid. The plan results essentially in placing railroad freight on a "c. o. d." basis. Among the advantages claimed for it are the elimination of a great deal of unnecessary clerical work with a corresponding reduction of expense, the securing of more prompt payments, and the avoidance of considerable friction between local superintendents and the railroad agents.

HANDLING OF BOND COUPONS

W. J. Kehl, of the Virginia Railway & Power Company, Richmond, Va., discussed the accounting methods involved in keeping track of coupon payments and of matured coupons unpaid. He said that the preservation of canceled coupons, awaiting the maturity of the bond and final payment of both principal and interest, had become a very annoying problem through the increase in extent and size of bond issues, and suggested that canceled coupons be periodically burned and a certificate of cremation issued to cover the transaction and represent that block of coupons in the final accounting.

ACCOUNTING SCHOOL FOR EMPLOYEES

In a paper by A. L. Holme a summary was given of the steps taken by the New York Edison Company to inaugurate a school on accounting theory and practice among the employees of its accounting department. The course was given on Wednesday evenings from 8 to 10 o'clock during the past winter season, and attendance was optional. There were nine lectures by an instructor from the New York University School of Commerce, Accounts and Finance; three written examinations were held, and six talks were given by company officials on the following topics: "Accounting Methods of the Company," "Relation of Accounting to the Company's Executives," "Work of the Contract and Inspection Departments," "Meters," "Purchasing and Supply Accounting" and "Customers' Accounts." The lectures were upon the following subjects: "Bookkeeping," "Assets and Liabilities," "Assets," "Investments," "Current Assets," "Patents, Copyrights and Trade-Marks," "Funds," "Capital Liabilities" and "Interpretation of Balance Sheets." While it is hard to measure the exact results of an innovation of this character, particularly in its early stages, Mr. Holme considered it successful.

Purchased Power in New York State

Extracts from the Reports Furnished by the Railway Companies of the State of New York to the Public Service Commission of the Second District—The Prices Paid for Power by the Different Companies Are Given

The electric railways in the State of New York are in an unusually fortunate position as regards the purchase of power owing to the existence of numerous water-power sites of large capacity. Notable among these are, of course, the installations at Niagara Falls. The Niagara Falls Power Company, which draws water from the American side of the falls, distributes power for electric railways through the Cataract Conduit & Power Company, the latter company acting as a selling and distributing agent only. On the Canadian side of the river the Ontario Power Company develops power and sells it through the Niagara, Lockport & Ontario Power Company. Both of these distributing companies furnish power within the State of New York at extremely low prices.

Next in importance to these mammoth enterprises is the Adirondack Electric Power Corporation, which is a consolidation of the Hudson River Electric Power Company, the Hudson Water Power Company, the Hudson River Power Transmission Company, the Hudson River Electric Company, the Empire State & Power Company, the Saratoga Gas & Electric Company, the Ballston Spa Light & Power Company and the Madison County Gas & Power Company. This company operates mainly in the eastern portion of New York State, obtaining large amounts of power from the rivers which flow in a southerly direction through the State to the Atlantic Ocean. While its power is not generated so cheaply as at the stations on Niagara Falls, the company has followed the policy of building up its business by selling at very low rates; and, as is shown by the number of companies purchasing power from this corporation or its subsidiaries, its prices are attractive.

The Niagara power companies have developed their sales of power along unusual lines. In general their contracts take such a form that current which is furnished on the basis of 100 per cent load factor is extraordinarily cheap. The price of $16 per hp per annum, which appears in some of the contracts, works out at 100 per cent load factor to the almost nominal price of 0.245 cent per kw-hr. Both companies, however, heavily penalize any variations from an absolutely steady load, although the price for additional power beyond the basic payment would be considered low in almost any other part of the country. In consequence it is the custom for the railways which use Niagara power to take energy from the producer at 100 per cent load factor, or as near to that as can be obtained in practice. Most of them have steam plants floating on the line to take care of peaks.

A good example of this custom is found on the Rochester Railway & Light Company, which supplies power to the New York State Railways. This company purchases Niagara Falls power, but has in reserve its own hydroelectric stations located on the Genesee River. A system of reservoirs along the ravine through which the river flows near Rochester, and in which the power stations of the railway company are located, permits storage of water so that, during the periods when peaks come on, these reservoirs are emptied through the power station flumes. In addition to this the company keeps a steam plant floating on the line to assist the hydraulic stations, whenever necessary, through the rush hours.

The contracts of the Niagara power companies generally include the term "firm power." This term applies to the quantity of power which the purchaser agrees to buy, and the purchaser pays for it whether it is used or not. In consequence this power is used at 100 per cent load factor. Additional firm power, or a normal increase in the demand, is also furnished at 100 per cent load factor. The price of additional firm power does not necessarily agree with that charged for original firm power for the reason that, opposing the tendency toward a decreased price on account of the increased quantity, there may be necessity for considerable additional expense on the part of the power company in providing for the increased demand, such, for instance, as new cables, poles or connections. Additional kilowatt-hours in these contracts are sold on a straight kilowatt-hour rate basis, and they do not take into consideration the matter of load factor. While this charge is often less than 1 cent per kw-hr., it appears extremely high when compared with the 0.245 cent per kw-hr. often used as a basic price for firm power, and in localities fortunate enough to be served by the Niagara companies there is a strong endeavor to avoid such payments.

The following extracts of power contracts in New York State are those which were reported to be in existence for the year ended June 30, 1912:

Adirondack Lakes Traction Company has a contract with Fonda, Johnstown & Gloversville Railroad for power, not measured, at $15 a day.

Albany Southern Railroad purchased 4,593,211 kw-hr. from its own electrical department at 0.67 cent per kw-hr.

Babylon Railroad has a contract, dated Sept. 19, 1910, with the Babylon Electric Light Company to furnish electric energy from July 15, 1910, to the fifteenth of each succeeding month. The consideration is $450 for 15,000 kw-hr., 2.5 cents per kw-hr. for each kilowatt-hour in excess of 15,000 and less than 25,000, and 2 cents per kw-hr. for each kilowatt-hour in excess of 25,000, unless the total consumption shall be less than 12,857 kw-hr., when the rate is 3½ cents for each kilowatt-hour during any one month. During the year ended June 30, 1912, 163,660 kw-hr. were supplied at 2.9 cents per kw-hr. Power is being furnished at $450 per month during the summer season and at $375 per month during the winter season.

Buffalo & Depew Railway has a contract with the Niagara, Lockport & Ontario Power Company dated Jan. 3, 1910. It expires March 1, 1930, and the consideration is $16 per hp per annum and 0.55 cent per kw-hr. During the year ended June 30, 1912, 380,000 kw-hr. were supplied at 0.549 cent per kw-hr. In addition to the kilowatt-hours power was purchased as follows: 1366 hp at $16 per hp-year, or $1,821, plus $261 for excess peaks.

Buffalo & Lake Erie Traction Company purchased during the year ended June 30, 1912, 8,954,987 kw-hr. from the Niagara, Lockport & Ontario Power Company at 0.702 cent per kw-hr., and also 1,465,740 kw-hr. from the International Railway at 1.131 cents per kw-hr.

Buffalo & Williamsville Electric Railway has a contract with the Genesee Light & Power Company, Batavia, N. Y., under which the first power was delivered Aug. 2, 1909. The contract expires five years from that date, the consideration being 3.75 cents per car mile with a minimum monthly rental of $250 based upon a minimum demand of not exceeding 100 kw. The company also has a contract with the Niagara, Lockport & Ontario Power Company dated March 18, 1910, and expiring ten years from May 1, 1910 The consideration for each electric horse-power delivered is $16 per year as the service charge and, in addition, 0.55 cent for each kilowatt-hour used when the firm power is less than 300 hp, 0.5 cent for each kilowatt-hour used when the firm power is 300 hp or more but less than 500 hp, 0.47 cent for each kilowatt-hour used when the firm power is 500 hp or more but less than 750 hp, and 0.44 cent for each kilowatt-hour used when the firm power is more than 1000 hp. The service charge is based on the average of the highest daily one-minute peaks.

Buffalo, Lockport & Rochester Railway Company has a contract with the Niagara, Lockport & Ontario Power Company dated May 8, 1907, amended Dec. 24, 1908, and expiring Sept. 1, 1932. The rate varies, the amount paid in the year ended June 30, 1912, being $37,701.05.

Catskill Traction Company has no formal agreement, but power is bought of the Schoharie Light & Power Company. The total number of kilowatt-hours supplied during the year was 261,400, the total gross price being $4,621.28, at an average net price per kilowatt-hour of 1.75 cents.

Corning & Painted Post Street Railway has no contracts or agreements. Power amounting to 413,589 kw-hr. and costing $8,271.79 was purchased during the year from the Corning Gas & Electric Company. The power is measured at the plant of Corning Gas & Electric Company, Corning, N. Y.

Eastern New York Railroad Company purchased during the year ended June 30, 1912, 202,675 kw-hr. from the Adirondack Electric Power Corporation at a price of 1.5 cents per kw-hr. measured on the a.c. side.

Elmira, Corning & Waverly Railway purchased during the year ended June 30, 1912, from the Elmira Water, Light & Railroad Company 1,576,514 kw-hr. at a price of 1.5 cents per kw-hr.

Fishkill Electric Railway Company purchased 358,904 kw-hr. from the Southern Dutchess Gas & Electric Company at a price of 3.5 cents per kw-hr.

Great South Bay Ferry Company entered into an agreement on April 24, 1909, with the New York & Long Island Traction Company, duly signed by the proper officers of each company, whereby the New York & Long Island Traction Company agreed to furnish electric power for 6 cents per kw-hr. No provision was made for the cancellation of this agreement except by the mutual agreement of the signatory parties. A total of 8104 kw-hr. was purchased under the agreement.

Hornell Traction Company paid the Hornell Electric Company in the year ended June 30, 1912, for power for city cars at a rate of $2.35 per car per day, and for the Canisteo cars at the rate of $3.65 per car per day.

Hudson River & Eastern Traction Company in the year ended June 30, 1912, was supplied with 302,880 kw-hr. by the Northern Westchester Lighting Company, the rate being 2.5 cents per kw-hr.

Huntington Railroad Company has no contracts or agreements, but purchased from the Long Island Railroad Company 783,996 kw-hr. at 1.02 cents per kw-hr., amounting to $8,008.89, during the year.

International Railway Company has a contract with the Niagara Falls Power Company dated Jan. 1, 1908, and expiring Dec. 31, 1917, for power at a price of $18 per electric hp per annum for firm power and 1.5 cents per kw-hr. for excess energy. The company also has a contract with the Tonawanda Power Company, dated Jan. 1, 1906, and expiring Dec. 31, 1920, at a price of $18 per electric hp per annum for firm power and 1 cent per kw-hr. for optional power; a contract with the Cataract Power & Conduit Company, dated July 1, 1899, and expiring July 1, 1931, for $25 per electric hp per annum for firm power and 1 cent per kw-hr. for excess power. There is also a contract with the Buffalo & Lake Erie Traction Company, dated Nov. 15, 1909, expiring Nov. 15, 1914, in which the consideration is $1.1275 per kw per month for firm power and $1.123 per kw per month for additional firm power. For excess power a charge is made which when the excess power does not exceed 40,000 kw-hr. is 0.786 cent per kw-hr. For excess power exceeding 40,000 kw-hr. and not exceeding 80,000 kw-hr. the charge is 0.786 cent per kw-hr. for the first 40,000 kw-hr. and 0.742 cent per kw-hr. for additional kilowatt-hours. For excess power exceeding 80,000 kw-hr. the charge is 0.74 cent for the first 80,000 kw-hr. and at the rate of 0.72 cent for all additional kilowatt-hours. During the year ended June 30, 1912, the company purchased the following power: from the Cataract Power & Conduit Company, 81,748,383 kw-hr. at an average price of 0.507 cent per kw-hr.; from the Tonawanda Power Company, 13,906,176 kw-hr. at 0.383 cent per kw-hr.; from the Niagara Falls Power Company, 5,030,100 kw-hr. at 0.560 cent per kw-hr.

Ithaca Street Railway Company, through its receiver, pays the Remington Salt Company for such quantities of electricity as it may require at a rate of 1 cent per kw-hr. for alternating current at the switchboard of the generating station. In addition to this the railway company pays one-half of the labor cost in the engine room of the power station, amounting to $167 per month. The receivers of the New York, Auburn & Lansing Railroad pay to the receivers of the Ithaca Street Railway for use of tracks and power: on New York, Auburn & Lansing passenger cars, for each revenue passenger between Ithaca and Renwick in either direction, 2.5 cents; for each freight car, either motor or unequipped, 5 cents per car mile; for rental of cars, 3 cents per mile, and for power supplied to cars on New York, Auburn & Lansing tracks, 3 cents per motor car mile. The receivers of the Ithaca Street Railway pay to the receivers of the New York, Auburn & Lansing Railroad for use of substation and equipment the sum of $1,617 per year.

Lima-Honeoye Light & Railroad Company purchased from the Livingston Niagara Power Company 172,172 kw-hr. at 3.14 cents per kw-hr.

Nassau County Railway Company has no contracts or agreements, but purchased from the Long Island Railroad Company 121,975 kw-hr. at 1.44 cents per kw-hr., amounting to a total of $1,761.19.

New York & Stamford Railway Company paid the New York, New Haven & Hartford Railroad Company for 155,740 kw-hr. at a rate of 1.25 cents per kw-hr.

New York Central & Hudson River Railroad Company paid the Rochester, Syracuse & Eastern Railroad Company for power, at a rate of 2 cents per kw-hr., $1,119.50 for 55,975 kw-hr.

New York State Railways bought of the Rochester Railway & Light Company 45,442,298 kw-hr. at 1.0942 cents per kw-hr., amounting to $497,222.50.

Northport Traction Company has no contracts or agreements, but purchased of the Long Island Railroad 63,546 kw-hr. at a rate of 5.52 cents per kw-hr., amounting to $3,509.61.

Oneida Lake Terminal Company has a contract with the Syracuse & South Bay Electric Railroad Company for the purchase of power. Upon verbal application the latter company during the year furnished the Oneida Lake Terminal Power Company power for lighting purposes at 3 cents per kw-hr., the total amount supplied being 5162 kw-hr., for which the Syracuse & South Bay Company was paid $154.86.

Orange County Traction Company purchased from the Central Hudson Gas & Electric Company 254,370 kw-hr., costing $4,425.12 at a rate of 1.78 cents per kw-hr. The company also purchased from the Wallkill Power Company 674,158 kw-hr., costing $8,425.85 at a rate of 1.25 cents per kw-hr.

Otsego & Herkimer Railroad Company purchased of the Hartwick Power Company 3,909,979 kw-hr. at a rate of 1.67 cents per kw-hr., amounting to $65,435.05.

Plattsburgh Traction Company purchased power from the Plattsburgh Gas & Electric Company at 1.5 cents per car mile operated, the kilowatt-hours not being measured. The cost this year was $2,256.04.

Port Jervis Traction Company purchased of the Port Jervis Light & Power Company 295,720 kw-hr., costing $5,335.82 at a rate of 1.8 cents per kw-hr. Other lighting and power amounting to 1768 kw-hr. cost $220.82.

Poughkeepsie City & Wappingers Falls Electric Railway Company bought of the Central Hudson Gas & Electric Company 1,673,870 kw-hr., costing $24,318.84 at a rate of 1.5 cents per kw-hr.

Putnam & Westchester Traction Company purchased of the Peekskill Lighting & Railroad Company 156,342 kw-hr., costing $3,908.55 at a rate of 2.5 cents per kw-hr. This was direct current measured and delivered at the electric station of the Peekskill Lighting & Railroad Company.

Rochester & Manitou Railroad Company has no contracts or agreements, but bought of the Rochester Railway & Lighting Company 163,038 kw-hr. at a rate of 2.15 cents per kw-hr., amounting to $3,500.39.

Shore Line Electric Railroad Company bought of the Westchester Electric Railroad Company, from and to the carhouse on the latter company's track, 11,303 kw-hr., costing $206.79 at a rate of 1.8295 cents per kw-hr.

Suffolk Traction Company bought of the Patchogue Electric Light Company 48,360 kw-hr., costing $1,924.20 at a rate of 4 cents per kw-hr.

Syracuse & Suburban Railroad purchased from the Syracuse Rapid Transit Railway Company 343,610 kw-hr. at 1 cent per kw-hr., amounting to $3,436.10, and also purchased from the Syracuse Lighting Company 181,175 kw-hr. at a rate of 1.87 cents per kw-hr., amounting to $3,470.03.

Syracuse & South Bay Electric Railroad Company had a contract with the Niagara, Lockport & Ontario Power Company which expired Nov. 1, 1911. Power, however, has been furnished since this date through the Syracuse, Lake Shore & Northern Railroad Company. The rate varies. For the year ended June 30, 1912, 915,044 kw-hr. was furnished the company, for which it paid $9,337.05.

Syracuse, Lake Shore & Northern Railroad Company has a contract with the Oswego River Power Transmission Company for the purchase of power dated Nov. 24, 1906, which expires Feb. 1, 1917. The rate varies, 3,679,021 kw-hr. being furnished, for which the company paid $32,176.27. There is also a contract for the purchase of power from the Rochester, Syracuse & Eastern Railroad Company, dated Jan. 24, 1910, as amended Nov. 28, 1910, and Dec. 8, 1911, which expired Dec. 31, 1912. The price is not specified, but power is paid for at same rates as those of the contract between the Oswego River & Power Transmission Company and the Syracuse, Lake Shore & Northern Railroad Company. During the year 544,636 kw-hr. was furnished, for which the latter company paid $7,244.74.

Syracuse Rapid Transit Railway Company purchased from the Niagara, Lockport & Ontario Power Company 26,325,500 kw-hr. at a rate of 0.5665 cent per kw-hr., amounting to $149,138.15. The company also purchased power from the following companies: Oneida Railway Company, 3600 kw-hr. at a rate of 1 cent per kw-hr., amounting to $36; Syracuse Lighting Company, 368,540 kw-hr. at a rate of 1.25 cents per kw-hr., amounting to $4,606.75; Syracuse & Suburban Railroad Company, 382,560 kw-hr. at a rate of 1 cent per kw-hr., amounting to $3,825.60; Electric Railway Terminal, 12,135 kw-hr. at a rate of 1 cent per kw-hr., amounting to $121.35. Direct current amounting to 4570 kw-hr. was purchased at a rate of 1 cent per kw-hr., amounting to $45.70.

Troy & New England Railway Company has no agreements or contracts, but purchased from the United Traction Company direct-current amounting to 245,756 kw-hr. and costing $1,228.78, at a rate of 0.5 cent per kw-hr.

Utica & Mohawk Valley Railway Company purchased from the Oneida Railway Company 4,708,500 kw-hr. at a rate of 0.86467 cent per kw-hr., amounting to $40,713.20. The company also purchased power from the following companies: Adirondack Electric Power Corporation, 100,810 kw-hr. at a rate of 0.93387 cent per kw-hr., amounting to $941.44; Adirondack Electric Power Corporation, $2,571,150 kw-hr. at a rate of 1 cent per kw-hr., amounting to $25,711.50; Oneida Railway Company, 5793 kw-hr. at a rate of 1 cent per kw-hr., amounting to $57.93, and from the receivers of the Hudson River Electric Power Company 142,315 kw-hr. at a rate of 0.87 cent per kw-hr., amounting to $1,242.68.

Waverly, Sayre & Athens Traction Company purchased 1,142,278 kw-hr. at an average price of 1.48 cents per kw-hr., amounting to $16,905.72. The company pays a minimum fixed charge of $708.34 per month and in addition to this pays 0.7 cents per kw-hr. for all power used.

Westchester Electric Railroad Company purchased during the year ended June 30, 1912, 8,890,200 kw-hr., costing $111,127.50. Power was furnished to Union Railway Company cars amounting to 1,486,926 kw-hr. at 1.8295 cents per kw-hr. Power was furnished by Union Railway Company to the Westchester Electric Railroad's cars amounting to 1,665,632 kw-hr. at 1.8295 cents per kw-hr. Arrangements with the receivers of the Union Railway Company had been made, but not reduced to writing, for the interchange of power at the rate of 1.8295 cents per kw-hr. for direct current, and also for the use of cars, although no compensation has been agreed upon for the use of cars. Arrangements have been made with the John Johnston road for the sale of power at 1.25 cents per kw-hr., direct current, and to furnish the John Johnston road with cars as required. This agreement was not reduced to writing. Arrangements had also been made with the receiver of the Third Avenue Railroad Company for a supply of electric power to the company at 1.25 cents per kw-hr., alternating current, and for the use of cars. This had not been reduced to writing and no compensation had been agreed upon for the use of cars.

Westchester Street Railroad Company purchased for the year ended June 30, 1912, 3,369,510 kw-hr., costing $55,274.45, the average rate being 1.64 cents per kw-hr.

Yonkers Railroad Company had an agreement with the Third Avenue Railroad Company to buy power from the latter at the rate of 1.25 cents per kw-hr., alternating current, and also has an agreement with the Yonkers Electric Light & Power Company permitting the latter to use the Yonkers Railroad Company's poles at the rate of $300 per annum. Power purchased for the year ended June 30, 1912, amounted to 10,381,000 kw-hr. and cost the total sum of $129,762.50.

APPLICATIONS FOR SPACE AT ATLANTIC CITY CONVENTION

H. G. McConnaughy, secretary of the American Electric Railway Manufacturers' Association, has issued a circular in regard to space at the October convention of the American Electric Railway Association. Copies are being mailed to the manufacturers who are members of the association. The blank contains spaces in which the number of square feet of space required at the convention, the names of the representatives who will be present, and other data can be entered. The charge to be made for space this year is 40 cents per square foot.

All applications for space received on or before June 15 will be considered on that date and will have equal preference as to location. Applications received after June 15 will be considered chronologically. The circular issued also contains a diagram of Young's Million Dollar Pier, upon which the exhibit will be held, and the promise is made that no exhibit will have to be out in the open as heretofore. The circular also says that the Greek Temple, in which the meetings are held, has been enlarged and that another meeting hall has been erected for the engineers beyond the Greek Temple.

All companies intending to exhibit are urged to send their application for space promptly and thus assist in making this convention the largest and best in the history of the association.

Convention of Southwestern Electrical & Gas Association at Galveston

The Attendance Numbered More than 500—A Report of the Proceedings So Far as They Related to Electric Railway Topics Is Presented

The ninth annual convention of the Southwestern Electrical & Gas Association was held at the Hotel Galvez, Galveston, Tex., May 21 to 24 inclusive. More than 500 members were in attendance, and each paper was received with interest and discussed at length. The first session opened with 150 members in attendance and President F. M. Lege presiding. Following an address of welcome by Senator J. H. Kauffman, Galveston, and a response by W. B. Head, Dallas, the secretary read the minutes of the preceding convention, and President Lege read his annual address. The president recommended certain changes in by-laws affecting the election of officers. These suggestions were referred to a committee for its recommendation.

TRACK CONSTRUCTION

The first paper presented was that by W. M. Archibald, superintendent of way Houston Electric Company, entitled "A New Type of Concrete Track Construction." An abstract of this paper was published last week. A number of members questioned the advisability of expending money for track construction providing for rail renewals, when the life of the rail was about that of the steel tie. It was the consensus of opinion, however, that a solid concrete foundation gave best results under the unstable soil condition prevailing in Texas cities. It also was believed that best results were being obtained when a concrete bed was used for paving blocks instead of the usual sand cushion. The former tended to waterproof the paving surface, which was very desirable whether wood block or paving brick was used. Two years' experience with the mortar bed for paving surface in Houston has demonstrated its practicability. The question was raised as to the best way of renewing paving, especially when the mortar-bed type of construction was employed. In reply Mr. Archibald stated that a sand parting was provided in his proposed construction for that purpose. He said further that he believed better results would be obtained from the 7-in. depth in the combination brick and concrete paving surface than with a 4-in. depth where brick or wood block was employed. R. B. Stichter, general manager Texas Traction Company, questioned the advisability of trusting to the concrete as a bearing when it came in direct contact with the rail. He believed that vibration would pulverize the concrete base, makng a renewal of the whole necessary when rail renewal was required.

VALUE OF TRAFFIC CHARTS

Continuing the prepared program, P. L. King, auditor San Antonio Traction Company, read his paper on "The Use of Traffic Charts in Rush Service." This paper was also abstracted in the issue of last week. In the discussion of this paper it was generally agreed that the traffic check was the only way to determine actual conditions, and it was merely a question of the cost of preparing a daily chart. Mr. King stated that one man prepared the daily rush-hour charts for all lines and in addition made a complete traffic chart of one line each day. This man's training was not special, as he had served as a conductor before taking up the traffic chart work.

E. F. Moore, general manager Dallas Electric Light & Power Company, stated that he had charts made from time to time but that they were different from Mr. King's in that they showed exact loads carried and the headway on each line. The method described in the paper included a tabulation of the total number of passengers carried per car on each line, and this would have no bearing on the car seating capacity. In explanation, Mr. King said that there was very little short haul in San Antonio, and this would make the charts show practically the true maximum load per car.

CAR DESIGN AND CONSTRUCTION

The Wednesday afternoon session of the association was largely taken up in discussing the points brought out in C. O. Birney's paper, "Old and New Ideas in Car Designing and Building." This paper was published in abstract last week. Mr. Birney's wide experience in this particular field as superintendent of car construction with the Stone & Webster Engineering Corporation gave the members an opportunity to obtain competent advice on this subject. The advisability of maintaining in first-class operating condition both air brakes and hand brakes on cars was discussed first. It was generally agreed that the present design of hand brakes made it almost impossible to keep them in good condition for emergency stops at all times. This was especially true on double-end cars where dirt will accumulate around the base of the brake staff. A hand brake was considered desirable when air fails and it is necessary to move a car to the shops, but its failure to operate efficiently made it almost useless in cases of this kind. Mr. Moore remarked that he believed the expense of maintaining a hand brake in good operating condition was not justified when the value received was considered. In six months his company had had two air-brake failures, which was too small a number to warrant the extra expense of placing hand brakes on his cars. H. S. Potter, general superintendent El Paso Electric Railway, stated that he did not believe it advisable to eliminate hand brakes from cars on lines where there were heavy grades. The hand brake served to protect electrical equipment in case of air-brake failure but had no value in an emergency stop. It was best to reverse the controller when the air failed.

R. B. Stichter, Dallas, emphasized the importance of standardization in car body construction, both for city and interurban service. It would be more satisfactory to the builders and reduce the cost to the purchaser. He said he believed that the car body should be designed with an all-steel underframe and side girders up to the windows. He also stated that he did not believe that a center entrance for interurban cars was to be desired but thought it probably would prove satisfactory for city service.

In discussing the inclosed vestibule it was shown that boarding and alighting accidents were' reduced from 70 per cent to 100 per cent. W. L. Wood, general manager Texarkana Gas & Electric Company, said that after two years' experience with the inclosed platform he felt sure that the principle was right. New forms of accidents had developed, but the cost of settling the claims was very small. David Daly, general manager Houston Electric Company, stated that while he believed the principle was right, his public would not permit the closing of vestibules. They especially objected to wooden doors, and in all probability he would of necessity have to adopt a wire-mesh door. In closing, Mr. Birney stated that he would recommend the inclosed vestibule but would like to be able to standardize on the door-operating mechanism. Local conditions might affect design in some cases, but. generally speaking, the doors should be in pairs, operative either together or separately.

Mr. Daly then presented an address on "Street Railway Planning for Growing Cities."

STREET RAILWAY PLANNING FOR GROWING CITIES

Mr. Daly said that the question of street railway planning was important in Texas owing to the rapid growth of the cities there. In a city of from 15,000 to 30,000 population the electric railway system consisted usually of several short stub-end lines or perhaps belt lines, but when the city reached a population of from 35,000 to 150,000, belt lines were out of place. Moreover, with a rapidly growing city, the real estate agents would demand extensions, and if these extensions were not constructed the company would be condemned for lack of enterprise and there would be agitation for either a municipal railway or a competitive road. The latter had been constructed in a number of cities and always resulted in considerable unnecessary duplication of track and more expensive operation, all at the cost of the community. Again, the competitive railway system was usually built from the standpoint of the sale of lots and not with the best interests of the city in mind. The result generally was that such a line was very crooked. The practice of real estate agents, when agitating for an extension, was to take the railway manager in an automobile rapidly through the district which they wished served and endeavor to give him the impression of a tremendous amount of progress in that neighborhood. The speaker's own company, in Houston, believed that it was worth while to make a careful study of the possibilities of electric railway extensions before they were built and by the initial expenditure of some $1,500 and the annual expense of from $500 to $600 to obtain the exact facts. It had prepared a chart of the city, laid off in squares and containing a record of every house built. When a demand for an extension in a certain section was made, the company knew exactly the number of houses and inhabitants there, and could estimate closely the gross earnings to be obtained from such a line. With these data the company could say to the real estate agents, if the traffic would not justify the construction of the line entirely at the expense of the company, that it would meet them part way and would build a "bonus" line. This plan had worked out very successfully in Houston. Three or four bonus lines had been built; the real estate agents had been pleased and the company had kept its system up with and beyond the growth of the city.

Continuing, Mr. Daly said that another question somewhat allied to the one discussed was the length of haul practicable for a nickel. This question was bound to arise when long extensions were being considered. In Houston the estimate had been made arbitrarily that the company could not afford to haul passengers more than 5 miles from the center of the city for a nickel and give universal transfers. In pursuance of this policy the company was prepared to construct, with any reasonable encouragement from the real estate owners, extensions within the 5-mile circle.

The chart of the city already referred to had the advantage that it permitted predictions on the growth of the system during the next few years and a systematic planning of the railway along the predicted lines. Thus it provided a comprehensive scheme of development.

LIGHT AND POWER SESSION

Beginning with the Thursday morning session of the association, all papers and discussions were concerning subjects of especial interest to light and power companies. The first paper to be read was that by E. E. Nelson, electrical engineer Northern Texas Traction Company, on "Erection and Protection of High-Tension Lines." Protection of linemen working on high-voltage lines was first considered. In reply to an inquiry, H. Jalonick, new-business engineer Texas Power & Light Company, Dallas, stated that men working on his company's 60,000-volt transmission lines were first required to ground the dead lines by means of chains. Replying to another question, he said that no special effort was made to ground the steel towers carrying this line. The tower legs were buried 6 ft. in the ground and set on concrete footings. The structure itself was a good conductor, being galvanized iron cold-riveted.

A question was asked as to advisability of stepping down the voltage in high-tension lines within cities and increasing the size of the copper conductors. Mr. Nelson replied that objection to high-voltage lines in city streets was more a question of mind than one of fact. They would not kill a person any more quickly than the arc-light circuits and probably were safer, as partial leaks in high-voltage lines will clear themselves.

W. L. Wood, Texarkana, emphasized the importance of the points brought out in the paper concerning switchboard wiring. The small operators should pay especial attention to this, particularly as regards the separation of various lines on the board. Crowded and improperly laid-out switchboards have been the direct cause of the destruction of entire plants. He said faulty design was often due to the small operator's lack of competent engineers. In further support of Mr. Wood's suggestion Dr. A. C. Scott, Scott Engineering Company, Dallas, said that too much stress could not be laid on proper switchboard design. Conditions exist in many small plants that are very bad, but since no accident had occurred no alterations have been made. As additional instruments and switchboard apparatus are required with the growth of the property, they have been added to the old panels, thus complicating the wiring and adding hazards to the board. Many boards are too close to the wall, making it practically impossible for a man to work behind them. A distance of 5 ft. to 6 ft., in his opinion, was too close. It would be better to build an addition to the station than crowd the board.

Dr. Scott then took up the question of ground wires in high-tension circuits. He said these wires could be placed too close or too far away from the transmission lines to accomplish the desired results. Further, he said it was a serious problem to protect against lightning discharges, which were notoriously freakish. The exact value of a ground line was unknown and proper insulation was most important. He said he would like to see something more done with glass insulators. Glass was more homogeneous than porcelain, which depends almost wholly on the glaze as an insulating medium.

Oil-switch maintenance was next discussed, and Mr. Nelson advised that oil switches should be taken apart at least once a year. The oil should be strained through cheesecloth if it is perfectly pure, and every part of the switch should be inspected and thoroughly cleaned. In some instances it might be necessary to clean an oil switch after a single opening; this was especially important after a heavy short-circuit.

Proceeding with the program following the transmission-line discussion, A. L. Chase, superintendent Clarendon Light & Power Company, read a paper on "Oil Engines for Light and Power Plants in Small Towns and Cities." In the discussion which followed it was stated that the operating cost and depreciation per kilowatt with oil engines was quite low. Mr. Chase stated that unless an accident occurred the cost of maintaining an oil engine was considerably less than that required with a steam engine. Dr. Scott stated that the period of obsolescence was about the same as with other machines, 3 per cent being applied. As to the operators, no more intelligence was required to run an oil engine than a steam engine. It was merely a question of proper training.

In the Friday morning session Dr. A. C. Scott, Scott Engineering Company, read a paper upon "The Purification of Feed Water for Steam Boilers." This paper was published last week. The discussion developed the opinion that there was little value in intermittent treatment of boiler-feed water but that good results might be obtained by continuous treatment where scale-forming salts are bad.

WORK OF THE SECRETARY'S OFFICE

Secretary H. S. Cooper's report of work accomplished by the new permanent secretary's office indicated that all companies were being benefited and that the undertaking and expense had been well worth while.

OTHER EVENTS ON FRIDAY

Friday afternoon was taken up with a boat-ride excursion to Galveston jetties and Bettison's Pier, where a fish supper was served by the supply men who are members of the association. Friday night was set aside for the Jovian parade, full rejuvenation supper and speeches, and a class of ninety new members was initiated at the Scottish Rite Cathedral. Fred Johnson, Wagner Electric & Manufacturing Company, St. Louis, acted as toastmaster, and the speakers of the evening included F. E. Watts, reigning Jupiter, New York; W. B. Head, Dallas, and Sam A. Hobson, Chicago.

BUSINESS SESSION

At the general session Saturday morning the business of the association was transacted. It included reports of various standing committees and of the secretary and treasurer and the nomination and election of officers for the ensuing year.

The following resolution, among others, was passed unanimously by the association:

"Resolved, That the thanks of the association be tendered to the Electric Railway Journal for its courtesy in sending a special representative to report the proceedings of the association, for the prominence given to the association's affairs in the Journal and for the uniform courtesy shown to this association and its officers during the past year."

The newly elected officers for 1914 are as follows: President, G. H. Clifford, vice-president and general manager Northern Texas Electric Company; first vice-president, D. G. Fisher, assistant general manager Texas Traction Company, Dallas; second vice-president, W. L. Wood, Jr., general manager Texarkana Gas & Electric Company; third vice-president, C. W. Kellogg, general manager Beaumont & El Paso Railway Companies; treasurer, J. D. Walker, auditor Dallas Electric Light & Power Company; secretary, H. S. Cooper, Dallas.

The executive committee is composed of the following: C. H. Clifford, Fort Worth; D. G. Fisher, Dallas; W. L. Wood, Texarkana; C. W. Kellogg, El Paso; F. M. Lege, Galveston; H. S. Cooper, Dallas; David Daly, Houston; F. J. Storm, Amarillo; F. B. Slater, Dallas, and W. B. Tuttle, San Antonio.

ENTERTAINMENT

The entertainment features of the Southwestern Electrical & Gas Association included surf bathing, free tickets being provided, a band concert and parade of United States troops at Fort Crockett, an open-air concert and dance at the Garten Verein, a German club, luncheon for the ladies at the Oleander Country Club, with special car transportation furnished by the Galveston-Houston Electric Company, a boat ride in Galveston harbor and an auction bridge party for the ladies.

The provincial council at Parma, Italy, has approved a scheme, which will have the effect of developing the electric tramway system of that city and its suburbs considerably. The lines in the city now in the hands of the National Italian Railway & Tramway Company and the lines to Zibello, Busseto, Soragna, Borgho San Domino, Rocca, Bianca Mano, Noceto, Medesano, Langhirano, Traversetelo and Montechio, upon all of which steam cars are now run, will be taken over and worked electrically, although the freight service will still be operated by steam.

NEW FORMS OF MONTHLY REPORTS IN MILWAUKEE

New forms of monthly reports have been developed for the use of twelve subsidiary public utility companies of the North American Company. Copies of the forms have been received from C. N. Duffy, vice-president The Milwaukee Electric Railway & Light Company. The use of the forms is simplified by the designation of electric railway properties as "railway," of electric light and power properties as "electric," of steam-heating or hot-water-heating properties as "heating," and of gas properties as "gas."

The forms comprise the following: (1) financial and operating report, fourteen pages; (2) power report, nine pages; (3) gas works report, two pages; (4) electric service operating report by systems and divisions, two pages.

The forms have been arranged in accordance with the classification of accounts of The Milwaukee Electric Railway & Light Company and its associated and controlled companies. This classification is in conformity with the uniform classification of accounts prescribed by the Railroad Commission of Wisconsin, which, however, is amplified for the purposes of the companies.

The forms have several distinctive features. All are of uniform size, 10½ in. by 14 in.

The financial and operating report is designed to show results by comparative three-year periods for both month and period. The totals are shown at the top instead of at the bottom of the report. Both common and specific units are used. The income account shows the result of the different forms of business conducted by the company. The comparative balance sheet shows the increases and decreases. Capital expenditures are classified in detail in accordance with the classification of accounts prescribed by the commission for the different forms of business conducted. The maintenance and depreciation reserve expenditures are also classified in detail in accordance with the classification of accounts prescribed by the commission for the different kinds of business conducted. Data based on the income account show certain percentage income results, percentage basis of apportionment of operating expenses and sundry items, charges in operating expenses credited to sundry reserves and expenditures charged against sundry reserves, both percentages and amounts, all of which are shown combined and also divided according to the different kinds of business conducted. The statistical calculations showing the results of operation are largely in conformity with the specific units used, which are applied to the different forms of business.

The power report covers operating expenses and operating statistics of power plants (steam power generation separate from hydraulic power generation), substations, transformer stations and storage battery stations. The statistics include "individual and coincident demands," "electrical energy output and disposition" and "station capacity and customer demands," divided according to the different classes of electrical energy. Blank pages are provided for expansion if necessary or for adaptation to any particular plant or class of service. The totals in this report also are shown at the top instead of the bottom of the form and both common and specific units are used.

The gas works report shows operating expenses and operating statistics incident to the production of coal gas and water gas and the purchase of purchased gas. The totals and units accord with the arrangement in the power report.

The electric service operating report by systems and divisions covers operating revenues, operating expenses, net operating revenues and statistics. It is designed to show the results of operation of a system or division of an electric light and power system. The form is the same as two pages of the financial and operating report. The treatment of the totals and units is the same as in the power and the gas works reports.

Meeting of Keystone Railway Club

Several Papers of Interest to Street Railways Were Presented, Among Them Being a Comprehensive Discussion Upon Special Track Work for Electric Railways by Victor Angerer

The sixth meeting of the Keystone Railway Club was held at the Colonial Hotel, York, Pa., Monday and Tuesday, June 2 and 3. The Monday meeting for the transaction of preliminary business was called to order at 8:30 p. m., with President Gould in the chair. After the reading of the minutes, reports of committees and disposition of unfinished business, the members voted to hold the next meeting at Reading, Pa., on Monday evening, Sept. 8, and Tuesday, Sept. 9. A committee composed of the wives of Reading members will entertain the wives of the visiting members on Sept. 9.

SELECTION OF EMPLOYEES

After the opening of the session on Tuesday morning there was read a paper on the "Selection and Retention of Transportation Employees," by W. H. Hitchcock, general superintendent Trenton & Mercer County Traction Corporation, Trenton, N. J. He said that not only should rules for platform men be carefully prepared and rigidly enforced, but justness and fairness should also be exercised. The men's quarters should be clean, comfortable and cheerful, and where possible their wishes should be consulted and respected. Money spent for club rooms with good reading matter and simple amusements would be returned a hundredfold in attracting and keeping a set of loyal men. The least that should be required in selecting employees was a good reference from the last employer and a satisfactory account of the applicant's movements for the last five years. Mr. Hitchcock suggested the possibility of a period of probation of say three months. If the student showed proficiency after the first six days with an instructor, an inspector should ride with him say four times during the next fifteen days, and during this period the recruit should also undergo two examinations. In the three-month probation period following, he should be watched closely by the inspectors to prevent his falling into many of the ruts open to new men.

The retention of old employees was a most important matter, for often the man let out was better than the one who replaced him. Many companies had ironclad rules which automatically dropped men for certain offenses, but it was a question whether this practice could always be justified. It was poor policy to drop a man with six months' experience because of one mishap, which cost the company say $200 or $300, and then to hire three or four others who in turn ran the risk of similar or costlier accidents. It was better to call in the offender, show him what his slip had cost, tell him that he could not expect much more than one chance and, if necessary, suspend him for a time rather than to discharge him outright. It was a rare occurrence for a man worth anything at all to have more than one costly accident within a reasonable period. The expense merely of teaching a new man was about $25, and this was followed by the likelihood of vehicle and other accidents before he became reliable. The speaker estimated that the average cost of the combined tuition and accident expenses of a new man was certainly $50.

Mr. Hitchcock referred to a road where almost one-half of the men had been changed annually for several years with the result of weak discipline and a high damage account. Finally, it was decided to supersede the rule of might by that of reason. In three months there was a decided improvement because of the talks with individuals, and in eighteen months the general manager could openly compliment the line on its good showing in reduced equipment abuse and accidents. During the last year less than 12 per cent of the 200 men had been changed, and of these only a small part were motormen. As for conductors, only 30 per cent of those cautioned for failing to register and account for fares collected had been detected a second time, and even better figures had since been secured. In general, excellent results had been obtained with this kind of discipline for offences other than drinking.

Mr. Hitchcock also advocated the employment of a liberal number of inspectors because many accident-breeding offences would not be committed if an inspector was present or likely to be on hand any moment. It would be better to devote some of the money now spent for the instruction of new men to the engagement of more inspectors. In any event, their wages would be less than the loss of traffic due to irregular service by crews who did not heed the schedule, and, furthermore, the public would have less reason for complaint.

In the discussion of the paper C. F. Crane, Pottsville, said that this year he had been obliged to break in only three new men instead of 180 by allowing the best extras of the previous season to keep their positions on the seniority list. J. E. Wayne, York, said that he had reduced the requirements for new men by permitting many extra summer employees to retain their badges for free riding during the winter months.

ELECTRIC RAILWAY TRACK WORK

A paper, accompanied by colored charts, on "Electric Railway Special Track Work" was then read by Victor Angerer, vice-president and general manager William Wharton, Jr., & Company. Mr. Angerer first defined the different kinds of track work for different classes of surface operation and deplored the unnecessarily large number of girder and guard-rail sections.

Theoretically, he said, for track laid to true gage, every combination of radius of curve and wheelbase of truck, with a given wheel flange, called for a specific width of groove to make the inside of the flange of the inside wheel bear against the guard and keep the flange of the outside wheel from grinding against the gage line of the outside rail and possibly mounting it. It would be manifestly impracticable to provide guard rails with such a variety of grooves or to change the grooves of the rolled rail. The usual minimum of 1 9/16 in. was wide enough to pass the A. E. R. A. standard flanges on a 6-ft. wheelbase down to about 45-ft. radius, and the maximum of 1 11/16 in. to about 35-ft. radius. On curves of larger radius the excess width should be compensated for by a corresponding widening of the gage. If the groove in the rolled rail was too narrow for given conditions, it must be widened by planing on the head side of the inside rail, to preserve the full thickness of the guard, and on the guard side of the outside rail, if a guard section was used, to preserve the full head. Unusual wheelbases of say 8 ft. or 9 ft. might require widening of the gage on some curves. The widening of gage was necessary only to bring the guard into play when the groove was too wide for some one combination of wheelbase and flange running over the work.

Referring to layouts for track carrying both interurban and city cars, Mr. Angerer said that it was probably true that the city regulations often prevented standardization on one kind of wheel, but cities should realize that when they expect the railway to bring interurban cars with larger flange wheels into the streets for the convenience of the people they should allow the use of the same wheel flange on city cars, and the track should be built to suit.

In T-rail curves the guard was formed of a rolled shaped guard, or a flat steel bar, bolted to the rail; but in Mr.

Angerer's opinion the double T-rail was the most substantial, and in the long run the most economical, particularly in standard T-rail track.

In special work and curves in high T-rail track a girder guard rail was often used. This was very desirable, as it was cheaper than the double T-rail and gave the solid guard in one piece with the running rail. The idea that a separate guard could be renewed when worn out did not usually work out in practice. When the guard was worn the running rail was usually worn to such an extent that it would soon have to come out also. The only drawback to this girder guard rail in high T-rail track was the compromise joint where the two had to join. The strains on a compromise joint, especially with lateral offset of plates, were quite different from the strain that tended to break the joint or loosen it. There was a remedy which should be more generally used. This was the use of so-called combination rails, namely, short sections of the rails to be jointed, say 3 ft. or more of each, welded together by a steel casting or any other method, or steel castings shaped to the desired sections on the ends, so that they could be connected to the rails in the track at both ends with plain joints. They cost somewhat more than the compromise joints, but they replaced that many feet of plain rail in the track, which helped to pay for them, and they certainly should soon save their extra cost in maintenance.

For special pieces, such as frogs and crossings, there was hardly an electric railway in the country to-day that, at present prevailing prices, could afford to buy anything less durable for tracks in paved streets than what was known as "hard-center" work. In the latter the pieces were formed of rails held together by a casting, into which they were partly fused or welded, or they were made a steel casting in their entirety. In either case a recess was left in the central part into which a hard metal plate was set and fastened in various ways. The metal "par excellence" for the centers and for track work in general was manganese steel, although some work was still made with chrome-steel or tool-steel centers.

Through the difficulty of machining manganese steel and because heating it to any marked degree destroyed its toughness and wearing quality, certain limits were placed upon the methods of applying and fastening manganese steel castings to track structures. The centers in hard-center work were fastened into the main body of the special work in various ways. (Here Mr. Angerer showed colored charts illustrating the methods named.) One method was to use a pendent lug and a key going through the lug and body, pulling the center down into the recess. Another was to use a combination of wedges applied to the edge of the center and between it and the wall of the body portion. Another method was to interpose a nut and brass set screw between horizontally extending lugs on the center and corresponding recesses in the body portion, and still another was the method of simply bolting down the center by vertical bolts running through both the body and the center plate. In all except the method last mentioned, zinc or spelter was poured in between the lower part and sides of the center and the body. In the bolted-down center zinc was also used in the same way in some work on the market, while in other work the under surface of the center and the top surface of the recess were finished by grinding and planing, and the two pieces were bolted together without the zinc lining.

Too much stress had been laid on the so-called renewability feature of special work. Anything mechanical that was easily detachable would, when put under repeated strains, be liable to detach itself. On the other hand, this renewability feature had been applied very little in practice, and a good portion of the renewals were made not on account of the wearing out of old centers but because something had gone wrong with the first center. Where centers were renewed on account of wear it was practically impossible to make a good job out of the surfaces, even by a very large amount of grinding of the adjoining parts, on account of the necessarily unequal wear on the two lines of rail. A good manganese steel center should outlast the adjoining portion of the body or rails, particularly the curved portions, which naturally existed in every piece of special work.

It was the wearing out of those portions of special pieces which had been made of ordinary rail outside of the manganese steel center that led to the introduction of solid manganese steel work in which the entire frog, crossing or other special piece was made in one manganese steel casting with the arms cast and ground to correspond to the general shape of the adjoining rail and joined to it with a regular joint plate. The main drawback was the greater cost, but it was no doubt economical for the railway company, provided the severity of the traffic warranted the greater initial outlay.

Some work had been made in which the main portion was cast solidly of manganese steel, similar in shape to the hard-center work, and a separate manganese steel plate set in at the points of the frogs and crossings. This might be warranted under certain conditions, but the difficulty of gaining advantage from the renewability of the center plates made its large introduction somewhat doubtful.

In the construction of frogs and crossings, of either the hard-center type or solid, the bottom of the grooves should be raised so that the wheel when crossing the intersecting groove would have a bearing of the flange on this raised floor or rather a simultaneous bearing on part of the tread and on the flange. This flange bearing was certainly necessary with narrow-tread wheels. If the wheel treads were wide enough to span the intersecting groove and still leave a good amount of bearing of the wheel tread on the running surface, and wide enough so that when crossing a groove at nearly right angles the blow would be distributed on a considerable area, the flange bearing would not be necessary. Though electric railway wheels were now made wider than years ago, the weight of the rolling stock had also increased and the wheels which could run on the present tracks were still not wide enough. There, again, the destructive effect of different sizes and different depths of wheel flanges running over the same track asserted itself. If the floor was raised only high enough to give bearing to the larger and deeper flanges of the wheels, all the wheels with shallower flanges would wear and batter down the points and other portions where they did not get a full tread bearing. If the floor was raised high enough to give a bearing to the shallower flange, then the deeper flange, not being assisted by any tread bearing, would soon cut into the floor.

The general remarks regarding the construction of frogs and crossings also applied to the mates that went with tongue switches. One piece in special track work in which a solid manganese casting for the body portion particularly recommended itself was the tongue switch. The important factor in the switch was the tongue bearing or pivot, which should be constructed to hold the heel of the tongue steady and to give the greatest possible resistance against the knocking down of the tongue at the heel end. It must have means of taking up the wear so as not to allow the tongue to get too loose, and still it must work loosely enough to permit throwing devices, like electric track switches, to move the tongue under all conditions.

To get the full life out of a tongue switch one must give it attention and take up the wear as it occurred. The tongue of the present day was generally reinforced by lateral flanges against the thrust of the weight of the cars. Tongue locks—that is to say, devices in which a spring held the tongue in one or the other position—should not be necessary in a properly constructed tongue switch and with the tongue bearings as snug and tight as they should be, but they were a safeguard against a tongue that was too loose or one that had a tendency toward accidental throwing between trucks.

In standard T-rail for unpaved streets practically the same details of construction were followed in the various special pieces as in the girder rail and high T-rail work, except that the low T-rail gave a better opportunity for the use of solid manganese steel special pieces at no marked increase in cost over hard-center work. It was possible in this work to make the special work pieces of the same heights as the adjoining standard T-rail. Another class of hard-center work in connection with standard T-rail was known as insert work. In this construction the main portion of the special pieces was built up of rails and a small manganese steel casting, which corresponded in extent to the center plate of hard-center work, was bolted in between the rails. The cost of this, however, was not much less than that of the solid work, and the latter was, therefore, undoubtedly preferable in new work. Inserts found their best place in repair work where the lengths of the original pieces, probably of ordinary bolted construction, must be adhered to and where solid manganese steel pieces often became too expensive, because of the extra length. Little ordinary bolted work was now used in T-rail track on public highways, except in places where the traffic is very unimportant, and sometimes inside of carhouses.

In standard T-rail work on private rights-of-way where steam railroad practice could be followed the ordinary frogs and split switches should be used for the sake of economy. However, where traffic on such lines was heavy manganese steel frogs either solid or of the rail-bound type used on steam railroads and split switches with manganese steel points should be used. If the wheels on such roads had a narrow tread, provision must be made for flange bearings in frogs and crossings, distinguishing the work thereby from the regular style of steam railroad work. In the ordinary bolted frogs and in the fixed line of spring frogs, this was usually done by making the filler between the rails of steel, and carrying it up to the necessary height in the groove. Of course, in manganese steel frogs this simply meant making the groove shallow enough at the intersection and tapering it.

The crossings of electric railways over steam railroads formed a distinct class of special work, and owing to the great speed and weight of the steam trains the wear of such a crossing, either insert or solid, could not be compared with the performance of an ordinary crossing built of rails. A similar argument applied to the special track work of electric railways in general. In 1902 the average city passenger car weighed 33,000 lb. empty and 40,000 lb. loaded; in 1912 it weighed about 43,000 lb. empty and 58,000 lb. loaded, owing to increased passenger capacity. In 1902 the average interurban car weighed 40,000 lb. empty and 56,000 lb. loaded, against 68,000 lb. empty and 89,000 lb. loaded in 1912, an increase of from 30 per cent to 50 per cent. Comparisons without this consideration of increased weights and speeds often lead to the belief that the work is not so durable as it used to be.

A.C.-D.C. EQUIPMENT AT YORK

E. L. Greene, master mechanic York railways, then presented his paper entitled "A Description of the A.C.-D.C. Equipment in Use on the York Railway System." He did not discuss the relative merits of a.c. and d.c. equipment but confined himself to a description of the apparatus, an article on which was printed in the Street Railway Journal for April 25, 1908. The cars operated between Hanover and York are 50 ft. long over all, weigh about 42 tons and carry four Westinghouse 135-A 75-hp motors, geared 60:17. The d.c. service is from York Center Square to the outskirts of that city, 2.8 miles, and the 6600-volt a.c. service from the city line to Hanover, 18.6 miles. The d.c. section is covered in thirteen minutes and the a.c. section in thirty-seven minutes, making a schedule speed of 25.6 m.p.h. The cars are equipped for multiple-unit operation with non-automatic master controllers and pantograph current collectors. Mr. Greene said that although the control wiring was complicated, it rarely gave trouble. Every part of the cars had a thorough inspection and the motors and control were blown out once a week, in addition to a light inspection twice a week.

COMMUTATOR SLOTTING

In the absence of W. H. Rushton, master mechanic Altoona & Logan Valley Railway, his paper on "The Slotting of Street Railway Commutators" was read by R. P. H. Staub, General Electric Company. This covered the author's experiences in the treatment of commutators.

A great improvement in service and cost had been obtained by slotting the commutators of old 40-hp motors. During the year previous to slotting 287 armatures had been removed and the commutators turned for flat spots, but during the past year no flat spots requiring lathe work had developed. The motor temperatures had been appreciably lowered, particularly on the company's "hill cars," which have magnetic brakes. The saving was 60 per cent in brushes, 66 per cent in brush holders and 72 per cent in commutator renewals. When commutators are being slotted attention should also be given to brushes and brush holders. Some roads asserted that they slotted commutators in from fifteen to twenty minutes, but the speaker believed that this work could not be done satisfactorily in less than fifty to sixty minutes. Clean cutting and finishing would always pay. Mr. Rushton's slotter embraces a small motor with an extended shaft on which is mounted a 1⅜-in.-diameter milling saw of the thickness of the mica. The motor is placed on a vertically adjustable stand, and the stand and motor are fastened to the tool carriage of a lathe.

He recommended that brush holders should be inspected carefully and kept in alignment. The tension of the springs should always be checked. Brush holders with a spring adjustment device and shunts were preferable. A holder which was worn enough to allow a forward and backward movement of the brush should be replaced at once. As such movements were often caused by the brush wearing on the holder when the commutator had flat spots or was out of true, they could be practically eliminated by undercutting the mica. Worn brush holders also allowed the brushes to tilt or ride up, thus preventing their proper contact with the commutator bars. Correct brush tension depended upon track, service and brush conditions, but in no case should it exceed 5 lb. Most conditions would be satisfied by 4½ lb. to 5 lb. per square inch of brush.

Carbon brushes had received much misplaced criticism. The treatments they received were legion. Some soaked them in gasoline to remove lubricant and others in cylinder oil or paraffin to introduce lubricant. Others had two sets of brushes for each motor and changed brushes each week for a fresh introduction of the cylinder oil and a rest. Such meddling was unnecessary as the brush manufacturers were making high-grade brushes to answer any conditions specified by the user. He favored a brush low in resistance and containing as little abrasive material as possible. Its mileage might not be high, but it would add years of life to the commutator. As a rule, brushes were kept in service too long. They should not be used when they get short or when they show wear against the brush holder. Their cost certainly was not enough of a factor in the total expense of maintenance to warrant the use of inferior grades.

QUESTION BOX

The last order of business was the question box. In reply to the question reading "How often should air compressors be removed from cars for a general overhauling?" A. F. Rexroth, Harrisburg, stated that it was not necessary to remove compressors more than once in six months. J. M. Connelley, Lancaster, said that he had gradually extended his overhauling period up to two years. Another delegate mentioned that the best time to renew springs, clean the compressor thoroughly with gasoline, drain off the oil, etc., was in the fall as the compressors gathered most dirt during the summer months. W. J. Jeandron, New York, said it was not desirable to slot compressor commutators if there was any possibility of oil getting on the commutator to short-circuit the bars.

In answer to the question reading "What results and what mileage have been obtained with one-run steel and cast-steel wheels?" W. A. Heindle, Wilmington, said he was getting 70,000 to 80,000 miles of wear from Lobdell one-run cast-steel wheels. W. S. Edgar, Midvale Steel Company, Philadelphia, added that the Public Service Railway of New Jersey and several New York State companies were using rolled-steel, one-wear wheels in large numbers. As much as 150,000 miles of life had been obtained from wheels with a rim only 1 9/16 in. thick.

The meeting was then adjourned for lucheon and a trip to the great hydroelectric plant at York Haven was made.

MEETING OF ELECTROLYSIS COMMITTEE

The joint national committee on electrolysis, whose membership was published on page 934 of the issue of May 24, met at the Engineering Societies Building, New York, on May 27. As the American Gas Institute and the American Water Works Association did not have representatives present at the meeting, it was decided to effect only a temporary organization until the co-operation of those associations and possibly some other associations in the movement could be secured. Since this meeting took place, however, the Natural Gas Association has decided that it will appoint a committee to co-operate in this work.

There were present R. P. Stevens, A. S. Richey and Calvert Townley, representing the American Electric Railway Association; E. B. Katté, D. J. Brumley and W. I. Trench, representing the American Railway Engineering Association; H. S. Warren and F. L. Rhodes, representing the American Telephone & Telegraph Company; Philip Torchio, L. L. Elden and D. W. Roper, representing the National Electric Light Association, and B. J. Arnold and F. N. Waterman, representing the American Institute of Electrical Engineers. Ralph D. Mershon, president of the American Institute, was also present.

Mr. Mershon stated that as the president of the American Institute of Electrical Engineers he felt it his duty to call the meeting to order and turn it over to a chairman to be elected by the committee. He then set forth the object of the meeting and stated that the associations which had not yet appointed representatives had been conferred with by letter on March 12, and that the American Water Works Association had replied to the effect that it would not be possible for the association to take any action until its convention, which would be held on June 23. The Natural Gas Association of America had also replied stating that no action could be taken by that association until after its next convention. The American Gas Institute had not yet replied to Mr. Mershon's communication.

Mr. Torchio suggested that, inasmuch as all of the associations which had been invited had not yet appointed representatives, it might be inadvisable to take any definite action until after the representatives of these associations had been appointed. These associations are the American Gas Institute, the American Water Works Association and the Natural Gas Association of America. Mr. Torchio further suggested that a temporary chairman be appointed, pending the appointment of these representatives. This view prevailed, and Mr. Arnold was elected temporary rary chairman.

Mr. Townley was asked to give his views as to what work should be undertaken by the committee, and he set forth to some extent the field that, in his opinion, the committee's work should cover, which was that it should be mainly suggestive and constructive, and that the committee should recommend to the associations interested certain findings which, when adopted, could be utilized by the associations in their work with each other in the handling of the general subject of electrolysis. There being a large representation of the committee present, it was deemed best to proceed with a general discussion of the subject, in order that time might not be lost, keeping in view, however, the fact that no definite action of any character would be taken until the other representatives could be present.

At the suggestion of Mr. Waterman, who stated that he had had some communication with the representatives of the American Gas Institute, it was thought best to appoint a committee to confer with the three associations which have not yet appointed representatives, with a view to obtaining their co-operation. Upon motion of Mr. Torchio, seconded by Mr. Katté, the temporary chairman was requested to act as such committee. Upon motion of Mr. Waterman, it was voted after some discussion to invite the National Bureau of Standards to appoint representatives on the committee.

A general discussion then followed as to the object, work and scope of the committee, in which several members took part. At the close of the discussion the following resolution was offered by Mr. Waterman, seconded by Professor Richey, and carried:

"Resolved, That the chairman be authorized to appoint a committee on scope, organization and plan of work, such committee to include representatives of each of the associations interested, and that no further attempt at work be made by the joint committee until the committee on scope, organization and plan of work can render a report to the joint committee, outlining the scope of its work and suggesting a plan of procedure."

The chairman appointed as members of this committee Calvert Townley, chairman, F. N. Waterman, E. B. Katté and H. S. Warren.

Mr. Katté stated on behalf of the American Railway Engineering Association, of which he is a representative, that the principal desire of that association, as regards electrolysis, is for education; that a sub-committee on electrolysis of that association has spent most of its time during the past year and a half in preparing an educational thesis, in very elementary language, which, when presented in the report of the committee at the last annual meeting, appeared to be just along the lines of information that some railway men were looking for, and that the sub-committee has been instructed to continue its work along the same lines. Hence the representatives of the American Railway Engineering Association would be glad to have information along educational lines to present to the association.

Mr. Waterman stated that he knew of a number of such reports as those mentioned by Mr. Katté having been prepared, and that perhaps a committee representing the joint electrolysis committee could be appointed to collect such reports and data as might be available and select therefrom a list of such matters as might be agreed upon as fundamental, which should form the basis of some sort of an educational document to be issued by the committee. That seemed to be the way in which the committee could be of most use.

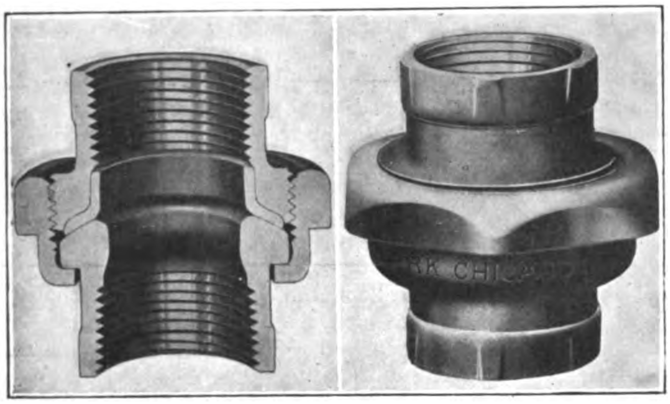
The question then arose as to whether the joint committee should suspend its work pending the appointment of the representatives of the associations which had not taken action, and it was decided that the committee would continue to hold meetings as occasion might require.

The chairman then named the members of the scope and organization committee and suggested that the committee prepare a skeleton outline of what it considered the joint committee should do, subject to the committee's approval.

The Ottawa (Ont.) Electric Railway has decided to change the color of the exterior of its cars from maroon to dark green. The twenty new cars to be put into use next month will be green, and the present cars will be repainted the new color as they go into the shops to be repaired.

COLD-DRAWN-STEEL UNION

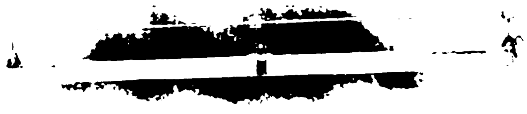
A pipe union made of cold-drawn steel has recently been placed on the market by the Mark Manufacturing Company, Chicago, Ill. It consists of the usual three main parts, namely, male and female ends joined by a coupling nut. These parts, as well as the brass seat ring, are drawn cold from flat stock, thereby obtaining a fitting that is said to be seamless and free from sand holes, pin holes or similar structural defects. As the union is threaded to the Briggs standard for pipe threads, it carries the same taper as the pipe instead of being tapped straight through as most unions are. The union is made of the same material as wrought-steel pipe, and therefore re-tightening and leaks are eliminated because of the equal expansion and contraction of the union and pipe. Another novelty is the densified hardened steel seat which is formed by applying the die with such great pressure that the metal is hardened and a smooth, accurately shaped surface is given to the seat. When the coupling nut is screwed into place the densified seat and the opposing soft brass ring in the female end make a joint which is leak-proof even under extreme pressures. Both seat and ring are formed in dies without machining or grinding so that the fit of one face against the other is exact. After the threads are cut, the union is also sherardized to provide against corrosion, but this protection does not alter the sharpness and fit of the threads.



Cold-Drawn Union

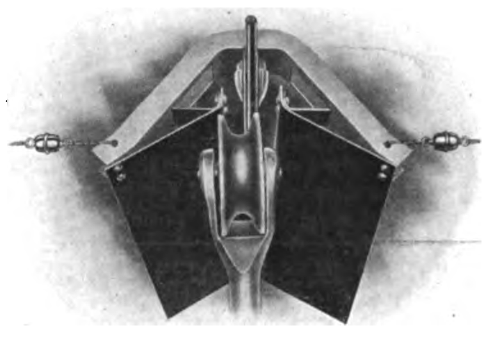
AUTOMATIC TROLLEY GUARD

The automatic trolley guard illustrated on this page has recently been added to the line of equipment sold by the Electric Service Supplies Company, Philadelphia, Pa. This guard is placed over the trolley wire usually at cross-overs intersecting steam and electric lines to replace the pole automatically should it leave the wire at these dangerous locations. Even if the pole is held down because the rope is caught, it is only necessary to release the rope and the automatic guard will replace the pole immediately. This guard also finds effective use on railways operating through tunnels, under grade crossings, bridges, dark sheds or at any other point where it would be difficult to replace the pole on account of darkness or other hindrances.



Method of Suspending Trolley Guard

The simple construction and application of this device appears from the illustration. The guard consists principally of two aluminum-coated steel sheets which are held in place by pressed-steel yokes or hangers. These hangers are adaptable to any standard type of trolley car. It has no projections or obstructions to hinder the trolley wheel. Furthermore, it allows a free vent for gases from passing locomotives and eliminates the possibility of choking up from any combination of ice, dirt or soot. The metals used in this guard are impervious to the action of the elements.

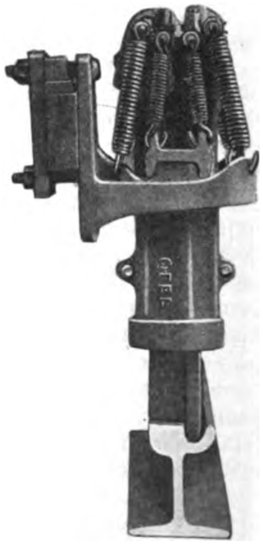


Trolley Guard in Operation

TWO-BLADED RAIL SCRAPER

In 1905 P. J. Pringle, now engineer and manager of the Ballarat (Australia) & Bendigo Tramways, designed a rail scraper with independent parts for cleaning the head and groove. Experience with the original design has led the manufacturer, the Consolidated Accessories Company, London, E. C., to add such improvements as screws to raise and lower the blades, one pair of springs to hold the blades down to the rail, a second pair of springs to absorb shocks and finally to use manganese steel for the groove blades.

A side view of this scraper, now known as the "Q-Fel," is presented in the accompanying illustration. The scraper has a bracket by means of which it is attached under the side of the car between the wheels with ample space for side movement. The vertical position of the scrapers should be adjusted so that the bottom of the sleeve, which is held in position by four main springs on two trunnions, is 4 in. from the top of the rail when the wheels are new. When necessary, a hard-wood packing block is inserted between the bracket and the frame to keep the groove blade vertical over the rail groove. The blades are brought into action and also adjusted for wear by turning two top handles anti-clockwise, and they are taken out of action by turning the same handles clockwise. Worn blades are removed by unhooking the reaction springs, swinging the cleaner to one side, using the top handles to withdraw the groove and tread blades and inserting new blades while the sleeve remains in oblique. The steel groove blades wear approximately ⅜ in. per 100 miles, equivalent to an effective life of 3000 miles. The life of the tread blades is about 9000 miles, the usual wear being about ⅛ in. per 100 miles. The blades are self-sharpening and therefore require no re-setting or removal until worn out.



Rail Scraper

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Connecticut.—Eminent Domain—Right to Exercise Power.

A street railway company may proceed to condemn land under Pub. Acts 1909, Chap. 101, and Gen. St. 1902, Secs. 3687, 3888, authorizing the condemnation of land necessary for altering and widening the right-of-way for a street railway company, though the company has, without authority, entered on the land sought to be condemned and has made excavations thereon and suits for damages therefor are pending. (Stevens v. Connecticut Co., 84 Atlantic Rep., 361.)

New York.—Carriers—Transfers—Penalties.

An agreement between the city of Buffalo and street railway companies operating surface railroads under franchises which binds the companies to abolish transfer charges and requires them to charge a uniform fare for a continuous trip by the most direct route from any point on any of the street railroads owned by the companies to any other point thereon is at most a contract by which each company agrees to honor the transfers of the others without charge. It is not a contract for the use of their respective roads or routes, within railroad law (Laws 1905, Chap. 695), Sec. 78, providing that any railroad corporation may contract with any other railroad corporation for the use of their respective roads or routes, or any part thereof, and a company refusing to give a transfer is not liable to the penalty imposed by Public Service Commissions law (Consol. Laws 1910, Chap. 48), Sec. 49. (Catalano v. Crosstown St. Ry. Co., 137 New York, Supplement 118.)

New York.—Taxation—Assessment—Pavement—Viaduct.

It was improper in assessing the property of a traction company to include as a part of its tangible property pavement laid by it solely for the benefit of pedestrians upon the highway, such pavement being the property of the municipality.

Where the assessment of a traction company's special franchise was presumptively correct, but a street pavement was improperly assessed as part of its tangible property, the assessment was invalid and could not be added to the value of the corporate franchise, though the pavement constituted a part of the cost of construction.

A viaduct necessary for the operation of a railroad, and in which the railroad company had a substantial property interest, was properly assessed against the company as part of its tangible property, though the public also had a right to use it. (People ex rel. Buffalo & L. E. Traction Co. v. State Board of Tax Commissioners, 136 New York, Sup. 474.)

Pennsylvania.—Steam and Electric Passenger Railways—Connecting Lines.

Where a corporation operates under leases a steam railway company and an electric street railway company, it will not be restrained, at the instance of a township, from constructing a connecting line between the two over a township road where it has gone no further than its lessor could have gone and where the railway existed before the township road. (Willis et al., Board of Commissioners of Baldwin Tp., v. Pittsburgh Rys. Co., 82 Atlantic Rep., 1117.)

Pennsylvania.—Cleaning Streets—Action for Cost.

In an action against a street railroad for the cost of cleaning streets which should have been cleaned by defendant, where the companies underlying defendant obtained their right to the streets on the condition that they should keep them cleaned, and defendant assumed the duty and conditions relating to cleaning of streets imposed by the charters and franchises of the underlying companies, a verdict and judgment for plaintiff for the cost of cleaning the streets between the tracks and 1 ft. on either side thereof, in accordance with a general ordinance, instead of for the entire street from curb to curb, as required by some of the charters, should be sustained. (City of Pittsburgh v. Pittsburgh Rys. Co., 83 Atlantic Rep., 273.)

Texas.—Condemnation Proceedings—Measure of Damages.

Where a railroad company wrongfully took possession of land and constructed its road without having paid or deposited the amount awarded by the commissioners, the measure of damages for the land taken was its market value at the date of the trial, and not its lesser value at the date it was taken.

The fair cash market value of land condemned for a railroad right-of-way is not the market value of the strip taken when considered by itself, but is its value as a part of the tract of which it forms a part. (Routh et al. v. Texas Traction Co., 148 Southwestern Rep., 1152.)

Washington.—Vacation of Street—Right to Question.

A street railway company which has a mere easement in a street cannot claim that there was a vacation of the street by operation of law because it was not opened within five years after the plat was filed, to defeat the right of the city to grade the street, upon which condition the company is bound by deed to remove its track to the center of the street. (Seattle, R. & S. Ry. Co. v. City of Seattle, 126 Pacific Rep., 531.)

LIABILITY FOR NEGLIGENCE

Alabama.—Collisions—Duty of Motorman—Duty of Travelers.

A motorman who sees a driver approaching on the regular roadway used by travelers with his horse under control need not stop his car until it becomes reasonably apparent that the traveler's horse will go on the track in front of the car. Where it is apparent that the driver sees the approaching car and is near enough to the traveled part of the street readily to turn off the track, the motorman may presume that he will get off the track until by his conduct he shows that it is his purpose not to do, or that he cannot do so. The motorman must then begin to stop the car to prevent injury. (Birmingham Ry., Light & Power Co. v. Simpson, 59 Southern Rep., 214.)

Alabama.—High-Voltage and Low-Voltage Wires on Same Pole.

Where an electric company maintained low-voltage and high-voltage wires on the same poles and a wire of high-voltage came in contact with a wire of low voltage and an employee working on the wire of low voltage was injured by an electric shock, the negligence in permitting the wires to come in contact was the cause of the accident. (Birmingham Ry., Light & Power Co. v. Canfield, 59 Southern Rep., 217.)

Georgia.—Municipal Corporations—Defects in Streets.

When the limits of the municipal corporation were extended so as to include a part of a highway which had previously been beyond the limits, such part of the highway then became one of the public streets of the city, and the municipality became liable for failure to keep it in proper repair, as it would be for failure to repair its other streets. But, whether or not the municipality was liable on account of any injury occurring there, this did not operate to release from liability one who unlawfully placed in the highway before it became a street a catch basin which caused a personal injury to a passer. (Georgia Ry. & Electric Co. v. Tompkins, 75 Southeastern Rep., 664.)

Indiana.—When Employees Are Passengers.

Where a carrier of passengers employs a person and assigns him a place of labor some distance from his home, giving him, in addition to his wages, tickets enabling him to ride to and from his work, such person, while riding on such tickets, is a passenger to whom the carrier owes the same duty as it is bound to exercise with reference to other passengers. (Indiana Union Traction Co. v. Langley, 98 Northeastern Rep., 728.)

Massachusetts.—Injuries from Sparks from a Third-Rail Shoe.

Plaintiff, while riding as a passenger on an open surface car beneath defendant's elevated structure, looked up as an elevated train passed overhead and was struck in the eye by a spark coming from the elevated road, probably from the contact shoe of the train. The elevated railroad was operated by proper authority in the proper manner, and there was nothing to indicate that defendant should have foreseen any particular danger or guarded against the same or that he had warning of its existence, nor was there any evidence that there was any practicable method of checking the emission of sparks from the trains or its electrical apparatus or preventing their falling into the street. Held, that plaintiff was not entitled to recover under the doctrine *res ipsa loquitur.* (Carney v. Boston Elevated Ry., 98 Northeastern Rep., 605.)

Missouri.—Explosion of Controller Box.

In an action against a street railroad company for injuries which a passenger received, owing to explosions in the controller box or other machinery, where it appeared that the motorman failed to throw off the electricity and permitted the car to run for several blocks after the explosions and flames began, there was a casual connection between the panic of the passengers caused by the flames and the negligence of the motorman in failing to stop the car. (Logan v. United Rys. Co. of St. Louis, 148 Southwestern Rep., 444.)

Missouri.—Collision with Hook-and-Ladder Truck—Care Required of Drivers.

In an action by a fireman who while riding on a hook-and-ladder truck was injured by a collision with a street car the motorman of which, although he could see that the driver of the truck was waiting on the tracks for the car to stop so that he could turn a sharp corner, did not stop the car, the petition pleaded an ordinance of the city giving the fire wagons right-of-way over all street cars. Held that, to rebut any inference of negligence on the part of the plaintiff for sitting on the truck until it was struck by the car, he might put in evidence the ordinance and the general custom of street car companies to obey the ordinance and stop their cars at the approach of fire wagons, the action not being based on the street car company's violation of the ordinance. (Taylor v. Metropolitan St. Ry. Co., 148 Southwestern Rep., 470.)

Montana.—Injuries to Passengers Expecting to Alight.

Where the motorman of a street car slowed up his car at a certain street, in accordance with a request of a passenger who, believing the car would come to an immediate stop, went upon the front steps and platform preparatory to alighting, the passenger may recover for injuries received from the failure of the car to stop and from its sudden and violent starting, which threw him off. (Knuckey v. Butte Electric Ry. Co. et al., 122 Pacific Rep., 280.)

New Jersey.—Coasting on Public Street—Collision.

Where one engaged in coasting on a public street was injured in a collision with a street car in consequence of the negligence of the motorman and not in consequence of any contributory negligence, he could recover from the street railroad company for the injuries received, though coasting is a public nuisance. (Lynch v. Public Service Corporation, 83 Atlantic Rep., 382.)

New York.—Injury Through Closing Doors—Overcrowding—Carrier's Liability.

A carrier of passengers is not liable for injury to one of them caused by his being crowded through a car doorway and his hand being caught by the door, if the carrier's employees used due care in closing the door. (Rubin v. Interborough Rapid Transit Co., 136 New York Sup., 60.)

New York.—Injuries to Persons on Trestle Used as Thoroughfare.

An engineer or motorman is required to keep a sharp lookout for pedestrians only at places where he has reason to expect they may be on the track, but where a trestle of a street railway company has been used by the public as a footpath so constantly and notoriously as to raise a presumption of knowledge on the part of the company its servants are bound to exercise the same vigilance in looking for travelers in that place as in places where the public have a right to go on the tracks. (Shelton v. Metropolitan St. Ry. Co., 151 Southwestern, 403.)

New York.—Injuries to Travelers—Passing Standing Car.

Plaintiff, a physician, was following a street car which stopped to take on a passenger. After looking ahead and observing no obstacles, he turned to the left in accordance with the law of the road to go round the car, when he saw another car approaching about 100 ft. away, without warning, and at a speed of more than 20 m. p. h. He endeavored to avoid collision, but was struck by the car and injured. Held, that since it was the duty of the street railway company when one car approached another which was standing on the street receiving and delivering passengers to have the approaching car under control in order that no injury be done the public, and plaintiff was entitled to presume that defendant would observe such rule, he was not negligent as a matter of law in going on the track. (Bocovsky v. Buffalo & L. E. Traction Co., 137 New York Sup., 75.)

Pennsylvania.—Boarding Car from Wrong Side—Who Are Passengers.

In an action against a street railroad company for causing death where the decedent was killed while forcing his way into the car from the wrong side at an unusual and improper place he could not be regarded as a passenger, and the mere fact that he had succeeded in getting his feet upon the running board, and even upon the body of the car, was not sufficient to make him one. (Geiger v. Pittsburgh Rys. Co., 83 Atlantic Rep., 367.)

Pennsylvania.—Injuries to Passengers—Liability of Company Issuing Ticket.

Where a street railway issues tickets in its own name having the words thereon "Good for one 5-cent fare," and supplies such tickets to two other independent railway companies, the tickets to be good as fare on any of the three railways, a person buying a ticket from the conductor of one of the other independent street railways and injured while riding on such road in a collision may sue the company issuing the tickets to recover for his injuries, though the issuing company received no benefit from the sale of the ticket. (Mullen v. Chester Traction Co., 84 Atlantic Rep., 429.)

Washington.—Injuries to Persons on Track.

A person lying on a street car track on a rainy night was struck by a car. The street railway company was not responsible for his presence on the track. There was no evidence of how long he had been on the track prior to the accident, and he might have moved on the track just before the car struck him. The car was not operated at a dangerous speed, and the fender was a suitable one. Held, not to show actionable negligence of the company, though the headlight of the car was obscured, so that the gripman could not see as far as he would have seen had it been in a proper condition. (Gilcher v. Seattle Electric Co., 124 Pacific Rep., 218.)

Washington.—Duty to Provide Gates—Passenger Alighting from Wrong Side of Car.

Where a city ordinance required street railway companies to equip their cars with gates or guards on the side of the platform next to the opposite track to prevent passengers from entering or alighting from that side, it was the duty of a carrier operating a double-track street railroad not only to provide gates but to see that they were kept closed. Hence, where a passenger on a crowded car attempted to alight on the side next to the adjoining track through open gates and was struck and injured by a car passing in the opposite direction, the facts indicated actionable negligence. (Elliott v. Seattle R. & S. Ry. Co., 122 Pacific Rep., 614.)

MISCELLANEOUS

Illinois.—Interference Between Employees.

Every employee has a right to protection in his employment from the wrongful and malicious interference of another. But an employee cannot complain because another servant causes his discharge by refusing to continue in employment if he is any longer retained. A servant having the right, in the absence of contract, to quit the service for any reason or without reason, and the wrong in such case in causing another's discharge being *damnum absque injuria.* (Kemp et al. v. Division No. 241, Amalgamated Ass'n of Street and Electric Ry. Employees of America et al., 99 Northeastern Rep., 389.)

Kentucky.—Assaults and Ejectments.

A carrier is liable for an assault upon a passenger by its servant, whether the assault was because of personal malice or in the supposed interest of the carrier, and is liable if its servant assaults the passenger, though the passenger provokes the servant by insulting language, or if the servant, having been assaulted by the passenger, uses force greatly in excess of that necessary to repel or eject him from the conveyance. (White v. South Covington & C. St. Ry. Co., 150 Southwestern Rep. 837.)

LONDON LETTER

(*From Our Regular Correspondent.*)

As a result of the refusal of the local councils to allow the overhead system to be adopted on the South Hackney-West India Docks route of the London County Council Tramways a trial is being made with some old cars equipped with the Stevens petrol-electric system. Each car is equipped with a petrol engine, a dynamo and the necessary motors, which are connected to the axles. The trial trips prove that a speed of 12 m. p. h. can be maintained, and that 8 to 10 miles can be run on a gallon of petrol. If successful, this method will be used by the London County Council on lines where the Borough Councils will not allow the installation of overhead wires and traffic does not justify the expense involved in installing the underground system. The London County Council has been hampered for years by the power of veto possessed by the Borough Councils against the use of the overhead system, although in many places the cost of installation of the underground system has been prohibitive.

The highways committee of the London County Council reports that it will be necessary to spend £67,500 on rails for maintenance purposes, and the new plant for the Greenwich generating station, together with other improvements, will cost £150,000. The Council has accepted the tender of the British Westinghouse Electric & Manufacturing Company for two 8000-kw turbo-generators for the Greenwich power station. These generators will have a guaranteed steam consumption of 12.44 lb. per kw, and the contract price is £50,532, subject to a bonus of £500 for every 0.1-lb. reduction in the consumption. The new machines, which will generate alternating current at 6600 volts and 25 cycles, will replace two of the four 3500-kw reciprocating engines and generators originally installed in the power house. It is expected that the new machines will be in working order by March, 1914. It is proposed eventually to install two similar turbo-generators in place of the remaining reciprocating plant. The ouput of the Greenwich power station is not sufficient for the present tramway requirements, and while these new turbo-generators are being built additional power will have to be secured temporarily from one of the London electric supply corporations.

At the recent discussion on the annual expenditure of the London County Council it was shown that the tramway problem grows more complicated each year and that the estimates of revenue are upset by the growing motor omnibus competition. While the results of last year's working are not up to expectations, the revised estimates show that the working expenses and the interest on debt have been met and that £388,000 out of surplus earnings is available for the repayment of capital. The total debt outstanding on the tramways is about £9,916,000 and the debt charges amount to £738,000, or the equivalent of nearly a 4d. rate.

The Metropolitan Electric Tramways, which operates largely in the northern suburbs of London, held its annual meeting recently. The chairman stated that in order to maintain the same income the sum of £24,000 had to be spent on a fleet of motor omnibuses owned by the London & Suburban Traction Company, the idea being that if vehicles of this class are to be operated on the company's route, then the company had better control the competing service. Many combined tramway and omnibus undertakings will probably be developed in the United Kingdom during the next few years. This company has also successfully promoted a bill empowering it to provide a system of railless traction on some of its outlying districts. The proposal had the support of the County Councils of Middlesex and Essex and of the District Councils of Tottenham and Walthamstow. From Wood Green to Finsbury Park the system will not be used for the transportation of passengers but simply to move the cars to and from the Wood Green depot. This bill is a substitute for a bill promoted successfully by the company in 1906 for the construction of an ordinary tramway, the cost of which was found prohibitive.

The Board of Trade has officially inspected a Cedes Stoll system of trackless trams at Keighley, on a line which has been installed between the Ingrow terminus of the Keighley Corporation Tramways and the village of Cross Roads. The principal difference between the Cedes Stoll car and those running in Leeds and Bradford is that in the latter the motors are hung beneath the chassis and driven by chain whereas the Cedes car wheels contain the armatures of the motors and there is no revolving axle.

The Manchester Corporation tramways and electricity committees have come to the following terms for the supply of electrical energy for tramway purposes:

(1) Charge to be made by the electricity committee to the tramways committee for all current supplied for traction, also for lighting and power at car sheds and car works, 1d. per unit. This charge is based upon price of coal at 11s. per ton. In the event of increase or decrease in price of coal there shall be an increase or decrease in the charge for current at the rate of .02d. per unit in respect of each shilling increase or decrease per ton in price of coal.

(2) This charge shall apply so long as current supplied for traction does not exceed 30,000,000 units per annum. If and when current supplied for traction exceeds this, then the supplies for all purposes (traction, lighting of car sheds and power at car works) over and above said 30,000,000 units shall be paid for at the prevailing rate which the electricity department charges to large industrial power users under similar conditions of supply.

(3) Arrangement to be in force for minimum of three years and terminable thereafter at end of any financial year on receipt of six months' notice from either side.

(4) In event of City Council altering the basis upon which the contributions from the profits of either or both of the two undertakings to the relief of rates is made, and thereby increasing the total amount of such contributions, either of the two committees to have the option of determining this agreement.

The select committee of the House of Lords has rejected the Hastings tramway bill, which would have authorized the substitution of overhead wires for the present surface contact system along the sea front. The bill was opposed by the Hastings Corporation and a number of frontagers, who gave evidence to the effect that the trams injured property on the front and that overhead wires would have an even worse effect. For the tramway company it was contended that the overhead system was the only practical system, and that the promoters were willing that the question of the system should be left to the Board of Trade.

The Northampton Town Council has decided to extend the limited parcels service in connection with its tramway undertaking. At present parcels are delivered on the line of route, but by the new arrangement a central receiving office is to be established to which all the parcels will be conveyed by the cars and later delivered by messengers at stated times.

The Glasgow Corporation tramways committee has adopted the report of a sub-committee recommending that two additional turbo-alternators be obtained for the Pinkston power station, one of 5000 kw and the other of 2000 kw, and that the general manager be instructed to prepare the necessary specification and form of tender and obtain offers for the erection of the alternators, and in the meantime to advertise one or more of the reciprocating engines at the Pinkston power station for sale.

A committee of the Town Council of Edinburgh, along with the city engineer, recently visited a number of English cities to inspect self-propelled tramway cars and obtain information concerning them. A number of extensions are proposed on various city and suburban routes. The most important is the line which is to be laid from the city to the new barracks at Redford. At present most of the Edinburgh and district lines are worked on the underground cable system. When horse traction was abolished it was not considered advisable to install the overhead system in Princess Street, but since then electric lines have been constructed by the Corporation of Leith, and from Edinburgh to Portobello, and it is recognized that the present cable lines cannot be extended. The Town Council must either construct overhead lines and require passengers to change cars wherever the trolley routes and the cable routes meet or organize a service of self-propelled cars which can run over any routes where there are rails. The deputation visited London, Coventry and Morecambe, where petrol-electric systems are in operation. A. C. S.

News of Electric Railways

Electrification Ordinance Recommended in Chicago

At a meeting of the committee on railway terminals of the City Council of Chicago, Ill., on June 2, 1913, an ordinance requiring the abatement of smoke on or before July 1, 1915, by all railroads entering Chicago was recommended to the Council for passage. The vote of the committee was twelve to one.

Robert Redfield, attorney for the Pennsylvania Lines and other roads interested in the plans for new passenger terminals on the West Side near the location of the present Union Station, asked that action be delayed until the committee of the Chicago Association of Commerce can complete its report on the subject. He said that the report of the committee would be ready by Jan. 1, 1914. The committee, however, refused to grant any delay. It was influenced in this attitude largely by a report which Alderman Theodore K. Long presented as his main argument in favor of immediate action.

This report was rendered by a committee of the Association of Commerce to Homer A. Stillwell, president of that organization, on July 8, 1910. It was substantially a recommendation for immediate electrification of the terminals. This report has not been made public heretofore. The members of the committee who rendered it were as follows: John M. Ewen, Bion J. Arnold, A. Bement, Paul P. Bird, W. F. M. Goss, W. B. Jackson and Charles E. Merriam. The committee reported that it found electrification of terminals to be both practicable and feasible and it recommended that immediate measures for its accomplishment under proper and reasonable plans be adopted. The committee also recommended that until electrification had been accomplished anthracite coal and coke be used as locomotive fuel.

Alderman Long also presented the minutes of an executive session held by leaders of the Chicago Association of Commerce on Sept. 22, 1910, at which the report of their early committee was discussed. In addition to the officials of the association, representatives of a number of prominent railroads were present. The president of one railroad was quoted as having stated in his discussion of the subject that electrification was a commercial problem, and if it cost $100,000,000 or $400,000,000 to electrify the terminals in Chicago the question was whether the commerce of Chicago would bear that burden.

The resolution of the Council committee will go before the City Council for consideration.

Claim Filed Against City of Buffalo for Strike Damage

The International Railway, Buffalo, N. Y., through its president, E. G. Connette, has filed a claim for $108,400 against the city of Buffalo for damage to the property of the company sustained during the recent strike of its employees. The company estimates that it suffered a loss of $102,108 in earnings and $6,292 in injury to its property through the failure of the city to afford the company proper protection. The company has tabulated in its claim the losses in earnings which it estimates it sustained from April 6 to April 13 inclusive, the highest amount for any one day being $17,197 for April 9. The damage sustained to the physical property is set forth in detail, the cost for labor and materials being given where the element of cost for labor was significant. The claim against the city is addressed to "The Honorable Common Council of the City of Buffalo, City Clerk, Corporation Counsel and Chief Fiscal Officers of Said City." After reciting that it operates in Buffalo under franchises granted by the city and that it is a large taxpayer, the company in its claim says in part:

"On April 6, 1913, claimant became informed of various threats and attempts to destroy and injure its property within said city by mobs, riots and unlawful assemblages upon the streets of said city and elsewhere, and claimant did immediately upon acquiring such knowledge notify the Mayor of the city of Buffalo of such threats and attempts to destroy and injure its property by such mobs, riots and unlawful assemblages, and did thereupon, both in writing and orally, demand of the Mayor of said city and of its police department and of others in authority to protect the property of claimant, and did further notify the Mayor of said city that claimant would hold the city of Buffalo responsible for any damages sustained by claimant by reason of such mobs and riots. That, commencing early on the morning of April 6, 1913, the cars, equipment and other property of claimant were attacked by mobs and by unlawful assemblages of people, and riots ensued and continued to and until April 12, 1913, and that by reason thereof claimant's property as more particularly set forth was damaged and injured by such mobs and riots and unlawful assemblages, and by reason of the fact that the city of Buffalo did not protect claimant's property from damage and claimant's employees from bodily harm and because of the violence practised by said mob upon claimant's property and claimant's employees, claimant was unable to carry on and operate its street cars and by reason thereof was deprived of earnings from its business of operating street cars and thereby suffered a large property loss as more specifically set forth. That by reason of the premises this claimant has been damaged and hereby makes claim and demands against the city of Buffalo in the sum of $108,400."

Decision of Supreme Court in Fort Street Case, Detroit

Mayor Marx of Detroit, Mich., had reached no decision up to April 30, 1913, as to the next step to be taken with respect to the street railway situation, now that the United States Supreme Court has ruled that the Detroit United Railway has no right on Fort Street and may be ordered off at any time by the City Council. The company is willing to obey the mandates of the city, but the manufacturing interests object to any move that would affect the street railway service. For the city to compel the company to discontinue service on Fort Street would cause a reaction against the administration in the section served and endanger the chances of the present officials for reelection. Mayor Marx has been advised by business men to negotiate with the company for lower fare, but he declares that the administration is for municipal ownership.

After reviewing the history of the Fort Street case and setting forth the contentions of both sides Justice Day of the Supreme Court at Washington said:

"Certain federal questions made out require consideration upon this application to dismiss or affirm. The first of these is that the attempt to terminate the rights of the railway and to require the removal of its tracks and property from the streets of the city impairs the obligation of a valid existing contract for the continued use of the streets until 1921. This contention is based on the ordinance of May 2, 1906, which by the title purports to be one in relation to the rates of fare on the Fort Street line of the railway and which provides, after reciting the purpose of the ordinance, as we have mentioned above, and the intention that the grants from the township of Springwells may be modified in accordance with the ordinance, the terms and conditions of the township grant not to be otherwise affected by the agreement.

"The argument is that, as this ordinance obligates the railway for a full term of the township grants to do what does not expire until Dec. 14, 1921, to sell tickets and transport passengers over its line including the portion covered by the now expired grants, the last-named grants of the railway were thereby extended to expire at the same time with the township grants, because only by such construction can the obligation of the railway to furnish transportation for the full term of the township grants be complied with, and that this was a contract.

"The principles upon which the grants of this character are to be construed have been frequently declared in decisions of this court."

Justice Day then referred to a decision in the Cleveland Electric Railway case, in which it is stated:

"The rules of construction which have been adopted by the court in cases of public grants of this nature by authority of cities are of long standing. It has been held that such grants should be in plain language, that they should be certain and definite in their nature and contain no ambiguity in their terms.

"The legislative mind must be distinctly impressed with the unequivocal form of expression contained in the grant in order that the privileges may be intelligently granted or purposely withheld. It is a matter of common knowledge that grants of this character are usually offered by those interested in them and submitted to legislatures with a view to obtain from such bodies the most liberal grants or privileges that they are willing to give. This is one among many other reasons why they are so strictly construed."

Continuing, Justice Day said:

"Applying these principles, it is impossible to hold that the effect of this ordinance was to extend the franchises, which by their terms had definite and fixed duration.' Such effect is nowhere suggested in the preamble of the ordinance and does not necessarily inhere in the thing sought to be accomplished. Legislation concerning prior grants was not brought to the attention of the Council, so that privileges enlarging them could be intelligently acted upon or clearly given or explicitly withheld. A fair construction of the ordinance requires such service at the rates fixed only while the railroad had a lawful right to use a street by grant from the city. Certainly it was not contemplated that the city should require such service after the grant had expired by its own limitation.

"We are of the opinion that where a street railway is authorized to operate in the streets of a city for a definite and fixed time and has enjoyed the full term granted it may upon failure to renew the grant be required within a reasonable time to remove its tracks and other property from the streets. In this case the Supreme Court of Michigan held that if the city by the resolution of its Common Council should require the removal of the company's property from the streets, the removal should be effected by the railway within ninety days after notice or resolution, unless it should receive a longer time or the time given should be extended by resolution.

"In thus providing for the removal of the property of the railway from the streets of the city we are unable to see that any contractual obligation was impaired, or that the property of the railway was taken without due process of law, and these are the contentions as to federal questions argued in this connection."

The utilities committee of the Charter Commission has asked Corporation Counsel Lawson for an opinion on the municipal ownership section which has been framed. This section, as it stands, will allow the street railway commission to demand a 2 per cent increase in the bonding limit of the city every two years, in addition to the 2 per cent increase in the general bonding limit. Commissioner Burton claims this is illegal, under the Verdier home rule law, and that it can never be put to a vote of the people. Other members assert that it is putting too much authority into the hands of the street railway commission and that it could go to any extremes in the issue of bonds, with the railway property as security. Still others say that if the commission does not have power to demand the issue of bonds when needed, the purpose of the municipal ownership section will be defeated.

Mayor Marx has announced the appointment of William D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees, as the third member of the street railway commission. Joseph S. Stringham, one of the men already named, has informed the Mayor that it will be impossible for him to serve in that capacity. The commission will probably be asked for advice in regard to the settlement of the differences between the city and the Detroit United Railway. Representatives of both the city and the company were reported to be working in executive session on plans for settlement on May 27.

On the following day Mr. Brooks said that the company was ready to consider any fair plan of settlement that might be proposed.

In pursuance of the order of the Wayne Circuit Court, the City Council on May 27 rescinded its action in appropriating $250,000 to be used for transportation purposes. This money was to be used in financing either a cross-town street railway or a bus line on Junction Avenue.

Attorney Hinton E. Spalding has filed notice of an appeal to the Supreme Court of Michigan from the decision of the Wayne Circuit Court declaring the Verdier home rule act constitutional.

Franchise Negotiations in Kansas City Resumed

The franchise negotiations in Kansas City, Mo., between Mayor Jost, representing the city, and the receivers of the Metropolitan Street Railway have been resumed. At a recent executive session two proposals were submitted by the receivers and a counter proposal was made by the Mayor. At the close of the session it was decided by both sides to the conference to issue a statement in regard to the progress made at the meeting. A summary of the first proposal made by the representatives of the company at the conference follows:

Capital value shall be fixed at $30,000,000, to which shall be added as new capital all capital expenditures since May 31, 1912, and all which may be hereafter made. The sum total shall from time to time be regarded as capital value upon which there shall be a return, cumulative, equaling 6 per cent per annum, payable semi-annually. The net surplus shall be divided 75 per cent to the city and 25 per cent to the company. The part going to the city shall, at its option, go to amortizing or paying off the capital value, so that when it is paid down to one-half of the then capital the city shall own the property, subject to an indebtedness for the other half, and when the city thus acquires the property the 25 per cent of the company shall cease. The excess of 8 per cent on gross earnings above taxation, at the option of the city, shall go into the city treasury, as at present, or be set aside as a primary amortization fund. The city shall have the right to test in the fourth and fifth years of the contract a reduction of fares to six tickets for a quarter to see whether the return is sufficient to carry out the spirit of the contract, and the 75 per cent of the surplus going to the city for the first three and subsequent years shall stand as security to the company against the loss, if any, by that test.

After this had been discussed the representatives of the company made a proposal in part as follows:

Capital value shall be fixed at $35,000,000, to which shall be added as new capital all expenditures therefor since May 31, 1912, and all which may be hereafter made. The sum total shall be regarded as the capital value. Upon the $35,000,000 there shall be a return, cumulative, of 5 per cent per annum, payable semi-annually. Upon the new capital there shall be a return, cumulative, of 7 per cent per annum, payable semi-annually. All the surplus over and above interest, as aforesaid, shall be applied to amortization, the 7 per cent money to be first amortized. When one-half of the total capital shall have been amortized the city shall own the plant, subject to the indebtedness for the other half. The present 5-cent fare shall never be so reduced as to impair the return aforesaid and the value to the company of said amortization. Under both plans it is agreed:

(a) The city may at any time purchase, at capital value, but if the purchase is made under the first plan before one-half of the capital is amortized, then there shall be added the fair value of the right of participation.; (b) an agreed plan shall be adopted for adequate and satisfactory representation by the public in the management of the property.

The counter suggestions of Mayor Jost have been summarized as follows:

The capital value to be $30,000,000; 6 per cent on this sum and on new capital to be hereafter invested; interest cumulative; all earnings after paying interest charge and operating expenses to be applied to paying off capital until it has been reduced to a point where it is the equivalent of the physical value of the property. During this time fare to be 5 cents with transfers as now. After capital has been paid off and reduced to physical value the company to receive one-third of the surplus and the city the remainder of the surplus. All surplus going to the city to be applied to further paying off capital until such time as the capital shall have been one-half paid off. The city shall thereupon become owner of the property and the rights of the present owners shall then and there terminate. At such time as the capital has been reduced to the physical value the city may reduce the fare, but the fare shall not be reduced to such an extent or in such a way as materially to impair the right of the company to participate in the surplus as aforesaid, measured by the earning power of a 5-cent fare.

Estimates Based on Proposed Merger of Chicago Surface Lines

The local transportation committee of the Board of Aldermen of Chicago has received a letter signed by all the members of the Board of Supervising Engineers, written in compliance with the request made by the committee on May 16 for figures showing the probable capital expenditures, gross receipts, operating expenses, net profits and rate of return of the Chicago Railways and the Chicago City Railway, provided these properties were operated as one property and under one management from Feb. 1, 1913, until the expiration of the present ordinances on Feb. 1, 1927. The letter reads in part as follows:

"In arriving at the figures submitted we have necessarily had to take into consideration the method of operating the cars of the different companies involved and the changing of the service in such a manner as to introduce the through routing of the cars to the greatest extent practicable, not only for the purpose of giving better service but also for the purpose of reducing operating expenses.

"Owing to the responsibility involved in our conclusions we have spent much time in estimating the probable increase in population and in growth of territory of the city of Chicago and their relation to the future gross earnings of the companies, and in making these calculations we have made a careful analysis of the past growth of many of the large cities of the world during the period occupied by them in growing to the present population of the city of Chicago, as well as thereafter, up to their present population.

"In determining the capital investment we have started with the present value of the properties, known as the purchase price in the 1907 ordinances, and have added annually the amounts which we deemed necessary properly to extend and equip the surface line systems, including both a north and south and an east and west surface car-line subway system through the business district.

"To determine the probable future operating expenses, it has been necessary to define a measure of service and use this measure of service in determining the necessary car service and consequently the number of cars required for the service. We have based our conclusions on the assumption that during the non-rush-hour periods, under normal conditions of operation, a seat will be provided for every passenger on the basis that there shall pass any given point on any route during each fifteen-minute period a number of seats equal to the number of passengers passing such point on the cars during the same period, and that during the rush-hour periods sufficient cars shall pass any given point within each thirty-minute period to carry all passengers that pass by the same point during the same period without the car-loading exceeding an average of seventy passengers per car, and that such cars shall have a seating capacity of not less than forty passengers, although it is contended by some members of this board that, considering the size and type of car used in Chicago, eighty passengers per car is a fair measure of service under the above conditions.

"After careful analysis we have determined that with the measure of service most advantageous to the public, as above set forth, and with the economies that can be effected resulting from unified operation, the operating ratio can be approximately 65 per cent of the gross receipts and upon this basis the net profits have been determined."

Based upon the above premises the accompanying table shows the income account and its distribution for the combined properties of the surface street railways operated as one property for the period beginning Feb. 1, 1913, and ending Jan. 31, 1927.

Year	Capital, Yearly Additions	Capital at End of Year	Gross Receipts	Operating Expenses, 65 per Cent of Gross Receipts	Net Receipts	5 per Cent Interest on Capital	Net Profits	City's Share, 55 per Cent of Net	Companies' Share, 45 per Cent of Net	Per Cent Companies' Share to Capital	Per Cent Total Companies' Share to Capital and Additional
1912*	$6,277,991	$133,770,389	$30,459,111	$19,396,257	$11,062,854	$6,524,947	$4,537,907	$2,529,993	$2,007,914	1.537	7.140
1913	$9,370,000	$143,140,000	$32,016,000	$20,810,000	$11,206,000	$6,922,700	$4,283,300	$2,355,800	$1,927,500	1.392	7.275
1914	8,754,000	151,894,000	33,623,000	21,855,000	11,768,000	7,375,800	4,392,200	2,415,700	1,976,500	1.339	7.113
1915	7,843,000	159,737,000	35,280,000	22,932,000	12,348,000	7,790,800	4,557,200	2,506,500	2,050,700	1.316	6.972
1916	7,398,000	167,135,000	36,988,000	24,042,000	12,946,000	8,171,800	4,774,200	2,625,800	2,148,400	1.314	6.904
1917	4,987,000	172,122,000	38,745,000	25,184,000	13,561,000	8,481,400	5,079,600	2,793,800	2,285,800	1.347	6.730
1918	4,778,000	176,900,000	40,550,000	26,358,000	14,192,000	8,725,600	5,466,400	3,006,500	2,459,900	1.409	6.766
1919	4,545,000	181,445,000	42,403,000	27,562,000	14,841,000	8,958,600	5,882,400	3,235,300	2,647,100	1.477	6.808
1920	3,917,000	185,362,000	44,303,000	28,797,000	15,506,000	9,170,200	6,335,800	3,484,700	2,851,100	1.554	6.832
1921	3,955,000	189,317,000	46,248,000	30,061,000	16,187,000	9,367,000	6,820,000	3,751,000	3,069,000	1.638	6.913
1922	4,017,000	193,334,000	48,237,000	31,354,000	16,883,000	9,566,300	7,316,700	4,024,200	3,292,500	1.720	6.994
1923	4,055,000	197,389,000	50,268,000	32,674,000	17,594,000	9,768,100	7,825,900	4,304,200	3,521,700	1.802	7.073
1924	4,105,000	201,494,000	52,339,000	34,020,000	18,319,000	9,972,100	8,346,900	4,590,800	3,756,100	1.883	7.151
1925	4,155,000	205,649,000	54,448,000	35,391,000	19,057,000	10,178,600	8,878,400	4,883,100	3,995,300	1.962	7.228
1926	4,193,000	209,842,000	56,593,000	36,785,000	19,808,000	10,387,300	9,420,700	5,181,400	4,239,300	2.040	7.303
										Average	7.076

*Figures are actual for year 1912.

Governor Sulzer's Veto of Power Bills

In the department "Legislation Affecting Electric Railways" in the issue of the Electric Railway Journal of May 31, 1913, page 980, brief mention was made of the vetoes filed by Governor Sulzer of New York in the case of the Murtaugh hydroelectric bill, designed to permit the utilization of the surplus waters of the canal for the development of water power by the State, and the Walters bill, which would have permitted quasi-public corporations to impound waters through the construction of dikes, watersheds, etc., and to market the water. The memorandum filed by the Governor in regard to the act to amend the conservation law by repealing one of the articles of that act and enacting a new article in relation to hydroelectric plants and making an appropriation therefor follows in part:

"This bill appropriates $650,000 to make a beginning, and I am advised that it will sooner or later cost the taxpayers of the State millions and millions of dollars. It seems to me that if we are to begin utilizing the natural water powers of the State for the benefit of the people we should commence at that place in the State where we have the greatest water power and not where we have the least. In other words, we should develop water power which is of so great a volume that power and heat and light can be generated for the benefit of all the people and not for a few in a selected locality.

"Then, again, this measure is severely criticised as loosely drawn, defective in places and of doubtful constitutional provisions. I am satisfied that if the bill should become a law it would be the subject of long and expensive litigation. In addition the friends of the Barge Canal are opposed to the plan embodied in this bill on the ground that it will cripple the efficiency of the canal.

"In view of all that has been said for and against this measure, I purpose to withhold my approval and have concluded to appoint a commission of experts and disinterested citizens to investigate thoroughly not only the project under consideration, but the Long Sault water powers, the Niagara water powers, the Genesee water powers and others, with a view of determining what is the best thing to do ultimately and finally for all concerned, and to report their conclusions, with appropriate bills, for the consideration of the next Legislature."

In his memorandum filed with the bill to amend the transportation law in relation to water storage corporations the Governor said in part:

"The basic principle underlying this measure is nothing less than the granting to private individuals of the vast, undeveloped and immensely valuable natural resources of our State, and it would mark the commencement of a policy that would inevitably end in the domination of the industrial life and the industrial liberty of our citizens by corporate control. So far as I know, the extraordinary powers conferred by this measure are without legislative precedent."

New Terminal for Dallas

The interurban terminal station which is to be erected by Stone & Webster, Boston, Mass., to accommodate its lines at Dallas, Tex., will cost approximately $2,000,000. Plans for the building have been drawn and adopted and construction will be started in a few weeks. The building will cover a block and will be nine stories high with a basement. Twelve tracks will run into the trainshed. The site of the proposed station is in the heart of the downtown business district.

The combined building and trainsheds will extend 200 ft. on the Jackson and Wood Street sides and 270 ft. on the Browder Street side. The building will have an aggregate floor space of 155,000 sq. ft. The trainsheds will house thirty-five interurban trains at one time. All of the interurban lines now running into Dallas, those being built into Dallas and those which are to be built in the future are expected to use these terminals. When the various interurban railways now under way are in operation 500 interurban trains will probably pass through the station every day.

The exterior finish on the street fronts of the building will be of pressed brick and terra cotta. The floors of the corridors and public spaces will be laid with terrazzo, a variety of inlaid mosaic. The walls will be finished in hard plaster and the interior woodwork will be of mahogany. The building will be equipped with three high-speed passenger elevators and the latest vacuum cleaning devices. There will be telephone and call bell systems, a fire alarm system, electric fans for offices, a refrigerating plant and pumps for circulating ice water to all offices. Hot water will also be supplied. There will be ample vault space and an independent heating plant with the necessary auxiliaries will be installed. The basement will be used as a substation for distributing current to the interurban lines and for lighting and power purposes in the business district in connection with the new underground system which is being installed. A portion of the ground floor of the main building will be devoted to stores. All of the Dallas Stone & Webster companies, the Stone & Webster district offices and the Stone & Webster Engineering Corporation will have their headquarters in this building.

Carhouse of Tri-City Railway Destroyed by Fire

The carhouse of the Tri-City Railway, in Rock Island, Ill., was destroyed by fire on the morning of June 1, 1913. Lightning struck the front end of the building and penetrated its entire depth of about 300 ft. The fire spread so rapidly that before sufficient help could arrive to assist the night force ninety-four cars were in flames, and it was possible to save only four. Practically all the rolling stock used in the bridge service between Davenport and Rock Island and the cars operated on the Rock Island and Moline city lines were stored in the building, but by working in the shops continuously the day and night following the fire the company was soon able to restore practically normal service with its obsolete equipment.

The Tri-City Railway placed an order recently with the St. Louis Car Company for thirty new cars, but they will not be ready for delivery until Sept. 1. It has officially announced that an order will be placed at once for sixty new cars and that work on the new shops will be rushed to completion. The new shops will be about 200 ft. wide by 300 ft. long, and must serve temporarily as a carhouse. J. G. Huntoon, general manager of the company, estimates the total loss from fire at $300,000. Of this amount $50,000 is chargeable to the building and $250,000 to the ninety-four cars which were destroyed. Insurance on the building and contents amounted to $225,000. The building which was destroyed was used as a storage barn and shop, while a two-story portion over the Fifth Avenue front served as trainmen's quarters and an office for the cashier. The proposed new shops were described in the ELECTRIC RAILWAY JOURNAL for Dec. 28, 1912.

Services of Traffic Expert Formally Ended.—The Supervisors of San Francisco, Cal., have adopted a resolution formally concluding the employment of Bion J. Arnold, Chicago, Ill., as traffic expert.

Motion for Inquiry Into Fare in Buffalo.—The committee on streets of the Aldermen of Buffalo, N. Y., has voted to file the resolution introduced in that body directing the Mayor to petition the Public Service Commission to conduct an inquiry into the fare charged by the International Railway in that city.

Beaumont Strike Declared Off.—The strike of the employees of the Beaumont (Tex.) Traction Company, which has been a thing of the past for some time so far as the company is concerned, has been declared off by the representatives of the former employees. The men went out on strike on Feb. 8, 1913.

Franchise Negotiations in Des Moines.—Mayor James R. Hanna of Des Moines, Ia., is reported to have stated that he hoped to be able to have a tentative ordinance for the extension of the franchise of the Des Moines City Railway ready for presentation to the officers of the company by June 15, 1913, for their consideration.

Prospects for Double-Tracking the Buffalo, Lockport & Rochester Railway Indefinite.—The matter of double-tracking any part of the Buffalo, Lockport & Rochester Railway, Syracuse, N. Y., is at present very indefinite. If the project does assume a definite form the company will in all probability do the work, which will merely consist of laying the track on the double grading which was completed when the road was originally constructed.

Plan to Take Over Abandoned Steam Branch.—The Northwestern Pennsylvania Railway is reported to have made an offer of $150,000 to the Erie Railroad for its old main line track between Meadville and Cambridge Springs, which is to be abandoned by the Erie Railroad when it completes its new double-track line at low grade. If the deal goes through, the Northwestern Pennsylvania Railway will, it is said, abandon its present line to Cambridge, except a 4-mile spur to the Country Club, and will use the old Erie main line instead.

Decision in Bridge Railway Case.—The Appellate Division of the Supreme Court of New York has confirmed the recommendation of a commission that the Manhattan Bridge Three-Cent Line, New York, be permitted to lay tracks in the borough of Manhattan. The line now runs from Fulton Street and Flatbush Avenue, Brooklyn, over the Manhattan Bridge to the bridge plaza in Manhattan. The line will extend from the North River through Desbrosses Street by double track to Washington Street, thence by single track in Vesey Street to Greenwich Street, by double track in Vesey Street to Canal Street and through Canal Street to the Manhattan Bridge terminal.

Changes in Personnel of the Choctaw Railway & Lighting Company.—In a recent reorganization of the Choctaw Railway & Lighting Company, McAlester, Okla., the following changes in the organization were effected: B. R. Stephens resigned as general superintendent and moved his office to St. Louis, Mo., where he still acts as secretary, auditor and purchasing agent. Russell Palmer succeeded D. W. Dawley as treasurer of the company. B. E. Tabler, formerly the traffic manager, was appointed general superintendent. M. Plunkett, formerly master mechanic, succeeded N. E. Daniels, chief engineer power station, now having supervision over the maintenance of equipment and power station.

Motor Buses Proposed for Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has caused a bill to be introduced in the Legislature giving it authority to operate motor buses in the city of Philadelphia. This is done in order that the company may be in a position to operate motor buses when considered necessary for the proper accommodation of the public. Nothing in this regard can be done, however, without having first secured consent of the city authorities. This bill does not confer an exclusive privilege on the Philadelphia Rapid Transit Company. Omnibus companies may still be incorporated as heretofore, and it remains for Councils to decide who shall operate omnibuses on any of the city streets.

Separate Management for Southern Pacific Electric Line.—It has been announced that the suburban electric lines of the Southern Pacific Company in Oakland, Alameda and Berkeley, Cal., are to be separated as an operating organization from the steam lines about the bay. Directly in charge of the electric organization will be a local manager to be appointed. Under him, W. H. Norton, at present assistant superintendent of the Western division, will supervise electric train operation. His headquarters will be at the Oakland pier. Paul Shoup, president of the Pacific Electric Railway, will remain the executive head of the transbay system, serving, it is said, however, largely in an advisory capacity. The steam lines will continue under the management of J. D. Brennan, superintendent of the Western division.

San Francisco Traffic Agreement Approved by Court.—The Supreme Court of California has approved the agreement between the United Railroads and the city on behalf of the Geary Street Municipal Railway for the joint use of lower Market Street. The tracks of the Geary Street municipal railway will now be connected with the tracks of the United Railroads on Market Street, and as soon as this work has been completed the cars of the Geary Street Municipal Railway will be operated to the ferry at the foot of Market Street. The way has also been cleared for the operation of the cars of the Sutter Street line to the ferry and for the abandonment of the horse cars. The action of the Supreme Court is in accordance with the result of the election on April 22, 1913, when the voters approved the agreement entered into between the city and the United Railroads.

Work of New England Railroad Conference.—Chairman Charles A. Prouty of the Interstate Commerce Commission met in the State House, Boston, Mass., recently with the representatives of all the other New England States than New Hampshire, who constitute the New England transportation conference appointed by the Governors. The temporary organization which was formed at the first meeting was made permanent, with Percival W. Clement, of Vermont, chairman, and Admiral Francis T. Bowles, of Massachusetts, secretary. The statement issued at the conclusion of the conference says that the members of the committee conferred in Washington with the Attorney General. The members then resolved to have certain committees appointed. These will be a general executive committee, a committee on the Boston & Maine Railroad, one on steamship affairs, one on electric railway affairs and one on legal affairs, in each case the committee to go into the present status, control and condition of the branch to be investigated.

Railway Report Adopted by Los Angeles Council.—The Council of Los Angeles, Cal., has adopted the report of its municipal railway committee, which has recommended certain changes in the methods of operation of the railways in Los Angeles and outlined a plan for a beginning in municipal ownership. The committee says in regard to municipal ownership: "The franchise for the Temple Street car line will soon expire, and we recommend that the city take over this line, accepting the offer of William Dunn to present the city with the track and overhead improvements. We recommend that this line, as soon as taken over by the city, be extended to Sunset Boulevard, along Sunset Boulevard to La Brea or Gardner Junction; thence north to Hollywood Boulevard and west on Hollywood Boulevard to the city limits. Sunset Boulevard is the only through east and west street between Hollywood Boulevard and Santa Monica Avenue, and the only route over which a car line could be operated to serve the extensive territory lying between the above-mentioned streets."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

The amended public utilities bill will be reported out by the committee of the House, according to a statement made on May 30 by John M. Rapp, chairman of the House committee on public utilities. The proposed measure gives Chicago home rule and expressly enlarges the powers which cities of more than 20,000 population have heretofore held over public utilities. For the cities under 20,000 the power is to be vested in the state commission, but the citizens are to have the right to vote to exercise home rule with the same powers that are delegated to the larger cities. The bill called up in the Senate by Senator Francis Brady, Chicago, to permit the establishment of stage and omnibus routes was opposed by Senator Walter Clyde Jones on the ground that under its provisions companies would be able to establish trackless trolley lines and create a monopoly. Senator Samuel Ettelson, Chicago, supported the bill. He declared street railway service on the South Side of Chicago is inadequate. The bill was laid over.

The Senate has passed the bill requiring all corporations to pay their employees at least twice a month.

MASSACHUSETTS

The House has ordered to a third reading the bill to provide for the acquisition of the electric railways in western Massachusetts by the New York, New Haven & Hartford Railroad. One of the conditions of the bill is that the railroad shall expend at least $5,000,000 in building new lines in that section of the State.

NEW YORK

The following is a summary of the progress through the Legislature of the Cronin measure relating to the employment of experienced motormen: The Cronin measure was known as Assembly bill printed No. 1897 and introductory No. 1678. A companion bill in the Senate was introduced by Mr. Sanner, known as printed No. 1403, introductory No. 1213. After the Assembly bill had been passed by the Assembly, it went to the Senate, where it became Recording No. 808, being substituted there for Sanner's bill, which was an exact copy of the Cronin bill. On April 16 the bill in the Senate (Cronin's measure) was referred to the railroads committee and was reported from that committee to the committee of the whole, or in other words third reading, or to the Senate as a body, on April 30, where it died, no further action being taken on it. The Cronin bill was published in full in the ELECTRIC RAILWAY JOURNAL of April 26, 1913.

Governor Sulzer has disapproved the act to extend the time of the Rochester, Corning & Elmira Traction Company, its successors or assigns, to begin the construction of its road, to expend thereon 10 per cent of its capital and to finish its road and to put it into operation.

OHIO

Governor James M. Cox has vetoed the Gregory bill which provided for the construction of the Bond Hill line of the Cincinnati Traction Company without the formality of securing the consents of the owners of abutting property. The Governor has signed the Snyder bill, which provides for the issue of bonds by a municipality for the construction of rapid transit loops under certain conditions which make the act applicable to Cincinnati only. This completes the legislation necessary to carry out the plans of Mayor Hunt for the proposed rapid transit changes in that city.

WISCONSIN

The Senate has deferred action on the Assembly bill relating to the distribution of the street railway tax. The bill was recommended for concurrence by the committee on corporations of the Senate, but has been re-referred to the committee on finance. The Conway bill to exempt mutual public utilities from the operation of the stock and bond law has been killed. Governor McGovern has approved the Assembly bill empowering municipalities to construct and acquire utilities. Very few new bills are being introduced in the Legislature and the work of the session is drawing to a close. A joint resolution has been passed by the Senate which provides for adjournment on June 12.

Financial and Corporate

Stock and Money Markets

June 3, 1913.

Price movements on the New York Stock Exchange in the last half of the forenoon were generally confined within narrow limits. In the afternoon weakness developed in the last hour and nearly all of the important railroad and industrial issues joined in the downward movement in the dealings at the close. Interborough-Metropolitan issues sold off under small sales. Rates in the money market to-day were: Call, 2½@3 per cent; sixty days, 3¾@4 per cent; ninety days, 4@4¼ per cent; four, five and six months, 4½@5 per cent.

Trading in Philadelphia to-day was broad and the volume of transactions increased. Pennsylvania and United States Steel were the features. The demand for bonds was fair.

The Chicago market was narrow and dull to-day. The bulk of the bond transactions was in the railway issues.

The Boston market to-day was unusually broad, with the trading well distributed over the list. Boston Elevated was by far the most active railroad issue.

The market for stocks in Baltimore was extremely narrow and dull. The bond transactions totaled $25,000, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 28	June 3
American Brake Shoe & Foundry (common)	93	90
American Brake Shoe & Foundry (preferred)	130	129½
American Cities Company (common)	37½	37¼
American Cities Company (preferred)	70	69½
American Light & Traction Company (common)	370	370
American Light & Traction Company (preferred)	106	106
American Railways Company	38	39
Aurora, Elgin & Chicago Railroad (common)	41½	41½
Aurora, Elgin & Chicago Railroad (preferred)	84	84
Boston Elevated Railway	87	90
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	*66	*66
Boston & Worcester Electric Companies (common)	*8	a8
Boston & Worcester Electric Companies (preferred)	43	43
Brooklyn Rapid Transit Company	91⅛	89⅞
Capital Traction Company, Washington	120	120
Chicago City Railway	*150	*150
Chicago Elevated Railways (common)	*25	*25
Chicago Elevated Railways (preferred)	*87	*87
Chicago Railways, ptcptg., ctf. 1	92½	92
Chicago Railways, ptcptg., ctf. 2	21¾	20
Chicago Railways, ptcptg., ctf. 3	7	7
Chicago Railways, ptcptg., ctf. 4	3	3
Cincinnati Street Railway	112	112
Cleveland Railway	103¾	103¼
Cleveland, Southwestern & Columbus Ry. (common)	*5¼	*5¼
Cleveland, Southwestern & Columbus Ry. (preferred)	*28¼	*28¼
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	69½
Columbus Railway (preferred)	83	83
Denver & Northwestern Railway	109	109
Detroit United Railway	85	70
General Electric Company	139⅜	...
Georgia Railway & Electric Company (common)	116	117
Georgia Railway & Electric Company (preferred)	84	84
Interborough Metropolitan Company (common)	14⅜	13⅝
Interborough Metropolitan Company (preferred)	50½	47½
International Traction Company (common)	*40	40
International Traction Company (preferred)	*95	95
Kansas City Railway & Light Company (common)	..	..
Kansas City Railway & Light Company (preferred)	..	..
Lake Shore Electric Railway (common)	*9	*9
Lake Shore Electric Railway (1st preferred)	*91	*91
Lake Shore Electric Railway (2d preferred)	*25	*25
Manhattan Railway	130	127
Massachusetts Electric Companies (common)	14½	14
Massachusetts Electric Companies (preferred)	72	72
Milwaukee Electric Railway & Light Co. (preferred)	*100	*100
Norfolk Railway & Light Company	*26½	26½
North American Company	70	68¼
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	44	41
Philadelphia Company, Pittsburgh (preferred)	40½	40
Philadelphia Rapid Transit Company	23⅞	23½
Portland Railway, Light & Power Company	*67½	*67½
Public Service Corporation	106	114
Third Avenue Railway, New York	16	30
Toledo Railways & Light Company	a12	a12
Twin City Rapid Transit Co., Minneapolis (common)	103	103
Union Traction Company of Indiana (common)	*7½	*7½
Union Traction Company of Indiana (1st preferred)	82	*82
Union Traction Company of Indiana (2d preferred)	32	*32
United Rys. & Electric Company (Baltimore)	..	26¾
United Rys. Inv. Company (common)	22	21
United Rys. Inv. Company (preferred)	43¾	42
Virginia Railway & Power Company (common)	55¾	50
Virginia Railway & Power Company (preferred)	92	92
Washington Ry. & Electric Company (common)	89	89
Washington Ry. & Electric Company (preferred)	89	89
West End Street Railway, Boston (common)	72	71½
West End Street Railway, Boston (preferred)	88	88
Westinghouse Elec. & Mfg. Company	65½	60
Westinghouse Elec. & Mfg. Company (1st preferred)	111	110

*Last sale. a Asked.

ANNUAL REPORTS

Philadelphia Company

The board of directors of the Philadelphia Company, Pittsburgh, Pa., has submitted a report of the operations of the company and its subsidiaries for the year ended March 31, 1913. The condensed income, profit and loss statement is as follows:

Gross earnings		$7,052,276
Operating expenses	$2,958,821	
Taxes	192,379	
Total operating expenses and taxes		3,151,200
Net earnings		$3,901,076
Other income		2,354,651
Total income		$6,255,728
Deductions from income		73,035
Net income		$6,182,693
Fixed charges		1,565,740
Net income after deducting fixed charges		$4,616,953
Improvements, betterments and extensions		1,198,811
Net income for the year		$3,418,142
Profit and loss surplus, April 1, 1912		5,394,152
Additions to profit and loss		9,789,902
Total		$18,602,196
Deductions from profit and loss		9,798,162
Balance—profit and loss		$8,804,034
Dividends		3,036,433
Surplus March 31, 1913—per balance sheet		$5,767,601

J. H. Reed, president of the company, said in part:

"The company has acquired and now owns, as representing its entire investment in electric light and power companies, all the outstanding capital stock of the Duquesne Light Company to the par value of $20,884,200, a moderate dividend upon which would provide the interest upon the total funded debt of the Philadelphia Company. The Duquesne Light Company has declared and paid its initial dividend of 1¾ per cent on said $20,884,200 for the quarter ended March 31, 1913, being at the rate of 7 per cent per annum. As a further result of the purchase by the Duquesne Light Company at the valuations determined by the appraisements made for it and the exchange of a portion of its stock for stocks of similar companies hitherto held directly by the company, the surplus of the Philadelphia Company was increased by $5,595,429.

"The company availed itself of the above increase in surplus and of a recognition of part of the increase over book values of the shares of stock of certain of its natural gas companies, in which companies many improvements and extensions had therefore been charged to earnings, to adjust its accounts with and the finances of the Pittsburgh Railways, to which it had advanced from time to time since 1902, as well as having assisted it to borrow, large sums of money to enable it to meet the Pittsburgh Railways' extraordinary maintenance demands for improvements and extensions and to pay interest upon such borrowings. It is important to note that in doing this no increased book values were placed upon the oil and gas leases owned by the several companies or upon the plant and property owned directly by the Philadelphia Company. The principal transactions involved in said adjustment were the sale and delivery to the Pittsburgh Railways of certain shares of stock of certain street railway and electric traction companies included in the Pittsburgh Railways operating system and carried on the Philadelphia Company's books at $8,265,000; also the turning over to the Railways company of the bills payable of that company and certain underlying street railways amounting in book value to $10,649,052, for which the Philadelphia Company received $10,000,000 par value of 6 per cent debentures of the Pittsburgh Railways, interest upon which is payable as and when earned and is non-cumulative.

"By this adjustment the Pittsburgh Railways was relieved from large indebtedness to its sole stockholder, the Philadelphia Company, and from the payment of a large sum of money annually as interest on such indebtedness. As the Philadelphia Company was and still is the owner of all the outstanding stock of the Pittsburgh Railways, the value of the stock of the Pittsburgh Railways was correspondingly enhanced by this arrangement. It is contemplated that any funds needed hereafter by the railways company for the improvement of its lines will be provided through the issuance of bonds of the Pittsburgh Railways, and that any increase of equipment will be provided either out of the proceeds of such bonds or the proceeds of some other satisfactory financial arrangement to be entered into by the Railways company.

"The Railways company has made a contract with the Duquesne Light Company for an adequate and reliable supply of all the power which it may need and this is relieved from the necessity of further financing to provide for its increasing power requirements."

J. G. White & Company, Inc.

J. G. White, president of J. G. White & Company, Inc., New York, N. Y., in the report to the stockholders of the company for the fiscal year ended Feb. 28, 1913, made under date of May 26, 1913, said in part:

"The balance sheet shows that the total debts of the company were $231,473, or less than half the item of 'cash in bank and on hand,' which was $474,178, this latter being exclusive of working capital, cash at branch offices and all other quick assets.

"The actual profits realized from the company's business during the fiscal year were $846,907. Against these profits, however, in making up the balance sheet, the committee of directors which was appointed to value securities, co-operating with the officers of your company, agreed that the provisions which are shown on the opposite side of the profit and loss account were advisable, especially as they could all be met out of the year's profits, and still leave a substantial amount to be added to the company's surplus.

"The explanations in the profit and loss account regarding provisions are probably all so clear as not to need special comment.

"During the preceding year an issue of bonds had been placed with investors, largely through the efforts of your company and its affiliated companies. During last year the actual earnings of the properties covered by the bonds were quite disappointing. Your executive officers and directors agreed that there were exceptional circumstances connected with the situation, and that looking to a probable reorganization of the properties, the best interests of your company would ultimately be served by repurchasing all of these bonds from investors at cost plus accrued interest. In co-operation with the associates who had been interested in the business, this was done. To provide for writing down the bonds thus repurchased to low figures, and to provide against any other contingencies in connection with the business, the provision of $300,000 was set aside and is believed to be more than ample for the purpose. The balance sheet indicated that after the above liberal provisions and payment of dividend on outstanding preferred stock, there was added to the surplus account the sum of $176,647, or about 12 per cent on the outstanding common stock of your company not in the hands of trustee.

"The good will, business in hand, etc., now includes also all of the $1,000,000 par value of the common stock of The J. G. White Engineering Corporation and all of the $500,000 par value of the common stock of The J. G. White Management Corporation. These two companies have been provided with cash working capital, to the extent of $500,000 for the former and $350,000 for the latter, by the sale at par of equal amounts of the preferred stocks of the respective corporations."

Questions and Answers Under Uniform System of Accounts

Another series of tentative answers to questions raised in connection with the uniform system of accounts is published below. Agreement on these answers, like those published in the issue of May 17, 1913, has been reached by members of the committee on a standard classification of accounts of the American Electric Railway Accountants' Association and representatives of the Interstate Commerce Commission. As these answers have not yet received the formal approval of the commission, however, it should be understood that the decisions do not represent its final conclusions and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission.

Q. What account is chargeable with the cost of a traveling crane installed in a power plant?

A. Account No. 30, "Power Plant Equipment," in the classification of "Expenditures for Road and Equipment of Electric Railways."

Q. To what account should the cost of a passenger elevator in a power plant be charged?

A. Account No. 24, "Power Plant Buildings," in the classification of "Expenditures for Road and Equipment of Electric Railways."

Q. To what account should be charged the cost of filler blocks and guard rails used in connection with ordinary curves?

A. Account No. 7, "Rails, Rail Fastenings and Joints," in the classification of "Expenditures for Road and Equipment of Electric Railways." (See case No. 100 in Accounting Bulletin No. 7.)

Q. To what accounts should be charged the cost of moving and maintaining tracks, portable crossovers and other work necessary to maintain continuous operation during the progress of reconstruction work?

A. If the entire cost is properly chargeable to operating expenses, it should be included in the appropriate accounts under "Way and Structures." If the work involves improvements or betterments, the cost should be divided between the appropriate accounts in "Operating Expenses" and the appropriate accounts in "Road and Equipment" on an equitable basis.

Q. What account is chargeable with the cost of guard rails on bridges?

A. The cost of additional track rails laid to prevent cars from jumping the track should be charged to Road and Equipment Account No. 7, "Rails, Rail Fastenings and Joints." The cost of timbers or other devices placed at the sides of the bridge to prevent cars from leaving the structure if they jump the track should be charged to Account No. 15, "Bridges, Trestles and Culverts."

Q. To what account should the cost of excavation for underground construction be charged?

A. The cost of excavation for underground construction for a system operated by underground electric contact or cable should be charged to Road and Equipment Account No. 9, "Underground Construction." Excavation for conduits for feeders or return wire or cables should be charged to Account No. 20, "Underground Conduits."

Q. What account should be charged with the cost of right-of-way for surface or elevated tracks, conduits or overhead lines?

A. Road and Equipment Account No. 2, "Right-of-Way." Payments for rent of property leased for such purposes for short periods should be included in "Deductions from Income."

Q. To what account should the cost of land and of water rights acquired for reservoirs and pipe lines be charged?

A. Road and Equipment Account No. 3, "Other Land Used in Electric Railway Operations."

Q. What accounts should be charged with the cost of railway tracks and wagon roads built for exclusive service of water-power stations and wagon roads built to facilitate the patrolling of reservoirs, canals, etc.?

A. The cost of the tracks should be distributed among the various construction accounts in the same way as the cost of other tracks. The cost of the wagon roads serving the power stations should be charged to the account to which the cost of the power stations is charged. The cost of the wagon roads built to facilitate the patrolling of reservoirs, canals, etc., should be charged to Road and Equipment Account No. 23, "Dams, Canals and Pipe Lines."

Q. What account should be charged with the cost of cutting and trimming trees for transmission lines and of constructing roads for patrolmen of such lines?

A. Road and Equipment Account No. 21, "Transmission System."

Q. To what account should the cost of signs warning against third-rail conductors be charged?

A. Account No. 16, "Crossings, Fences, Cattle Guards and Signs," in the classification of "Expenditures for Road and Equipment of Electric Railways."

Q. What account should be charged with the loss sustained by an electric railway company from the hold-up of a conductor or through default of a conductor?

A. Operating Expense Account No. 72, "Other Transporation Expenses."

Consolidation of Maryland Companies

In accordance with an agreement of consolidation dated April 7, 1913, the Hagerstown & Frederick Railway has been formed, the following being the constituent public utility corporations: Frederick & Hagerstown Power Company, Hagerstown Railway of Washington County, Md., Hagerstown & Myersville Railway, Hagerstown & Boonsboro Railway, Hagerstown & Northern Railroad, Myersville & Catoctin Railway of Frederick County, Md., Frederick Railroad and Frederick Gas & Electric Company.

By an order of the Public Service Commission of Maryland, dated May 8, 1913, the Hagerstown & Frederick Railway has been authorized to issue and sell first and refunding mortgage 5 per cent sinking fund gold coupon bonds in the amount of $3,300,000, preferred 7 per cent cumulative stock redeemable at par, $635,000, and $2,000,000 of common stock. Of these amounts, $1,515,000 par value of the bonds will be reserved by the trustee under the mortgage to cancel and redeem all the underlying bonds of the various constituent companies. The following issues of bonds underlie the consolidated issue, but will be exchanged for the new first and refunding mortgage bonds or be retired at maturity:

	Amount	Per Cent
Frederick & Hagerstown Power Company..........	$300.000	6
Hagerstown Railway..............................	200.000	6
Hagerstown & Myersville Railway..................	120,000	5
Hagerstown & Boonsboro Railway..................	110.000	5
Hagerstown & Northern Railroad..................	200.000	5
Myersville & Catoctin Railway.....................	35.000	5
Frederick Railroad................................	190.000	5
Frederick & Middletown Railway..................	250.000	5
Monocacy Valley Railway........................	30,000	5
Frederick Gas & Electric Company................	181,000	5
	$1,616,000	

The remainder of the $3,300,000 issue will be sold in the near future to care for the floating debt and to provide new rolling stock, extend the electric light and power system, and rehabilitate the properties.

The property of the company is all in Frederick and Washington Counties, Maryland, and consists of an interurban railway between Hagerstown and Frederick with various branches, an electrified steam railroad from Frederick to Thurmont, Md., together with gas, electric light and power franchises in Hagerstown. Additional railroad construction will be authorized in the near future, and an extension of the power and lighting system will be made.

At a meeting of the directors of the Hagerstown & Frederick Railway on May 23, 1913, the following officers were elected: Edward F. Peck, of the firm of Allen & Peck, Inc., Syracuse, N. Y., president; Emory L. Coblentz, Frederick, Md., vice-president; Henry Holzapfel, Jr., Hagerstown, Md., vice-president; Victor M. Cushwa, Hagerstown, Md., secretary; Thomas H. Haller, Frederick, Md., treasurer; C. A. Hoag, Syracuse, N. Y., assistant secretary and treasurer; Edward F. Peck, Henry L. Coblentz, Henry Holzapfel, Jr., Alexander Armstrong, Jr., Hagerstown, Md., and S. K. Colby, vice-president of Allen & Peck, Inc., Baltimore, Md., executive committee.

The general manager of the combined properties is Franz Von Schilling. W. J. Harvie has been appointed assistant to the president and engineer of construction.

At a previous meeting of the stockholders of the Hagerstown & Frederick Railway, the following directors were elected: Henry Holzapfel, Jr., M. P. Moller, Walter D. Wilson, Victor M. Cushwa, Alexander Armstrong, Jr., D. Ramacciotti and Clifford A. Hoag, all of Hagerstown, Md.; Harvey S. Bomberger, Boonsboro, Md.; Harry E. Clark, Philadelphia, Pa.; Emory L. Coblentz, G. Mantz Besant, George Birely, Thomas B. Johnson, John C. Mottor, Alexander Ramsburg, E. Charles Renn, Richard P. Ross, Calvin E. Schildknecht, George William Smith, Charles Wertheimer and Thomas H. Haller, all of Frederick, Md.; Cyrus F. Flook, Myersville, Md.; John N. Shannahan, Hampton, Va.; William I. Tabor, Utica, N. Y.; Henry A. Abbe, New Britain, Conn.; Talmadge C. Cherry, Annapolis, Md.; James Piper and Frederic C. Todd, both of Baltimore County, Md.; William J. Harvie and C. Loomis Allen, both of Syracuse, N. Y.; Edward F. Peck, Schenectady, N. Y.; Safford K. Colby, Baltimore, Md.; Abraham Hemp, Jefferson, Md.

Allen & Peck, Inc., Syracuse, N. Y., have been appointed managers of the consolidated company. It will be within the scope of the managers to handle the re-financing of the property and upon its completion to develop the public utilities in this district along broad and liberal lines.

Preliminary Report by Receivers

Judge Reese G. Richards, Steubenville, and W. R. W. Griffin, East Liverpool, the latter general manager of the Tristate Railway & Electric Company, East Liverpool, Ohio, on May 27, 1913, submitted to Judge Day of the United States federal court at Cleveland, the initial report of the receivership of the company, covering the company's holdings in East Liverpool and Steubenville and the territory between. The report covers in detail the operations between March 19, 1913, the date of the appointment of the receivers, and May 1, 1913. Hereafter the receivers will be required to file a report on the first of every month, the April 1 account having been passed owing to the length of time necessary to place the operation under the receivership upon an initiatory working basis. The receivers asked for suggestions from the court in regard to the betterment of its operation. The receivers are also asking suggestions and advice by letter from stockholders, bondholders and creditors of the company. In making out the report to Judge Day, the interests coming under the receivership have been designated as the Tri-State Company, with the East Liverpool Traction & Light Company, a subdivision, termed the Liverpool Company, and the Steubenville & East Liverpool Railway & Light Company, called the Steubenville Company. This has been done in order to avoid confusion and a possible misunderstanding in the interpretation of the receivership reports. The receivership of the Tri-State line covers only that territory between the Pennsylvania state line and Steubenville, including Chester, W. Va., opposite East Liverpool, Ohio. Other divisions of the system are independent of the receivership.

Order by California Commission Affecting Evidences of Indebtedness

The following order, effective on June 1, 1913, has been issued by the Railroad Commission of California in regard to the matter of stock, bonds and other evidences of indebtedness issued by public utilities under the jurisdiction of the commission during the years 1911 and 1912:

"It is hereby ordered that all public utilities of every kind and character (including common carriers) operating within the State of California shall file with the Railroad Commission on or before the effective date of this order verified statements showing the following information:

"1. An itemized statement of new issues (not transfers) of stock certificates issued during the years 1911 and 1912, giving the number of the certificate, the number of shares of stock covered thereby, and the par value of said shares of stock and the date of issue of the certificate.

"2. The net cash realized from each certificate issued, or, if issued for a consideration other than cash, an itemized description of such consideration.

"3. The purposes to which the proceeds of said stock were devoted.

"4. An itemized statement of bonds issued during the years 1911 and 1912, giving the numbers of the bonds, the face value thereof, the date of issue and the type of the bond.

"5. The net cash realized from each bond, or, if issued for a consideration other than cash, an itemized statement of the consideration received.

"6. The purposes to which the proceeds from the issue of said bonds were devoted.

"7. Notes or other indebtedness issned between Jan. 1, 1912, and the date of the return on this order, giving the face value of note, the date of issue of the note and its term.

"Attention is drawn to Section 52 (b) of the public utilities act, providing that notes for not more than twelve months may be issued for the first time without the consent of the commission, 'but no such note shall, in whole or in part, be refunded by any issues of stocks or stock certificates, or of bonds or notes of any term or character, or any other evidence of indebtedness, without the consent of the commission.'"

Bucks County Interurban Railway, Philadelphia, Pa.—The Bucks County Interurban Railway, a merger of the Trenton, New Hope & Lambertsville Street Railway, Morrisville & Trenton Street Railway, Newton & Yardley Railway and the Bucks County Electric Railway, as noted in the ELECTRIC RAILWAY JOURNAL of May 24, 1913, has issued or is about to issue all of its $1,000,000 of capital stock. No bonds have been issued and no debts are outstanding, although there are $1,000,000 of divisional bonds outstanding on the underlying merged companies. The entire capital stock of the merged companies will be owned by the group of men composing the officers and directors of the Bucks County Interurban Railway, except eighteen shares of Bucks County Electric Railway and forty shares of the Trenton, New Hope & Lambertsville Street Railway. The receivers of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., were discharged under date of March 3, 1913, and the company retains the ownership of its lines in Trenton of the three underlying corporations comprising the Princeton division. The Trenton City Bridge Company is a separate corporation. The Bucks County Interurban Railway, the New Jersey & Pennsylvania Traction Company and the Trenton City Bridge Company are owned by the officers and members of the board of directors of the Bucks County Interurban Railway. The names of the officers and directors of the three companies follow: Sydney L. Wright, Philadelphia, Pa., president; Gaylord Thompson, Trenton, N. J., vice-president; W. Frederick Snyder and William Redwood Wright, Philadelphia, Pa.; John Barbey, Reading, Pa.; Frank Battles and W. Henry Snyder, Trenton, N. J. The secretary-treasurer is Walter T. Bilyeu.

Chicago City & Connecting Railways, Chicago, Ill.—The First Trust & Savings Bank, Chicago, Ill., has bought $1,500,000 of Chicago City Railway first 5's, 1927, and $500,000 of Calumet & South Chicago Railway 5's, 1927. Only $800,000 of the new Chicago City Railway bonds and $400,000 of the Calumet & South Chicago bonds, it is reported, will be issued at once, making the amounts outstanding $28,000,000 and $4,725,000 (or $4,625,000) respectively. The two roads mentioned above are members of the Chicago City and Connecting Railways Collateral Trust, which was declared valid by the Illinois Supreme Court as reported in the ELECTRIC RAILWAY JOURNAL, May 17, 1913.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—A meeting of the stockholders of the Cincinnati, Dayton & Toledo Traction Company will be held on June 23 to consider the modification of the terms of its lease to the Ohio Electric Railway and to adjust the capitalization to conform to such changes as may be made. The Ohio Electric Railway states that the property has never paid a sufficient amount to cover its rental under the lease and that under these circumstances it cannot undertake to repair the flood damages, which will require an expenditure of about $290,000. There are other debts and more than $400,000 will be needed to make the connection with the proposed loop at Cincinnati. In addition to this some of the underlying bonds will soon be due. Under the lease the Ohio Electric Railway is paying 5 per cent on $250,000 of preferred stock and 2 per cent on $5,000,000 of common stock. This company proposes to surrender $1,000,000 of the Cincinnati, Dayton & Toledo Traction Company's common stock and asks the holders of the other $4,000,000 to accept one share of new stock for each two shares of the old, which would reduce the amount to $2,000,000. The preferred stock would then be increased to $1,250,000, and this would be issued to the Ohio Electric Railway from time to time to cover funds required for repairs, payment of bonds, etc. The Ohio Electric Railway would pay one-half of 1 per cent on the common stock in July, 1915, and then increase this each year until 1922, when it would reach 5 per cent annually and continue at that figure thereafter.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The shareholders of the Cleveland, Southwestern & Columbus Railway, as well as the Ohio Public Service Commission, have approved the propositions to issue $5,103,000 of an authorized issue of $25,000,000 thirty-year 5 per cent bonds and $1,500,000 of an authorized $2,000,000 of first preferred 6 per cent cumulative stock. Details concerning these new issues were given in the ELECTRIC RAILWAY JOURNAL of May 31, 1913.

El Paso (Tex.) Electric Company.—A quarterly dividend of 2 per cent, or at the rate of 8 per cent a year, has been declared on the $1,750,000 of common stock of the El Paso Electric Company, payable June 16 to holders of record of June 4. This is an increase, payments of 3½ per cent having been made semi-annually in September, 1912, and March, 1913.

New York (N. Y.) Railways.—Judge Goff of the State Supreme Court on May 27, 1913, dismissed the suit brought against the New York Railways by the accident creditors' protective committee of the old company for an injunction restraining the reorganized company from paying interest on the new bonds until the bonds have been issued to persons holding accident claims amounting to more than $500,000 who did not file their claims before March 4, 1912, the time limit therefor.

Ottawa (Ont.) Electric Railway.—Thirty 4 per cent debenture bonds in the amount of $30,000 issued under a mortgage dated June 29, 1897, are called by the Ottawa Electric Railway for payment at par and interest on July 5, at the office of the company in Ottawa.

Pelham Park & City Island Railway, Inc., New York, N. Y.—The Public Service Commission for the First District of New York has approved the plan of reorganization of the Pelham Park and the City Island Railroads as one company under the name of the Pelham Park & City Island Railway, Inc. It has also granted that company permission to issue its capital stock to the amount of $117,000 to acquire the property of the two old companies and reconstruct the lines as a standard-gage electric railway. The order provides for a 5-cent fare over the whole line. This road runs from the Bartow, or City Island, station on the Harlem River branch of the New York, New Haven & Hartford Railroad to Belden's Point, City Island. The two old companies were owned by the Interborough Rapid Transit Company. Within the last few years one of these companies installed a monorail line from Bartow to City Island bridge, and this has been in operation for some time but has not given satisfaction. The companies did not earn enough to make the roads pay and last year the Interborough Rapid Transit Company foreclosed and had the property bought in by George Keegan. Mr. Keegan will transfer the property to the new company, whose stock will be issued to the Interborough company.

Richmond & Henrico Railway, Richmond, Va.—The Virginia Trust Company, Richmond, Va., was appointed receiver of the Richmond & Henrico Railway on June 3, 1913, by Judge Crump at Richmond, on application of the Union Trust Company, Toronto, Can., trustee for the holders of the bonds of the railway.

Taunton & Pawtucket Street Railway, Taunton, Mass.—The Federal Trust Company, Boston, Mass., trustee undet the mortgage given by the Taunton & Pawtucket Street Railway to secure an issue of first mortgage bonds to the amount of $200,000, has applied for the appointment of a receiver for the railway. The interest on the bonds is said to be in default since January, 1909.

Toledo Railways & Light Company, Toledo, Ohio.—At the meeting of directors of Toledo Railways & Light Company to elect officers to represent the control of the company by the Toledo Traction, Light & Power Company and Henry L. Doherty & Company, Henry L. Doherty was elected a director in place of Jay K. Secor and John H. Taylor was elected to succeed H. S. Swift, who has been secretary of the company. Frank R. Coates was elected president and will also take over the duties of general manager, which have been performed by L. E. Beilstein. Rathbun Fuller was elected vice-president to succeed Frank Hafer, and C. E. Murray was elected secretary and assistant treasurer. W. P. Troth, New York, was appointed assistant secretary and assistant treasurer. S. D. Carr was elected treasurer.

Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.—The directors of the Trenton, Bristol & Philadelphia Street Railway have authorized an issue of $750,000 of 5 per cent notes, $406,000 of which will be issued in favor of George C. Blakstone, president of the Union Trust Company, Baltimore, Md., to take up the companies securities held by him. The balance will be held in the treasury.

Dividends Declared

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

California Railway & Power Company, San Francisco, Cal., quarterly, 1¾ per cent, prior preferred.

El Paso (Tex.) Electric Company, 3 per cent, preferred; quarterly, 2 per cent, common.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

Massachusetts Electric Companies, Boston, Mass., 2 per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

West Penn Traction & Water Power Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BATON ROUGE (LA.) ELECTRIC COMPANY							
1m.,	Mar.,	'13	$12,312	*$7,851	$4,461	$2,075	$2,386
1 "	"	'12	10,880	*9,203	3,977	1,729	2,248
12 "	"	'13	150,896	*92,131	58,764	21,464	37,300
12 "	"	'12	126,159	*77,279	48,880	20,745	28,135
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.							
1m.,	Mar.,	'13	$8,009	*$6,982	$1,028	$1,099	†71
1 "	"	'12	7,514	*6,511	1,004	1,054	†50
12 "	"	'13	121,179	*92,438	28,741	12,674	16,067
12 "	"	'12	119,566	*90,830	28,735	12,745	15,990
CAPE BRETON ELECTRIC COMPANY, SYDNEY, N. S.							
1m.,	Mar.,	'13	$174,809	*$107,921	$68,888	$24,635	$42,253
1 "	"	'12	143,057	*96,069	46,988	24,705	22,282
12 "	"	'13	1,922,450	*1,136,011	786,438	295,823	490,615
12 "	"	'12	1,655,597	*1,110,915	54,683	250,369	294,313
HOUGHTON (MICH.) COUNTY TRACTION COMPANY							
1m.,	Mar.,	'13	$25,638	*$60,041	$9,597	$5,995	$3,902
1 "	"	'12	24,485	*14,352	10,133	5,227	4,906
12 "	"	'13	311,054	*175,991	135,063	68,688	66,375
12 "	"	'12	301,629	*178,653	122,976	62,720	60,256
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.							
1m.,	Mar.,	'13	$188,967	*$113,005	$75,962	$36,944	$39,018
1 "	"	'12	149,417	*93,494	55,922	33,387	22,535
12 "	"	'13	2,113,144	*1,227,379	885,765	407,812	477,953
12 "	"	'12	1,627,656	*1,012,973	614,682	274,096	340,586
JACKSONVILLE (FLA.) TRACTION COMPANY							
1m.,	Mar.,	'13	$59,220	*$36,446	$22,774	$10,957	$11,817
1 "	"	'12	51,257	*32,231	19,026	9,590	9,436
12 "	"	'13	574,088	*386,888	187,202	123,473	63,729
12 "	"	'12	562,956	*350,754	212,203	106,307	105,896
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.							
1m.,	Mar.,	'13	$186,895	*$103,677	$83,218	$24,958	$58,260
1 "	"	'12	139,192	*75,067	64,125	20,846	43,279
12 "	"	'13	1,910,114	*1,009,910	900,205	277,978	622,227
12 "	"	'12	1,614,215	*886,628	727,587	251,525	476,062
PENSACOLA (FLA.) ELECTRIC COMPANY							
1m.,	Mar.,	'13	$21,767	*$14,990	$6,778	$6,394	$384
1 "	"	'12	22,309	*14,371	7,638	6,377	1,261
12 "	"	'13	288,434	*177,875	110,558	76,400	24,158
12 "	"	'12	286,771	*180,092	106,679	65,430	41,249
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.							
1m.,	Mar.,	'13	$24,662	*$15,836	$8,826	$7,327	$1,499
1 "	"	'12	23,656	*17,366	6,291	7,140	†849
12 "	"	'13	290,957	*189,063	101,895	87,967	14,828
12 "	"	'12	273,542	*175,199	98,344	82,709	15,635
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.							
1m.,	Mar.,	'13	$701,941	$423,150	$278,791	$170,022	$108,769
1 "	"	'12	691,518	412,026	279,492	163,332	116,160
12 "	"	'13	8,299,653	4,844,292	3,455,260	2,004,357	1,451,003
12 "	"	'12	....	....	....	....	....

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*Includes taxes. †Deficit.

Traffic and Transportation

Re-routing, Wages and Co-operative Buying Discussed by Philadelphia Rapid Transit Company

The Philadelphia (Pa.) Rapid Transit Company issued under date of May 28, 1913, Co-operative Bulletin No. 16, in which the company deals with the subjects of re-routing, wages and co-operative buying. The plans of the company for re-routing its lines were referred to at length in the ELECTRIC RAILWAY JOURNAL of May 17, page 910. The changes under the first step in the re-routing plan are described in detail in the bulletin just issued and the statement is made that the changes under the second step will be described in the next issue of the bulletin.

The company now has fifteen depots from which cars are operated. The co-operative committee consists of two men from each of these depots selected by vote of the motormen and the conductors at the depot which they are chosen to represent. Referring to the results secured by this co-operative committee in bettering the conditions of the men by means of the co-operative plan and the use of the 22 per cent fund, the company says:

"For the first time in the history of any street railway the rules for the information and guidance of motormen and conductors and the improving of working conditions have been passed upon by the representatives of the men and the operating officials of the company in joint council. Motormen and conductors now secure their day of rest. The number of days off per man now averages four and one-third per month, which about equals one day off duty to every six days of work.

"The co-operative committeemen pass upon all time-tables before they are made effective and themselves have the final word as to what hours shall constitute a day's work thereunder. In no other city do the men have this voice in the management. Extra men are guaranteed a minimum of $12 per week of seven days, this being a larger sum than is guaranteed to extra men upon entering the service in any other city. Wages of motormen and conductors have been increased from the scale which was made effective in settlement of the 1910 strike and which was in force June 30, 1911—i. e., new men, 22 cents; after one year's service, 23 cents; after two years' service, 23 cents; after three years' service, 23 cents; after four years' service, 23 cents; after five years' service, 23 cents—to the present scale made effective May 1, 1913—i. e., new men, 23 cents; after one year's service, 24 cents; after two years' service, 25 cents; after three years' service, 26 cents; after four years' service, 27 cents; after five years' service, 28 cents.

"Comparison of the above scales shows an advance of 5 cents in the maximum wage during the past two years. This is a greater increase in the wages of motormen and conductors than has been accomplished in any other city during this period.

"It is now practically assured that a further advance of 1 cent per hour for all of the motormen and conductors can be made effective Sept. 1 next—i. e., new men, 24 cents; after one year's service, 25 cents; after two years' service, 26 cents; after three years' service, 27 cents; after four years' service, 28 cents; after five years' service, 29 cents.

"The co-operative committee is using its best efforts to make possible a further advance, as of Jan. 1, 1914, and now fully expects that the 22 per cent fund will permit of the following much to be desired scale—i. e., new men, 25 cents; after one year's service, 26 cents; after two years' service, 27 cents; after three years' service, 28 cents; after four years' service, 29 cents; after five years' service, 30 cents.

"Provided that nothing occurs in the meantime to prevent the realization of this scale on Jan. 1, there will have been accomplished during the two and one-half year period following the establishment of the 22 per cent fund an advance of 7 cents per hour, which will be 2 cents per hour more than was prophesied by Chairman Mitten, in the co-operative plan booklet of August, 1911, as being possible of attainment during the five-year period of the Stotesbury management.

"The results already accomplished under the co-operative plan by the aid of the co-operative committee, in comparison with that condition which existed during the two years preceding, offer the most conclusive proof of that which can be accomplished by the management and its men working together, as compared with the conditions resulting from organized opposition each to the other."

The report on co-operative buying which was presented by the trustees of the Co-operative Beneficial Association and adopted by the co-operative committee on May 27, 1913, is included in the bulletin. The board announced that the coupon books would be placed on sale on June 2, 1913. The buying plan has been inaugurated with more than sixty-five merchants on the lists of those whose contracts to accept the cash coupons have been approved by the board of trustees. The bulletin says in part in this connection:

"The list of representative merchants submitted shows the wide variety of the necessities and the luxuries of life which at the start can be purchased by the Co-operative Beneficial Association members at the saving made possible under this plan. These merchants are located throughout the various sections of the city convenient to large numbers of the members. Of the 10,000 employees of the company who are eligible, 7782 have already become members of this association. This number is increasing at the rate of more than fifteen members per day.

"Purchases exceeding $4,000,000 a year are made by the families of these members. It now only remains for this membership to demonstrate its combined purchasing power by the greatest possible use of these cash coupons. This should insure that not only larger discounts may be obtained on new contracts, but that a still greater number of representative dealers in foodstuffs and merchandise throughout the city may rapidly be added to the list of those accepting these coupons—this with the result that the price at which the beneficial association can sell the coupon books to its members may be correspondingly reduced.

"Books of cash coupons will now be sold as follows:

Purchasing Value	Cost to Members	Savings, 8 Per Cent
$2.50 book	$2.30	$0.20
5.00 book	4.60	0.40
10.00 book	9.20	0.80

"One of the regular receivers at each of the fifteen depots will act as agent of the beneficial association for the sale of these books of coupons to members. The books will also be on sale at the office of the Co-operative Beneficial Association, 820 Dauphin Street. During certain hours of the day, as may be found necessary, an agent of the association will be stationed at the Sixth Street shops for the convenience of members in purchasing books at this location. Employees of the electrical and other departments can purchase books at the most convenient carhouse or at the office of the association. Members may be properly identified at the time of purchasing a book, by displaying to the agent their association membership certificates. The cost of unused coupons will be returned to the purchaser, if he so desires, upon application at the office of the association."

Reduction in Fare Ordered on California Road.—A decision has been rendered by the Railroad Commission of California establishing a fare of 5 cents on the Peninsula Railway, San José, Cal., between Mayfield Junction and Palo Alto and Stanford University. The fare formerly was 10 cents.

Virginia Fare Case Heard.—A hearing was held recently before the Corporation Commission of Virginia on the application of the Norfolk Southern Railroad, Norfolk, Va., for permission to increase its passenger fares. The company claims that the electric division was operated at a considerable loss for the last three years. The commission has taken the matter under advisement.

Answer Filed to Fare Petition in Rhode Island.—The Rhode Island Company, Providence, R. I., has filed with the Public Service Commission of Rhode Island its answer to the petition for a reduction in the fare of the company over its Buttonwoods line to Durby's Corner and Dryden Heights from 10 cents to 5 cents. The company denies that the 10-cent fare is unjust or discriminatory.

Increase in Wages in Brooklyn.—The following announcement was made on June 6, 1913, by T. S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company: "Following similar action a year ago in making a general increase in wages of employees, the companies in the Brooklyn Rapid Transit System announced to-day another increase, effective on July 4, 1913, which will benefit about 6000 men in the transportation department. The increases vary according to length of service and record of efficiency, range from 4 per cent to 15 per cent."

Height of Steps Fixed Tentatively in Washington, D. C.—Following a conference in Washington, D. C., between the members of the Public Service Commission and the officers of the electric railways which operate in that city a rule was tentatively adopted by the commission which provides that on all cars placed in operation after July 1, 1913, no step immediately above the rail and no subsequent step is to exceed 14 in. in rise. Open cars will not be affected by the proposed order, but on closed cars already in service no step is to exceed 16 in. in rise after Sept. 1.

Increase in Wages in Dayton.—The City Railway and the Oakwood Street Railway, Dayton, Ohio, have announced an advance of approximately 8 per cent in the wages of their motormen and conductors. The men on both lines have been receiving 25 cents an hour for day duty and 24 cents for night duty. The new order, which went into effect on June 2, raises the wages 2 cents an hour, to 27 cents for day men and 26 cents for night men. Substitutes, who have been receiving 20 cents an hour, are raised 2 cents an hour, to 22 cents for the first year, and 24 cents an hour thereafter until they are installed in regular positions. Most of the men work from nine to nine and one-half hours a day.

New Elevated Station Ordered in New York.—The Interborough Rapid Transit Company, New York, N. Y., has been ordered by the Public Service Commission for the First District of New York to build a new station on the Ninth Avenue elevated railroad at Ninety-ninth Street and Columbus Avenue, Manhattan, and to have the same completed and ready for operation by Dec. 1, 1913. At present there is no station betweent Ninety-third Street and 104th Street, a distance of eleven blocks. The commission denied an application for a station at this point in 1909, mainly because the property owners affected had refused to give their consent. Since that time the consents of all property owners but one have been obtained, and upon the renewed request the commission ordered the establishment of the station.

Increase in Wages in Davenport.—An agreement has been reached with the employees of the Tri-City Railway, Davenport, Ia., whereby employees of all grades will receive an increase of 2 cents an hour under an agreement which will run four years. The contracts for the men on the Illinois & Iowa Railway and the Davennport and Muscatine lines are the same as on the Watertown and Silvis and Rock Island, Moline and Davenport city lines. It is understood that shopmen will be given an increase of about 10 per cent. Extra work for regular motormen and conductors is to be paid for at 7 cents an hour above the regular pay. Trainmen's badges are to be good for transportation on all lines covered by the agreement. All questions which may arise in regard to the interpretation of the terms of the agreement are to be submitted to a board of arbitration.

Transit Commissioner Taylor's Work in Philadelphia.—In announcing the appointment of A. Merritt Taylor as director of the new department of transit of the city of Philadelphia to be established in that city on July 1, 1913, Mayor Blankenburg said: "Mr. Taylor has outlined a complete rapid transit system for the entire city and compiled all relative facts and figures to support his conclusions. As transit commissioner, Mr. Taylor estimated that the report would be completed within eighteen months and that the cost of the work would be within $150,000. He has actually completed the work in approximately twelve months, at a cost of less than $125,000, notwithstanding his enforced absence for four months, from December to March, owing to a serious attack of typhoid fever." Reference to the appointment of Mr. Taylor by the Mayor was made in the Electric Railway Journal of May 31, 1913, page 987.

Personal Mention

Mr. G. W. Gwinn has been appointed assistant superintendent of the Fresno (Cal.) Traction Company to succeed Mr. G. R. Duncan.

Mr. Russell Palmer has been elected treasurer of the Choctaw Railway & Lighting Company, McAlester, Okla., to succeed Mr. D. W. Dawley.

Mr. W. B. Miser has been appointed general superintendent of the Jacksonville Railway & Light Company, Jacksonville, Ill., to succeed Mr. J. P. Doan, resigned.

Mr. E. W. Fowler has been appointed assistant to Mr. H. E. Chubbuck, vice-president executive of the Illinois Traction System and the Western Railways & Light Company.

Mr. J. F. Holman, formerly freight agent of the Ohio Electric Railway Company, Columbus, Ohio, has been appointed general freight agent of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.

Mr. John C. Eversman has been appointed general agent of the Illinois Traction System, with headquarters in Chicago, Ill., to succeed Mr. Fred A. Stowe, who has become one of the owners of the Peoria *Herald-Transcript.*

Mr. J. H. Miller, formerly city ticket agent of the Chicago, Burlington & Quincy Railroad at St. Joseph, Mo., has been appointed general passenger agent of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.

Mr. John E. Wilkie, whose appointment as assistant to Mr. Henry A. Blair, chairman of the board of the Chicago (Ill.) Railways was noted in the ELECTRIC RAILWAY JOURNAL of May 24, 1913, was elected vice-president of the company on June 4.

Mr. A. W. Patten has been appointed assistant general manager with jurisdiction over the Kansas utilities of the Illinois Traction System and the Western Railways & Light Company, reporting to Mr. H. E. Chubbuck, vice-president executive.

Mr. B. R. Stephens has resigned as general superintendent of the Choctaw Railway & Lighting Company, McAlester, Okla., and has moved his office to St. Louis, Mo., where he will continue as secretary, auditor and purchasing agent of the company.

Mr. M. Plunkett, master mechanic of the Choctaw Railway & Lighting Company, McAlester, Okla., has had his jurisdiction extended over the maintenance of equipment and the power station, succeeding Mr. N. E. Daniels, chief engineer of the power station.

Mr. T. R. Woulfe, formerly of Fort Wayne, Ind., has been appointed power sales manager of the Cleveland, Southwestern & Columbus Railway to succeed Mr. J. P. Lewis, who resigned several months ago. Mr. Woulfe's headquarters will be at Elyria, Ohio.

Mr. A. H. Mann has resigned as general superintendent of the Jersey Central Traction Company and the Monmouth Electric Light, Heat & Power Company, Keyport, N. J. Mr. Mann was previously connected with the Michigan United Traction Company, Jackson, Mich.

Mr. Fred J. Maxwell, auditor of the Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis., and of the Wisconsin Electric Railway, Oshkosh, Wis., who has been stationed in Fond du Lac, has been transferred to the executive offices of the companies in Milwaukee, Wis.

Mr. B. E. Tabler, formerly traffic manager of the Choctaw Railway & Lighting Company, McAlester, Okla., has been appointed general superintendent of the company to succeed Mr. B. R. Stephens, who continues with the company as secretary, auditor and purchasing agent with offices in St. Louis, Mo.

Mr. J. K. Moffitt, one of the trustees placed in charge of the United Properties Company, Oakland, Cal., has been elected a vice-president of the San Francisco-Oakland Terminal Railways to succeed Mr. W. A. Bissell, who has been elected president of the company. Mr. Bissell quite lately succeeded Mr. Dennis Searles as a vice-president of the company.

Mr. W. A. Bissell, one of the trustees placed in charge of the United Properties Company, Oakland, Cal., pending the preparation of some general plan of financing, has been elected president of the San Francisco-Oakland Terminal Railways to succeed Mr. E. A. Heron, resigned. Mr. Bissell was lately elected a vice-president of the company to succeed Mr. Dennis Searles.

Mr. T. H. Shaughnessy has resigned as master mechanic of the Essex County division of the Public Service Railway, Newark, N. J., to become assistant superintendent of equipment of the Chicago (Ill.) Railways. Mr. Shaughnessy was formerly general foreman of rolling stock of the New York (N. Y.) Railways and previous to that was district mechanical inspector of the Philadelphia (Pa.) Rapid Transit Company.

Mr. Edward F. Peck, of the firm of Allen & Peck, Inc., Syracuse, N. Y., has been elected president of the Hagerstown & Frederick Railway, the organization of which is noted elsewhere in this issue. Mr. Peck is also vice-president of the Newport News & Old Point Railway & Electric Company. A biography and a photograph of Mr. Peck were published in the ELECTRIC RAILWAY JOURNAL of Jan. 20, 1912, at the time Mr. Peck was elected president of Allen & Peck, Inc.

Prof. George F. Swain has been chosen chairman of the Boston Transit Commission to succeed George G. Crocker, who died recently. Professor Swain has been a member of the commission since 1894. He was born in San Francisco March 2, 1857. He received the degree of LL.D. from New York University in 1907. At the taking of the tenth United States Census in 1880-1884 he was the hydraulic expert. In 1887 he became the consulting engineer of the Boston Transit Commission and continued as such up to the time of his appointment to the commission.

Mr. Gaylord Thompson, who in April, 1913, became connected with the New Jersey & Pennsylvania Traction Company, Trenton, N. J., as vice-president and general manager, has been elected vice-president and general manager of the Bucks County Interurban Railway. This company, the New Jersey & Pennsylvania Traction Company and the Trenton City Bridge Company are all owned by the same interests. The Bucks County Interurban Railway is a merger of the Trenton, New Hope & Lambertsville Street Railway, the Newton & Yardley Railway and the Bucks County Electric Railway.

Mr. E. E. Soules has been appointed publicity manager of the Illinois Traction System, Peoria, Ill., to succeed Mr. Fred G. Buffe, who has become managing editor of the Peoria *Herald-Transcript.* Mr. Soules was formerly publicity agent of the Michigan United Traction Company. Previous to Feb. 1, 1911, when he became connected with the Michigan United Traction Company, then the Michigan United Railways, Mr. Soules was connected for about six years in reportorial and editorial capacities with newspapers in Peoria. He also did considerable publicity work for various parks and amusement enterprises.

Mr. E. A. Heron has resigned as president of the San Francisco-Oakland Terminal Railways, Oakland, Cal. Mr. Heron has been connected with railway work in and about Oakland since the organization of the Piedmont Cable Company in 1888. He has acted as president of the companies at Oakland through the series of consolidations which included the taking over of the initial enterprise by Mr. F. M. Smith and Mr. F. C. Havens in 1894 and the forming of the Oakland Transit Company, the purchase of the Alameda line, the Hayward line and the Telegraph & San Pablo lines from the Southern Pacific Company and the extension of these lines, as well as the operation of the Key Route ferry system.

Mr. Walter Silvus has been appointed superintendent of equipment of the Texas Traction Company and the Southern Traction Company, Dallas, Tex. Mr. Silvus began his railroad career with the Baltimore & Ohio Railroad in 1893. He remained with that company ten years and then accepted the position of shop foreman with the Chicago, Lake Shore & Eastern Railroad at Chicago. He resigned that position in January, 1904, to become general inspector of the Twin City Rapid Transit Company, Minneapolis, Minn., where he remained until the fall of 1909, when he went with the Chicago & Milwaukee Electric Railroad as master mechanic. In August, 1910, he was appointed master mechanic of the Michigan United Railways, now the Michigan United Traction Company, with offices at Jackson, Mich.

Mr. George H. Clifford, the newly elected president of the Southwestern Electrical & Gas Association, is vice-president and general manager of the Northern Texas Traction Company, Fort Worth, Tex., which operates the city lines in Fort Worth, 15 miles of city lines in Dallas and a 35-mile interurban line between the two cities. Mr. Clifford was born at Fort Worth in 1881. He was graduated from the public schools and attended Weatherford College. After he left school he worked as a stenographer for several companies until 1901, when he entered the service of the Northern Texas Traction Company as secretary to Mr. F. M. Haines, who was general manager of the company, owned by the Bishop & Sherwin syndicate, Cleveland, Ohio. In 1903 Mr. Clifford was made secretary and treasurer of the company, which position he held until 1905, when the property was purchased by Stone & Webster, Boston, Mass. After the change in ownership he was made general superintendent. In 1910 he was elected vice-president and general manager of the Northern Texas Traction Company and in addition he is general manager of the Fort Worth Southern Traction Company, which owns and operates a 32-mile interurban line between Fort Worth and Cleburne, Tex., and the Arlington Light & Power Company, which is engaged in the water, light and ice business at Arlington, Tex.

G. H. Clifford

Mr. W. J. Harvie, formerly railway manager of the operating department of J. G. White & Company, Inc., New York, N. Y., has been appointed assistant to the president and engineer of construction of the Hagerstown & Frederic Railway, the organization of which is referred to elsewhere in this issue. Mr. Harvie was born in Buffalo, N. Y., and was educated in the public schools and the high school in that city. He was first employed in the operation offices of the Western Union Telegraph Company. He attended Syracuse University and was graduated from that institution with the degree of electrical engineer. Previous to the year of his graduation he entered electric railway work in the overhead department of the Syracuse Rapid Transit Company. During the latter part of 1900 he was employed on the Syracuse, Lake Shore & Northern Railway in various capacities in the car shops and power houses. He was appointed electrical engineer of the Syracuse & Suburban Railroad in 1901 in charge of the power plant, car equipment and overhead lines. In the fall of 1901 he became associated with the Andrews-Vanderbilt syndicate in charge of the construction work in Oneida on the Oneida Railway and also in charge of the overhead construction of the Little Falls extension of the Utica & Mohawk Valley Railway. In 1902 he was appointed electrical engineer of the Utica & Mohawk Valley Railway in charge of the power installation, one of the first 25,000-volt transmission lines with substations to be operated in the East. Later he was placed in charge of the mechanical department with charge over the car shops in Utica, Mohawk and Rome. During 1905 and 1906 and the early part of 1907 he supervised the installation of electricity on the West Shore Railroad between Utica and Syracuse. He was appointed chief engineer of the Syracuse Rapid Transit Company and the Oneida Railway in 1908 with supervision also over the Utica properties. In February, 1912, he was appointed railway manager of the operating department of J. G. White & Company, Inc. Mr. Harvie was president of the American Electrical Railway Engineering Association in 1911 and was acting president of the association for ten months of the preceding year.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Wayne County Street Railway, Honesdale, Pa.**—Chartered in Pennsylvania to build an interurban railway between Honesdale and Hawley. Martin B. Allen, Honesdale, president. Edmund B. Hardenbergh is interested. [E. R. J., Dec. 14, '12.]

***Temple, Northwestern & Gulf Railway, Austin, Tex.**—Application for a charter has been made by this company in Texas to take over the property and assets of the present Temple & Northwestern Railway. Part of this railway has been constructed and it will now be extended from Temple to Dublin. Capital stock, $100,000. Incorporators: John H. Thompson, James F. Sadler, Jr.; Jonathan Lane and William A. Vinson, all of Houston, and W. S. McGregor and J. H. McGregor, of Temple.

Minneapolis, Merrill & Marinette Railway, Merrill, Wis.—Application for a charter has been made by this company to build a 75-mile interurban railway between Merrill and Antigo and from Merrill to Prentice Junction. Capital stock, $400,000.

FRANCHISES.

Medicine Hat, Alta.—The ratepayers of Medicine Hat have sanctioned a by-law giving an exclusive twenty-five-year franchise to the Montreal Engineering Company to operate an electric railway in Medicine Hat.

Fresno, Cal.—The Fresno Traction Company will ask the Supervisors for a franchise for its San Joaquin River extension.

Taylorville, Ill.—The Council has granted a fifty-year franchise to the Decatur, Sullivan & Mattoon Transit Company to construct and operate an interurban railway over certain streets in Taylorville.

Biddeford, Maine.—The Biddeford & Saco Railroad has asked for a franchise to double-track its line on Main Street from Laconia Street to the city building in Biddeford.

Lenox, Mass.—The Berkshire Street Railway has asked for a franchise in Lenox.

Springfield, Mass.—The Springfield Street Railway has received a franchise in Springfield.

Ithaca, N. Y.—The Ithaca-Cortland Traction Company, Ithaca, has received an extension of time to June 30, 1915, for the completion of its twenty-nine-mile electric railway to connect Ithaca and Cortland via Freeville, Forest Home, Dryden and McLean. Paul K. Clymar, Ithaca, N. Y., president. [E. R. J., Jan. 4, '13.]

Cincinnati, Ohio.—The Cincinnati Traction Company has received a franchise from the Council to extend the Avondale Street Railway route along Hunt Street in Cincinnati.

Portland, Ore.—The Errol Heights Railway has received a franchise from the Council over certain streets in Portland.

Salt Lake City, Utah.—The Salt Lake & Ogden Electric Railway has received a forty-two-year franchise from the Council over certain streets in Salt Lake City.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company plans to build an extension to Lewisburg.

Rome & Gadsden Railroad, Gadsden, Ala.—This company states that construction will be begun within the next few weeks on its 60-mile interurban railway between Rome, Cave Springs, Center, Forney Key, Rock Run and Gadsden. The power house and repair shops will be located at Rome and the company will operate twenty cars. Capital stock authorized, $5,000 to $5,000,000. Officers: J. B. Wadsworth, Gadsden, president; J. N. King, Rome, vice-president; Louis S. Daniel, Rome, secretary, superintendent and general manager; G. P. Smith, Center, treasurer. [E. R. J., May 17, '13.]

Mobile & Baldwin County Railroad, Mobile, Ala.—Work has been begun by this company grading and laying rails on its 65-mile gas-electric railway between Mobile, Bay Minette, Blakely, Volanta, Fairhope, Yerkon, Magnolia, Foley, Elberta and Pensacola. Contracts will soon be awarded for the bridges and equipment. The company's repair shops will be located at Volanta. It will operate five passenger cars and a number of freight cars. Capital stock authorized, $200,000. The headquarters of the company are in the Bank of Mobile Building, Mobile. Officers: W. B. Miller, Chicago, Ill., president; M. H. Miller, Mobile, Ala., vice-president, general manager and purchasing agent, and P. A. Parker, Mobile, chief engineer. [E. R. J., March 8, '13.]

British Columbia Electric Railway, New Westminster, B. C.—This company has awarded W. A. Gilley two contracts. The first contract is for the erection of a wharf at Port Moody. The work will require 200,000 ft. of lumber and the driving of over 300 piles. The construction calls for a double trestle 700 ft. long and capable of carrying two tracks. The Vancouver contract calls for a trestle viaduct on the south end of the Granville Street bridge at Vancouver. This will be used in connection with the new depot to be built for the patrons of the Lulu Island branch of the company and will require 1,000,000 ft. of lumber in construction.

Fresno (Cal.) Traction Company.—As soon as the right-of-way deeds can be cleared this company will begin the construction of a line from Muscatine to Biola.

Pacific Electric Railway, Los Angeles, Cal.—This company has awarded a contract to Grant Brothers for the grading of 22 miles of its line between San Bernardino and Uplands. Announcement has been made by this company that it will connect Long Beach and Redondo with an 18-mile electric railway skirting the ocean. Rights-of-way are now being secured.

San Diego (Cal.) Electric Railway.—This company announces that it will extend its Ocean Beach line from a point just beyond La Playa to the Fort Rosecrans Military Reservation.

Santa Barbara & Suburban Railway, Santa Barbara, Cal.—Plans are being considered by this company to build an extension out Fourth Avenue. The company is at present reconstructing the entire system formerly owned by the Santa Barbara Consolidated Railway, double-tracking State Street and purchasing new equipment.

Central California Traction Company, San Francisco, Cal.—It is reported that this company's line will be extended to Cosumne within the next few months. Ultimately this line will be extended to Jackson.

Southern Pacific Company, San Francisco, Cal.—This company will build an extension from Redwood to San José.

Waterbury & Milldale Tramway Company, Waterbury, Conn.—Surveys have been made and part of the construction capital secured by this company for its 8½-mile line from Waterbury to Milldale. Contracts for 4 miles of the line will be let soon. John H. Cassidy, Waterbury, Conn., secretary.

Georgia Railway & Electric Company, Atlanta, Ga.—This company has been asked to consider plans to build a 1½-mile extension to the Atlanta Steel Mills in Atlanta.

Central Illinois Interurban Railway, Peoria, Ill.—Surveys have been made and construction will be begun soon by this company on its 40-mile line to connect Kewanee, Osceola, Bradford and Henry. John R. Fate, 413 Dechman, Peoria.

Peoria, Canton & Galesburg Railroad, Peoria, Ill.—At a recent meeting of the board of directors the following officers were elected: W. T. Irwin, president; John W. McDowell, vice-president; and Clifford Ireland, secretary and treasurer, all of Peoria. [E. R. J., May 17, '13.]

Kankakee & Urbana Traction Company, Urbana, Ill.—Surveys have been completed by this company for a 10.6 mile extension between Rantoul and Paxton. The date for awarding the contracts has not yet been decided upon. C. J. Hays, Urbana, chief engineer.

Fort Wayne & Northwestern Railroad, Fort Wayne, Ind.—Plans are being made by this company to build a new depot and freight station on Cedar Street and Twelfth Street in Auburn.

Tri-City Railway & Light Company, Davenport, Ia.—Mayor M. R. Carlson of Moline has advocated a new line for this company on Third Avenue to connect with the Seventh Street line now under construction and with the extension of the Fourth Avenue line.

Aroostook Valley Railroad, Presque Isle, Maine.—During the next eight weeks this company will finish its 7-mile line to Caribou.

Winnipeg (Man.) Electric Railway.—This company plans to build between 12 and 14 miles of new track during the season.

Holyoke (Mass.) Street Railway.—This company has been asked to consider plans to extend its Holyoke line to Enfield and possible to Ware.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—Plans are being made by this company for financing the proposed interurban line between Omaha and Lincoln.

United Traction Company, Albany, N. Y.—This company has been asked to consider plans for a new route for the proposed extension over New Scotland Avenue in Albany.

Binghamton (N. Y.) Railway.—Orders have been placed by this company for the material needed for improvements of its entire system in Binghamton. Plans are being made to double-track several of its lines.

Manhattan Bridge Three-Cent Line, New York, N. Y.—The Appellate Division of the Supreme Court has confirmed the recommendation of a commission that this company be permitted to lay tracks in Manhattan.

New York, N. Y.—The Public Service Commission, First District, has advertised for bids, to be opened June 24, for the construction of section No. 4 of the Broadway subway in Manhattan. Construction of this subway is now going on in lower Broadway as far north as Bleecker Street and section No. 4 will extend from that point to Fourteenth Street. This subway, when completed, will run up Broadway to Forty-second Street and thence through Seventh Avenue to Fifty-ninth Street and eastward through Fifty-ninth and Sixtieth Streets over the Queensboro Bridge. It will be operated by the New York Municipal Railway Corporation.

Richmond Light & Railroad Company, New York, N. Y.—The Public Service Commission has refused this company's request to modify the order for the double-tracking of the Castleton Avenue Street railway on Staten Island.

Niagara Gorge Railroad, Niagara Falls, N. Y.—This company plans to build soon a new passenger station at Youngstown.

New York State Railways, Rochester, N. Y.—The company has asked the Public Service Commission for permission to double-track its East Syracuse line in upper James Street in Syracuse. The Public Service Commission has granted permission to the company to construct extensions of its lines in West Dominick, East Dominick and Mill Streets at Rome. The city recently granted franchises for these extensions.

***Hiawassee Valley Railway, Andrews, N. C.**—Plans are being made by this company to begin surveys about June 10 on its 35-mile interurban railway between Andrews and Hayesville, N. C., and Hiawassee, Ga. A power plant will be built in Andrews on the Hiawassee River. Headquarters, Andrews. J. Q. Barker, Andrews, N. C., is interested.

Ottawa & Morrisburg Electric Railway, Ottawa, Ont.—This company has awarded the contract to the Reliance Construction Company, Chicago, for the entire construction of its line between Morrisburg and Ottawa.

Pittsburgh, Pa.—An electric line from the river district into Washington, Pa., is advocated by the Washington Board of Trade and the officials of Washington and Jefferson College. An effort was made some time ago by the West Penn Railways to build such a line, but objections by the college authorities led Gov. John K. Tener to refuse to grant the charter.

Montreal & Southern Counties Railway, Montreal, Que.—This company has accepted the by-law granting an extension on Youville Street in Montreal for terminals.

Charleston & Summerville Interurban Railway, Charleston, S. C.—Financial arrangements are being made for the completion of work on this 22-mile line. Surveys have been made between Charleston and Summerville, 22 miles, and grading has been completed for 15 miles. J. L. David, president. [E. R. J., Feb. 8, '13.]

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company has placed in operation its East Sixth Street line in Chattanooga.

Clarksville Railway & Light Company, Clarksville, Tenn.—Plans are being considered by this company to build an extension to Dunbar's Cave.

Middle Tennessee Traction Company, Franklin, Tenn.—Work has been begun by this company on its 72-mile line to connect Franklin, Shelbyville and Fayetteville with connections at Franklin with the Nashville Interurban Railway. The Interurban Construction Company has been organized to construct and equip this line. The company's repair shops will be located in Franklin and it will purchase power. Capital stock authorized, $250,000. Capital stock issued, $10,000. Bonds authorized, $30,000 per mile. Officers, John A. Pitts, Nashville, president; L. W. Buford, Franklin, vice-president; C. R. Cockle, Nashville, secretary; O. D. Berroth, Franklin, treasurer; P. E. Cox, Franklin, general manager and purchasing agent, and C. B. Howard, chief engineer.

Johnson City & Elizabethton Railway, Johnson City, Tenn.—Grading will soon be begun by this company on its 13-mile electric railway between Johnson City, Milligan College, Oak Grove, Gap Creek and Elizabethton. J. G. Burchfield, Milligan, president. [E. R. J., June 15, '12.]

Memphis (Tenn.) Street Railway.—This company will extend its Lane Avenue line from Claybrook Street to Evergreen Street in Memphis in the near future.

Southern Traction Company, Dallas, Tex.—Plans are being made by this company for a 4-mile extension in Waco.

Wichita Falls (Tex.) Traction Company.—Plans are being made by this company for a 2-mile extension at Wichita Falls.

Pacific Power & Light Company, Astoria, Wash.—This company is asked to consider plans to extend its line from the present terminus at Forty-section Street eastward to a point near the Hammond Lumber Company's plant in Astoria.

***Spokane, Wash.**—An electric interurban line between Spokane and Wenatchee, the route following closely the tracks of the Great Northern Railroad, is being planned. Half a dozen important power sites on the Rock Island, Wenatchee and Columbia Rivers have been secured by A. B. Perrine, Salt Lake City.

Morgantown (W. Va.) Interurban Railway.—Surveys have been completed by this company on its 10-mile line between Morgantown and Point Marion, via Star City. It is not decided when construction will be begun. S. D. Brady, Morgantown, chief engineer. [E. R. J., May 24, '13.]

SHOPS AND BUILDINGS

San Diego. (Cal.) Electric Railway.—During the next few weeks this company will award contracts to build a new carhouse with a capacity for 100 cars. Plans for the new structure have not yet been completed.

St. Petersburg & Gulf Railway, St. Petersburg, Fla.—Work will be begun at once by this company for the removal of its carhouses from the waterfornt to Sixteenth Street and Central Avenue in St. Petersburg.

Illinois Traction Company System, Peoria, Ill.—Preliminary plans for this company's new seven-story building to be erected at Hamilton Street and Jefferson Street in Peoria have been filed by the architects, Hotchkiss & Harris.

Union Traction Company, of Indiana, Anderson, Ind.—It is announced that this company has purchased property at Meridian Street and Twelfth Street in Anderson on which it plans to build a new terminal station in the near future.

Tri-City Railway & Light Company, Davenport, Ia.—This company's carhouses at Rock Island were destroyed by fire on June 1. More extended reference to the fire and loss sustained is made on page 1033 of this issue of the ELECTRIC RAILWAY JOURNAL.

Louisville (Ky.) Railway.—This company's new repair shops, located at Twenty-ninth Street and Garland Avenue in Louisville, are sufficiently near completion for the company to begin the purchase and installation of the mechanical equipment which will be needed. It has already contracted with the Henry Vogt Machine Company, Louisville, for the down-draft water-tube boilers which will furnish the power to the plant and other equipment will be bought later.

Toronto (Ont.) Railway.—This company plans to build a new carhouse on the south side of Queen Street near Connaught. The structure will be 100 ft. x 360 ft. The cost is estimated to be about $3,600.

Barre & Montpelier Traction & Power Company, Montpelier, Vt.—This company is now building a 30-ft. addition to its carhouse to be used for a paint shop. The company will also build 80 ft. of new pit in its carhouse.

Wheeling (W. Va.) Traction Company.—Plans are being made by this company to enlarge its carhouses in Wheeling.

POWER HOUSES AND SUBSTATIONS.

Savannah (Ga.) Electric Company.—This company has placed in operation its new Riverside power plant at West Broad Street and River Street, in Savannah.

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—This company has installed a new 7500-kw high pressure turbine recently at its power house at Batavia and is installing several new boilers.

Fort Wayne & Northwestern Railroad, Fort Wayne, Ind.—This company plans to build soon a new substation in Auburn.

Aroostook Valley Railroad, Presque Isle, Maine.—This company has completed its new substation in Caribou.

Worcester Consolidated Street Railway, Worcester, Mass.—This company's Worcester lines are now receiving power from the Connecticut River Transmission Company's substation at Millbury; 2000 kw has been added to the instalment already received for Worcester proper. In Worcester alone the company now has 4600 kw additional power. Outside of Worcester the company has added 600 kw at Berlin and 600 kw at Northboro.

Rochester Railway & Light Company, Rochester, N. Y.—A new power station will be built by this company on the river flats south of Platt Street bridge in Rochester. The structure will be 100 ft. x 40 ft. It will have two turbo-generators, one with a capacity of 2700 hp and the other with one of 5300 hp.

Pittsburgh (Pa.) Railways.—Plans have been prepared by this company for trebling the capacity of the plant on Brunots Island. The capacity will be increased from 25,000 kw to 85,000 kw. Bids are now being taken for the increased 60,000 kw. Twenty Stirling boilers of 822-hp capacity each have been ordered from the Babcock & Wilcox Company and the Westinghouse Electric & Manufacturing Company will supply four 15,000-kw turbo-generator sets. Condensers and pumps will be furnished by the Worthington Pump Company. The boilers are to be placed in four batteries of five boilers each. A 14-ft. x 180-ft. stack will be furnished for each battery. Estimates on the stoker equipment have already been taken.

Maritime Coal, Railway & Power Company, Ltd., Montreal, Que.—At the annual meeting of this company in Montreal the president reported that the negotiations for the sale of a considerable block of the company's securities had been successful and that it was contemplated to carry out during the ensuing year large extensions to the power plant at Chignecto, to cope with the increasing demand for electric power.

Manufactures and Supplies

ROLLING STOCK

Second Avenue Railroad, New York, N. Y., expects to change 175 of its cars to the pay-within type.

Third Avenue Railroad, New York, N. Y., contemplates changing 200 of its cars to the pay-within type.

Harrisburg (Pa.) Railways has ordered seven pay-as-you-enter cars from The J. G. Brill Company.

Morris County Traction Company, Morristown, N. J., is in the market for ten cars.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., is building five cars in its own shops.

United Railways & Electric Company, Baltimore, Md., is reported as expecting to purchase a large number of cars.

Wilmington & Philadelphia Traction Company, Wilmington, Del., expects to purchase from ten to twenty-five new cars.

Salt Lake & Ogden Railway, Salt Lake City, Utah, has ordered fifteen cars from the Niles Car & Manufacturing Company.

New York & Queens County Railway, New York, N. Y., is considering the change of 177 of its cars to the pay-within type.

Modesto (Cal.) Interurban Railway has ordered one storage battery passenger car from the Federal Storage Battery Car Company.

Charlottesville & Albemarle Railway, Charlottesville, Va., has ordered five near-side, one-man cars, from The J. G Brill Company.

Puget Sound Electric Railway, Tacoma, Wash., is in the market for ten steel hopper cars of 80,000-lb. capacity and ten 80,000-lb. steel-side dump cars.

Emigration Canyon Railroad, Salt Lake City, Utah, has placed an order with the Niles Car & Manufacturing Company for two 47-ft. two-compartment cars.

Tri-City Railway, Davenport, Ia., is in the market for sixty cars to replace the cars that were burned in its carhouse at Rock Island, Ill., on June 1, 1913.

Minneapolis & Northern Railway, Minneapolis, Minn., has ordered two 55-ft. gasoline motor cars and one 200-hp. freight locomotive from the McKeen Motor Car Company.

West Jersey & Seashore Railroad, Camden, N. J., has ordered twenty-six 34-ft. center-entrance motor-car bodies, mounted on Brill 39-E trucks, from The J. G. Brill Company.

Chattanooga Railway & Light Company, Chattanooga, Tenn., is in the market for a number of cars to be used on its own line and some of the properties which it controls.

San Diego (Cal.) Electric Railway, noted in the ELECTRIC RAILWAY JOURNAL of May 10, 1913, as expecting to purchase several cars, states that thirty-five prepayment, center-entrance cars will be purchased.

Puget Sound Traction, Light & Power Company, Seattle, Wash., noted in the ELECTRIC RAILWAY JOURNAL of May 17, 1913, as having ordered ten double-truck single-end cars from the Cincinnati Car Company, has instead ordered twenty-five cars of this type.

Springfield (Mass.) Street Railway has awarded the contracts for one express car and four 35-ft. semi-convertible cars to the Wason Manufacturing Company. The company has also placed an order with the Osgood-Bradley Car Company for nine 28-ft. closed cars.

Shore Line Electric Railway, Saybrook, Conn., noted in the ELECTRIC RAILWAY JOURNAL of March 29, 1913, as having ordered eight semi-convertible cars from the Wason Manufacturing Company, has specified the following details for these cars:

Seating capacity	44
Weight (car body only),	20,000 lb.
Length of body	30 ft. 8 in.
Length over vestibule,	40 ft. 1 in.
Couplers	Brill channel iron
Curtain fixtures	Cur. S. Co.
Curtain material	Pantasote
Fenders	Pfingst
Gongs	Dedenda
Hand brakes	Brill
Width over sills	7 ft. 11½ in.
Width over all	8 ft. 3 in.
Rail to trolley base	11 ft. 9 in.
Body	wood
Interior trim	cherry
Headlining	birch veneer
Roof	arch
Underframe	composite
Axles	Penn. steel
Bumpers,	Hedley anti-climber
Car trimmings	bronze
Control	1200-volt
Heaters	Consol.
Headlights	Crouse-Hinds
Journal boxes	Brill
Motors	West., 4 per car
Sanders	Brill Dumpit
Sash fixtures	Brill
Seats	Brill Winner
Seating material	rattan
Step treads	oak
Trucks	Brill
Varnish	Murphy
Ventilators	Brill exhaust
Wheels	32 in. standard

Chicago & Joliet Electric Railway, Joliet, Ill., which recently ordered ten prepayment closed cars from the St. Louis Car Company, has specified the following details:

Seating capacity	40
Bolster centers, length	20 ft.
Length of body	21 ft.
Length over vestibule	40 ft.
Width over sills	8 ft. 5⅝ in.
Width over all	8 ft. 8 in.
Height, rail to sills,	2 ft. 10 in.
Sill to trolley base,	8 ft. 6⅞ in.
Body	composite
Interior trim	bronze
Headlining	Agasote
Roof	turtle-back type
Underframe	composite
Bumpers,	4-rib Hedley anti-climbers
Car trimmings	St. Louis
Conduits and junction boxes,	St. Louis
Couplers	St. Louis
Curtain fixtures	Cur. S. Co.
Curtain material	Pantasote
Fenders or wheelguards,	H. B.
Gongs	St. Louis
Hand brakes	St. Louis
Heaters	Smith No. 2 hot air
Headlights	Crouse-Hinds
Motors, type,	GE 80 and GE 67
Sanders	Ohio Brass
Sash fixtures	Edwards
Seats, style	St. Louis
Seating material	wood-slat
Step treads	Universal
Trolley catchers or retrievers	Keystone
Trolley base	U. S.
Trucks, type	Brill 39 E
Ventilators	St. Louis
Buzzer system,	Cons. Car Heating

TRADE NOTES

H. M. Byllesby & Company, Chicago, Ill., has appointed B. F. Wellington, Jr., assistant Pacific Coast manager.

Wendell & MacDuffie Company, New York, N. Y., has opened an office in the People's Gas Building, Chicago, Ill.

Pittsburgh Testing Laboratory, Pittsburgh, Pa., has appointed F. E. Walker representative in charge of its office and laboratories at Easton, Pa.

Graphite Lubricating Company, Bound Brook, N. J., is operating its enlarged plant day and night in order to supply the increasing demand for "Bound Brook" trolley wheel bushings.

H. A. Strauss Company, Chicago, Ill., has been awarded the contract for all the heavy concrete construction work on the new plant of the Baldwin Locomotive Works, located at East Chicago, Ind.

Cassava Products Company, Jamaica, British West Indies, has appointed Allan S. Barrows its vice-president and general manager. Mr. Barrows was formerly manager of the Chicago office of the Pantasote Company.

John A. Roebling's Sons Company, Trenton, N. J., has purchased the seven-story building at 169-175 Hudson Street, New York, N. Y., and will eventually move its offices from 117 Liberty Street to the new location.

Fonger Fender Company, Chicago, Ill., manufacturer of the Fonger tip-tilting automatic fender, has recently incorporated and will issue $50,000 capital stock. The proceeds of this issue will be used in increasing its plant capacity and promoting sales.

C. G. Young, New York, N. Y., has been engaged to make examinations and reports on certain important public utilities in Central America. H. A. Belden, one of the firm's engineers, who will make the local studies, sailed from New York on May 17, 1913.

M & G Truck & Engineering Company, London, Eng., has just completed a shipment of forty-two Warner trucks to the Kobe (Japan) Electric Railway. This makes forty-two railways on which the Warner axle is being used, ten of which are in the United States.

Pyrene Manufacturing Company, New York, N. Y., has received recent large orders for its fire extinguishers from the New York, New Haven & Hartford Railroad, Delaware, Lackawanna & Western Railroad and the Westinghouse Electric & Manufacturing Company.

Ohmer Fare Register Company, Dayton, Ohio, states that the general average of conductors operating Ohmer registers on the Denver (Col.) City Tramway Company for the month of April, 1913, was 97.72 per cent. John F. Ohmer claims that this is the highest register record ever attained.

Electric Service Supplies Company, Philadelphia, Pa., has received large orders for protected rail bonds from the Boston (Mass.) Elevated Railway, the International Railways, Buffalo, N. Y.; the Georgia Railway & Power Company, Atlanta, Ga., and the Long Island Railroad, New York, N. Y.

I. S. Van Loan Railway Equipment Company, New York, N. Y., has been incorporated with a capital stock of $125,000 to deal in engines, machinery and general supplies. The incorporators are: A. C. Case, New York, N. Y.; D. Pierson, Jr., East Orange, N. J., and E. W. Samuel, Mount Carmel, Pa.

Roberts & Schaefer Company, Chicago, Ill., has placed Willis E. Holloway in charge of the marketing of the new Marcus combination screen and picking conveyor which the company has recently acquired. Mr. Holloway was formerly connected with the Jeffrey Manufacturing Company.

Western Electric Company, New York, N. Y., has appointed C. W. Murphy railway and mine sales specialist, with headquarters at Pittsburgh, Pa. Mr. Murphy has been formerly connected with the Tri-State Railway & Electric Company, East Liverpool, Ohio, and the Westinghouse, Church, Kerr Company.

Dossert & Company, New York, N. Y., report having received recent large orders for connectors from the Public Service Railway, Newark, N. J.; Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil; Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., and the American Car & Foundry Company.

General Bakelite Company, New York, N. Y., reports that as a result of negotiations between it and the Condensite Company of America the suits brought for alleged infringement of the Bakelite patents have been withdrawn and the Condensite Company has acknowledged the validity of the Bakelite patents and will pay royalty.

Thomas Railway Track Appliance Company, Kansas City, Kan., was incorporated on May 22, 1913, to make switch stands, switch frogs and other special appliances. The company has a capital stock of $200,000. The incorporators are John W. Thomas, R. J. Barker, J. R. Hammill, W. G. Miller and G. G. Austin, all of Kansas City, Kan.

W. J. Jeandron, New York, N. Y., United States agent for "Le Carbone" brushes, who has been in Europe for the past six weeks, returned on May 26. Mr. Jeandron spent ten days at the factory of the Le Carbone Company arranging for a larger production of "Le Carbone" brushes to meet the increased demand in the United States.

Fairbanks, Morse & Company, Chicago, Ill., has appointed C. W. Pank general director of sales, with offices in Chicago, Ill. Mr. Pank was formerly manager of the St. Louis (Mo.) office of the company. L. Norvell, manager of the railway supplies department, has been made manager of the St. Louis office, succeeding Mr. Pank, and F. O. Roy has been made manager of the railway supplies department, succeeding Mr. Norvell.

Anglo-American Varnish Company, Newark, N. J., held a meeting of its board of directors at which B. A. Hegeman, Jr., was elected president, Charles C. Castle vice-president, and J. Franklin Ford chairman of the board of directors.. The company was established in 1872 by the late William Marshall and under his management the property gained recognition as a reliable producer of high-class varnishes. The plant of the company has recently been enlarged in order to meet the requirements of an increased business.

Buda Company, Chicago, Ill., has established a headlight department for the manufacture and sale of the Buda-Ross electric headlights. Mark A. Ross, who has been engaged for sixteen years in the manufacture and sale of electric headlights; Harry P. Bayley, for thirteen years sales agent in the headlight industry, and John Eberhart, who for sixteen years has been manufacturing headlights, have become associated with the company. Mr. Ross will have entire charge of the headlight department, with the above-mentioned men at the head of their respective departments.

James H. Denton has been appointed Eastern manager of the Railway Utility Company, Chicago, Ill., with offices in the Marbridge Building, New York, N. Y. Mr. Denton became connected with the Christensen Engineering Company in 1898 as sales engineer and remained with that company until 1906, after having served in various capacities, including that of chief engineer and general superintendent. Mr. Denton then became manager of the air-brake department of the Allis-Chalmers Company and in 1909 resigned from that company to enter the railway supply business for himself.

Robert W. Hunt & Company, Chicago, Ill., held a conference in Pittsburgh, Pa., on May 13 and 14 of its chief inspectors who have charge of the inspection of rails and fastenings at the various mills of the United States. At the meeting various matters were discussed relative to the inspection of rails, joints, bolts, spikes and tie plates, the idea being to bring the inspectors into closer contact, with a view of harmonizing and systematizing the work to the end that more consistent action and results should be attained. Samples of the various types inspected, specifications and report blanks were on exhibition, and the different points of all were thoroughly discussed.

ADVERTISING LITERATURE

Day & Zimmermann, Philadelphia, Pa., have issued a folder illustrating some of the recent work which they have done.

John A. Roebling's Sons Company, Trenton, N. J., has printed a small booklet, containing a list of Roebling products.

Electric Service Supplies Company, Philadelphia, Pa., has issued a small folder illustrating and describing the advantages of its automatic trolley guard.

Underfeed Stoker Company of America, Chicago, Ill., has issued the *Publicity Magazine* for May, 1913, illustrating and describing several new installations of Jones stokers.

Sprague Electric Works, New York, N. Y., have issued in very attractive form Catalog No. 439, which contains a complete list, with illustrations of all Sprague conduit products.

Warner International & Overseas Engineering Company, London, Eng., has issued folders containing standard specifications Nos. 231,212 and 241,212 and Warner patent non-parallel axle and double-track alignments.

Railway & Traction Supply Company, Chicago, Ill., has issued a catalog illustrating its Wyoming vacuum track sanders, Wyoming vestibule curtain release and the Hercules steel bumping posts, with directions for installing them.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletins Nos. 128, 132 and 133 dealing with "Miscellaneous Equipment for Pneumatic Drills," "Pneumatic Motors and Pneumatic Geared Hoists" and "Cylinder Air Hoists and Jacks," respectively.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. A 4116, describing isolated and small-plant alternating-current switchboard panels, both generator and feeder, for three-phase, 25 to 60 cycle circuit. The bulletin is made up principally of dimension and connection diagrams and miscellaneous data referring to the various panels and equipments.

Unit Construction Company, St. Louis, Mo., has issued a thirty-two-page catalog entitled "The Unit Method of Construction for Reinforced Concrete Buildings." It discusses briefly the advantages of this method of construction and illustrates numerous structures which have been erected by the company, including the new carhouse for the Philadelphia (Pa.) Rapid Transit Company. The dimensions of this carhouse are 375 ft. x 611 ft., and it has a storage capacity for 366 cars.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JUNE 14, 1913 No. 24

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.

239 West 39th Street, New York.

Chicago Office.....1570 Old Colony Building
Philadelphia Office.....Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere; United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

RULES FOR SAFETY

As a part of its safety campaign the Pennsylvania Railroad Company has issued a booklet of hints and suggestions to employees, covering the road, the yard and the shop. There is also a list of unsafe practices, examples of which can be seen on almost any road. Safety is not a matter of teaching rules but of instilling a sense of personal responsibility and of responsibility toward others. The emphasis laid upon this factor in safeguarding the worker from his own carelessness and recklessness is the feature that makes the Pennsylvania booklet noteworthy. On these points Vice-president Atterbury says: "The problem of safety is not altogether a question of rules and their enforcement, safety appliances and their application, but the development of inherent self-restraint and control." S. C. Long, general manager, makes this even more positive statement: "Safety in railroad operation is not a question of safeguards, but of intelligent caution constantly exercised. The ultimate aim of the safety work is to develop in each employee a sense of personal responsibility, not alone in taking measures for his own safety, but for that of his fellow employee as well." Read with these precepts in mind, the Pennsylvania shop rules and many of the operating rules are worthy of general adoption, but the main thing to learn from them is the necessity for education in responsibility and caution.

A. E. R. A. MEMBERSHIP

By no means content with a company membership which comprises 76 per cent of the mileage of American electric railways, nor with the roster of 2800 individual members, the campaign continues to bring into the American Electric Railway Association fold the companies operating the 24 per cent of mileage not now represented and to increase the individual membership to 5000. Two new pamphlets have just been issued by the association, one bearing on company membership and the other aimed to bring in applications for individual membership. The keynote of the former publication is that in union there is strength, and in addition to the clear-cut statement of the advantages of company membership there is an impressive argument in the list of member and non-member companies in each state with the percentage of mileage operated by each group. In some states it must make a company feel lonesome to be outside the ranks of the associated companies working all together for the common good. The individual membership pamphlet is as effective in its way as the company booklet. Both are good campaign literature, and while no doubt wide circulation will be given to them by the association, it would aid its efforts and the cause in general if present members should add a personal note to the printed appeal. With every member a self-constituted but active coadjutor of the membership committee, there is no doubt that before this year's convention both the company and individual roll can be materially increased. Maximum results, in fact, can be obtained in no other way than by general co-operation with the officers of the association, who, of course, welcome requests for printed ammunition to be used in effort of this kind.

ELECTRICITY ON THE FARM

Under this heading a report was presented to the N. E. L. A. convention which tells of investigations made in the field of rural electrical extensions in the Eastern States, a matter which is of interest to electric railways as well as to electric lighting companies. While it is true that the efforts of some of the Eastern companies to push this work in their respective territories are admirable and along varying lines, such as those of the Boston Edison Company, with its traveling exhibits of devices and appliances capable of use in rural life, and the 4600-volt, three-phase lines of the Eastern Michigan Company, reaching twenty-five towns, much more has been accomplished in the Far West probably than elsewhere in the country. There electric power is used extensively for irrigation and farm service along the extensive power transmission lines which cross and intersect such states as California and Utah, for instance. The chief objection made by the electric companies to this class of service is the cost of securing it, owing to the low density of the business and to the characteristically small units of area. We can readily see that business of this kind might not warrant an extensive investment in a distribution system, but where the distribution system is already installed the question presents a different aspect. This is, of course, the situation with the electric railways, and we believe that more attention might profitably be given to the development of the power business from railway circuits than has been the case in the past. There are certain technical difficulties, to be sure, on account of the fluctuating voltage and grounded circuit, but these are not serious objections to the sale of energy for most purposes where power would be used on the farm, and indeed at least one railway company in the Central States has developed quite an extensive service of this kind. The matter is certainly worth looking into.

FRANCO-BRITISH VIEWS ON RAILWAY ELECTRIFICATION

The active state of the railway electrification problem abroad is evident from a perusal of the proceedings, as reported elsewhere in this issue, of the joint meeting of the Institution of Electrical Engineers and the Société Internationale des Électriciens which was held in Paris during the week beginning May 21. Six papers were presented on railway electrification while a seventh paper dealt with high-tension d.c. transmission, which, of course, is very close to the same subject. It is noticeable from both the papers and discussions that European engineers are close students of American electrification practice and appreciate clearly the difference in conditions, more notably in the maximum weights of trains. Mr. Gratzmuller's paper on high-tension d.c. railways sets the present safe maximum voltage for an overhead d.c. line at 3000 volts, and he finds that with a current of 500 amp the total input of 1500 kw would be insufficient to handle the heaviest trains by means of single locomotives. It may be pointed out that in the case of the 2400-volt d.c. Butte, Anaconda & Pacific electrification, as described in the ELECTRIC RAILWAY JOURNAL for June 7, two four-motor locomotives are required to handle a 3400-ton train. The combined continuous capacity of these locomotives is 8 × 190 amp at 1200 volts or 1824 kw. The limiting feature as regards the weight of a train, with the electric locomotive, is of course not the power which can be put in the locomotive but the strength of the drawbars on the forward cars in the train. Mr. Gratzmuller's belief that 1200 volts per motor should be attainable is already confirmed by the Butte equipment, and higher voltages are in sight.

The papers of Messrs. Jullian and Mazen were of particular interest in contrasting the opposite policies of the Midi and the Western State Railways. The Midi company is electrifying nearly 300 miles of track on the single-phase system for branch and trunk-line service at line construction costs which are remarkably low for the character of operation. On the other hand, the d.c. third-rail electrification of the Western State Railways at Paris is a typical suburban network. According to Mr. Mazen, the conditions of electricity supply in France are likely to have great influence on the system of electrification, most central stations supplying fifty-cycle, three-phase current. He finds that as a rule French railways could use current from nearby existing stations after converting it at their own substations. If energy can be purchased at 1 cent per kw-hr. from central stations at other points besides Paris, the French railways are certainly in a most favorable position for accelerating electrification. No reports on the construction and operation of English lines were presented at the meeting, but reference was made to early high-tension d.c. electrifications in districts where, apparently, the tracks have reached their capacity with steam.

THE N. E. L. A. CONVENTION AT CHICAGO

The similarity of a great many of the problems in the electric light industry and in the electric railway industry is shown in the abstracts of the papers and reports presented at the N. E. L. A. convention in Chicago published in the issues of this paper for this week and for last week. This similarity is not confined simply to the apparatus used, although a great many of the problems of a technical nature are the same and many of the accounting problems are also alike. But both classes of public utilities have a further correspondence on account of their susceptibility to regulation from the same bodies, to onerous franchises and to tax burdens—in fact, in all of the broad questions of public policy.

As the urban railways were established long before the lighting systems, they have passed through forms of complete physical reconstruction to an extent from which the light and power companies, fortunately for them, have been spared up to this time. The history of the railway industry, involving progress through destruction, contains lessons which the lighting industry should heed. The railway industry, on the other hand, can well afford to study the aggressive commercial methods adopted by the light and power companies as a means of introducing and developing their service. The two principal points of difference between the two utilities are, perhaps, that the lighting companies are not such large employers of labor and that, since their employees are brought much less into physical contact with the public, every transaction with customers does not mean, as it does with the railway, an opportunity for personal disagreement with an employee. Another point of difference is the system of rates, because the lighting companies are reasonably free to vary their charges for different forms of service, although their maximum rate may be regulated. Their rates, also, are proportioned to the service given to a greater extent than on the railways. The latter have a unit charge regardless of the service rendered, corresponding somewhat to the original plan of charging for electric lighting before the energy supplied to the customer was metered. If this original plan of charging for electrical energy had been continued by the electric lighting companies, they would be as regards rates in a position very similar to that of the city electric railway companies with their 5-cent fare. Fortunately, however, they not only adopted early the meter principle, but the introduction of the tungsten lamp some five years ago has enabled them to make a material reduction to their customers in the cost of illumination without any increase in their own operating expenses per unit of energy delivered.

One condition which is bringing the two classes of companies together is the growing practice of an amalgamation of the railway load with the lighting and power load of the same central station. The tendency in this direction is stronger now than ever before, and a discussion of the economies which result from it formed a part of the proceedings at the National Electric Light convention. Chicago affords a conspicuous example in this respect, but there are many others. Arrangements of this character give to the lighting companies a new interest in railway operation, although the railway companies do not lose their concern in the effectiveness and economy required in the generation of power. In consequence, the two classes of properties should come closer together with the march of evolution.

THE MINNESOTA RATE CASE DECISION

The practical effect of the decision in the Minnesota rate case handed down by the United States Supreme Court is to leave the status quo of the question undisturbed. The right of the states to exercise over intrastate rates the control that they have exercised for a generation has been confirmed, and their regulations will be legal provided they are not confiscatory and do not directly affect interstate commerce. The ruling now reaffirmed is the old familiar one, and the only departure seems to be the definite emphasis that is given to the facts that Congress has full power in the doubtful zone where interstate and intrastate rates become inextricably mingled and that here federal control must be exercised through the body created for that purpose, the Interstate Commerce Commission. Under the system of regulation defined by the Hepburn act, that body alone has power to declare that discrimination in fact against points outside a state has resulted from the exercise by the state of its admitted powers within its borders. As the Interstate Commerce Commission did not investigate the alleged discrimination in the Minnesota case, the state law was sustained merely on general constitutional grounds. Confirmation in regard to this duty of the commission, however, must await the decision in the Shreveport case. Here the Interstate Commerce Commission set aside rates fixed by the laws of Texas on the ground of discrimination against foreign points, and not until this matter is adjudicated will the precise scope of the power over intrastate rates reserved to the states be known.

It is the second part of the decision, however, rather than the above, that will particularly engage the attention of students of electric railway problems—the sections where the court discusses railway values and their computation. No affirmative rule is laid down, but from the principles of valuation negatively set up it appears that the attempt of railroads to establish the cost of reproducing their property new as equivalent to the "fair value" upon which they are entitled to earn rates is doomed. The method of valuation by the cost of reproduction new is, in the eyes of the court, inseparably linked with the use of an artificial multiplier applied to the market value in order to determine approximately what the acquisition of the land would cost, including expensive condemnation proceedings, razing of hypothetical buildings, etc., and other expenses incidental to its purchase. Thus, in estimating the value of the railroad property, the federal court in Minnesota allowed the railroad to multiply the normal market value of land by two in order to arrive at the cost of reproducing anew a right-of-way outside the three large cities in Minnesota, thereby taking cognizance both of the hypothetical condemnation expenses and of the peculiar "railroad value" of the land. Justice Hughes held, however, that as the amount of this additional value is largely mere speculation, the railroads must be satisfied with a fair average market price, an increase in the original investment being allowed only in so far as any is shown by similar adjacent property owned by others. We understand from the decision, however, that the court is prepared to consider the investment where it is in excess of the market value and has not been made in an improvident and reckless manner. Thus it will be seen that the approved method of valuation is neither that of "cost of reproduction new," as that term is usually understood, or the investment, but possesses some features of both methods. It is also evident that the court, in objecting to the use of multipliers, did not intend to eliminate the construction costs such as grading, and that it also recognized the propriety of such intangible elements as engineering, superintendence, legal expenses, contingencies and interest during construction, when based upon a proper valuation.

In deciding that the rates for the Minneapolis & St. Louis Railway were confiscatory and that such a claim had not yet been proved for the other roads the court has not made any definite statement as to what might constitute a universal legitimate return on the valuation. In one of these cases, decided in the Circuit Court by Judge Sanborn in 1911, it was stated that the companies were entitled to "a net return of 7 per cent per annum upon the respective values of their properties devoted to public use," and that "since it is an economic axiom that the greater the risk the greater the return must be upon invested capital, the conclusion is irresistible that a net return of 7 per cent is not more than fair." In reversing Judge Sanborn's decision, however, the Supreme Court does not at all generalize upon the adequacy of any percentage of return. As we stated above, it has overthrown the basis of valuation set up by the lower court, but as to whether 7 per cent is in general a reasonable return, or as to whether since 1911 the various risks and local conditions have not changed so much that 7 per cent is insufficient, the court is silent. As in previous discussions of the rate of return the court has always considered the local rates for different classes of investment, we assume that the same rule will apply and that in all subsequent rate cases each will have to stand on its own merits as to the adequacy of the rate of return.

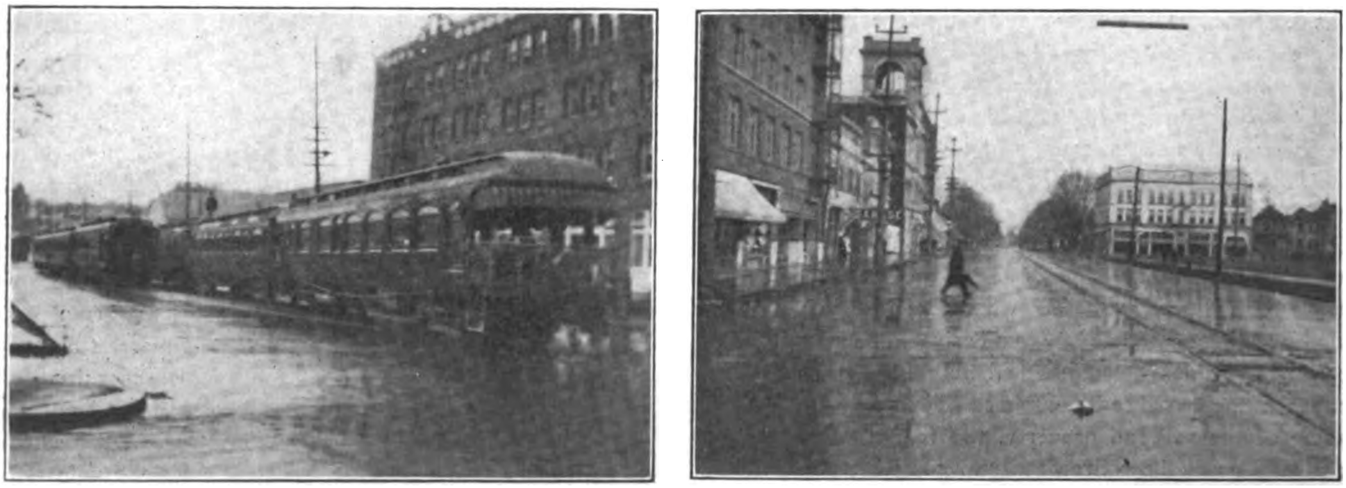
One final point might well be mentioned. In adhering strictly to its practice of not attempting legislation beyond its power and of not settling by judicial fiat disputes political in their character, the Supreme Court has refrained from telling in any specific way what rules should be adopted in arriving at railway values. It recognizes the complexity of the problem, but while overthrowing the adoption of the inappropriate method of valuation employed in this case, it leaves to the Interstate Commerce Commission the real problem of valuation. In the nation-wide valuation on which the Interstate Commerce Commission is beginning to work this decision will have to be reflected, so far as it goes by prohibition. Then besides the valuation of each entire railroad system by the Interstate Commerce Commission there must be a separate valuation of the parts lying within the boundaries of each state, with the attendant problems of the allocation of terminal investments, in order to determine whether particular intrastate rates are confiscatory. With these valuations necessary the narrowing down of the field of valuation by the decision at least serves as a guide for the future.

The Oregon Electric Railway

This Line Operates Trains with Observation Cars and Sleeping Cars Between Portland and Eugene, a Distance of 122 Miles —It Is Equipped with 1200-Volt Apparatus and Has Recently Built a Number of Important Extensions

One of the longest electric railways recently put in operation is the Oregon Electric Railway, which extends from Portland south through the Willamette Valley to Salem, Albany and Eugene, with branch lines to the west. This line is a part of the Spokane, Portland & Seattle Railway, a steam railroad, which is owned jointly by the Great Northern and the Northern Pacific Railways, and the construction in Oregon represents the most important electrical railway project yet undertaken by these large steam railway interests. It is interesting to note that the Southern Pacific Railroad, which previously operated the only railroad extending the entire length of the Willamette Valley, is electrifying portions of its line and is building new track for electrical operation to connect therewith so that it will also have a through electric line between Eugene and Portland, a distance of about 125 miles, and several lines on each side of the Willamette River between Salem and Portland, which are distant about 50 miles. The accompanying map, reproduced from the ELECTRIC RAILWAY JOURNAL for Jan. 25, 1913, shows the lines in operation as projected by both companies.

Oregon Electric Railway—Material Yard, Showing System of Storing Material by Shifting Tracks



Oregon Electric Railway—Two Trains Passing in Front of Salem Station and View in Main Street of Salem

Of the system of the Oregon Electric Railway, shown in the accompanying map, all of the lines have been built with the exception of the branch from Tigard to McMinnville.

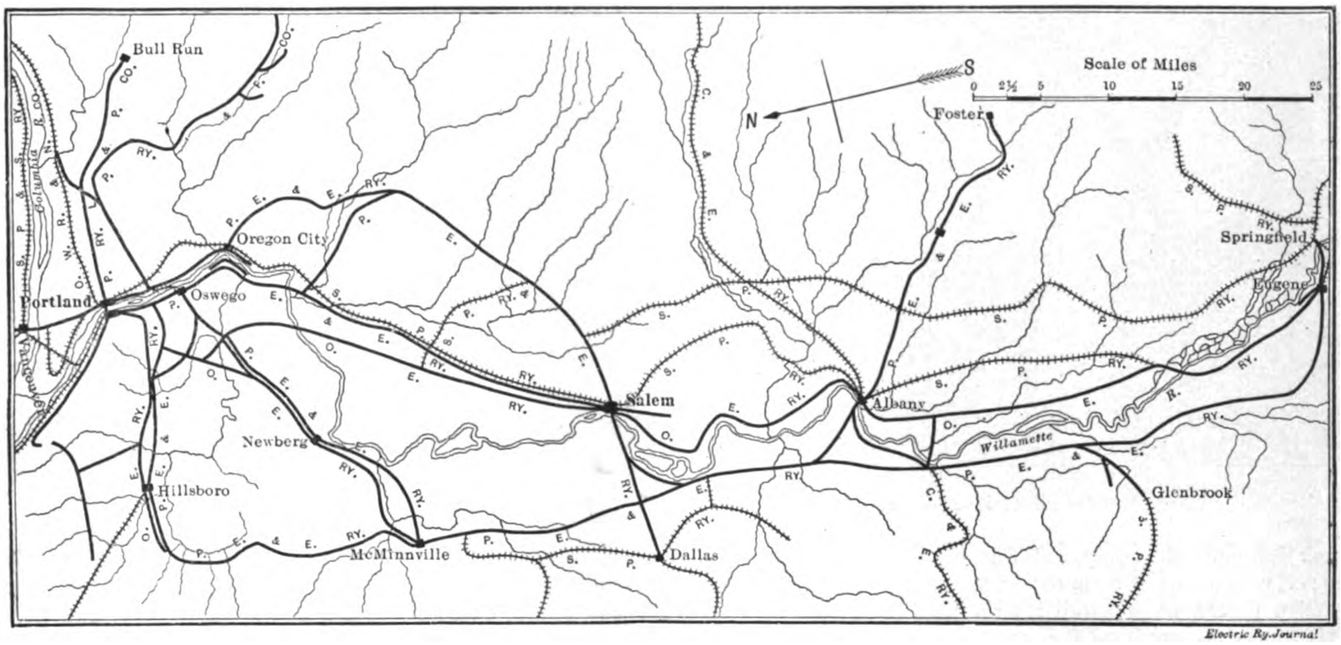
HISTORY OF THE LINE

The Oregon Electric Railway was built originally as an independent interurban railway between Portland and Salem by W. S. Barstow & Company and was described in the ELECTRIC RAILWAY JOURNAL for Oct. 2, 1909. It was purchased by the present owners three years ago. The extensions made since that time have all been built on steam railroad standards, the bridges and clearances being such as to accommodate standard steam trains. On one part of this line, that between Albany and Eugene, the company has a tangent 24 miles long. The section between Portland and Salem is being reconstructed along steam railroad lines.

Cars are operated in trains made up of two or more. At present all passenger trains start from the main station of the Spokane, Portland & Seattle Railway at Eleventh and Hoyt Streets in the northern part of Portland and run south through the streets for about 1½ miles. While in the city the trains stop at designated corners to receive passengers and then make a regular stop for passengers and baggage at the Oregon Electric station at

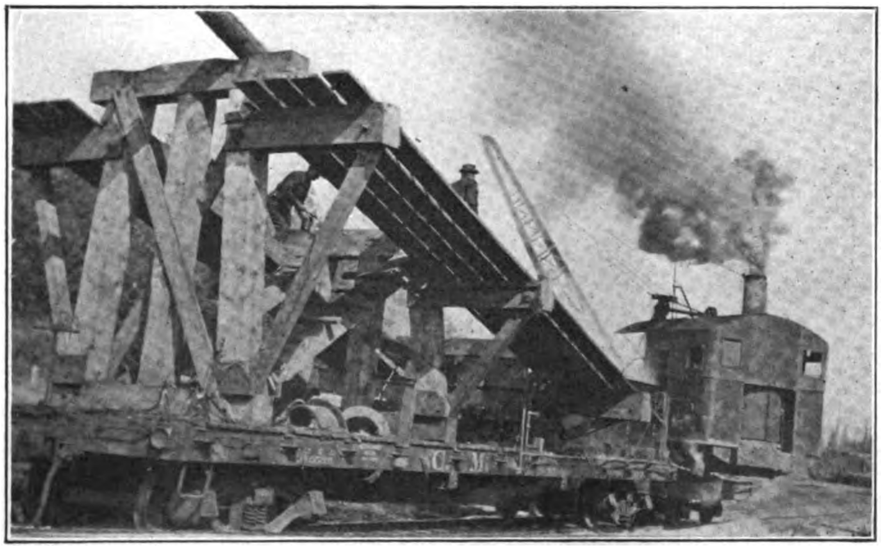
Front and Jefferson Streets in the southern part of Portland. The company is now rebuilding that part of its line between South Portland and the Oregon Electric depot in South Portland so as to bring it in on private right-of-way instead of city streets.

In the city streets the sharpest curve has a radius of 70 ft. There are several of these curves in Portland, and for this reason passengers are not allowed to pass through the vestibules from one car to another while the cars are running through Portland.



Oregon Electric Railway—Map of Electric Railways in Operation or Under Construction in Willamette Valley

The company is now building a freight cut-off between Orenco and Helvetia. The former station is on the Oregon Electric Railway and the latter is on the line of the United Railways. When completed this cut-off will allow the freight trains to be taken off the portion of the system of the Oregon Electric Railway where traffic is most dense.



Oregon Electric Railway—Treating Poles with Preservative

This cut-off is being constructed on a grade of five-tenths of 1 per cent. All new main line of the Oregon Electric Railway is constructed with a maximum of four-tenths of 1 per cent grade and a 3 deg. curve, as the company anticipates a large freight business and wishes to be able to take care of it economically.

The company is also double-tracking its line between Portland and Garden Home. In this work the deepest cut is from 40 ft. to 50 ft. and the highest fill is 90 ft. The deepest cut required the excavation of 185,000 cu. yd. of dirt, and for one section of track 5000 ft. in length the company will have 335,000 cu. yd. of fill and excavation. The double-track grade will be 32 ft. wide when finished, the cuts being 60 ft. wide at the bottom.

MATERIAL YARD

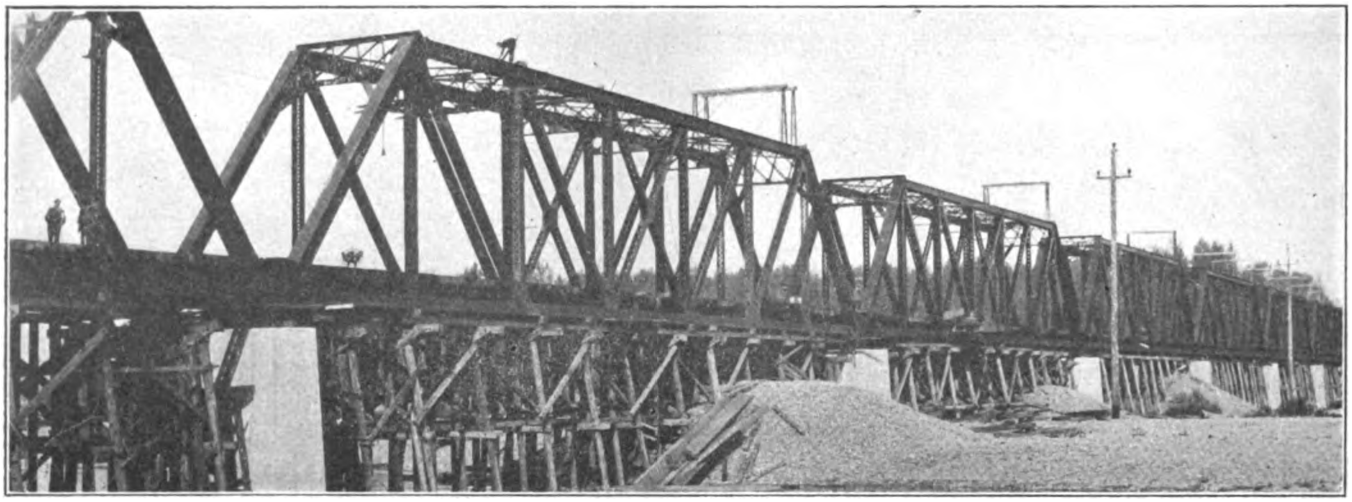
The engraving on page 1050 shows the material yard of the company near Salem. The tracks in this yard are laid in a series of arcs of circles with considerable space between them. The practice of unloading material in this yard is as follows: As the material is brought to the yards it is unloaded by crane on to the ground directly adjoining and on one side of the track. After the entire length of the tracks is filled in this way they are shifted a few feet so that the next lot of material can be unloaded in the empty space, and this process is repeated until all of the material is stored. When the material—ties, rails, etc.—is required on the work the construction cars are loaded by crane from the semi-circular rows last unloaded, and the tracks are then gradually shifted back until all of the material required is taken from the yards.

TREATMENT OF POLES

All the wooden poles used on the system are treated at the yards with preservative at their butts before being stored. Upon receipt there they are lifted by a derrick car upon a runway and their ends are dipped in a tank containing hot creosote, where they remain from ten to twenty minutes. They are then lifted out by the same derrick car and set into a tank of cold creosote, where they are allowed to remain about the same length of time. The poles are treated in this way for a distance of about 8 ft. from the butt. An illustration of this process is presented.

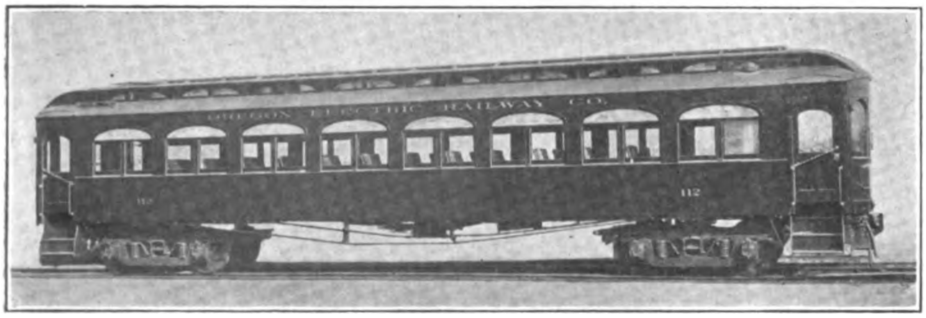
BRIDGES

There are a number of long bridges on the line. The largest is over the Santian River and consists of seven 175-ft. spans. The weather conditions in Oregon are such that only about five months is available for active construction, so that this bridge had to be erected rapidly and under traffic. After the false work was put in the trusses were erected, and piers were sunk under them while the bridge was being used for traffic. To avoid interference with the erection derricks from the live trolley wire, the company used a third-rail in the middle of the track for current supply. It was supported on hard-wood blocks which were mounted directly on the ties. The wooden blocks were painted with P. & B. paint, and the rail was connected to the 1200-volt supply at one end through a switch, so that there was no voltage on the rail except when the trains were running. The cars were not equipped with a third-rail shoe, but a hand car, provided with a third-rail shoe which could be raised and lowered by a lever, was used for making the connection. When a train arrived at the bridge the hand car was put in front of it, and a jumper was connected between the shoe terminal and the head motor car. To warn the bridge workers of the passage of a train, bells were connected in the third-rail circuit and rang continuously while the third-rail was alive. After the train had crossed the bridge the hand car was taken off at a portable turntable, and the train proceeded. It required only three minutes to take the train across the bridge in this way.

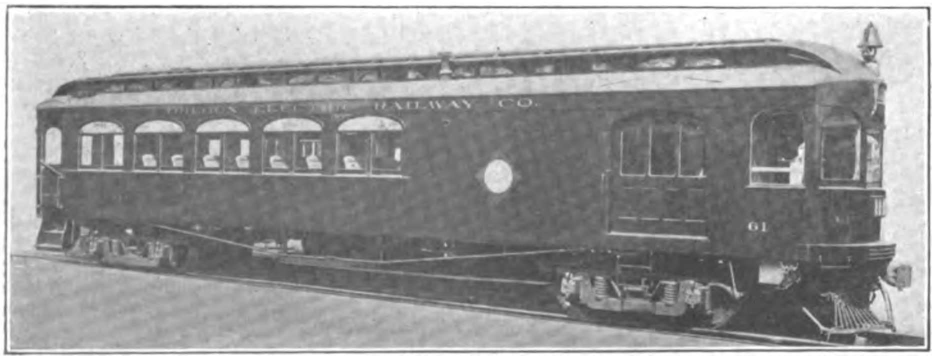


Oregon Electric Railway—Bridge Over the Santian River While Under Construction

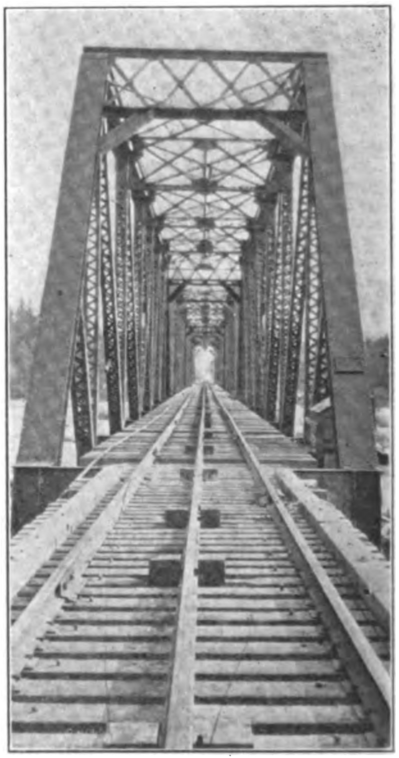
Another bridge at Harrisburg crossing the Willamette River consists of three 200-ft. spans and two 100-ft. spans. This bridge, however, was not erected under traffic as it was finished before service was established out of Albany. Another bridge with a 150-ft. span was erected 2 miles south of Albany. This bridge was erected under traffic, but it was so short that the trains were able to coast across it.



Oregon Electric Railway—Standard Passenger Motor Car



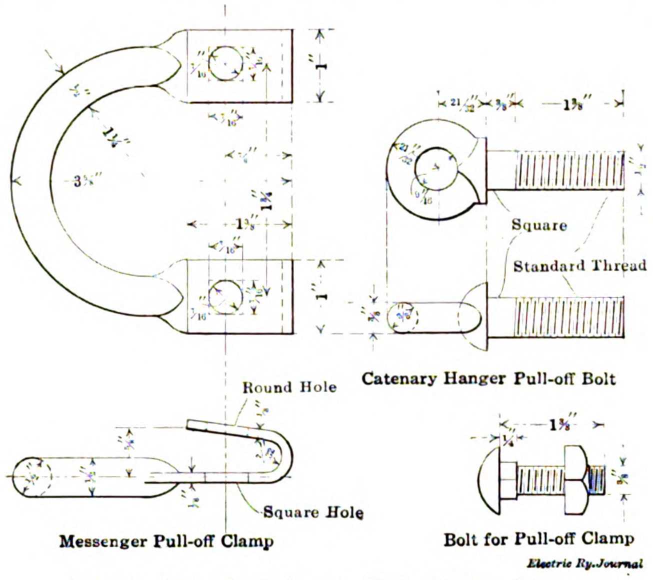
Oregon Electric Railway—Standard Combination Car



Third-Rail on Santian Bridge

CHANGE FROM 600 VOLTS TO 1200 VOLTS

The Oregon Electric Railway was originally equipped for operation with 600 volts. After the company had decided to build the extensions mentioned above, it was evident that more feeder capacity would be required soon, and the advisability of changing from 600 volts to 1200 volts was carefully considered. At that time there were five substations, four on the main line at Multnomah, Tonquin, Donald and Waconda and one on the Forest Grove line at Moffatt. These stations were approximately 12 miles apart. It was estimated that the company could electrify 72 miles of track south of Salem on the 1200-volt system at a saving over the 600-volt electrification sufficient to justify the changing over of the original mileage to 1200 volts, when the capitalized value of the saving in operating expenses on the entire system at 1200 volts was also taken into consideration. In consequence the company abandoned its substation at Donald and moved the 500-kw, 600-volt rotary at that point to Moffatt, where it was put in series with a similar rotary to give 1200 volts. The 500-kw rotary at Waconda was installed in the Tonquin substation in series with the one there, and a new 1200-volt, 500-kw rotary was installed at Waconda. At Multnomah there were two 600-volt rotaries in parallel. These were connected in series and a new 1200-volt rotary was installed there. The trolley wire on the existing line was re-insulated, and new substations were built south of Salem so that the spacing between substations is now between 18 and 20 miles. All substations are of concrete and steel, and on the new line the company has also built a combination with operators' cottage for three families. This permits the substation attendants, who work in three shifts of eight hours each, to be always near their place of work.

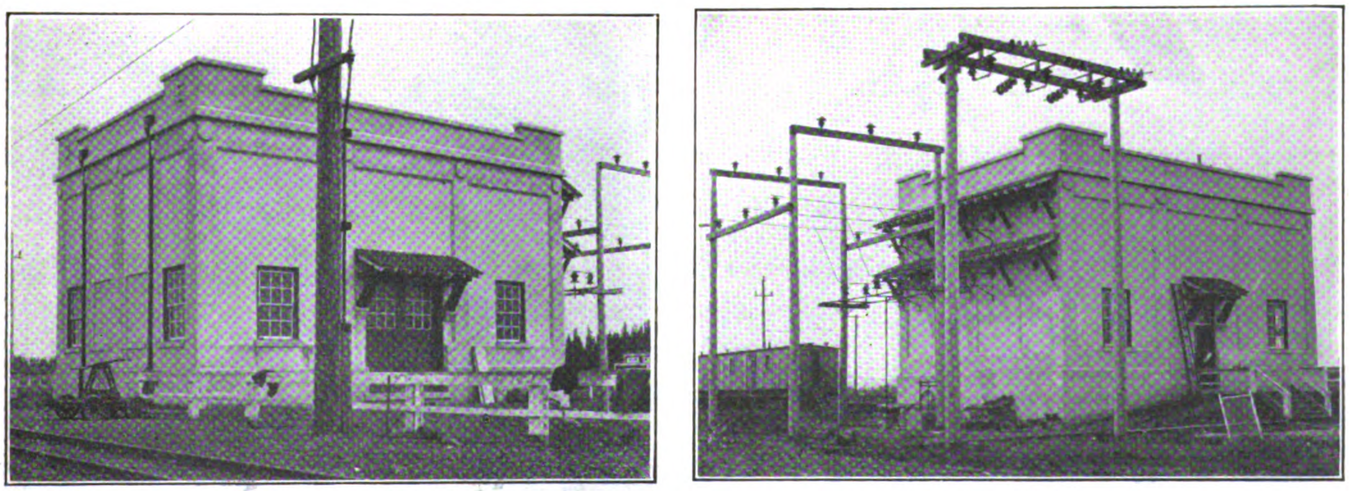


Catenary Hanger Pull-off Bolt

Messenger Pull-off Clamp

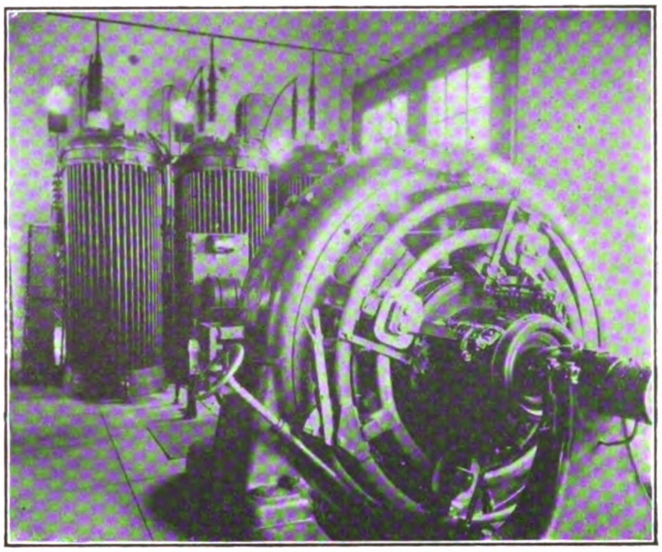
Bolt for Pull-off Clamp

Oregon Electric Railway—Pull-off for Curves



Oregon Electric Railway—Exterior Views of Substation at Pirtle

The company has a 500-kw, 1200-volt portable substation in a steel car. Each of the standard substations of the company contains a track connected with the main line so that this portable substation can be run into any of the standard substations of the company and coupled up with the equipment there. It has been found almost indispensable for this service to carry the load while changes are being made in the apparatus at the substation thus assisted. The portable substation is also used for caring for unusual load conditions. Practically all of the electric equipment is of the General Electric make.



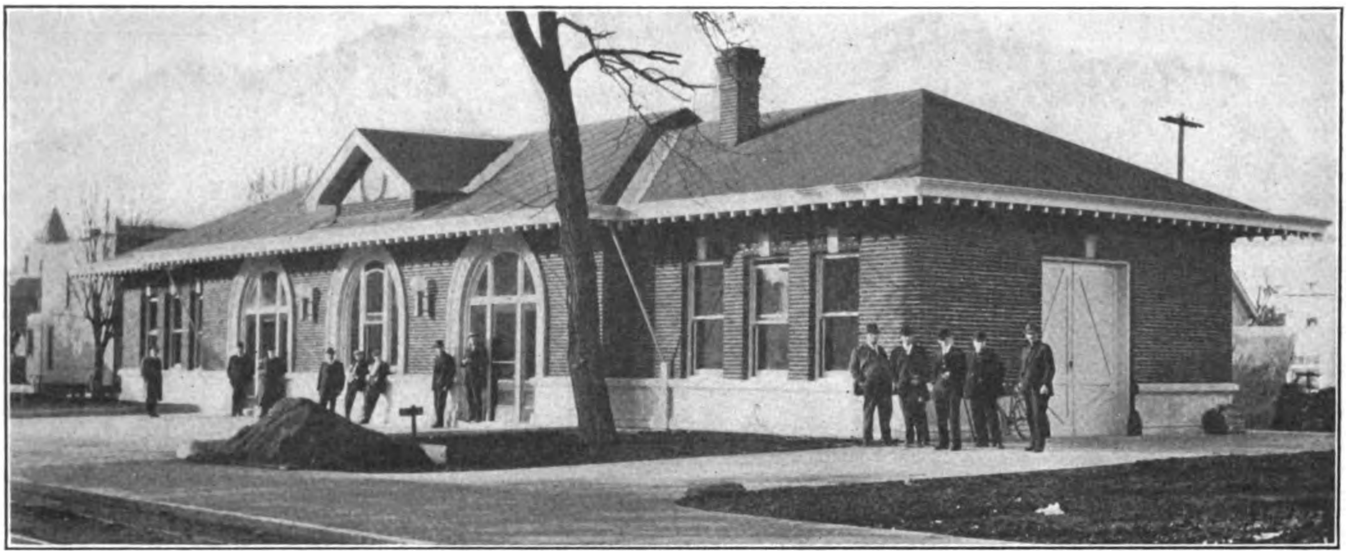
Oregon Electric Railway—Interior of Substation at Pirtle

When the line was acquired a transmission voltage of 33,000 volts was being used. This was increased to 60,000. The high-tension insulators were changed in accordance, and new step-up transformers were installed at the station of the Portland Railway Light & Power Company, from which all power used on the line is taken. All of this work in changing from 600 volts to 1200 volts was done at night without any interruption to the service.

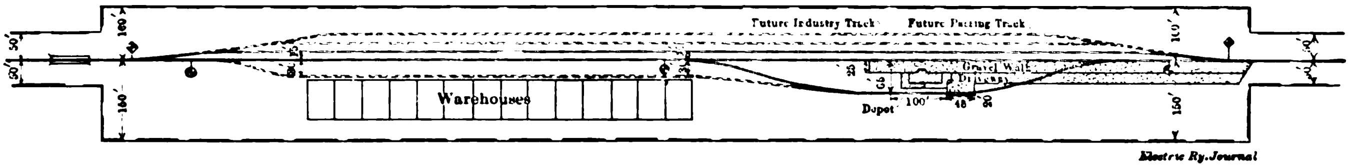
PASSENGER STATIONS AND OTHER BUILDINGS

At the large cities on the line, like Salem, Albany and Eugene, the company has erected large modern passenger stations equal in appointments if not superior to those which would be erected by steam railroads in cities of the same size. In Albany and Eugene these buildings are devoted entirely to railroad purposes, but in Salem the station occupies part of the ground floor of a large office building.

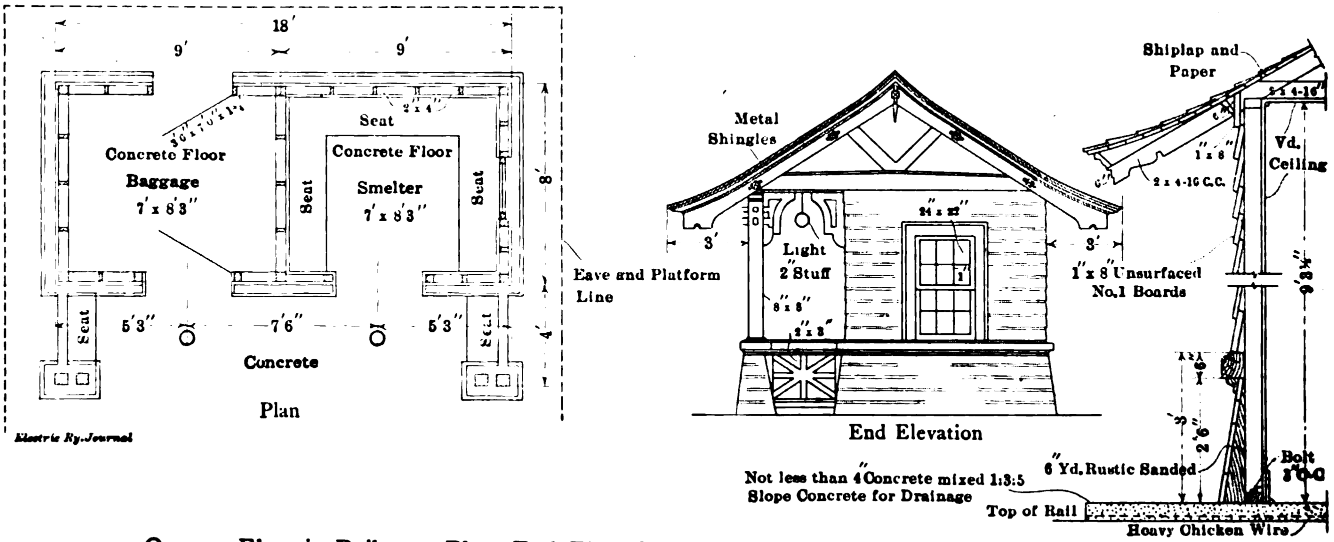
At other stops the company has erected three different types of stations. At the more important points it has built stations of its standard "C" or "D" type. The "D" type of station is the smaller and consists of a single-story building 61 ft. in length and 21 ft. to 28 ft. in width, with a front platform for passengers and an end platorm, 18 ft. 6 in. in length by 26 ft. 4 in. in width, used for unloading the freight. The station includes a waiting room about 22 ft. by 15 ft., ticket offices, etc., about 12 ft. by 22 ft. and a freight room about 33 ft. by 22 ft. When the traffic at such a station increases sufficiently it is changed to a type "C" station by extending the freight room and devoting a part of it to the baggage room. The freight room in a type "C" station is 66 ft. in length and the baggage room is 15 ft. in length. The other portions of the stations, the waiting room and ticket office, are the same as in the smaller station.



Oregon Electric Railway—Passenger Station at Albany


Future Industry Track
Future Passing Track
Warehouses
Gravel Walk
Driveway
Depot
100'
48
100'
150'
Electric Ry. Journal

Oregon Electric Railway—Plan of Typical Way Station Grounds, Showing Freight Sidings and Warehouses


18'
9'
9'
Seat
Concrete Floor
Baggage
7'x 8'3"
Concrete Floor
Smelter
7'x 8'3"
Seat
Seat
Seat
Seat
5'3"
7'6"
5'3"
4'
8'
Concrete
Plan
Electric Ry. Journal
Eave and Platform Line
Metal Shingles
3'
3'
Light
2" Stuff
8" x 8"
2" x 8"
24" x 22"
1"
1" x 8" Unsurfaced No.1 Boards
End Elevation
Shiplap and Paper
1" x 8"
2 x 4-16 C.C.
Yd. Ceiling
6" Yd. Rustic Sanded
Bolt
Not less than 4" Concrete mixed 1:3:5
Slope Concrete for Drainage
Top of Rail
Heavy Chicken Wire

Oregon Electric Railway—Plan, End Elevation and Wall Section of Standard Shelter Station

TURNOUTS AND STOREHOUSES

The right-of-way of the Oregon Electric Railway is wide enough for a double track throughout its entire length, and although the line is now single track from Garden Home south, all turnouts are constructed so that the second track can be used as a part of a double track later. Each turnout is 2000 ft. in length, and ultimately the company expects to have one every 4 miles. In most cases the turnout is located at a station, and a typical layout of this kind is illustrated on this page. At the east end of the station a branch freight house track leaves the main track, and after passing behind the station has a double end connection, one connection leading back of the main line and the other paralleling the main line for a distance of 800 ft. or 900 ft., passing in front of a series of warehouses. The sites of these warehouses are leased to local shippers for a nominal sum so that on them the shippers may erect their own warehouses. On the opposite side of the standard turnout is room for two other passing or industry tracks.

TRACK CONSTRUCTION

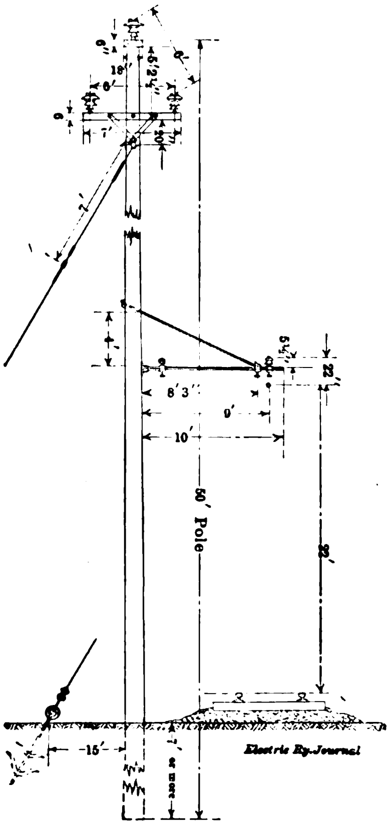
All interurban track is laid with 75-lb. rail on 7-in. x 9-in. x 8-ft. ties, spaced eighteen to twenty ties to a 30-ft. rail. In paved streets the company uses a 6-in. T-rail mounted on a ballast of thick gravel or crushed rock and with concrete between the ties. A vitrified paving brick is used between the rails. This construction costs $7.25 per foot of single track, including the rail. On the greater part of the line welded rail bonds of the American Electric Railway Improvement Company are used and were attached with a bonding car. Under certain circumstances, in city streets, the compressed bonds of the American Steel & Wire Company are employed.

OVERHEAD CONSTRUCTION

The overhead construction is of single catenary type with hangers spaced 25 ft. apart on tangents and 22 ft. apart on curves. The hangers are of a special type made by the Ohio Brass Company, with 3-in. loops at the top and mechanical clips designed to hold the No. 0000 trolley. They were described in the ELECTRIC RAILWAY JOURNAL for Sept. 21, 1912, page 460. The pull-off, which was supplied by the Ohio Brass Company, is also of a novel type because it is not attached directly over the hanger but has a bridle which surrounds the hanger so that the latter can rise and fall and have the same freedom of movement as on straight track. This pull-off is illustrated. The messenger is ⅝ in. extra-strength steel. The feeders used south of Salem are of aluminum, with a 300,000-circ. mil section. All dispatching is by telephone, and the company has an independent telephone line with Gill selectors.

BLOCK SIGNALS

Between Portland and Garden Home the railway is equipped with the General Railway Signal Company's continuous track circuit block signal system covering 7 miles of single track. This system will be altered for double-track use when the second track between Portland and Garden Home, on which work is now being conducted, is completed. At present there are twenty-two of the company's Model 2A semaphore signals operating three-position in the upper left-hand quadrant. Energy for the signal system is transmitted at 2200 volts, single-phase, 60 cycles, then is stepped down to 110 volts for signal operation and to 2 volts to 6 volts for the track circuits.



Section of Standard Overhead Line

SERVICE

The company operates twenty trains each way between Portland and Garden Home, a distance of 8 miles; ten trains each way between Portland and Salem, a distance of 50 miles; seven trains each way between Portland and Albany, a distance of 77 miles, and five trains each way between Portland and Eugene, a distance of 122 miles. It also runs nine trains each way daily between Portland and Forest Grove, a distance of 27 miles. The fare charged is 3 cents a mile, with no reduction in price for a return ticket unless used the same day. The company, however, sells sixty-ride commutation tickets for 1½ cents a mile and 1000-mile books for $25. Week-end excursion tickets are also sold at reduced rates.

Oregon Electric Railway—Typical Shelter Station

Two trains each way daily between Portland and Eugene are called limited trains, and each makes the run of 122 miles in four hours. These trains are usually made up of two motor cars and one observation parlor car, on which an extra fare is charged and on which there is buffet dining service.

There is also a night passenger train each way made up of one day coach and one sleeping car. These sleeping cars were described in the ELECTRIC RAILWAY JOURNAL for Jan. 18, 1913. The usual local train is made up of a combination baggage and passenger car and a standard coach, both motor cars.

Oregon Electric Railway—Standard Freight House

The following are the dimensions of the standard cars of the company:

COMBINATION SMOKING AND BAGGAGE CARS

Length over buffers	57 ft. 11¾ in.
Width over side sills	9 ft. 0 in.
Width over sheathing	9 ft. 1½ in.
Length baggage compartment, inside	17 ft. 10¾ in.
Length smoking compartment, inside	19 ft. 7⅛ in.
Seating capacity	38
Weight, fully equipped	94,000 lb.
Motors	two GE-73 and two GE-205, 75-hp
Trucks	Baldwin 78-30

COMBINATION PASSENGER, SMOKING AND BAGGAGE CARS

Length over buffers	57 ft. 11¾ in.
Width over side sills	9 ft. 0 in.
Width over sheathing	9 ft. 1½ in.
Length baggage compartment	7 ft. 10¾ in.
Length smoking compartment	19 ft. 0 in.
Length passenger compartment	19 ft. 6 in.
Seating capacity	54
Weight, fully equipped	93,000 lb.
Motors	two GE-73 and two GE-205, 75-hp
Trucks	Baldwin 78-30

PASSENGER COACHES

Length over buffers	58 ft. 4½ in.
Width over side sills	9 ft. 0 in.
Width over sheathing	9 ft. 1½ in.
Length inside	46 ft. 6½ in.
Seating capacity	62
Weight fully equipped	84,000 lb.
Motors	two GE-73 and two GE-205, 75-hp
Trucks	Baldwin 78 30

The company has also six electric locomotives, two of 50 tons capacity and four of 60 tons capacity. The former are equipped with four GE-207 motors and each of the latter with GE-212-G motors.

POWER

At present the company purchases power from the Portland Railway, Light & Power Company, but it is planning to develop hydraulic power in the McKenzie River at Clear Lake, where from 25,000 kw to 40,000 kw will be available. The company will erect here this spring a temporary dam to determine whether the surrounding soil, which is of recent lava origin, will hold the water. This test will show the proper height of the dam to be erected at this point. After this is determined, the company will be able to locate the elevation of the conduit which will lead the water at Clear Lake to the forebay above the power station. The conduit will be lined with concrete 28,000 ft. in length and will have a finished area of 68 sq. ft. and a grade of 7½ ft. to the mile. The head at the power house will be 970 ft. The penstock lines between the forebay and the power house will be carried in a solid rock tunnel, steel-lined, and the power station itself will be of concrete. The storage facilities to be provided at Clear Lake will permit the development of 60,000 hp for such times as are necessary to care for normal loads. Transmission to Salem, where this transmission line will connect with the present high-tension lines, will be at 60,000 volts.

MEETING OF THE RAILWAY SIGNAL ASSOCIATION

A meeting of the Railway Signal Association was held in New York City June 11-12, 1913. The program included the presentation of reports of a number of committees, which generally took the form of specifications for signaling apparatus and accessories and for methods of construction.

The committee on automatic block signals reported that it had spent considerable time on experiments and study to find a practical and simple method for testing the iron used in magnetic circuits but that it had so far been unsuccessful in arriving at any definite conclusion. The committee also reported that it had continued its investigation of the causes and remedies for the sweating of relays. While nothing definite had been determined, the investigation indicated that ventilated relays would sweat less than non-ventilated relays and that, in consequence, relay boxes should be ventilated. Relays in wooden boxes or in iron boxes with wood lining having an air space between the iron and wood appeared to sweat less than relays in plain iron boxes or in signal mechanism cases. In the opinion of the committee openings from relay boxes to ground should be sealed.

The committee on manual block signals made a report which stated as additional information on manual blocks that the plain manual block was the most flexible system, providing the easiest method for cutting offices in and out and being the cheapest to install and maintain, but it did not protect itself against open switches, broken rails or cars which were outside of clearance points. With regard to the controlled manual block, the report stated that it was more expensive to install and maintain than the manual block and that it did not in itself protect against open switches, broken rails or cars outside clearance points. It provided, however, a mechanical check to secure co-operation between operators before the "proceed" indication was displayed. With regard to the staff system, the report stated that it did not in itself protect against broken rails but did provide facilities for movements of trains without written orders, giving a continuous indication to the operator and to the train regarding the condition of the block. The report of this committee included also a statement of the costs of various installations of manual block signals without track circuit control.

The report of the committee on electric railways and alternating-current signaling included recommendations for revisions of the specifications and requisites for apparatus and material for an alternating-current automatic block signal system for railways which used alternating propulsion current. The committee also submitted complete specifications for core-type impedance bonds for both alternating and direct-current propulsion and for single-phase track transformers for 250 volts or less. Additions to the existing specifications for apparatus and material for alternating-current automatic block systems were also recommended, together with complete specifications for slate switchboards and equipment for alternating-current signal systems.

Two papers were presented at the meeting by J. E. Saunders, assistant signal engineer Delaware, Lackawanna & Western Railway, as matters of information. They were entitled "Selection of Motor Generators for Use as Frequency Converters" and "Twenty-five-cycle Versus Sixty-cycle Power for Railway Signals." In the former paper the author spoke of the necessity for the purchase by steam railroads of current from local power companies. As this was generally at sixty-cycle frequency, it was necessary to convert it from sixty to twenty-five cycles for use with the signal system, and the only satisfactory frequency changer was, he said, the motor generator. As the complication of synchronous motors practically compelled the use of induction motors, the lack of exactly suitable motor speeds involved considerable variation from twenty-five cycles in the frequency of current which was delivered. The author presented tables showing the frequencies obtained by motors with different numbers of poles and recommended that where practicable fourteen-pole motors be used. When this was impossible the use of a ten-pole motor was recommended.

In the comparison of twenty-five-cycle and sixty-cycle power for railway signaling Mr. Saunders submitted figures to show that the ultimate length of transmission for a 10 per cent drop in a 4400-volt three-phase line with No. 6 copper wires 2 ft. apart would be 65 miles for twenty-five cycles and 45 miles for sixty cycles. For double-track signaling with one-mile blocks the maximum power required at the generator would be for a 65-mile line at twenty-five cycles, 11.37 kw. with a power factor of 0.728. For 45 miles of sixty-cycle signaling 14.28 kw would be used with a power factor of 0.629. This indicated the desirability of twenty-five-cycle current from the standpoint of both transmission distance and power consumption. The author presented a list of the few cases where twenty-five-cycle signaling could not be used to advantage and gave the reasons in each case.

Papers and Discussions at the N. E. L. A. Convention

A Continuation of the Abstracts of Papers and Discussions of Railway Interest at the National Electric Light Convention in Chicago Last Week

Abstracts of a number of the papers and reports presented at the N. E. L. A. convention in Chicago last week were published in the issue of June 7. Abstracts of other papers and reports of electric railway interest follow:

PUBLIC POLICY

The report of the public policy committee, signed by Arthur Williams, as chairman, and by N. F. Brady, Everett W. Burdett, H. M. Byllesby, Henry L. Doherty, Charles L. Edgar, W. W. Freeman, George H. Harries, Samuel Insull, Joseph B. McCall, Thomas E. Murray, Samuel Scovill, Charles A. Stone and Frank M. Tait, ex officio, is in itself compact, but added to it are appendices relating to: (1) the service annuity plan of the Edison Electric Illuminating Company of Boston, (2) welfare work of the Public Service Corporation of New Jersey, (3) decision of the Supreme Judicial Court of Massachusetts in the case of the Fall River Gas Works Company versus the Board of Gas and Electric Light Commissioners, and (4) the decision of the Railroad Commission of Wisconsin in relation to electric-service rates in Milwaukee.

The committee believes that where a given territory is occupied by an electrical corporation rendering good service at fair prices, treating its employees fairly and otherwise holding itself in alignment with the public interest, it should be protected against "raiding" or destructive competition. The natural and proper tendency of the industry is toward a regulated monopoly. One of the advantages to be gained is a unified system of enhanced capacity, which as a result is capable of rendering better and cheaper service. Anything which seeks to disturb this condition is not in the interest of the public, either that part served by the corporation or that holding its securities.

So far as the committee can learn, the plan for minimum wage has been carried out without complications or labor disturbance or seriously objectionable increase in the cost of manufacture. The results seem to have been beneficial and the committee repeats that the industry must suffer if its employees are inadequately compensated. It urges the care of employees as a definite responsibility and says that nothing to insure a healthy, contented and well-trained human organization in a public utility industry should be left undone.

Prevention rather than cure should be the attitude of the industry toward questions of safety and sanitation. Accidents entail loss upon the public as well as upon the company and its employees, and in the end the public pays the cost of all industrial accidents. In relation to sanitation, the committee points out the importance of providing pure drinking water at a proper temperature. This is spoken of as an economic necessity. A note of warning is sounded in relation to the methods followed by some of the casualty corporations in adjusting claims of injured employees. It is urged that members using this insurance shall themselves see to it that their employees receive fair treatment.

Under the head of "Important Commission and Court Decisions" the committee lists the recent commission decision in New Jersey in relation to the rates of the Public Service Gas Company; the New York Second District Commission's decision in the matter of complaint of the city of Buffalo against the Buffalo central station companies, reducing rates from 25 to 28 per cent; the decision of the First District Commission of New York reducing gas rates of the Kings County Lighting Company (in this case the Appellate Court has reversed the order of the commission); the Des Moines gas case; the decision of the Maryland Public Service Commission reducing rates of the Baltimore company, and, one of the most important, the decision of the Supreme Judicial Court of Massachusetts in the case of the Fall River Gas Works Company against the Board of Gas and Electric Light Commissioners. This last decision is reproduced in full in the appendix. A decision of the Wisconsin commission in relation to electric rates in Milwaukee is reproduced practically in full in the appendix.

The committee refers to the joint meeting held with the same committee of the American Electric Railway Association and appreciatively mentions the services in this connection of General Harries and Thomas N. McCarter.

A renewal of the tendency toward municipal ownership and operation of public utilities seems imminent, in the judgment of the committee. The Socialist party is making special efforts in this direction, and where members are threatened with competition of this character they are urged to get in immediate touch with the officers of the association. The committee commends the recent movement which has resulted in the organization of commercial educational courses and in summing up calls attention to the serious state of public unrest here and abroad. Much good, it says, will be accomplished in continuing the policy of the past of approaching these problems in a spirit of earnest interest, fair play, good will and sincere regard for those associated with the central staiton interests in the conduct of the industry.

RESUSCITATION FROM ELECTRIC SHOCK

The report of the commission on resuscitation from electric shock, presented by Past-president W. C. L. Eglin, reviewed exhaustively the work of the commission, with a discussion of the relative merits of the Silvester and Schaefer manual methods of artificial respiration. An important feature of the report was a critical analysis of the claims made for the pulmotor as an efficient mechanism for reviving unconscious subjects and an outline of the mechanical method of artificial respiration by pharyngeal insufflation as developed by Dr. S. J. Meltzer, head of the department of physiology and pharmacology in the Rockefeller Institute for Medical Research.

The commission concedes that the Schaefer method is superior to the Silvester through its greater simplicity and ease of performance, absence of trouble from the tongue falling back and blocking the air passages and reduced danger of injuring the liver or breaking the ribs in the application of pressure. Observations indicate that, so far as the amount of ventilation of the lungs is concerned, the Schaefer method, reinforced by the extension of the arms forward, is decidedly better than that suggested by Silvester. This advantage, taken in conjunction with its greater simplicity and safety, caused the commission to vote unanimously in favor of the prone-pressure method of artificial respiration as an effective means of giving immediate aid. Reference was made to the commission's booklet on resuscitation, which has been prepared as the outcome of the work.

Even a relatively poor method of artificial respiration, if begun immediately, may maintain life and permit ultimate recovery in cases in which an ideal method, with all the resources of the laboratory and hospital, would be ineffective after a few minutes. In order to test the action of devices now being advocated, a sub-committee, with Dr. Meltzer as chairman, was appointed. The apparatus examined was used according to directions, and the effects were demonstrated before the members of the committee. At leat four machines for performing artificial respiration are now in the market—the pulmotor, the Du Brat apparatus, the "lungmotor" and the "salvator." The last two devices were not examined. The apparatus of Du Brat seems never to have become a successful commercial article. The committee emphasizes the wide publicity which the pulmotor has received through the daily press, but points out at length that the pulmotor has lacked scientific, surgical and medical sponsors. Efforts to obtain scientific details and other reliable information bearing upon specific cases in which the pulmotor has been used lead to the conclusion that the cases available to the committee do not furnish convincing proof of the necessity or exceptional value of this apparatus. The committee agrees that the instrument is probably capable of creditable performances and doubtless has in some instances favored the restoration of normal breathing. Its present vogue, however, is not supported by a critical examination of the principles involved in its mechanism or of its effect when used for long periods. No well-considered testimony as to its action is to be found in medical literature, and in this country at least its loudest sponsors are the newspapers, which have spread the impression that the pulmotor is a perfect resource when inspiration is suspended. In view of the facts obtained by study of the Du Brat apparatus and the pulmotor, the members of the sub-committee agreed upon the following suggestions: In cases without any respiration the pulmotor should be used only when guided by hand and then not faster than twelve to fifteen complete respirations per minute; when left to run automatically it is liable to be ineffective and dangerously deceptive. Because of suction on the lungs neither the pulmotor nor the Du Brat should be used more than five or six minutes at a time. If nothing better is available one of them should be alternated with the Schaefer method combined with oxygen inhalation. In cases of slow and stertorous breathing, however, both machines can probably be used for a longer time with benefit and without danger.

The remainder of the report describes the mechanical method of artificial respiration used by Dr. Meltzer, based on pharyngeal insufflation. The apparatus which Dr. Meltzer has devised has the following commendable features: (1) Its positive action is determined by the operator and not left to a mechanism which may fail to work; (2) it is free from a sucking action during expiration, as the latter results from the natural recoil of the disturbed parts; (3) it is light; (4) it is relatively inexpensive; (5) it is simple, and (6) it embodies in a form which can be used by laymen a method of artificial respiration which has been employed for many years in scores of laboratories and on thousands of animals and is known to be effective and free from danger. The commission recommends this apparatus as a satisfactory means of continuing artificial respiration and suggests that in cases of suspended breathing the modified prone-pressure method be supplemented as soon as possible by the use of the apparatus.

ELECTRICITY ON THE FARM

The committee for the Eastern States on electricity on the farm submitted an interesting account of the possibilities and progress made in the rural districts in the East. It was stated that of the Eastern States, New York, New Jersey and Connecticut, on account of their population density, are conceded to offer the most promising field for exploiting electricity in the rural districts. The installations on the farms themselves should be rugged, and in this connection the polyphase induction motor is thought to offer the best solution of the problem, because it is low in first cost and gives comparatively little trouble in operation. Technical efficiency should be considered as secondary to convenience, reliability and low cost. The value of the farm district load to the central station was considered, and an instance was cited where a Western plant, now serving a farming community, had been able to transfer its period of maximum demand from the winter to the summer months. The sub-committee for the Central States of the committee on electricity on the farm made a less optimistic report. It believed that some reason other than the farming business must be found for extending lines across the country and the farm business must be considered as a by-product. Other industries in the rural districts which deserve attention are irrigation and drainage projects, coal mines, stone quarries, brick and tile works and cement plants. The data gathered by the committee show that in each of these industries lies an opportunity for an installation of 300 kw or more. In spite of the various means which have been resorted to in order that a part of the investment cost may be shifted from the central station to the users, it is the opinion of the committee for the Central States that the farming business as developed at present does not furnish returns commensurate with the capital investment.

PROGRESS TOWARD UNIFORM ACCOUNTING

The committee on uniform accounting, of which Mr. E. J. Bowers, of the Kansas City (Mo.) Electric Light Company, was chairman, reported that during the past year it had appointed sub-committees on public service relations, uniform classification of accounts, and statistics and forms. The latter committee will make a collection of forms now in use in the industry arranged according to population of towns. It was stated further that some attention had been given during the year to an attempt to co-operate with the various public service commissions in an effort to secure standardized forms that would be of most service both to government and to the companies. Still another line in which progress has been made during the year was explained in the report, where details were given of a meeting held in Chicago in February, 1913, at which it was decided to include in the report for 1913 a complete index by topics of all the papers that have been read on accounting matters before the association. The topic heads chosen were general accounting matters, depreciation, purchasing and stores, work-order systems, meters and meter records, customers' accounts, collections, statistical, and miscellaneous, and in pursuance of this policy the report closed with abstracts of these papers.

In the discussion H. M. Edwards, New York, said that the report of the sub-committee on a tentative classification of accounts was superior to any forms so far promulgated by the public service commissions in this country. A. S. Scott, Chicago, said that the system could not be applied to hydroelectric and transmission business without several amplifications. Copies of the uniform system of accounting were distributed at the end of the session in order that suggestions or changes might be recommended.

PRIME MOVERS

W. L. Abbott, Commonwealth Edison Company, Chicago, opened the discussion on the report submitted by the committee on prime movers through I. E. Moultrop, chairman, as abstracted on page 1012 of the ELECTRIC RAILWAY JOURNAL for June 7, 1913. He called attention to the recent order of a 30,000-kw steam turbine for the company's service as evidencing the rapid progress of the art even in the brief interval since the prime movers committee report was prepared about three months before.

I. E. Moultrop, Boston, closed the consideration of this paper by reading a letter from the General Electric Company which stated that the breaking of the turbine diaphragm nozzles mentioned in the report was not due to their having been cast in solid with the diaphragms, but to the fact that 30 per cent nickel steel was used in the partitions, instead of 3½ per cent nickel steel. Where the cast-in nozzle type of machine was used the smaller percentage of nickel was desirable for the partitions. A removable nozzle had been developed for some of this manufacturer's turbines, and in replacing broken nozzle diaphragms, the removable-nozzle feature had been applied where the customer considered that this feature was worth the additional price.

ELECTRICAL APPARATUS

The discussion on the report of the committee on electrical apparatus, submitted by L. L. Elden, chairman, and abstracted on page 1012 of the ELECTRIC RAILWAY JOURNAL for June 7, was opened by R. F. Schuchardt, Chicago, who said that the 30,000-kw generator for the Commonwealth Edison Company would operate at 1500 r.p.m., delivering energy at 9000 volts without auto-transformers. About half the reactance was in the machine itself and half in external coils, an arrangement which tended to increase the efficiency about two-thirds of 1 per cent. In the near future the limit of generating capacity per section of the Chicago central-station system will probably be raised from 60,000 kw to 100,000 kw. Regarding noise in substations, Mr. Schuchardt cited the replacement of a frequency changer with transformers as an effective measure. He also mentioned the tendency to supply an exciter on the generator shaft in large units for central station service. Philip Torchio, New York, favored the use of external reactance coils in connection with large turbo units. The bus tie reactances mentioned in the report should have the full carrying capacity of the switch between bus sections. Reactances beween parallel operating stations are as important as between bus sections.

SWITCHBOARD INSTRUMENTS

The discussion on Paul MacGrahan's paper on "Switchboard Instruments," as abstracted on page 1013 of the ELECTRIC RAILWAY JOURNAL for June 7, turned upon the greater reliability of the induction-type, permanent-magnet form of relay as compared with the solenoid-type, bellows-equipped apparatus. C. P. Osborne, of the Portland, (Ore.) Railway & Light Company, emphasized the great need of more reliable relays for the protection of alternating-current circuits. B. H. Smith, of Pittsburgh, and the author, in closing, defended the repuation of the inductive type of relay as capable of meeting a wide range of service demands.

HIGH-TENSION D.C. TRANSMISSION

A general discussion on high-tension d. c. transmission followed the report of the committee on progress which was submitted by T. C. Martin. Dr. C. P. Steinmetz, Schenectady, N. Y., discussed the economic aspects of such transmission, compared with three-phase. He said he had had no opportunity to go over the details of the Trollhättan Falls (Sweden) proposed high-voltage d. c. submarine transmission, but the investigation of many transmission projects elsewhere had never disclosed to him a single instance where direct current was the proper solution of the problem. The choice was largely an economic question. Where it was necessary to cross the ocean bed in a very long and high-pressure transmission it might in some cases be desirable to use direct current. One would get inductive line disturbances from lightning regardless of the character of current used. Direct-current generators were less economical and flexible, and experience favors three-phase, high-tension transmissions. E. A. Lof, Schenectady, N. Y., stated that high-voltage d. c. transmission was less desirable from the operating standpoint. Its selection for the Trollhättan-Copenhagen scheme was largely due to the inability of manufacturers to offer submarine cables one and a half years ago good for over 90,000-volt service. Arthur Wright, London, England, and F. B. H. Paine, Buffalo, N. Y., closed the discussion, the former bringing out the absurdity of considering machines as small as 1500-kw rating for large transmission work. This was about the limit of successful commutation, and it formed a fatal objection to high-tension d. c. transmission.

SUSPENSION INSULATOR DESIGN

A. O. Austin's paper on suspension insulator design, abstracted on page 1014 of the ELECTRIC RAILWAY JOURNAL for June 7, was discussed by Prof. E. E. F. Creighton, who briefly outlined the creepage effects in a three-petticoat insulator accompanying frequency increases. L. C. Nicholson, of Buffalo, said that a greater factor of safety was obtained by placing the insulator disks as closely together as possible. The problem was largely a function of the ratio of dielectric puncture to dry flash-over between terminals. Tests conducted by the speaker indicated that increased mechanical strains tended to hasten electrical failures, although in practically no case had a disk failed immediately after passing the flash-over voltage. The action appeared to be molecular in character. The same percentage of failure was obtained after as during the imposition of a mechanical strain. In closing the discussion the author said that the effect of combined electrical and mechanical stresses was serious with slight flows under mechanical loads.

POLES AND POLE PRESERVATION

Russel A. Griffin's paper on "Poles and Pole Preservation," briefly noted on page 1013 of the ELECTRIC RAILWAY JOURNAL for June 7, led to several questions, in reply to which the author said that the imported carbolineums were giving excellent service, particularly in cold applications. Any of the coal-tar creosotes passing the association's specifications, whether of domestic or foreign make, could be used sucessfully. With the brush treatment it was necessary merely to treat 2 ft. above and 2 ft. below the ground line. On any 30-ft. pole two coats of oil, requiring about 0.5 gal., or 4 lb., of oil were sufficient for this treatment. The inner bark should always be taken off in applying a preservative process.

DISTRIBUTION PROBLEMS

The report of the committee on distribution problems, presented by P. M. Downing and abstracted on page 1013 in the ELECTRIC RAILWAY JOURNAL for June 7, was discussed by F. G. Hamilton, Visalia, Cal., who said that in the San Joaquin Valley the distributing pole line had a spacing of from 300 ft. to 400 ft. Poles 30 ft. long were used on the shorter spans and 35-ft. and 40-ft. poles were employed on the larger ones. At highway crossings the poles were 5 ft. higher than elsewhere. In closing the discussion, L. A. McArthur, of the Pacific Power & Light Company, Portland, Ore., pointed out that 30-ft. poles were too short for Oregon and Washington conditions, where the alfalfa stackers were liable to hit the lines if the farmers were careless.

CIRCUIT BREAKERS AND LIGHTNING ARRESTERS

J. N. Mahoney's paper on "Circuit Breakers and Lightning Arresters," abstracted on page 1014 of the ELECTRIC RAILWAY JOURNAL for June 7, led to several inquiries, to which Mr. Mahoney replied that additional protection against lightning was being secured in oil switches by placing porcelain barriers between the terminals and by installing porcelain tubes over the terminals. The reactance type of breaker, in which a fairly heavy inductance is cut into the circuit for a few cycles prior to the final circuit opening, rendered possible an equalization of conditions in the adjacent line with little danger of surges.

DISCUSSION ON ACCOUNTING PAPERS

The discussion on the paper on "An Accounting School for Employees," published in abstract last week, centered upon the success which the New York Edison Company has had with its accounting school. Members representing smaller cities were anxious to know how such an educational bureau could be conducted by smaller companies. F. A. Birch, Philadelphia, said that it was only when "friendly rivalry and competition" was incited that employees were willing to take advantage of an educational bureau. It was suggested and heartily supported that the employees be allowed to study during work hours and that certain prizes be offered for the best scholarship. F. L. Riordan, St. Louis, believed that such a school should be conducted to develop the average employee rather than to weed out the "laggards." Another suggestion was that the employees be educated as to the company's policy.

In the discussion of the paper on freight bills by A. S. Scott, of the Public Service Company of Northern Illinois, F. Heydecke, Newark, N. J., told of the work of the National Freight Tariff Bureau, which handles freight bills throughout the country, auditing them for a nominal charge of about 1 cent each. Provisions were made for rebating overcharges. E. C. Scobell, Rochester, N. Y., said that in his case the carting company rendered the bill for freight charges with its carting charge.

In the discussion on depreciation, A. L. Holme, New York, explained the use of separate accounts in charging up poles, lines and service runs. If salvage should be credited to depreciation, in cases where a certain salvage is received f. o. b., the amount paid for freight would actually be lost. He said that the New York practice was to charge replacement to depreciation, except where betterment was involved. C. E. Brenton, St. Louis, said that the labor of removing and installing services was kept under a single account by the Union Electric Company, but not as a construction charge. By means of the unit system used the cost of installing could be easily ascertained.

In the discussion of the paper on handling of bond coupons W. H. Winslow, Superior, Wis., said that he used a book with heavy manila leaves on which were numbers corresponding to the bonds and coupons. As the coupons were turned in they were pasted in this book, overlapping each other but showing the bond and coupon number.

ILLINOIS RAILROAD COMMISSION HEARING ON CLEARANCES

On June 3 the Illinois Railroad & Warehouse Commission held a hearing on clearances at Springfield, Ill., at which all the interurban roads in the State were requested to appear. The engineers of the commission have inspected the various interurban properties in the State with a view of arriving at some limiting dimensions on side and overhead clearances. It is proposed to fix these limits under three classifications, namely, roads handling passengers only, those operating passenger and freight trains not to exceed ten cars in length, and those handling passenger and freight traffic in trains exceeding ten cars. Tentative clearance diagrams were submitted to the representatives of the interurban roads, with a request that each offer its objections. The commission stated that if it did adopt a set of clearance diagrams giving side and vertical clearance limits the ruling would not be retroactive but would govern all future construction. Representatives of twelve of the principal interurban lines in the State were present at the hearings, and each offered his criticisms to the proposed clearance limits. In reply to a question as to why electric roads should not conform to the steam road practice of giving 22 ft. clear headroom in subways, C. F. Handshy, general superintendent Illinois Traction System, stated that with modern rolling stock equipped with automatic aid and M. C. B. couplers there was no reason why a trainman should be required to ride on the top of the car.

MILEAGE OF APPROVED ELECTRIFICATIONS

In the table of lines approved for electrification published in the article on "Electrification Progress in the United States," in the issue of June 7, omission was made of the approved Providence-Boston single-phase electrification of the New York, New Haven & Hartford Railroad. As this is estimated at 216 miles, the total mileage of lines approved for electrification should be approximately 1465 miles instead of 1249 miles. Reference to this future construction of the New Haven company was made in the text although not added to the table.

MEETING OF THE COMMITTEE ON POWER DISTRIBUTION

The last meeting to be held before the convention by the committee on power distribution of the American Electric Railway Engineering Association took place in New York on June 5 to 8 inclusive. At the meeting were present G. W. Palmer, Jr., electrical engineer Bay State Street Railway Company, chairman; Charles R. Harte, assistant engineer Connecticut Company; Gaylord Thompson, vice-president New Jersey & Pennsylvania Traction Company; Edward Heydon, superintendent overhead construction Indianapolis Traction & Terminal Company, and R. H. Rice, electrical engineer Board of Supervising Engineers, Chicago.

At the session on Thursday it was decided by the committee to recommend that line crossings of all types should be considered by one body.

The report of the sub-committee on poles was then presented. The sub-committee, which consisted of Messrs. Rice, Thompson and Heydon, had prepared a remarkably comprehensive statement upon the design, construction and use of wood, tubular steel and reinforced concrete poles, including recommendations which harmonized so far as possible with the standards of the National Electric Light Association, the American Telephone & Telegraph Company and the Western Union Telegraph Company. As a part of the report tables were submitted showing the details of design and the weights of steel and concrete poles for all conditions of service, including formulas for obtaining dimensions, reinforcement and deflections for the concrete poles. Formulas for the computation of horizontal pull of span wire construction upon trolley poles for both single and double track were also submitted, together with a table showing sags, temperature strains, etc. The discussion on this report occupied the remainder of the session on Thursday.

On Friday the committee took up the matter of revision of the specifications for rubber-insulated conductors and cables which had been in the hands of a sub-committee composed of Messrs. Rice, Thompson and Salber. The scope of these specifications covered the furnishing and testing of all kinds of rubber-insulated conductors and cables used for railway power purposes at not more than 2500 volts tension and provided for two grades of insulation. As the specifications were discussed by the committee in most minute detail, not only from the standpoints of technical accuracy and practicability but also with regard to clarity and conciseness of expression, the entire day, including an evening session, was devoted to consideration of the subject.

On Saturday the proposed revision of the specifications for copper trolley wire was discussed.

The preparation of specifications for standard 600-volt overhead construction had been assigned to a sub-committee composed of Messrs. Harte, Heydon and Cadle. The sub-committee prepared this specification in accordance with what was considered the best of the practices adopted as standard by the greatest number of member companies so as to avoid so far as possible changes from the forms of construction which were generally used at the present time. The sub-committee had also taken under consideration the matter of harmonizing the different designs for the various pieces of overhead equipment as furnished by the manufacturers so that complete interchangeability of the different parts would be assured even when coming from different makers. After the discussion of this report, which extended over Saturday and Sunday, the committee approved the report of the sub-committee for recommendation to the convention and the meeting adjourned.

Electric Railway Costs

The Author Suggests that All Power Costs Be Entirely Separated from Transportation Expenses and Presents Actual Operating Results from Three Railways in This Manner, Including in a Final Figure the Cost per Unit of Power Delivered at the Train to Facilitate Comparisons Between the Different Electrical Systems

BY JOHN B. SPARKS, LONDON

With the remarkable spread of railway electrification and the consequent growth of operating statistics, it is essential that some standard form of accounts shall be adopted which will not only enable the results obtained on different railways to be readily compared but will also facilitate comparison with steam operation. In a suggestive article in the ELECTRIC RAILWAY JOURNAL of May 3, 1913, entitled "Accounting Versus Statistics," Milan V. Ayres drew attention to the confusion, in electric railway returns, of the power supply and traction equipment costs and pointed out that the power supply portion of an electric railway undertaking is an enterprise entirely distinct from the operation of the railway. The recent papers read before the American Institute of Electrical Engineers by Messrs. Hobart and Kahler further emphasize the necessity of this distinction, which becomes essential when comparisons are to be made with a railway purchasing its power from an independent undertaking, or between steam and electric propositions.

The object of the present article is to suggest a still more rigid distinction between the power supply and transportation expenses in statistics intended for comparative purposes. It is proposed to determine for each railway the final cost per unit of the power delivered at the locomotive or motor car, thus embodying in this one figure the capital and operating charges of power station, transmission lines, substations, distribution, third-rail or overhead trolley and track bonding. This will dispose entirely, for purposes of cost comparison, of the whole of the expense incidental to the electrical system with the exception of the interest and maintenance costs of the rolling stock, which rightly come under transportation expenses, and will give a clear indication of the relative economy. Further, when making comparisons with steam operation, this final cost per unit of power will correspond with the fuel cost per ton, and thus afford a mode of comparison which will strongly appeal to steam railroad engineers.

Table I shows how the capital and operating charges in respect of the power system may be set out in detail and in logical sequence so as to show at a glance the effect of each link in the system on the final cost per unit. This method of analysis was first proposed by the writer in an article in the *Times Engineering Supplement*, London, March 6, 1912, and the results here given for the Central London Railway and for the West Jersey & Seashore Railway were included in that article. The writer is indebted to Dr. H. F. Parshall, then chairman of the Central London Railway, for permission to analyze and publish the capital and operating costs of that railway and for many valuable suggestions. The results for the Hamburg-Altona railway were kindly furnished by Dr. H. Alexander of the Allgemeine Elektricitäts Gesellschaft of Berlin, with the special permission of the German State railway authorities, as a result of the writer's request for comparative single-phase costs. It should be mentioned that in the case of the Central London Railway the figures given refer only to the plant and the energy used for the trains and do not include anything in connection with the working of the lifts or station lighting.

It will be noticed that the unit costs in Table I are expressed in terms of the electrical units handled so as to show the true cost of the energy at any point in the system. For similar railways equipped with the single-phase and direct-current systems the figures show clearly the relative economy of the two systems in any part.

Other useful statistical figures, such as the cost per kilowatt of plant installed at power station and substations, cost per mile of transmission lines and cost per mile of third-rail or catenary construction, are included. The effect of the comparatively higher cost and lower efficiency of the converter substations of the direct-current system as compared with the transformer substations of the single-phase system is clearly brought out. This is partly balanced, in the final figure, by the higher cost of the track equipment of the single-phase system, which should include the cost of return feeders, transformer boosters and any expenses due to alterations to telegraph and telephone circuits. In the case of single-phase railways in densely populated areas these last items enormously increase the cost of track equipment and seriously affect the economy of this system as compared with the direct-current system. In passing, it may be mentioned that the figure of $3,000 per mile for track equipment and bonding assumed in Mr. Kahler's estimates is much too low.

In the case of a railway purchasing power at the high-tension busbars of its substation or at the far end of its transmission line, the purchase price per unit will correspond with items T and I respectively of the table, and the final cost at the train will be determined by adding the subsequent charges as before.

The objection may be raised that the final cost per unit obtained in this manner does not include any allowance for depreciation, but the writer agrees with the author of "Accounts Versus Statistics" that depreciation ruins for statistical purposes all items into which it enters as a constituent. It should therefore be handled as a special fund, and the amount set aside for the electrical supply and distribution system should be included in the comparative statement or report as a particular deduction from income in the case of electrification. Depreciation items are, therefore, also omitted in the analysis of Mr. Kahler's estimates in Tables I and III.

Having reduced the whole financial burden of the power generation and distribution system to a figure of cost per unit at the train, it only remains to deal with the cost, operation and maintenance of the rolling stock. It has been usual, in the case of railways handling mainly passenger traffic, to express these costs in terms of the car or train miles run, but on account of the difference in seating capacity such figures are of little use for comparison. The ton-mile basis is also unsatisfactory for the same reason, and the seat-mile basis is objected to by some on account of the difference in space allowed per seated passenger on different railways. To overcome all these objections the costs are here expressed in cents per effective foot mile run. The effective foot miles run per annum are equal to the car miles run per annum multiplied by the effective length of a car in feet, the effective lengths being the length of car available for seats, excluding platforms or any lengths taken up by electrical equipment or by the motorman's cab.

Table II shows the actual costs of operating the first three railways of Table I, set out on this basis, and the effect of the different traffic conditions and different classes of equipments can readily be traced. The final figure for

TABLE I—COST OF ELECTRIC POWER DELIVERED AT THE TRAINS ON DIFFERENT RAILWAY SYSTEMS.

	DIRECT-CURRENT RAILWAYS		SINGLE-PHASE RAILWAYS	
	Suburban Line	Trunk Line	Suburban Line	Trunk Line
Railway	Central London	West Jersey & Seashore	Hamburg-Altona-Blankenese-Ohlsdorf	Unnamed railroad
	City subway. 6½ miles of double track. All passenger traffic. Third-rail. 550 volts, direct-current [Figures from Central London Railway 1910-11 records]	Trunk Railroad. 74 miles of double track. Practically all passenger traffic. Third-rail. 675 volts, direct-current [Figures from paper by B. F. Wood read before A.I.E.E. June, 1911, 1910 returns]	German Suburban Railway. 16.6 miles of route. 42 miles of single track. Overhead trolley equipment. All passenger traffic. 6,600 volts, 25-cycle, single-phase [1911 returns by Dr. H. Alexander in *Times Engineering Supplement*]	Single-track railroad, 467 miles long. Passenger and freight traffic. Overhead trolley. 11,000 volts, 15 cycles, single-phase [Figures from C. P. Kahler's paper before A.I.E.E., May, 1913]
Power station	Six 850-kw horizontal engine sets and one 2,000-kw turbine set generating at 5,000 volts, three-phase, 25 cycles. No transformers	Four 2,000-kw turbine sets generating at 6,600 volts, three-phase, 25 cycles, current transformed to 33,000 volts three-phase by twelve 700-kw transformers	Six 1,250-kw, single-phase turbo-generators. 6,600-volt, 25 cycles. One 600-kw turbo set. 6,300 volts, 50 cycles for lighting	Independent undertaking
A. Rated capacity of plant, kw	5,500	8,000	8,100	....
B. Investment, including land, buildings, etc	$859,000	$998,000	$1,008,000	....
C. Investment per kilowatt installed (B/A)	$156	$125	$124	....
D. Kw-hr. delivered per annum for traction	13,100,000	27,000,000	19,753,200	90,000,000 purchased
E. Interest on investment at 5 per cent (B × 5/100)	$42,950	$49,900	$50,400	....
F. Interest cost per kw-hr. (E/D), cents	0.328	0.185	0.256	....
G. Operating and repairs costs, including wages, rates and insurance	$96,600	$153,700	$159,300	....
H. Operating expense per kw-hr. (G/D), cents	0.737	0.569	0.806	....
I. Total cost per kw-hr. delivered (F + H), cents	1.065	0.754	1.062	(Purchase price) 0.750
Transmission line	From two to six three-conductor 5,000-volt insulated cables of various sections, supported on brackets in tunnels and protected by steel shields	Two 33,000-volt, three-phase overhead lines on separate pole lines with wooden poles. No. 1 B & S gage copper	Two 30,000-volt, single-phase overhead lines with steel poles. Each line has two conductors, 50 sq. mm. each. Part of output of power station used for traction	One 110,000-volt single-phase overhead line with steel towers
J. Total length of transmission lines, miles	5.8	60	18.2	450
K. Interest on investment in overhead lines or cables	$107,500	$241,500	$72,000	$2,250,000
L. Average investment per mile (K/J)	$18,530	$4,025	$3,960	$5,000
M. Average efficiency of line, per cent	97	96	97	96
N. Kw-hr. delivered per annum to substations (D × M)	12,700,000	25,900,000	4,120,000	86,400,000
O. Interest on investment at 5 per cent (K × 5/100)	$5,375	$12,075	$3,600	$112,500
P. Interest per kw-hr, cents	0.042	0.046	0.088	0.130
Q. Operating and repair costs	Negligible	$3,460	$720	$22,500
R. Operating expense per kw-hr. (Q/N), cents	Negligible	0.014	0.016	0.026
S. Increase in cost per kw-hr. due to loss inline (D − N) I/N	0.034	0.032	0.032	0.031
T. Total cost per kw-hr. delivered to substations (I + P + R + S)	1.141	0.846	1.198	0.937
Substations	Four substations with a total of ten 900-kw rotary converters supplying lifts, lighting and trains. Large batteries provided as reserve	Eight substations with five 2,500-kw rotary converters, one 2,000-kw, one 1,500-kw and one 1,000-kw. Load chiefly traction	One transformer substation with two 870-kw transformers	Fourteen substations with total of 56,000 kva, installed in transformers, three portable substations (6,000-kva)
a. Rated capacity of plant, kw	5,850	17,000	1,740	50,000
b. Capital cost including land, buildings, etc	$256,800	$492,000	$33,600	$712,000
c. Investment per kilowatt installed (b/a)	$44	$29	$19.3	$14.2
d. Average efficiency of substation plant, per cent	85	85	95	95
e. Kw hr. delivered per annum (N × d)	10,800,000	22,000,000	3,920,000	82,100,000
f. Interest on investment at 5 per cent (b × 5/100)	$12,840	$24,600	$1,680	$35,600
g. Interest cost per kw-hr. (f/e), cents	0.118	0.112	0.042	0.043
h. Operating and repair costs including wages	$8,740	$24,450	$1,920	$7,450
i. Operating expense per kw-hr. (h/e), cents	0.081	0.110	0.050	0.009
j. Increase in cost per kw-hr. due to substation loss (N − e) T/e, cents	0.202	0.150	0.060	0.049
k. Total cost per kw-hr. delivered (T + g + i + j), cents	1.542	1.218	1.350	1.038
l. Kw-hr. delivered per annum to contact conductor and low-tension feeders direct from power station	None	None	15,503,200	None
m. Total kw-hr. delivered to contact conductor and low-tension feeders direct from power station (e + l)	10,800,000	22,000,000	19,423,200	82,100,000
n. Average cost per kw-hr. delivered to contact conductor and low-tension feeders direct from power station, cents	1.542	1.218	1.120	1.038
Distribution to trains	Third-rail, 85 lb. yd. and feeders. Track return and negative feeders	Third-rail, 100 lb. yd. Track return. No feeders (positive or negative)	Overhead catenary with 6,600-volt feeders. Track return but no return feeders	3/0 grooved copper trolley with 2/0 feeder wire for whole length. Bonded track but no return feeders
o. Length of single track equipped, miles	12.6	142	42	624
p. Investment of third-rail, overhead equipment, L. T. feeders and track bonds, and cost of alterations to telegraph and telephone circuits	$72,000	$739,000	$307,000	$1,873,720
q. Investment per mile of single track (p/o)	$5,700	$5,200	$7,310	$3,000
r. Average efficiency of distribution, per cent	97	95	96	96
s. Kw-hr. delivered per annum to trains (m × r)	10,450,000	20,900,000	18,640,000	78,800,000
t. Interest on investment at 5 per cent (p × 5/100), cents	$3,600	$36,950	$15,350	$93,680
u. Interest per kw-hr. (t/s), cents	0.034	0.176	0.082	0.119
v. Maintenance and repair costs	$4,130	$18,250	$14,250	$66,760
w. Maintenance cost per kw-hr. (v/s), cents	0.040	0.088	0.076	0.085
x. Increase in cost per kw-hr. due to distribution loss (m − s) n/s, cents	0.048	0.064	0.048	0.043
y. Total cost per kw-hr delivered to train (n + u + w + x), cents	1.664	1.546	1.326	1.285

the single-phase railway works out almost equal to that of the Central London Railway, but it should be remembered that the service in the latter case is much more severe, that the latter railway is much older with correspondingly higher first cost of plant, and that no allowance is included in the single-phase figures for any alterations to telegraph and telephone circuits. The higher costs of the West Jersey & Seashore Railway are chiefly due to the heavier rolling stock required for the high speed and long runs and for the relatively unfavorable traffic conditions.

While these figures admit of a more accurate comparison from the point of view of passenger traffic, a comparison on the basis of the total operating costs per ton mile will probably appeal more to railroad men accustomed to think in these figures and will also be of greater service in making comparisons between steam and electric operations on trunk lines.

TABLE II—TOTAL OPERATING COSTS (PER EFFECTIVE FOOT MILE) INCIDENTAL TO ELECTRIC WORKING ON DIFFERENT RAILWAY SYSTEMS

	DIRECT-CURRENT RAILWAYS		SINGLE-PHASE RAILWAY
	Suburban Line	Trunk Line	Suburban Line
Railway	Central London	West Jersey & Seashore	Hamburg-Altona-Blankenese-Ohlsdorf
Rolling stock	68 (250-hp) motor cars weighing 23 tons without passengers, and seating 34. 170 trailer cars weighing 13.5 tons without passengers and seating 48	81 (400-hp) motor cars weighing 42 tons without passengers, seating 58, and 12 baggage cars	194 (330-hp) motor cars seating 62 each and weighing 32 tons without passengers
a. Schedule speed in m.p.h.	17	....	....
b. Average distance between stops, miles	0.5	2.5	1.0
c. Number of motor cars	68	93	194
d Number of trailer cars	170	None	None
e. Composition of train, normal	2 motor cars and 5 trailer cars	3 motor cars	2 motor cars
f. Car miles run per annum	7,672,000	4,552,500	7,338,600
g. Effective length of motor car	21 ft.	47 ft.	43.2 ft.
h. Effective length of trailer car	30 ft.	....	....
i. Effective foot miles run per annum	206,380,000	214,000,000	317,400,000
j. Kw-hr. consumed per effective foot mile (s/*i*)	0.0506	0.0977	0.059
k. Cost of current at train per effective foot mile (*j*×y), cents	0.084	0.152	0.078
l. Capital cost of trains	$1,445,000	$1,132,000	$2,208,000
m. Interest on capital at 5 per cent (*l*×5/100)	$72,250	$56,600	$110,400
n. Capital charge per effective foot mile run (*m*/*i*), cents	0.036	0.026	0.034
o. Operating and repair costs including drivers' pay	$148,500	$180,000	$249,500
p. Operating expense per effective foot mile run (*o*/*i*), cents	0.072	0.084	0.078
q. Total cost of running trains, including current, per effective foot mile (*k*+*n*+*p*), cents	0.192	0.262	0.190

An analysis on this basis is shown in Table III, the figures in which are deduced from the estimates in Mr. Kahler's recent paper before the American Institute of Electrical Engineers on "Trunk Line Electrification." The railway in question is an unnamed single-track line, 467 miles in length, with a traffic consisting mainly of freight trains. The reader is referred to Mr. Kahler's paper for full particulars, but Table III stands by itself as a comparison between steam and electric operation in the given circumstances. It should be noted that the ton miles run per annum are less in the case of electrical operation on account of the lighter locomotives and the absence of fuel haulage. Some 400,000 tons of coal are consumed per annum by the steam locomotives as compared with some 78,800,000 units of electrical energy at the electric locomotives. Estimated efficiencies of 95, 96 and 95 per cent for transmission line, substations and distribution respectively bring Mr. Kahler's figure of 90,000,000 units purchased down to 78,800,000 used by the trains. Dividing by the ton miles run, one gets a coal consumption of 0.21 lb. per ton mile as against an energy consumption of 24.8 watt-hr. per ton mile (this is too low a figure). The coal cost $2.25 per ton and the electricity 1.285 cents per unit as shown by Table I, so that by simple multiplication it is found that a fuel cost of 0.024 cent per ton mile in the case of steam traction corresponds to an energy cost of 0.032 cent per ton mile in the case of electrical operation. That electrical operation may be more economical, the other operating costs will have to be about 0.01 cent less per ton mile than with steam traction. The capital charge is greater with electric traction, but the charges in respect of maintenance, repairs, wages and engine-house expenses are so much less than with steam traction that there is a difference in the final figures of 0.007 cent per ton mile, or 8¼ per cent, in favor of electrical working. As fewer ton miles per annum are necessary with electric traction, the total saving is much greater than at first appears. It can readily be found by multiplying the final figures by the respective ton miles and subtracting one from the other, and will be found to be about $755,000, or some 23 per cent. The object of the table is, however, not to show the total saving but the relative operating expenses per ton mile, and these in such a manner that the relation between the various items can be readily compared. Mr. Kahler in his paper shows a total saving by the substitution of electric traction in this case of $940,000, but excluding the saving due to less wear and tear of permanent way and making due allowances for interest on capital expenditure and for

TABLE III—COMPARATIVE OPERATING COSTS (PER TON MILE) FOR STEAM AND ELECTRIC WORKING

Railway	Single-track railroad, 467 miles long, taken as example in paper "Trunk Line Electrification," by C. P. Kahler, A.I.E.E., May, 1913	
	Steam Operation	Electric Operation
Rolling stock	140 steam locomotives	Single-phase, 11,000-volt, 15-cycle trolley. 64 locomotives, 14 motor cars
a. Total ton miles run per annum	3,815,000,000	3,188,000,000
b. Total tons of coal burned in locomotives	400,000	....
c. Total kw-hr. consumed per annum	....	78,800,000
d. Pounds of coal burned per ton mile (b/a×2,000)	0.21	....
e. Watt-hr. per ton mile at locomotive $\left(\frac{c \times 1{,}000}{a}\right)$	....	24.8
f. Cost of coal per ton	$2.25	....
g. Cost of power per kw-hr. at locomotive from Table I, cents	....	1.285
h. Cost of coal per ton mile (d×f×100/2,000), cents	0.024	....
i. Cost of electricity per ton mile (e×g÷1,000), cents	....	0.032
j. Capital cost of locomotives and motor cars	$2,873,000	$3,237,000
k. Interest on capital at 5 per cent (j×5/100)	$143,650	$161,850
l. Capital charge per ton mile (k/a), cents	0.004	0.005
m. Stores, maintenance and repairs to rolling stock	$1,115,000	$641,000
n. Stores, maintenance and repairs per ton mile (m/a), cents	0.029	0.020
o. Wages of engine men, train crews, etc.	$935,800	$636,400
p. Wages of engine men, train crews, etc., per ton mile (o/a), cents	0.025	0.020
q. Engine house expenses	$100,000	$12,700
r. Engine house expenses per ton mile (q/a), cents	0.003	0.001
s. Total operating cost per ton mile, cents	0.085	0.078

depreciation, his result will be found to agree with the above.

In conclusion, the writer would suggest that, apart from the statistical value of the figures in the above tables, the reduction of all expenses incidental to the generation and distribution of power to the trains to a single figure for the cost of electricity per unit delivered at the locomotive is a method which will appeal strongly to steam railroad engineers and will enable electrification propositions to be expressed and analyzed in a much more convincing manner than they have been hitherto.

DECISION OF SUPREME COURT IN MINNESOTA RATE CASES

The right of the states to regulate intrastate traffic by fixing reasonable rates for railroad transportation on interstate railroads within their borders was upheld on June 9 by the Supreme Court of the United States in the Minnesota rate cases. At the same time the court laid down important principles governing the valuation of railroad property for rate-making purposes.

The Supreme Court held that the authority of Congress to regulate interstate commerce is plenary, that its complete control is not to be thwarted by the commingling of interstate and intrastate operations, and that the states can in no guise impose a direct burden upon interstate commerce. With these limitations, however, it was declared that there remains to the states, until Congress acts, a wide range for the permissible exercise of power appropriate to their territorial jurisdiction, although interstate commerce may be affected. Within this range the states are empowered to regulate intrastate commerce, so long as they do not impose a direct burden upon or interrupt the free flow of interstate commerce, or interfere with the regulations for the control of interstate commerce prescribed by Congress, and so long as the rates fixed are not in themselves unreasonable or confiscatory. But it must be remembered that in this field of close relationship between interstate and intrastate commerce, the states are restricted as follows: "The paramount authority of Congress enables it to intervene at its discretion for the complete and effective government of that which has been committed to its care, and for this purpose and to this extent, in response to a conviction of national need, to displace local laws by substituting laws of its own."

One of the most interesting features of the decision was its treatment of the alleged confiscation of the railroads' properties and their valuation as a basis for rate making. Justice Hughes in his decision criticised the lower court's theory of arriving at a fair value by finding the "reproduction cost new," and he utterly disregarded the claims of the roads for a high valuation for their properties on the ground of the peculiarly important public uses to which they were put. The lower court was held to be in error in adding 30 per cent to the normal value of the land at the terminals and 200 per cent outside the terminals in arriving at the fair value. It was not right, said Justice Hughes, to include in the value more than the market value of similar and adjacent property, and neither the continuity of right-of-way should be considered nor its "use" for railroad purposes, nor even the assertion that under condemnation the railroad would have to pay more than the market prices. The decision went on to say:

"The conditions or ownership of the property and the amounts which would have to be paid in acquiring the right-of-way, supposing the railroad to be removed, are wholly beyond reach of any process of rational determination. The cost-of-reproduction method is of service in ascertaining the present value of the plant, when it is reasonably applied, and when the cost of reproducing the property may be ascertained with a proper degree of certainty. But it does not justify the acceptance of results which depend upon mere conjecture.

"The question is whether, in determining the fair present value of the property of the railroad company as a basis of its charges to the public, it is entitled to a valuation of its right-of-way not only in excess of the amount invested in it but also in excess of the market value of contiguous and similarly situated property. It is clear that in ascertaining the present value we are not limited to the consideration of the amount of the actual investment. If that has been reckless or improvident, losses may be sustained which the community does not underwrite. As the company may not be protected in its actual investment, if the status of its property be plainly less, so the making of a just return for the use of the property involves the recognition of its fair value if it be more than its cost.

"In order to determine the reasonableness of the return allowed by the rate-making power, it is not admissible to attribute to the property owned by the carriers a speculative increment of value over the amount invested in it and beyond the value of similar property owned by others, solely by reason of the fact that it is used in the public service.

"Assuming that the company is entitled to a reasonable share in the general prosperity of the communities which it serves, and thus to attribute to its property an increase in value, still the increase so allowed, apart from any improvements it may make, cannot properly extend beyond the fair average of the normal market value of land in the vicinity having a similar character. Otherwise we enter the realm of mere conjecture. We therefore hold that it was error to base the estimates of value of the right-of-way, yards and terminals upon the so-called 'railway status' of the property. The company would certainly have no ground of complaint if it were allowed a value for these lands equal to the fair average market value of similar land in the vicinity, without additions by the use of multipliers or otherwise to cover hypothetical outlays. The allowances made for a conjectural cost of acquisition and consequential damages must be disapproved; and, in this view, we also think it was an error to add to the amount taken as the present value of the lands the further sums, calculated on that value, which were embraced in the items of 'engineering superintendence, legal expenses, contingencies, and interest during construction.'"

The Supreme Court did not discuss what in general would be an adequate return upon money invested. The annual return of the Northern Pacific Railway under the attacked rates was 6.021 per cent, of the Great Northern Railway 4.14 per cent, on the valuation as presented in each case by the railroad. The charge of confiscation set up by these roads was overthrown because of the erroneous system of valuation used and sanctioned by the lower court. The value of the property being less than the amount estimated, the returns upon a correct valuation would show a greater percentage. A different view was taken in the case of the Minneapolis & St. Louis Railroad, owing to the narrow margin on which it was running, from 4.4 per cent down to 3.5 per cent in different years. Its valuation also was criticised, but it was stated that the margin of differences that might arise from a more correct valuation was so small that an enforcement of the low rates against this road would probably result in confiscation. The decree of the lower court was therefore sustained as to this road, with the single amendment that should the circumstances of the road improve the Attorney-General of Minnesota or the Railroad and Warehouse Commission could ask the lower court for a new decree enforcing the low rates.

A company has been formed in Constantinople under the title of the Société Ottomane des Chemins de Fer Métropolitain de Constantinople for the purpose of working the concession granted for the construction and operation of an underground network of railways in Constantinople.

Convention of the Railway Master Mechanics' Association at Atlantic City

The Account of the Proceedings Includes an Abstract of a Paper on "Maintenance of Electric Equipment"—The Exhibits This Year Were of Unusual Interest.

The twenty-sixth annual convention of the American Railway Master Mechanics' Association was held at Atlantic City, N. J., on June 11-13, and this year it preceded the annual convention of the Master Car Builders' Association. At the convention there were reports from two standing committees and thirteen special committees, besides four individual papers. Of these papers and reports only one related directly to electric traction. It was entitled "Maintenance of Electric Equipment" and was read by C. H. Quereau, superintendent of electrical equipment at New York of the New York Central Lines.

Mr. Quereau's paper was largely a discussion of the conditions presented to a superintendent of rolling stock whose experience had been entirely along steam railroad lines and who was required to take charge of the electrical equipment of an electrified steam railroad. He said that when he was asked to take this position on the New York Central his first impulse was to decline because of lack of electrical knowledge, but he was assured by the head of the railway department of an important manufacturer of electrical apparatus that at least 75 per cent of the necessary training was supplied by experience in mechanical lines. He found that this statement was conservative and that at least 90 per cent of the problems of maintenance to be solved could be worked out by a good master mechanic with very limited electrical knowledge, provided he had experience in the motive power department of a steam railroad. Some knowledge of electricity for such men was necessary, but it needed to be very elementary and practical rather than theoretical, and he believed it could be acquired in such a short time that the advantages of using men for the maintenance of electrical equipment who had already a knowledge of steam railway motive-power equipment very decidedly outweighed the disadvantages due to a lack of extended knowledge in electrical apparatus.

Mr. Quereau gave definitions of some of the common terms in electrical engineering, such as "volt," "ampere," "watt," watt-hour," etc., and of the terms "series" and "series parallel." In conclusion he said:

"The statement is occasionally made that an electric is a simpler machine than a steam locomotive. If this refers to ease of handling and operating or matters requiring the attention of the engine crew, such as injectors, steam pressure and water level, there is no possible doubt the statement is correct, but if it refers to the mechanical simplicity or number of adjustable or moving parts that must be inspected and kept in proper relation, the steam locomotive is very much the simpler. There is, however, this fundamental difference favoring the electric machine, that the moving parts of the control are of very light weight, easily accessible for inspection and repairs and not subjected to nearly as great wear as are the corresponding parts of a steam locomotive.

"It will, no doubt, interest motive-power men to know that the shop arrangement and tools for maintaining electric equipment are not essentially different from those they are accustomed to in repairing steam locomotives, except, of course, that the electric locomotive has no boiler or tender and it is necessary to provide facilities for rewinding armatures and field coils.

"The steam motive-power man will no doubt be much surprised when told that the electric locomotive requires no shopping for a general overhauling, except for a general painting. This is made possible by having a stock of spare parts, permitting the removal of a defective part from a locomotive, the substitution of a repaired part and releasing the engine, the defective apparatus being repaired at leisure. For instance, a set of driving wheels needing tire turning is replaced by an extra set in good condition, this operation requiring not more than five hours with adequate drop pit facilities. Air compressors, controllers and contactors can be handled in the same way.

"The steam locomotive cannot be maintained on this plan, as the boring of cylinders and resetting flues make it necessary to shop the engine, withdrawing it from service for a considerable length of time.

"It is quite possible that the foregoing statements of personal experience and opinions will not prove as convincing as the records made by an electric equipment maintenance department organized by and largely consisting of men whose earlier experience and training were obtained in the motive-power department of steam railroads. Common sense will conclude there can be no particular mystery or unusual danger in maintaining electric locomotives when the records for the year 1912, after five years' service, show a cost of less than 4 cents per mile and an average of 48,271 miles per train detention due to electrical apparatus, with a banner record of 249,423 miles (equivalent to ten times around the world) without a train detention due to the electrical equipment."

EXHIBITS

At the convention of the American Railway Master Mechanics' Association and the American Master Car Builders' Association, which was opened June 11 at Young's Pier in Atlantic City, the exhibits of the manufacturers have proved to be of great interest to all of the visitors. The space occupied by the exhibitors reached a total of about 88,000 sq. ft., establishing the highest figures in the history of the associations and even exceeding the space devoted to exhibits at the last American Electric Railway Association convention to be held in Atlantic City, that of 1911, by over 10 per cent. To provide the necessary additional area beyond that used last year an extension was built upon the annex on the west side of the main building which is generally devoted to exhibits of heavy machinery, but notwithstanding this practically all of the available space was occupied on the Pier between the Board Walk and the Grecian Villa in which the convention sessions were held.

As in the exhibits of last year's convention, one of the most noticeable things was the evidence of progress in truck design toward simplicity on the one hand and toward flexibility on the other. The solid cast-steel truck side, which in one case was even cast integral with the journal boxes, was again generally in evidence. Not all of the trucks shown provided rigid alignment between the truck sides, and in one case neither transoms nor spring planks attached to the truck sides were used. The desirability of this arrangement is in large part limited to use with cars comprising trailing loads. For use under motor cars its value would be questionable, on account of its dependence upon wheel-flange action to keep it square, although its advantages in simplicity are obvious.

Another truck of the same general type had the springs taken out from under the truck bolster and moved outside of the columns, the load from the bolster being transmitted to the springs through a pair of equalizer bars, one inside and one outside of the truck side. The object of this radical innovation is primarily to increase the permissible length, or rather height, of spring and thus to provide easier riding qualities. The arrangement also permits a great increase in the depth of the bolster ends, a serious consideration with cars of great capacity, as the bolster can be extended down into the space formerly occupied by the springs on top of the spring plank. In the same exhibit a variable-load brake was shown.

Flexibility was attained in another design by having the truck sides rotate on a fulcrum at each end of the transoms and each journal box rotate on a fulcrum at the end of each cast-steel truck side, thus permitting the wheels to move with perfect freedom in vertical planes but absolutely prohibiting any sidewise or twisting motion. Still another example of the desire for flexibility in truck design was shown by the roller-bearing devices for permitting sidewise as well as swiveling motion for the truck. A fairly well known four-point bearing was exhibited which consists of two sets of rollers at each end of the body bolster, one arranged to permit a forward and back or swiveling motion between truck and body bolster and the other arranged to permit transverse motion of the body bolster. No center bearing is provided except as a guide or center about which the truck can turn, as the roller bearings raise the car as it shifts from center line or tangent and thus tend to keep it in alignment. A multiple-roll side bearing of another type which had run 1,000,000 miles was also exhibited, together with a side bearing of the single roll type. The latter worked as a standard roller bearing within the ordinary limits of curvature, but beyond these the roller rotated on a pin, thus permitting an unlimited degree of swiveling for the truck without the necessity for a roller guide of unusual length.

The commercial possibilities of flexible steel conduit or steel-armored hose were indicated by several very complete exhibits, a valuable addition to the more recently developed means conducive to safety. The automatic oil-handling machinery was also in evidence, including exhibits of a waste saturating tank and a special black-iron tank for signal oil provided for the reason that galvanized-iron receptacles injuriously affect the quality of that oil.

One of the most ingenious devices shown was a hand wrench which automatically separated its jaws and slipped around a nut when pulled in one direction, but which also automatically closed its jaws and gripped the nut when pulled in the other direction. The scheme involves the use of three pieces, of which one was a handle having one end formed into teeth. Two jaws were provided, one swiveling on a pin at the toothed end of the handle and the other sliding upon the first jaw but having a rack on it which engaged the teeth in the handle. When the jaws were swiveled in one direction on the pin the relative movement of the teeth on the handle and on the one jaw caused the latter to move relative to the other jaw and to close the jaws together. When swiveled in the other direction the relative motion was reversed and the jaws opened. In operation, by placing the wrench on the nut and pulling on the handle the handle swiveled on the pin relative to the jaws, closed them and turned the nut, but by reversing the pressure and pushing on the handle the jaws opened and slipped around the nut until the direction of pressure was again reversed, when the jaws would again grip the nut and turn it. Another device along these lines was a lock washer which was held in place by three triangular teeth which were flattened out and pressed into the bolt thread when the nut was set up on top of the washer.

A radical novelty in block signal apparatus was shown. This consisted of acetylene lights which took the place of the standard oil or electric lamps used for illuminating the colored glass lenses on semaphore arms to give light indications. The acetylene light, however, was arranged to give a series of flashes instead of a continuous illumination, the flash occurring once each second and lasting for about one-tenth of that period. This intermittent light, used to a great extent in marine signals for buoys and lighthouses, was claimed to have for railway work a vastly increased arrestive effect and also to possess distinctive features which would avoid confusion with house or station lights. The standard equipment, such as has been used in a number of trial installations on steam railroads, provides a reservoir of 270 cu. ft. capacity, containing acetylene at 150 lb. pressure sufficient to supply the light for nine months night and day. The intermittent effect is obtained by keeping a tiny acetylene pilot light burning continuously at the main burner, which is supplied with the charges of acetylene whenever the gas pressure builds up over a diaphragm connected to a permanently magnetized lever and valve in sufficient amount to overcome the magnetic attraction. When the charge escapes to the burner the consequent reduction in pressure over the diaphragm permits the lever to be pulled up and the valve stays closed until the gas pressure again builds up, pushes down the diaphragm and opens the valve. The cycle requires about one second for completion, but may be varied as desired by changing the rate of flow from the main reservoir.

In the machinery section are two especially novel tools, one being a broaching machine which draws through the blank a long tool fitted with a large number of cutting edges ground to a particular shape, thus cutting square, irregular or oval holes or keyways as desired. By revolving the broach spiral keyways may be cut. A horizontal boring mill fitted with a vertical milling head which is exhibited is a good example of the tendency toward the development of machine tools capable of general rather than specific use, and a shaper for woodworking is shown in which the cutting is facilitated by imparting a rising and falling motion to the spindle.

The out-door exhibit on Mississippi Avenue is, as it has always been in past years, of especial interest, although its extent is not so great as it has been in past years. Among the exhibits on this track is the 2400-volt locomotive described in last week's issue of the ELECTRIC RAILWAY JOURNAL. This is, by the way, the only locomotive exhibited, no steam machines being shown. A standard box car with corrugated ¼-in. steel ends is also shown. This has been in regular service for three years, and the stiffening effect of the solid squares of steel is evident through the absence of any signs of racking in the posts and carlines.

The tendency toward the elimination of wood as a material for car construction was shown by two exhibits of seats and seat cushions made throughout of steel with the exception of the seat arms and the rattan and plush covering. Even the foot rests under the back of the seats were composed of steel tubing. A welcome feature found in several types of seat was a ticket holder of plate brass introduced beneath the strips on the seat backs.

Two thermostats for automatically regulating car temperatures were shown, and both of these were stated to be well past the experimental stage. These as well as the exhibits of the mercury-arc rectifier attracted a great deal of attention, the latter being shown at work converting about 30 kw of single-phase power into the direct-current form.

The Saxon government has bought several large brown-coal fields in the neighborhood of Leipzig with a view to the eventual electrification of the State Railways, but such an electrification on a large scale is not contemplated for the near future. The substitution of electric power for steam on some of the smaller lines in the kingdom is under consideration.

Joint Meeting of British and French Electrical Engineers in Paris

Abstracts of Papers and Discussions on Heavy Electric Traction and High-Tension D. C. Transmission Are Presented

The joint meeting of the Institution of Electrical Engineers and the Société Internationale des Électriciens was held in Paris beginning May 21 at the invitation of the latter society. Six papers on electric traction by French authors were read and discussed. Among the other papers was one on high-tension d.c. transmission. The following is an abstract of the account published in the May 29 issue of the London *Electrical Engineering*.

HIGH-TENSION DIRECT-CURRENT RAILWAYS

L. Gratzmuller dealt first with station apparatus for the high-tension d.c. system. When the power station is far from the railway three-phase generation is the obvious solution, but to keep down the weight of the turbo-alternators a frequency greater than twenty-five cycles is desirable unless rotary converters are to be used in the substations. If the station is so near the track that there is no need for a higher transmission pressure than 1500 volts and reciprocating engines or water turbines are used, it is possible to get satisfactorily 1500 volts from a single commutator, and machines with two windings and two commutators can be used to give a higher pressure. With steam turbines he prefers to generate alternating current and to transform it. The mercury converter can be used whatever may be the frequency, and mercury converter apparatus of a capacity up to 300 kw already exists. For high pressures its efficiency is nearly unity.

With regard to overhead conductors, 3000 volts pressure would probably be the safe limit for some time to come, but since 500 amp at this pressure furnishes 1500 kw, it would seem that powerful locomotives must use a third-rail. As to motors, with the same internal diameter, length of iron and weight of windings, it should be possible to obtain the same torque in normal working, whether the motor is wound as a d.c. or a three-phase induction motor. Although the single-phase motor is heavier, the difference is not so great as was formerly assumed, the difference being only 15 per cent and not $1 \div \sqrt{2}$.

A pressure of 1200 volts per motor is easily practicable when multiple units are employed, and 1500 volts can be used for locomotives. Unfortunately, with small motors these voltages will often require two turns per coil; series winding will naturally be used. A locomotive of 2000 hp at 3000 volts can thus be constructed with two motors in series or with motors having two commutators. The current required will then be approximately 500 amp. The use of aluminum for the rotors appears very suitable, and the increase in electrical resistance can be largely compensated for by the increase in peripheral speed for the same centrifugal force. Owing, also, to the recent improvement in gear cutting, reduction gear can be used with side rods, as with the Lötschberg locomotives of Switzerland. This increase in peripheral speed, coupled with forced ventilation, will enable the weight of the motors to be reduced by about 50 per cent. Auxiliary fans or water-cooling are not justified; each rotor should act as its own fan and produce a current of air which would enter near the shaft through a bearing and pass through the center of the commutator and the iron stampings of the rotor. The commutator might also be provided with vanes. For the control, any of the well-known systems can be employed, but if two motors are used, each for one-half of the total pressure and connected in series, the chances are that slipping may occur and cause an undue pressure to come on one motor.

The advantages of d.c. are principally the large starting torque, good commutation and light cars. The disadvantages are the use of an exposed high-tension rotating part, particularly dangerous in damp localities, the use of a commutator and the control of the large currents necessary when a large amount of power is required.

SINGLE-PHASE RAILWAYS

Marius Latour contributed the second paper, which was devoted chiefly to a consideration of series and repulsion motors. The motors should be mounted on springs to avoid dangerous resonance effects, such as arise at certain speeds with mechanical transmission, in so far as these arise from fluctuations in the torque. In addition to the mean rotation of the motor, there is an oscillatory movement which is liable to produce a leading wattless emf in the armature. He then referred to the extensive tests which had been carried out by the Midi Railway, France. In the repulsion motor at speeds above synchronism the transverse field increases in strength, the iron losses increase and commutation becomes unsatisfactory, until at $\sqrt{2}$ synchronous speed, commutation is worse than that of the series motor. The compensated repulsion motor, on the other hand, works at approximately unity power factor, because commutator motors with short-circuited brushes have no inductance at synchronous speed and negative inductance above that speed, even when supplied with simple alternating current. As indicated by the name, the other two types have an additional winding perpendicular to the brush axis connected up so as to give commutating fields. Mathematical investigation of these motors shows that the commutator should run at a high peripheral speed for which gearing is necessary. At a frequency of fifteen cycles the repulsion-type motors are heavy, and the efficiency does not improve with lower frequency, whereas with series motors it approaches more nearly that of a d.c. machine. With regard to commutation, the narrower the auxiliary poles the smaller the losses. This necessitates a small rotor tooth-pitch. Thus a large number of poles, high speeds and small air-gaps are required. At a frequency of fifteen cycles commutation losses could be reduced to 0.25 per cent.

ELECTRIFICATION OF THE MIDI RAILWAY

Mr. Jullian described the electrification of the Midi Railway, to which reference has been made in the Oct. 7, 1911, July 6, 1912, Jan. 4, 1913, and May 3, 1913, issues of the Electric Railway Journal. Some of the track is standard gage and some meter gage. When the proposed electrifications are completed there will be 386 miles of electrified line, of which 203 miles are now in operation. It is also proposed to electrify the line from Perpignan to Villefranche in the eastern Pyrénées. The lines to be constructed in the Pyrénées have steep grades, chiefly between 1.5 per cent and 3.2 per cent, and the mean practicable speed is about 37.2 m.p.h. Current at 12,000 volts, sixteen cycles, is used throughout. It is generated at 6000 volts single-phase and transmitted at 60,000 volts to five substations. It was found in equating the extra cost of the single-phase generators over three-phase against the reduced cost for single-phase switch-gear and transmission lines that the advantage is on the side of single-phase. In the experimental line from Villefranche to Vernet-les-Bains six types of overhead equipment have been established. Four of these belong to the simple catenary type, one to the double catenary and one to the rigid type. The spans are 328 ft., 197 ft. or 164 ft., and the longer sections have compensating arrangements. It was found that on the lines comprising fairly numerous curves of a radius between 1148 ft. and 2624 ft. and operated over by trains at speeds of from about 47 m.p.h. to 50 m.p.h. but not exceeding 55.8 m.p.h. the choice should be the plain uncompensated catenary with spans of between 164 ft. and 197 ft. and with pull-offs on the curves when necessary. The catenary cable should in this case invariably be anchored to the insulator at each bracket. Poles of reinforced concrete are too expensive and too heavy for existing lines, but those composed of old rails are very suitable for single-track lines. Lattice poles must be used, however, for double track. The high-tension transmission lines, generally two in parallel, are of aluminum, with most of the insulators of glass and the rest of porcelain. The overhead-line cost on the track already electrified is $6,240 per mile of single track, using "rail" poles, and $6,880 per mile of double track. Tests are still in progress with locomotives and motor cars. Girousse apparatus has been adopted to protect the telegraph lines from disturbances. To avoid telephone trouble, the State is about to replace ordinary insulators by others of greater insulation resistance, to transpose the two transmission lines every 984 ft. to 1312 ft., and to insert transformers between the lines and the receiving apparatus to eliminate the risk of shocks.

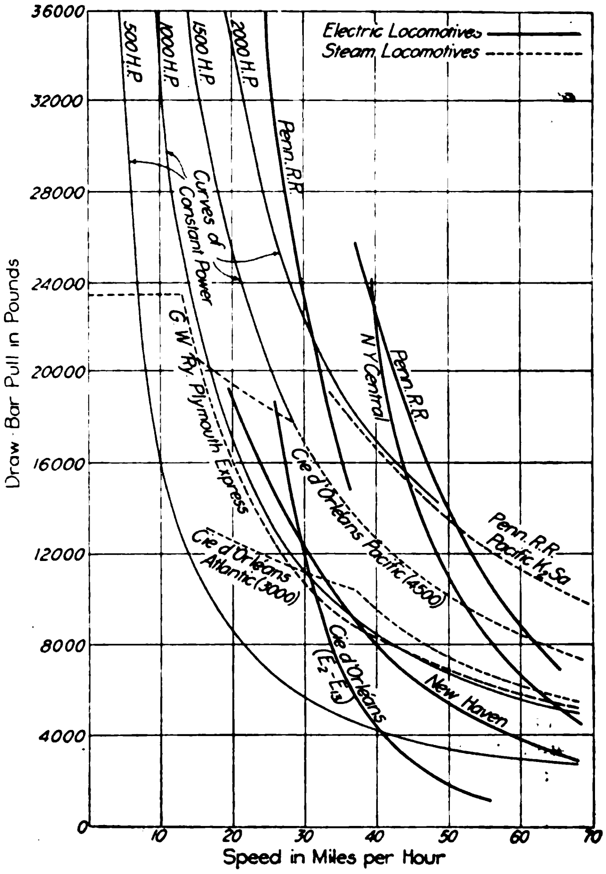
THE PARIS SUBURBAN SYSTEM OF THE WESTERN STATE RAILWAYS

A. N. Mazen gave some data of the Western State Railway which operates some 1640 trains per day in and out of Paris. Electrification was necessary, owing to the congestion caused by the mixture of suburban and long-distance traffic and the rapid increase of both. Electrification would also hasten the increase of traffic. Thus the electrified line from the Invalides to Versailles has shown traffic increases of from 12 per cent to 13 per cent per annum, while the other steam lines show increases of barely 2 per cent or 3 per cent. The author said the d.c. 650-volt, third-rail system was adopted in preference to single-phase or a higher d.c. pressure because of the lighter weight of equipment, the avoidance of trouble with overhead lines and of interference with telephone circuits, etc. The same system is also used for all the existing heavy electric traction schemes in Paris. The under-contact third-rail weighs 152 lb. per yard. The standard motor cars, operated singly and in trains, can carry 100 passengers including "straphangers." Electric baggage trains are also to be operated. The construction and working of the two power stations at Moulineux and Bezons has just been intrusted to an industrial syndicate. These stations contain 5000-kw turbines and when the installations are complete will have a capacity of about 60,000 kw and will furnish about 100,000,000 kw-hr. per annum. Under the sliding scale of charges adopted, energy will be sold to the State at about 1 cent per kw-hr.

PRACTICE IN THE UNITED STATES

H. Parodi sketched the differences between American and Continental conditions, emphasizing particularly the greater rate of increase of traffic in the United States and the reasons why, with the longer distances and heavier trains, merchandise could be carried in America at a lower rate than in Europe. The relation between traffic and expenses which must exist to make electrification remunerative was considered mathematically, and he concluded that the passenger traffic of the New York, New Haven & Hartford Railroad, which is quite exceptional, would almost justify a general electrification of the lines of that company, but that was not the case with the New York Central and the Pennsylvania Railroads. Curves given by Mr. Parodi of the drawbar pull of different classes of steam and electric locomotives are reproduced. He said that the electric locomotives named were really constructed to develop their maximum power at about 37.2 m.p.h., corresponding to a suburban service. In the United States there are no d.c. or single-phase locomotives which are as powerful at their maximum running speed as the Simplon Tunnel locomotives, which develop a drawbar pull of 13,200 lb. at 43.4 m.p.h., and the new Simplon locomotives, which will develop 3000 hp at the same speed. The Italian State Railways, also using three-phase equipment, have ordered ten locomotives able to develop 2000 hp-2400 hp at 62 m.p.h.

While locomotives with a series characteristic are suitable for suburban conditions, something more approaching a shunt characteristic is required for trunk-line service. In this respect three-phase locomotives would be far superior to the others, as their weight would be considerably less, being something like 66 lb. per hp, while the lightest American single-phase locomotive weighs 132 lb. per hp. In the United States the question is what drive to adopt for locomotives capable of hauling express trains. Three radically different methods have been employed there, namely, connecting rods, a direct drive and a drive through gear and a hollow shaft. For high speeds the first seems to be preferred.



Curves Showing the Drawbar Pull of Different Classes of Steam and Electric Locomotives

DISCUSSION

Roger T. Smith said that for suburban lines the engineering problem of electrification had been solved and merely the commercial problem remained. In the case of hilly districts there was a critical grade above which electric driving would always pay. In spite of the work which had been done in Italy, he thought that either the d.c. or single-phase system was better than three-phase, owing to the series characteristic torque, and for speeds up to 31 m.p.h. they were better than steam for the same reason. In England the North Eastern Railway was now building a very high-tension direct-current line, and a 3500-volt line would be started in England soon. To the curve of tractive effort in Mr. Parodi's paper he had added another (shown dotted in the illustration), giving the result of a test with a dynamometer car on a 4-6-0 type of locomotive drawing a passenger train from London to Plymouth (226½ miles) without a stop, at an average speed of 54 m.p.h. The train weighed 405 tons, of which the locomotive accounted for 117 tons (namely, 28 per cent). At 70 m.p.h. the drawbar hp was 730, and no electric locomotive had yet been built which could give this drawbar effort at such a speed. For general purposes, however, the actual strength of the drawbar was the limiting factor—it was limited to 12 tons, corresponding to a train weighing 2500 tons to 3000 tons. There were in Great Britain some 500,000 private freight cars not under the supervision of or made by the railway companies. They represented a capital of some $300,000,000, and their draft gear could not be relied upon to stand more than 12 tons.

Mr. Latour said that there had been much discussion on the question of frequency in single-phase traction, but as the contact surface of the commutator depended on the frequency, there was no doubt that the cost of maintenance of a twenty-five-cycle system was nearly double that of a fifteen-cycle system. When fifteen cycles was employed for three-phase operation nobody had anything against it. This low frequency also diminished telephone disturbances. The employment of auxiliary poles in single-phase motors introduced no complication. It was, of course, admitted that the single-phase system resulted in heavier locomotives, but one must not forget that single-phase was introduced to give the advantage of a single contact wire carrying current at high tension. He touched briefly, but without being very sanguine, on the ultimate possibility of employing a rotary converter on a locomotive so that the advantage of high-tension single-phase at high frequency with a d.c. motor for driving would be obtained. He also referred to the mercury rectifier.

Mr. Gratzmuller agreed that the main objections to the single-phase system were the greater weight and the increase in the surfaces of commutation. He believed that the repulsion motor might now be ruled out of court and that the field was left to the series compensated motor. The disadvantage of single-phase over high-tension d.c. amounted to only 15 per cent. The use of resistances to diminish the emf between short-circuited segments of the commutator was correct, for by their means the size of the commutator could be enormously reduced. If the resistances were placed in supplementary slots leading out of the main slots and not in the main slots themselves, a satisfactory arrangement was secured without increasing the size of the armature at all. Returning to the question of contact surface at the commutator, Mr. Gratzmuller said that the same surface as with ordinary d.c. motors would be attained; in fact, a 420-volt Westinghouse single-phase motor already built had a contact surface of the same area as a 500-volt d.c. motor.

Mr. Mazen said that the French railway system, taken as a whole, might be considered as a network of squares, each side of which was from 9.3 miles to 31 miles long. It was recognized that the present policy for the railways was to obtain their current from central stations and not to generate it themselves. The current offered to them was the one which was most useful for general purposes, namely three-phase at fifty cycles. They had practically no option but to place substations at the junctions of the network of squares, and they had come to the conclusion that single-phase working would not be so suitable for their conditions as third-rail d.c.

HIGH-TENSION D.C. TRANSMISSION

On Thursday a paper on "Power Transmission on the Thury System," by J. S. Highfield, was discussed. The paper is similar to one which Mr. Highfield had written earlier that was abstracted in the ELECTRIC RAILWAY JOURNAL for July 6, 1913. The author pointed out that it is easy to meet an increasing load by starting up new stations on the same line and that this can be done without increasing the maximum line pressure by placing additional stations at proper points. The difficulties of running stations in parallel are thus avoided, and the uniform section of cable renders the series system more flexible in this respect than the parallel. Another advantage is that difficulties due to cable capacity and inductance are eliminated, and as a higher pressure can be used with direct current than with alternating current the energy can be transmitted to a greater distance. The cost of an overhead three-phase line at even the same pressure is greater than that of a series d.c. line, and for transmitting up to, say, 30,000 kw not more than four wires will be required, working two in parallel, instead of six wires for a similar three-phase line. There would thus be some saving in insulators, and in most cases the weight of copper would also be less, as the regulation need not be so close and the loss can be calculated purely on a commercial basis without reference to technical difficulties.

Mr. Highfield considered that the maximum size of a generator on the high-tension d.c. system may be taken as 1200 kw to 1500 kw, so that to make up a large power unit it is necessary to couple two or more generators to a single prime mover. Line losses would usually be higher than with the constant-pressure system, and the a.c. system also has the advantage as regards the cost of the substations, except in those cases in which the frequency of the transmission line is different from that required in the distributing circuits. In his case, where a load of about 700 kw had to be supplied at various points in a scattered district involving a length of approximately 100 miles by underground mains, and in which the cost of energy was comparatively small, the series system was the only one commercially possible.

In the discussion on Mr. Highfield's paper, Mr. Thury admitted that the applications of the high-tension d.c. system were limited. Constant potential remained as the system for distribution, and a.c. transmission suited this in most cases. The series system came in for very long-distance transmission and when underground cables were desirable. An overhead line was dear and its maintenance expensive when pressures were high. For distribution the series system was limited to cases in which there were only a few consumers of large size. It also entailed problems to be solved which would be impossible with alternating current; for instance, in crossing a small stretch of sea it had been adopted because the cable makers would give a guarantee only in the case of single cable. Tests at Lyons and also in England showed that d.c. cables absorbed a negligible amount of energy. At Lyons it was found that a cable of only 3 mm (0.12 in.) thickness of insulation would stand 300,000 volts. As to the limiting size of generator, he had recently planned to use a 5000-kw machine with two armatures.

In reply to a question as to whether there had been electrolytic troubles owing to the ground return, Mr. Highfield said that they had been working in this manner for four months continuously and there had been no interference with the track signaling on the Great Western Railway. Mr. Thury added that on the St. Maurice and Lausanne system the iron grounding plates which were used should theoretically have been destroyed by electrolysis in less than two months but they worked as well after a year as they did on the first day, owing to the formation of a protective film of oxide of iron. No electrolysis on pipes had been noticed, but he admitted that the possibility of electrolysis should be considered in any plans.

Mr. Smith pointed out that 1200 kw, the largest size of unit mentioned by Mr. Highfield, was about the power needed for an average-size freight train and this would be a suitable unit for substation motor-generators on a railway system. Mr. Highfield's ground-return current, he said, had been flowing for months under the Great Western Railway, where ground returns were used for signaling and where telephones were worked at a pressure of only 2 volts, but no trouble had been experienced. He was impressed by the simplicity of the substation arrangements.

Final Testimony and Arguments in the Cleveland Case

Depreciation in the Value of the Property of the Company Shown by Tables Submitted by Henry J. Davies—Operating Expenses per Car Mile, per Passenger and per Ride—Other Testimony and Oral Arguments of Counsel

The hearing before the board of arbitration in the Cleveland Railway case was resumed on June 3 and continued until June 6, when it was concluded. The principal testimony offered was that of Henry J. Davies, secretary and treasurer of the company, who submitted tables bearing on the question of the value of the property. After the completion of the case of the company the only witness introduced on behalf of the city was Carl H. Nau, accountant for the city street railroad commissioner. After the testimony was finished Mayor Baker, representing the city, and H. J. Crawford, counsel of the company, made oral arguments before the board. When these were made the hearing was concluded. Written briefs will be submitted by counsel for both sides. Abstracts of the final testimony and oral arguments in the case follow:

MR. CRECELIUS ON THE POWER EQUIPMENT

Lawrence P. Crecelius, superintendent of power Cleveland Railway, took the stand again on June 3 and presented Table I, as published herewith, showing the money expended in betterments and maintenance of power plants, battery plants, overhead lines and return circuits.

Mr. Crecelius, referring to the column in the exhibit headed "Percentage of Reproduction," said that the total of the maintenance and betterment expenditures, divided by the reproduction value of the property, gave the percentage of the reproduction value that was put back into the property in the way of maintenance and betterments. He gave the details of various changes in his department which involved deductions in the property account. Specifying, he gave the reproduction values of the items and the lower values fixed upon them in the Tayler valuation.

In answer to a question from H. J. Crawford, counsel for the company, Mr. Crecelius said that, including the additions and betterments, the book value of the electrical equipment on March 1, 1913, was less than it was on Jan. 1, 1910. Independent of the question of book value, the judgment of Mr. Crecelius was that the property was not in as good condition in 1913 as in 1910.

Mr. du Pont asked the witness a question about the value of the power department as an operating department now. Mr. Crecelius said that, when the additions and betterments were taken into account, the department was more valuable as an operating department than it was in 1910. The application of the depreciation rates showed, however, that the value of the plant in money was less.

Mr. du Pont said that the value of the property as an operating unit was more than the figures would indicate, and that would necessarily show that the rates of depreciation were too high.

Mr. Duffy stated that the rates used were definite rates applied to fix the valuation that was incorporated in the franchise as the value to be recognized. Mr. Duffy then asked Mr. Crecelius if he took the purchased power into consideration in judging the efficiency of the department. The witness said that he did. The company had been getting approximately one-third of its power from the Cleveland Electric Illuminating Company.

Mr. Crawford said that the rates of depreciation used in the calculations were not theoretical and that they had not been so regarded in the past. They had been extremely practical and were used in the calculations which led to a reduction in the stock of the company from 100 per cent to 55 per cent.

Mr. du Pont said that perhaps he could explain the situation. There was a very peculiar depreciation on power. Horace E. Andrews and he had agreed on the valuation of the power plant one year previous to the determination of the value for the present ordinance. They did not reappraise the property when the values were determined for the present ordinance but corrected their figures according to the reduction in the price of material. The former appraisal had been made when copper was at a high price. The price had dropped from about 24 cents to 14 cents per pound and the value of the copper in the generators was reduced accordingly.

Mr. Crawford said that there was a figure of $50,000 in the figures covering the cost of some material purchased in 1908 which looked unusual. He would like to have it looked up, and if it was not correct he wanted the arbitrators to know it.

Judge Killits asked how the efficiency of the power department compared on Nov. 1, 1912, and March 1, 1910.

Mr. Crecelius asked whether the question referred to efficiency in the cost of production. When Judge Killits answered that he had in mind the amount of work done by the department, Mr. Crecelius said that the efficiency was improved now. It was very much improved after Nov. 1, 1912, when the substations were started. Answering further questions from Judge Killits, Mr. Crecelius said that before any current was received from the Cleveland Electric Illuminating Company the power situation was getting pretty uncertain. The voltage was low in the outskirts of the city and there was a lot of trouble from other complications that arose in the distribution of heavy-tension current for long distances. Motor cars could be operated, but they could not carry trail cars.

ADDITIONAL TESTIMONY OF MR. DAVIES

Henry J. Davies, secretary and treasurer Cleveland Railway, took the stand again on the afternoon of June 3 and presented tables of valuation which he had made from the books of the property of the company as of March 1, 1910, and also as of March 1, 1913. The first table in the series presented by Mr. Davies showed the valuation of $18,909,252 placed by Judge Tayler upon all the physical property of the company in existence Jan. 1, 1908, under the several classifications of the appraisal that had been made in the spring of 1908 by Mayor Johnson and F. H. Goff. Another table showed the reproduction value of $24,155,410 for all the property shown in the first table on the same date. The reproduction value of the physical property of the Cleveland Electric Railway Company, which was the name of the present company before it absorbed the various lines, the Forest City Railway Company and the Low Fare Railway Company as appraised by Mr. Goff and Mr. Johnson in April, 1908, was ascertained as of Jan. 1, 1908, by the determination from the Goff-Johnson schedules of the details of the valuation of the several classifications of property, the percentages of remaining value and of depreciation. To the reproduction value of the property of the Cleveland Electric Railway Company in a new condition, thus ascertained, there were added overhead charges or allowances of Judge Tayler and his valuation of the property of the Forest City and the Low Fare railway companies. Judge Tayler added to the valuation agreed upon by Mr. Goff and Mr. Johnson certain percentages for specific overhead charges and certain other percentages for general overhead charges. These percentages were set forth in a pamphlet which Mr. Davies gave to the arbitrators.

In the tables which Mr. Davies made for this arbitration he omitted two items shown in the tables referred to in the pamphlet, namely, the items of "stores" and "other items." The figures that he made were based on the valuation of the other items of physical property, or a total value as fixed by Judge Tayler of $18,909,252 instead of $19,317,456 as shown in the table in the Tayler valuation pamphlet. In order to ascertain the present value of the property as well as the present value of all replacements of that property and all additions to it, it was necessary to consider, among other things, the depreciation in its value, from whatever cause the depreciation might come. It was necessary to account for the property that went out of use in the period between Jan. 1, 1908, and March 1, 1913, the date to which he had brought his figures, and to take that property out at its reproduction value.

Table I—Money Expended in Betterments and Maintenance of Power Plants, Battery Plants, Overhead Lines and Return Circuits

Year	Track Mileage	Maintenance	Betterments	Totals	Percentage of Reproduction
1908	236.590	$178,971	$77,511	$256,492	4.05
1909	258.428	149,226	36,958	186,184	2.90
1910	272.696	*200,595	93,071	293,666	4.55
1911	288.904	125,165	26,077	151,242	2.36
1912	290.727	103,278	148,643	251,921	3.92
1913	293.398	to date	to date	to date	to date

*Two months, January and February, under receivers in which $40,466 96 was charged to maintenance.

Table II—Ratio of Depreciated Value of Property on Jan. 1, 1913, to Cost, Compared with Ratio of Depreciated Value as Fixed by Judge Tayler to Reproduction Value

	Jan. 1, 1908 Per Cent	March 1, 1910 Per Cent	March 1, 1913 Per Cent
Track	74.96	66.45	55.11
Pavement	79.55	68.23	55.54
Cars	77.81	54.40	59.79
Land	100.00	104.22	101.28
Buildings	82 85	64.20	71.74
Overhead construction Return circuit	89.25	83.70	77.75
Power stations	69.99	57.59	45.20
Storage batteries	84.12	75.66	66.18
Shop machinery	97.78	69.12	77.56
Miscellaneous rolling stock	66.91	57.93	12.34
	78.28	65.23	59.85

In another table Mr. Davies showed the amount in dollars and cents of property that had disappeared or gone out of use since Jan. 1, 1908, whether by reason of sale or replacement by other property or permanent abandonment. The total at March 1, 1913, was $1,943,424.

Table III—Depreciation per Revenue Car Mile

	Jan. 1, 1908, to March 1, 1910 Cents	March 1, 1910, to March 1, 1913 Cents	Jan. 1, 1908, to March 1, 1913 Cents
Track	1.55	1.34	1.42
Pavement	0.58	0.49	0.52
Cars	1.03	0.97	0.99
Land	....	....	....
Buildings	0.14	0.12	0.12
Overhead construction Return circuit	0.18	0.16	0.17
Power stations	0.89	0.75	0.81
Storage batteries	0.11	0 09	0.10
Shop machinery	0.03	0.03	0.03
Miscellaneous rolling stock	0.06	0.05	0.05
	4.57	4.00	4.21

Mr. Davies showed in another table the reproduction value or cost new of the original property, that is to say the property in existence remaining after deduction of the value of the property that went out of use and before deduction of depreciation. Starting with the value of $24,155,410 on Jan. 1, 1908, this table showed a value of $23,687,370 on March 1, 1910, and of $22,211,986 on March 1, 1913.

In several of the tables following, Mr. Davies showed the depreciation in value of the property appraised by Mr. Johnson and Mr. Goff, and later by Judge Tayler. One of these tables showed the depreciation on the entire property. This amounted to $2,303,670 for the period from Jan. 1, 1908, to March 1, 1910, and to $3,189,697 from March 1, 1910, to March 1, 1913, or a total of $5,493,367. Another of the tables showed the depreciation in the value of the property that went out of use between the date of the first appraisal and March 1, 1913. From Jan. 1, 1908, to March 1, 1910, the amount was $42,094 and from March 1, 1910, to March 1, 1913, it was $229,378, making a total of $271,472 for the full period. One of the tables showed the depreciation in the value of the property appraised by Judge Tayler (less the depreciation in the value of property replaced or abandoned) at the rates of valuation used by him in his valuation, which were the same as those used by Mayor Johnson and Mr. Goff in their valuation, viz., 5 per cent on track, pavement, rolling stock, power stations and their equipment, storage batteries and shop machinery, and 2½ per cent on other buildings and on power-distribution system and return circuit. From Jan. 1, 1908, to March 1, 1910, the amount was $2,261,576 and from March 1, 1910, to March 1, 1913, it was $2,960,318, making a total of $5,221,894.

Table IV—Ratio of Present Value of Property to Cost of Reproduction of Entire Property

Cost of original property			$24,155,410
Less cost of abandoned property			1,943,424
Remainder			$22,211,986
Cost of additions			2,615,752
Cost of renewals			2,122,459
Total reproduction value of entire property			$26,950,197
Tayler valuation of original property			$18,909,252
Less cost of abandoned property			1,943,424
Remainder			$16,965,828
Cost of additions			2,615,752
Cost of renewals			2,122,458
Total capital value of physical property			$21,704,038
Depreciation on original property	$5,493,367		
Less depreciation on scrap value of original property from Jan. 1, 1908, to March 1, 1913, five years and two months, at, say, 5 per cent per year	587,912	$4,905,455	
Depreciation on cost of additions and renewals	$458,685		
Less depreciation on scrap value of additions and renewals for one-half of period from Jan. 1, 1908, to March 1, 1913, two years and seven months, at, say, 5 per cent per year	59,319	399,366	
Total		$5,304,821	
Less depreciation on property abandoned	$271,473		
Plus depreciation on scrap value of property gone out of use for the period during which it was in use, say one-half of five years and two months, at 5 per cent per year	24,979	296,452	$5,008,369
Depreciated or present value of all physical property March 1, 1913			$16,695,669

The next table showed the reproduction value or cost new of the original property, less the depreciation in the value of that property. The final figure on the whole property for March 1, 1913, was $18,662,043. The ensuing table showed Judge Tayler's valuation of the original property remaining after deduction of the depreciation. The final figure as of March 1, 1913, was $11,743,933.

In the next table Mr. Davies showed the costs of the additions to the property in the several classifications. From Jan. 1, 1908, to March 1, 1910, these amounted to $519,842, and from March 1, 1910, to March 1, 1913, to $2,095,910, making a total of $2,615,752. The following table in the series showed the amount expended for property that took the place of other property that had been worn out or was discarded for other reasons. It was the cost of renewals, $438,266 from Jan. 1, 1908, to March 1, 1910, and $1,639,192 from March 1, 1910, to March 1, 1913, or a total of $2,122,458. Mr. Davies also combined the figures in the two tables last mentioned. Depreciation was figured on the additions at the same rates that were used in determination of the depreciation on the original property, not from Jan. 1, 1908, but from the date at which the property was added. The total depreciation on these items for the full period was $218,625. Similarly depreciation was computed on the renewals. This amounted to $240,060. The total of these two calculations was then shown, $458,685.

The next table showed the present value of the additions and renewals after deduction of the depreciation thereon. The value of these items as of March 1, 1910, was $944,808, and as of March 1, 1913, it was $4,279,525.

Mr. Davies then gave the reproduction value of the original property and of additions and renewals. On Jan. 1, 1908, the value in this table was $24,155,410; on March 1, 1910, it was $24,690,478, and on March 1, 1913, it was $26,950,197. The depreciation in the value of the original property and of additions and renewals was $5,680,579 on March 1, 1913.

The depreciated or present value of the original property and all additions and renewals was $18,909,252 on Jan. 1, 1908; $17,124,444 on March 1, 1910, and $16,023,458 on March 1, 1913.

Table II, published herewith, shows the ratio of the depreciated value of the property on Jan. 1, 1913, to cost compared with the ratios of the depreciated value, as fixed by Judge Tayler, to reproduction value.

The revenue car miles run, with trail-car mileage figured at 60 per cent of the motor-car mileage in each year, was as follows: In 1908, 22,928,059; in 1909, 24,074,834; in two months of 1910, 3,796,020; in ten months of 1910, 22,271,366; in 1911, 28,086,854; in 1912, 29,109,201; in two months of 1913, 4,594,926; total for the full period, 134,861,260.

Table III, published herewith, shows the depreciation per revenue car mile.

One table showed the depreciation on storage batteries calculated at 8 per cent instead of at 5 per cent. Perhaps that should have been 8⅓ per cent, but Mr. Davies had figured it at 8 instead of 5 per cent, the figure that was used in a previous table, and that made a difference in the amount of depreciation of $81,000. The depreciation at 5 per cent amounted to $135,073.

Another calculation gave the basis for the calculation of depreciation of scrap value which should be deducted from the depreciation shown in the tables submitted. Mr. Davies assumed the value of scrap at 10 per cent of the cost of property.

Table IV, published herewith, shows the ratio of the present value of the property to the cost of reproduction of the entire property. This gave a depreciated or present value for all the physical property as of March 1, 1913, of $16,695,669. This calculation disregarded an item of property sold and not replaced amounting to $57,350, on which depreciation should not have been included in the depreciation tables, and disregarded also the items of additional depreciation on storage batteries, which should have been included in the depreciation table. The latter item more than offsets the former and the inclusion of both would not materially affect the results. From these figures the ratio of depreciated or present value of the property, $16,695,669, to the total cost of reproduction of the entire property, $26,950,197, appeared to be 61.95 per cent. The ratio of the Tayler value to the reproduction value, Jan. 1, 1908, was about 78 per cent. There appeared, therefore to have been a depreciation of the difference between 78 per cent and 62 per cent. Mr. Davies thought that the percentage of depreciation which had been applied in the determination of these figures was conservative.

Mayor Baker went through a long period of cross-examination of the witness, seeking to show that replacement of parts of the property would continue from time to time so as to keep the plant in operating condition with the result that at the end of a fixed period of years the property would still be in as efficient working condition as at the present time. He discussed a car as a specific instance.

Mr. Duffy asked Mr. Davies if it was not a fact that in practice at the end of twenty years or some other time in the life of the car it reached such a condition that it could not be repaired any more. The witness said that that was so and that there might be depreciation on the car from another cause. It might become obsolete.

TABLE V—OPERATING EXPENSES

PER RIDE (CENTS)

	12 Months 1909	10 Months 1910	12 Months 1911	12 Months 1912	3 Months 1913
Power:					
Wages	0.06605	0.05729	0.04989	0.04681	0.04279
Fuel	0.13331	0.12260	0.11446	0.10933	0.08410
Power purchased	....	0.00038	0.00074	0.00606	0.06625
Other expenses	0.02123	0.01986	0.01674	0.01540	0.01484
Total	0.22059	0.20013	0.18183	0.17760	0.20798
Transportation:					
Wages, c. and m	0.66789	0.70823	0.71640	0.68055	0.62705
Wages, other	0.15879	0.13002	0.13406	0.12109	0.12194
Cleaning and sand	0.01474	....	....	....	....
Snow and ice	0.00241	....	....	....	....
Other expenses	0.02150	0.04599	0.04691	0.04564	0.06242
Total	0.86533	0.88424	0.89737	0.84728	0.81141
General:					
Officers and clerks	0.04461	0.04292	0.04129	0.04288	0.04537
Legal expenses	0.01974	0.00757	0.00394	0.00210	0.00207
Damages	0.09863	0.08990	0.08575	0.08111	0.07747
Insurance	0.01346	0.01514	0.02061	0.01881	0.01866
Stores	0.01167	0.01126	0.00852	0.00861	0.00814
Rent of tracks	0.00460	0.00861	0.01086	0.00828	0.00762
Rent of equipment	....	0.01106	0.01021	0.00956	0.00873
Commissioner	0.03547	0.02573	0.02011	0.02434	0.02585
Other expenses	....	0.01456	0.01296	0.01533	0.01550
Total	0.22818	0.22675	0.21425	0.21102	0.20941
Grand total	1.31410	1.31112	1.29345	1.23590	1.22880

PER FARE (CENTS)

	12 Months 1909	10 Months 1910	12 Months 1911	12 Months 1912	3 Months 1913
Power:					
Wages	0.08861	0.07633	0.06877	0.06583	0.06002
Fuel	0.17884	0.16337	0.15778	0.15377	0.11797
Power purchased	....	0.00051	0.00102	0.00852	0.09294
Other expenses	0.02848	0.02646	0.02307	0.02167	0.02082
Total	0.29593	0.26667	0.25064	0.24979	0.29175
Transportation:					
Wages, c. and m	0.89598	0.94369	0.98752	0.95714	0.87960
Wages, other	0.21302	0.17324	0.18480	0.17031	0.17105
Cleaning and sand	0.01978	....	....	....	....
Snow and ice	0.00324	....	....	....	....
Other expenses	0.02884	0.06128	0.06467	0.06418	0.08757
Total	1.16086	1.17821	1.23699	1.19163	1.13822
General:					
Officers and clerks	0.05985	0.05719	0.05691	0.06031	0.06364
Legal expenses	0.02648	0.01008	0.00544	0.00296	0.00291
Damages	0.13231	0.11979	0.11820	0.11408	0.10867
Insurance	0.01806	0.02017	0.02841	0.02646	0.02618
Stores	0.01566	0.01501	0.01175	0.01210	0.01142
Rent of tracks	0.00617	0.01147	0.01498	0.01165	0.01068
Rent of equipment	......	0.01474	0.01407	0.01344	0.01224
Commissioner	....	0.01940	0.01786	0.02156	0.02175
Other expenses	0.04758	0.03429	0.02772	0.03423	0.03626
Total	0.30611	0.30214	0.29534	0.29679	0.29375
Grand total	1.76290	1.74702	1.78297	1.73821	1.72372

PER CAR MILE (CENTS)

	12 Months 1909	10 Months 1910	12 Months 1911	12 Months 1912	3 Months 1913
Power:					
Wages	0.53660	0.50978	0.46547	0.46164	0.44183
Fuel	1.08295	1.09101	1.06784	1.07830	0.86840
Power purchased	....	0.00342	0.00691	0.05975	0.68418
Other expenses	0.17246	0.17673	0.15613	0.15193	0.15326
Total	1.79201	1.78094	1.69635	1.75162	2.14767
Transportation:					
Wages, c. and m	5.42569	6.30236	6.68363	6.71191	6.47503
Wages, other	1.28993	1.15698	1.25073	1.19427	1.25918
Cleaning and sand	0.11976	....	....	....	....
Snow and ice	0.01961	....	....	....	....
Other expenses	0.17465	0.40927	0.43768	0.45007	0.64461
Total	7.02964	7.86861	8.37204	8.35625	8.37882
General:					
Officers and clerks	0.36242	0.38194	0.38520	0.42290	0.46848
Legal expenses	0.16032	0.06735	0.03680	0.02074	0.02141
Damages	0.80121	0.80000	0.80000	0.80000	0.80000
Insurance	0.10938	0.13470	0.19226	0.18551	0.19270
Stores	0.09480	0.10021	0.07954	0.08487	0.08406
Rent of tracks	0.03737	0.07658	0.10135	0.08169	0.07862
Rent of equipment	....	0.09845	0.09522	0.09427	0.09013
Commissioner	....	0.12957	0.12090	0.15121	0.16012
Other expenses	0.28814	0.22899	0.18761	0.24003	0.26692
Total	1.85364	2.01779	1.99888	2.08122	2.16242
Grand total	10.67529	11.66734	12.06727	12.18909	12.68891

Mr. du Pont asked whether, assuming that obsolescence was omitted, the witness claimed that if any part of a railroad system was replaced piece by piece it could be kept in as good condition as it was originally. The witness said that he did not think it was possible to replace a car piece by piece and keep it going for twenty years.

Mr. du Pont asked if the company, except as the result of a collision, had ever discarded a car that was worn out so that it could not be operated for another year. Mr. Davies said that the company had discarded cars at times when other types of cars were adopted.

During the cross-examination of Mayor Baker on June 4 Mr. Davies said that he had tried to find errors in the basis on which he made up the figures and that if there were any errors he would help to work them out. If any error existed, it was in the inclusion of depreciation on additions to property. As the ordinance had been construed the company had felt that it was not entitled to any reserve to make up the depreciation on property added from new capital, because while new capital might be issued for the entire cost of the addition, and for that only, the ordinance seemed to indicate that the company might maintain the addition in a condition equal to 70 per cent of its cost, and therefore the reserve did not seem to provide for depreciation on this particular property.

TABLE VI—OPERATING EXPENSES PER CAR MILE (CENTS)

	12 Months 1903	12 Months 1904	12 Months 1905	12 Months 1906	12 Months 1907
Maintenance	....	4.38	5.31	6.90	6.35
Power plant	1.63	1.40	1.25	1.48	1.54
Cars	5.97	5.88	5.89	6.18	6.24
Transportation	....	7.28	7.14	7.66	7.78
General	1.62	1.91	1.74	2.07	2.02
Total	13.05	13.57	14.19	16.63	16.15

Table V shows the operating expenses per ride, per fare and per car mile from 1909 to 1913.

Table VI shows the car-mile operating expenses from 1903 to 1907.

Gross earnings per car mile have been as follows: In 1903, 22.38 cents; in 1904, 23.60 cents; in 1905, 24.28 cents; in 1906, 25.37 cents; in 1907, 23.17 cents; in 1908, 22.10 cents; in 1909, 26.36 cents; in 1910 (ten months), 23.29 cents; in 1911, 22.67 cents; in 1912, 22.84 cents.

SERVICE AND CAR-MILE RESULTS

During the afternoon session on June 4, Mr. Davies explained that part of the increase in car-mile expense in 1912 as compared with 1909 was due to the increase in the wages of conductors and motormen. That amounted to 1.3 cent per car mile. Part of the increase in general expenses was due to the appointment of a city street railroad commissioner, and the expense of his office was about 0.15 cent per car mile. Another factor affecting the results was that population and the number of passengers tended to increase faster than the means of transportation increased. If the expense of transportation or the operating expenses of the company were the same in one year as in the earlier years, and there was an increase in the number of car miles, the expense per car mile would be less. If there was an increase in business at a given rate per cent, and an increase in service or car miles at a lower rate per cent, the expenses per car mile might show an increase, while the expenses of operation per fare or per passenger or per ride would be reduced. If by increasing its operating expenses per car mile the company was enabled to increase its earnings per car mile in a larger proportion, it seemed to Mr. Davies that it was to the credit of the management and the commissioner who supervised the management. Mr. Davies also pointed out that the earnings per car mile were as large in 1912 as they were in 1903, notwithstanding the very large reduction of fare. Part of that was accounted for by the fact that the service measured in car miles had not increased in equal pace with the increase in the number of fares or the number of passengers carried. In reference to the increases in cost of officers' and clerks' salaries, Mr. Crawford brought out the fact that the requirements of the Tayler ordinance involved more clerical hire than was necessary before.

Mr. Davies then said that, accepting Mayor Baker's estimate that the population of Cleveland was 700,000, there had been an increase of 25 per cent in population since 1910. The number of fares in March, 1913, compared with March, 1910, showed an increase of nearly 32 per cent. The increase in the number of rides in March, 1913, over the number of March, 1910, was 41 per cent, while the increase in service measured in car miles was 16.35 per cent.

TESTIMONY OF CARL H. NAU

Carl H. Nau was introduced as a witness for the city. Since Jan. 1, 1912, the firm of which he is a member has been auditor for the city street railroad commissioner. Mr. Nau presented a number of tables and stated that the status of the interest fund strictly under the ordinance at March 1, 1913, would be $796,920. He had made an estimate of the amount of money which would be made by the company in the last fifteen years of the grant, based on the assumption that the number of passengers would increase at the rate of 6 per cent compounded annually, with an increase in the car miles at the rate of 5 per cent compounded annually. He then took the number of revenue fares thus accumulated and multiplied them by 4.15 cents, the maximum rate of fare chargeable during the last fifteen years under the ordinance. He multiplied the assumed number of car miles run by 24.04 cents. This figure allowed 12½ cents per car mile for operation, an average of 5 cents per car mile for maintenance and the amount per car mile that the interest and taxes now called for. The calculation showed a total income from passengers at the maximum rate of fare of $289,311,210 during the fifteen years from 1920 to 1934. There would be accumulated surpluses extending from something over $228,000 in the first year to over $9,000,000 in the last year. Accumulating all of them and not adding interest on the accumulation but merely the sum of the accumulations together gave a total of $83,226,858.

Mr. Baker asked what increase in the capital value would be necessary to carry passengers at the rate assumed in that period.

Mr. Nau said that the largest estimate he had ever heard made was that at the end of this fifteen years the capital value of the company might be $50,000,000. At present the capital value is $26,000,000.

Mr. Duffy asked if the $26,000,000 was not almost $4 of capital for every $1 of earnings. The earnings in 1912 were something less than $7,000,000. Was it not reasonable to suppose that in order to earn any sum there must be capital corresponding, or the company would not have the facilities with which to earn the amount? Mr. Nau said that the earnings for the last year of the fifteen-year period would be $28,000,000 according to the table.

Mr. Duffy said that if the earnings continued at the rate of $10 per capita per annum, the population necessary in Cleveland at the end of the fifteen-year period to contribute $28,000,000 of operating revenue would be 2,800,000.

OTHER TESTIMONY.

At the morning session on June 5 Mr. Baker read an agreed statement of facts with regard to one of the questions submitted by the city affecting the surplus of old companies, which stood on Jan. 1, 1913, on the balance sheet at $323,304. This amount was the balance remaining of the balances which were brought over from the old company when the Cleveland Railway Company books were opened about March 1, 1910. It represented the difference between the assets ascertained at that date and the known liabilities at the same date, plus the capital value as fixed by Judge Tayler. There were, however, certain assets and liabilities having their origin prior to March 1, 1910, which had not been ascertained, and this account was left open to take care of future bookkeeping adjustments necessary to be made after such additional assets and liabilities existing March 1, 1910, had been finally determined. There had been charged against this balance payments made on account of the final liquidation of old injury and damage suits and other expenses and claims which antedated March 1, 1910 but had not been settled at that date. There were still pending certain liabilities and old injury and damage suits, tax claims, etc., which might have to be paid at some future date, and such payments would then be charged against this balance. If, after a final determination of all pending claims and liabilities of every kind antedating March 1, 1910, the account showed a credit balance, the credit balance would represent the excess of assets over liabilities plus the capital value as determined in the ordinance, and if the account showed a debit balance after all liabilities as of March 1, 1910, had been liquidated, then the debit balance would represent a deficiency between the assets and all liabilities, plus the capital value as of March 1, 1910. The city and the company therefore agreed, as disposing of this question, that on March 1, 1916, or as soon thereafter as all cases then pending against the company involving taxes or claims having their origin prior to March 1, 1910, shall have been finally determined, the balance then remaining, whether debit or credit, shall be written off by writing up or down the book value of the property of the company without affecting the capital value as defined by the ordinance.

Taking up another of the questions, Mr. Baker said that when the settlement was finally made under the Tayler ordinance $189,300 stock of the Cleveland Railway Company was among the assets in the hands of the receivers of the Municipal Traction Company. This was due to the fact that the latter company had been buying and selling stock of the Cleveland Railway Company. This stock was turned over by the receivers to the Cleveland Railway, and by that company was placed in the hands of Horace E. Andrews as trustee. Dividends had been paid regularly on the stock, and when the company had sold additional stock and had offered it at par to existing shareholders, Mr. Andrews as trustee had taken advantage of the option and bought additional stock, paying for it out of the dividends. Mr. Andrews, therefore, held as trustee the original sum and the accruals thereon. The question before the arbitrators was whether the original sum should be regarded as part of the general property of the company, and if so should the stock be sold and the proceeds used in improvement of the property without additions to capital value, and should the earnings of the original principal sum of $189,300 go to the interest fund as general earnings of the company, or if not disposed of in this manner, how should the principal and interest be disposed of?

Mr. Davies was recalled to tne stand on the afternoon of June 5.

Mr. Baker said that since March 1, 1910, the company had expended in betterments and additions to the property a large sum out of capital account. Had there been any charge in those betterments for general overhead or general expenses?

Mr. Davies said that had not been the practice.

Mr. Crecelius, speaking about this point, said that the wages of employees working strictly on betterments were charged to capital. No salaries of engineers, purchasing agents, auditors or general officers had been charged to capital account under these circumstances, but all were paid as expenses.

FINAL ORAL ARGUMENTS

When the arbitrators met on the morning of June 6 Mr. Crawford referred briefly to some of the minor questions involved before beginning his discussion of the principal matters of controversy. He said that the question as to the amount in the interest fund as of April 1, 1913, would be determined automatically by the decision of the arbitrators on the other questions. He understood it to be Mr. Baker's desire that the disposition of the surplus of old companies, although settled by agreement between the city and the company, be included in the award of the arbitrators. Mr. Crawford said that the framers of the ordinance agreed that the company should be secured in its investment and in a fair and fixed rate of return, and that the city should have the best street railroad transportation at cost consistent with the security of the property and the certainty of a fixed return thereon and no more. The purpose was in effect to maintain the integrity of the property at all hazards so long as it could be maintained within the maximum rate of fare. If any contention of the city impaired or reasonably threatened to impair the integrity of the property or the certainty of a fixed return, it must be rejected. When the meaning and intention of the parties in drawing the contract was ascertained, there was only one other question. Was it a legal intention? If it was, then nothing was left to the board to do but to enforce the contract.

Mr. Crawford argued that in considering the matter of the operating expense allowance the arbitrators must always keep in mind the fact that the company had no control over the quantity or quality of the service furnished. That was under the absolute control of the city all the while. The company had shown that it actually cost it to render the service which the city had exacted of it 12.19 cents per car mile for the last year. There had been no claim or suspicion that the road had not been well and efficiently and economically managed. The city had had the service, it had cost more under economical management than the ordinance allowance, and the company simply asked to be reimbursed in accordance with the provisions of the ordinance which said that the city was entitled to transportation at cost. It was idle to say that the framers of the ordinance could attempt to set in advance a limitation upon the cost. They made an allowance which was the best estimate that they could get on the subject.

Mr. Crawford went into the history of the ordinance, saying that it was drawn at the end of the most bitter ten years' conflict in the history of the world between a municipality and a public service corporation. When the Tayler ordinance was drawn neither side was willing to trust the other. The device of a board of arbitration was then arranged. The city had previously approved of a construction of the ordinance which permitted the company to increase the operating expense allowance to make good a deficit.

In referring to the matter of the reserve funds, Mr. Crawford called the attention of the arbitrators to the section of the ordinance which said that the purpose was to secure to the company unimpaired its capital value. The position of the company was that it could not keep its capital value unimpaired unless it took from the operating revenues of each year a sufficient amount to meet the expenses of that year. There could be no surplus until every liability of the year was either paid or provided for. It was just as much to the interest of the city as to the interest of the company to collect from the car riders of each year the cost of the operation of the system in that year. There was nothing alarming in the size of the accident fund, but if it should grow to alarming proportions the stockholders would not get it, the money would be the property of the company. If the arbitrators thought the amount was too high they could reduce it. He did not care to what point they reduced it, so long as they gave the company what they thought would be enough. The matter of the insurance reserve, Mr. Crawford said, was of comparatively small moment, except as it involved a question of principle. The fund was the property of the company, not of the stockholders.

Mr. Crawford then took up the subject of the present allowance for the maintenance, renewal and depreciation expense. He referred to the expenditures of the company and said that no suggstion had been made that any part of this sum had been spent improperly. In addition to the current expenditures the ordinance contemplated that there should be a reserve to take care of the depreciation that everybody knew would ensue in spite of the ordinary maintenance of the property. Mr. Crawford argued that the $800,000 for the disused and scrapped power equipment should be written off. To allow any part of that amount to stand on the asset side of the balance sheet would be misleading, because there would be nothing to represent it.

Judge Killits asked if in this particular case the Cleveland Electric Illuminating Company contract would be regarded as an asset of the company, varying in value according to the number of years it had to run.

Mr. Crawford said that if it was distinctly established that the contract had a value, then it might be so regarded to that extent, but it had been suggested that the company could produce power cheaper than it could get it under the contract if it would make certain expenditures. There was no evidence of the value of the contract as an asset, and it would be upon the city to show that. The company showed that the power plant had been scrapped at $800,000 and the burden would be upon the city to show that there was some other asset that had taken its place. All that the company had from the Illuminating company was the privilege of taking the power and paying for it. It paid the Illuminating company the cost of the power, so that it was not an asset.

Mr. Crawford said that when the property was valued in connection with the Tayler ordinance, it was not valued as an operating system but at the cost of reproduction less depreciation. If the city valued the property again it would apply the same rule or some different rule of depreciation. If the city was to make another valuation to-day it would confront the company with the depreciation of the property at 5 per cent per annum. To offset the maintenance and depreciation charges the company had had an allowance of 5 cents per car mile, but approximately 3 cents of that had been used in ordinary maintenance and the remainder had actually gone into the property by way of renewal, and still there was no provision for arresting the depreciation. As a private property the company set aside 6¼ cents per car mile in 1908; in 1905, 5.32 cents; in 1906, 6.81 cents, and in 1907, 6.38 cents.

The company also asked an allowance to make up the overdraft of the operating expense fund. That could be distributed over such a period of time as the arbitrators thought proper. The deficit in the maintenance fund, however, ought to be made up immediately. The charge of $800,0000 for the power equipment that was to be displaced should be taken into account in the consideration of this point. The continued success of the Tayler plan was dependent upon the prosperity of the company. To enable it to finance economically it must keep its stock above par and make the improvements that the city required. In Mr. Crawford's opinion the changes in the allowance should be so gradual as to cause as little as possible disturbance in the rate of fare, if any at all. Judge Killits asked what disturbance in the rate of fare the allowances would create if they were awarded at this time. Mr. Crawford said he did not know, but he thought that all that would be necessary would be to put on 1 cent for a transfer. On the undisputed testimony there was $500,000 in the interest fund.

Judge Killits asked if there was anything that would prevent taking some of the $500,000 in the interest fund to make the deficits good. Mr. Crawford thought a strict construction of the ordinance would prohibit that. He thought he spoke for the officers of the company when he said they were not particular about any method. The company did not care what rate of fare was charged so long as it could maintain the property unimpaired and get its 6 per cent.

Mr. Duffy asked if he was to understand Mr. Crawford to say that in his judgment the amount could be transferred from the interest fund. Mr. Crawford said that that was only his hasty conclusion. Mr. Duffy said that the board would recommend in its decision a satisfactory way of making up the deficit.

Mr. Crawford said that Mr. Stanley suggested that of course it could be done by ordinance. Mr. Davies had made the suggestion, which Mr. Crawford thought was a very excellent one, that this could be done under the ordinance by dating the allowance back. There was nothing in the ordinance to prevent dating back the allowance.

ARGUMENT OF MR. BAKER

Mr. Baker then made his argument on behalf of the city. He said he could not help but feel that the decision that the board made involved the failure or success of the ordinance. Mr. Baker said that the city of Cleveland kept its eye on the status of the interest fund. That was the only thing affecting the rate of fare which interested the people of Cleveland. If there had been any complaint on the part of the company that an increase of operating expenses per car mile was the result of any requirement made by the city, proof of it would have been produced by the company in this arbitration.

Mr. Baker said that it did not really matter whether the sum designed to provide for depreciation was in money or in property. The city contended that the ordinance provision that the company should be enabled to make good any deficit meant that if in the administration of the funds the company found that there was likely to be need for more money than the then existing allowance would produce, it might ask the city to agree to an increase in the allowance. In addition, it was easily thinkable that sudden and unexpected emergency matters might arise which would cause a need for an increase in one or the other of the funds. In the presence of a difficulty the company would have to act, and when such an emergency had been met in a prompt, efficient and economical way, then it would be entirely proper for the company to go to the city and ask for an increase in the allowance. The company brought in statements made up from its books showing that it had expended more money than the allowances would produce. There was not a scintilla of proof to show the necessity for all of the expenditures.

Judge Killits asked: "Except as to the increase of wages?"

Mr. Baker said that the city was not making any complaint about the increase of wages, but it was admitted that no assent was received from the city for the increase. He did not criticise that because he did not think it was the business of the city. He thought that the company had the right to pay its operators whatever it chose to pay them so long as it did not come to the city and ask the city to increase the allowance. If the company paid too much and still kept within the allowance, the street railroad commissioner could object. Mr. Baker contended that if unusual conditions developed, they afforded the best sort of reason for immediately going to the Council and asking an increase in the maintenance or the operating expense allowance. The fact that the rate of fare was variable instead of inflexible showed that it was intended as a reservoir to take up the shock of sudden need instead of spreading it over a number of years.

Taking up the question arising from the proposed scrapping of the power equipment of the company, Mr. Baker said that he thought the arbitrators had no control over the method to be adopted by the company in charging the amount against the maintenance and renewal fund. He thought that the city had the right to say when this amount should be charged off, but if this should be determined otherwise it seemed to him that it ought to be distributed over a period of years. If the company could spend any excess over the allowance, then it was idle for the city to put limits in the ordinance. He thought that the arbitrators would be obliged to find that the limits were absolute. He had no particular interest in a further reduction of fare at this time. He did not believe the people of Cleveland wanted the fare reduced. He thought they would rather keep the fare at the place it now is for a little while and let any revenues accruing from that source go into the further betterment of the property.

Mr. Baker did not believe the arbitrators would find that they had any right to take a penny out of the interest fund to pay either of the deficits, but he thought that the city had the right to agree that the deficits should be wiped out of the interest fund, and he should recommend to the Council, and he felt quite certain that the Council would act favorably upon the recommendation, that the company be authorized to straighten up its books by taking out of the interest fund, when it should have been restated in accordance with the rules as he believed the character of the determination of the arbitrators would require, enough to straighten up the maintenance, depreciation and renewal account, and also to straighten up the operating allowance so that from this date there would be a clear balance sheet. If the arbitrators should decide that it seemed wiser to make the operating allowance 12 cents per car mile than to leave it at 11½ cents, then the city should not have any complaint on that score. It would not prejudicially affect the interest fund in the way of affecting the rate of fare. Mr. Baker believed that 11¾ cents would be enough, but he had started out with the proposition that the figure might be put at 12 cents, and that would probably be wise. The increase in wages of motormen and conductors seemed to run the car mile expense up about 1 cent per car mile. The schedule speed had been increased, and with the increase of power it was possible to make faster time, and by the adoption of alternate stops and other devices more miles were run in the same number of hours by the platform employees, so that the car mile cost of motormen's and conductors' wages was showing a tendency to decrease, and those who had been watching from the side of the city believed that the limit of economy in this direction had not yet been reached.

Mr. Baker felt that there should be no increase above 5 cents in the maintenance allowance, and that probably if the city were to undertake to revalue the property as it was valued at the time of the Goff-Johnson valuation, it would be in a position to claim a substantial reduction in the 5 cents per car mile allowance rather than an increase, but it did not desire to make that request.

Mr. Baker said that in the preparation for the arbitration it had been necessary for the city street railroad commissioner's office to have an unusual amount of service from the firm employed as accountants in that office, and he hoped that the board would allow the city to present the extra expense that had been incurred on that account so that provision might be made for it.

The hearing was thereupon concluded.

METHOD OF CHECKING CREWS REPORTING FOR DUTY AT DALLAS, TEX.

The operating department of the Dallas Electric Corporation, which controls the street railway companies operating in Dallas, Tex., has adopted a clever method of checking the crews reporting for duty. All trainmen are permitted to select their runs every three months on a seniority basis, and all crews, both regular and extra, are required to report for duty ten minutes before they are due to take their runs. To obtain an accurate check on the report time of each crew, a regular and extra run assignment board has been installed in each carhouse. This board shows the various lines and runs as well as the crews assigned to them. In the column adjacent to one showing the line and run numbers two holes appear opposite the different runs and under a heading marked "motorman" and another heading marked "conductor."

Whenever a regular man reports for duty he inserts a white plug in the proper column opposite his run number. In case a trainman fails to appear ten minutes before he is due to take out his car, the car starter inserts a red plug in the proper position in the run assignment board, which indicates that an extra man has been assigned. If the regular man arrives before his car is started and can offer a satisfactory excuse to the car starter, he is permitted to go on duty. A brass plug inserted in the board indicates to the motorman or conductor that he is wanted at the office. The advantage of this system is that the number of crews having reported for duty at any time may be checked at a glance, and as a result the men are more punctual in reporting for their runs.

EQUIPMENT COMMITTEE MEETING AT PITTSBURGH

A meeting of the American Electric Railway Engineering Association committee on equipment was held at the Fort Pitt Hotel, Pittsburgh, Pa., on Thursday, June 5. The members present were F. R. Phillips, chairman, Pittsburgh; E. W. Holst, Boston; W. R. McRae, Toronto; J. P. Barnes, Syracuse, and J. M. Bosenbury, Peoria. J. M. Larned, Pittsburgh, who is chairman of the committee on way matters, was also present to discuss the fitting between the proposed standard rail and wheel.

The first subject considered was that of specifications for steel wheels. The sub-committee had outlined a program which had not been entirely completed, but this program was acceptable to the committee and the sub-committee was instructed to report finally by July 1. One valuable novelty of this report will be a series of gages for checking all important classes of wheel tolerances, such as contour, flange tread, eccentricity, plane and tape. Mr. Larned then submitted drawings of the proposed girder rail standard which met with the approval of the committee.

The sub-committee on self-propelled cars made a statement of progress as additional data are being secured for inclusion in its final report.

The report of the sub-committee on wires and cables was next presented. In addition to two specifications covering flexible wire with 20 per cent Para rubber content for car wiring, the report contained the substance of many interesting answers which had been received to questions on car wiring. This report will present the specifications as tentative.

Following a discussion on the location of cable cleats under double-truck cars, the committee considered the question of air-brake hose specifications. The sub-committee stated that this problem was also before the Master Car Builders' and Air Brake associations. The committee then read the Master Car Builders' new specifications, which will come up for discussion at their June convention this year. The final report of this sub-committee will include a résumé of the papers and discussions on this subject as read at the latest meetings of the two associations named, but in view of the novelty of the subject only tentative specifications will be submitted to the convention.

The report of the sub-committee on revision of brakeshoe standards related to defining the gage line in the standard flanged brakeshoes as affecting the construction of brakebeams, to the comparatively rapid wear of the ends of brakeheads, to variations from the standard of the Central Electric Railway Association in over-all length and tread tape, to errors in dimensions, etc. The report was accompanied by sketches of the shoes if revised as proposed. After making some changes, this report was adopted. One change proposed is that the brakeshoe drawings be revised in their entirety so that all dimensions will be indicated from a base line, which base line shall have a definite relation to the gage line of the wheel.

The chairman was instructed to write letters of good cheer to L. M. Clark, Indianapolis, and R. N. Hemming, Anderson, who were unable to attend the meeting because of the recent flood conditions in their properties.

Programs of New York and American Associations

The Latest Particulars Are Presented of the Programs at the Next Annual Meetings of the New York State and American Electric Railway Associations, to Be Held During June and October Respectively

As already announced, the annual convention of the New York Electric Railway Association will be held at Brighton Beach, N. Y., this year on June 24 and 25. Technical sessions will be held on the morning and afternoon of Tuesday, June 24, and on the morning of Wednesday, June 25. A list of the papers to be presented follows:

"Construction of Timetables and Schedules," by J. J. Dempsey, superintendent of transportation New York Consoildated Railroad Company, Brooklyn.

"Maximum Traction Trucks Versus M. C. B. Trucks for City and Suburban Service," by H. A. Benedict, mechanical engineer Public Service Railway, Newark, N. J.

"Operating Economies," by J. S. Doyle, superintendent of car equipment Interborough Rapid Transit Company; W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, and J. S. McWhirter, superintendent of car equipment Third Avenue Railway, New York.

"Freight and Express Business on Electric Railways," by Frank Walsh, superintendent Electric Express Company, Schenectady.

"The Corresponding Location of Trolley Wires on Curves and Proper Location of Overhead Frogs," by J. H. Barnard, engineer The J. G. White Management Corporation, New York.

"Relations Which Should Exist Between the Railway Companies and Their Employees," by N. W. Bolen, superintendent of transportation Public Service Railway Company, Newark.

"Standard Methods for the Mechanical Department," by John Sibbald, master mechanic Fonda, Johnstown & Gloversville Railroad Company, Gloversville.

Question box:

(1) What success has been experienced in mounting both motors on the rear truck of a single-end passenger car? Has any trouble developed on account of the wheels of the front truck derailing during snowstorms?

(2) Has it been found to be of any considerable value to have a steel wire which is grounded at short intervals carried on top of the pole line that is carrying a high-tension transmission line through a country that is subject to frequent electrical disturbances?

(3) What, if any, publicity work is desirable when contemplating any radical change in operating conditions, especially when the local public is not inclined to accept new ideas without protest?

(4) What are the comparative values of leather and rattan coverings for seats in interurban cars?

(5) What is considered the best method of keeping trainmen on scheduled headway?

(6) Should the operating department or the mechanical department be held responsible for the work of cleaning cars? Which is the best plan and why?

(7) What is the minimum number of car movements per hour to make economical or practical the use of an automatic electric track switch?

(8) What method do you employ for obtaining and computing individual city car mileage?

(9) Do you find that creosoted ties affect the growth of weeds on roadbed? If so, state results after a period of years.

(10) Has spar varnish ever been used on cars as a paint preservative? Would not an application twice a year lengthen the life of the paint?

(11) Which method should be followed with cars equipped with maximum traction trucks—should pony wheels be inside or outside? Which method gives the best tractive effort?

(12) What is a fair maintenance cost per mile of line for the distribution system, including in this the return circuits?

(13) From an accounting standpoint, what is the proper method of keeping time of trainmen and checking same?

ENTERTAINMENT

An attractive entertainment program has been arranged. On Monday evening at 9 p. m. those in attendance will visit Steeplechase Park. On Tuesday at 2 p. m. an automobile trip will be provided for the ladies. They will return to the hotel at 4 p. m., when there will be a tea dance. The banquet will occur at the hotel at 8 p. m. on Tuesday, and it is promised that the dancing after the banquet will be more pleasing than is usual in summer weather owing to the proximity of the ocean.

On Wednesday, after the adjournment of the convention, there will be a shore dinner at Tappen's roadhouse at Sheepshead Bay.

THE BANQUET

A list of excellent speakers has been arranged for the banquet which will take place on Tuesday evening, and it promises to be one of the best ever held by the association. The speakers will include two public service commissioners, Hon. Edward E. McCall, of the First District commission, and the Hon. Martin S. Decker, of the Second District commission, also General George H. Harries, president American Electric Railway Association; Theodore P. Shonts, president Interborough Rapid Transit Company; Colonel T. S. Williams, president Brooklyn Rapid Transit Company, and Howard MacSherry, attorney Public Service Corporation of New Jersey.

COMMITTEES

Three committees have been in charge of the meeting as follows: Program committee—W. H. Collins (chairman), J. K. Choate, H. N. Latey and H. C. Donecker. Committee on arrangements—J. H. Pardee (chairman), C. R. Ellicott, J. K. Choate, Frank Hedley, C. C. Castle, Stuart Wilder, S. W. Trawick and J. J. Dempsey. Committee on entertainment—J. P. Barnes (chairman), C. R. Ellicott, Robert M. Colt, J. Stanley Moore, C. E. Barry and H. N. Ransom.

Secretary Dietz of the association announces that the Brooklyn Rapid Transit Company has recently joined the association and will, of course, be well represented at the meeting. A large attendance is also expected from the other member companies of the association as well as from some of the large companies in neighboring states like New Jersey and Connecticut.

HOTEL ACCOMMODATIONS AND EXHIBITS

Applications for hotel accommodations should be made to H. J. Hanf, manager Brighton Beach Hotel, Brighton Beach, N. Y. All sessions are to be held at this hotel. It is further announced that the hotel management has made especially attractive rates for the delegates to the convention.

No general provisions will be made for an exhibit of appliances and apparatus by allied members, but any such exhibits will be welcome, and arrangements for space can be made directly with the manager of the Brighton Beach Hotel.

PROGRAM OF ATLANTIC CITY CONVENTION

The American Electric Railway Association has announced the subjects for discussion at its convention in Atlantic City on Oct. 13-17. The topics were selected by a subjects committee, consisting of J. D. Mortimer, chairman; Calvert Townley, E. C. Foster and Martin Schreiber, and are as follows:

"Valuation."

"Relations of Carriers to the Development of the Territory They Serve."

"The Relief of City Congestion by the Construction of Subways and Viaducts."

"Electric Railway Securities from the Investor's Viewpoint."

"Present Tendency of Public Utility Laws and Regulations."

"Profit Sharing with Employees."

The names of the speakers who are to treat these subjects have not yet been made public, but a tentative list has been agreed upon and announcement will be made as soon as definite arrangements have been made.

MEETING HALLS

The meeting halls have been assigned to the different associations. The American and Transportation & Traffic associations will meet in the Greek Temple, which is near the end of the Pier and has been enlarged during the past year. A new meeting hall has been constructed for the engineers not far from the Greek Temple and a little farther out on the Pier. The Claims Association and the Accountants' Association will meet on the second floor of the entrance hall. From this arrangement it will be seen that all the meetings will be held on the Pier this year.

The association has announced the membership of the transportation committee which will have charge of the selection of the special trains to the convention. W. O. Wood, Long Island City, is general chairman.

The names of the gentlemen who are chairmen of the committees in charge of the transportation from different sections of the country follow:

New England, M. C. Brush, Boston.

New York State, exclusive of New York City, W. H. Collins, Gloversville, and B. E. Tilton, Syracuse.

New York City, Joseph K. Choate, New York.

Philadelphia and vicinity, H. J. Crowley, Philadelphia, Pa.

Middle Atlantic States (Delaware, Maryland, Virginia and District of Columbia), C. B. Buchanan, Richmond, Va.

Central Electric Railway Association (Indiana, Ohio, Michigan and western Pennsylvania), R. I. Todd, Indianapolis, Ind.

Chicago (northern Illinois and Wisconsin), E. C. Faber, Wheaton, Ill.

Central Northwest (Minnesota, South and North Dakota and Iowa), Horace Lowry, Minneapolis, Minn.

St. Louis, Kansas City and Southern Illinois, Richard McCulloch, St. Louis, Mo.

Southwest (Texas, Oklahoma and Louisiana), D. A. Hegarty, New Orleans, La.

West (Colorado, Utah, Nebraska, Kansas), John A. Beeler, Denver, Col.

California, W. R. Alberger, Oakland, Cal.

Northwest, A. W. Leonard, Seattle, Wash.

Canada, Patrick Dubee, Montreal.

Southeast, E. C. Deal, Augusta, Ga.

In this connection, the association will not issue any bulletins this year in regard to the arrangements at the convention, but instead will print this information in the pages of its monthly publication.

EXHIBIT COMMITTEE

The Manufacturers' Association announces that the following have been appointed members of the exhibit committee for 1913:

E. H. Baker, vice-president in charge of exhibits, New York.
H. G. McConnaughy, director of exhibits, New York.
George Arnold, Cleveland, Ohio.
L. R. Ashhurst, Jr., Philadelphia, Pa.
S. A. Bullock, Philadelphia, Pa.
S. J. Cotsworth, Philadelphia, Pa.
F. H. Gale, Schenectady, N. Y.
L. E. Gould, New York.
N. M. Hench, Pittsburgh, Pa.
William M. Henderson, Steelton, Pa.
T. W. Illingworth, Philadelphia, Pa.
S. G. Johnson, New York.
F. D. Killion, New York.
J. R. McFarlin, Philadelphia, Pa.
J. C. McQuiston, East Pittsburgh, Pa.
John F. Ohmer, Dayton, Ohio.
J. W. Perry, New York.
A. L. Price, Mansfield, Ohio.
F. W. Sargent, Mahwah, N. J.
L. H. Snyder, Jersey City, N. J.
Charles H. Thomas, Franklin, Pa.
S. M. Wilson, Philadelphia, Pa.

CHANGES ON THE PIER

As already published in this paper, the conditions on Young's Pier have been improved, and an extension has been built to Machinery Hall. There will be no outside booths this year or booths not under cover, and Aquarium Court will not be utilized for exhibits. The Hotel Men's Annex has been roofed over permanently with the exception of a small space running through the center which will be covered with canvas for light and air or in such a way that there will be no danger from rain. While there is not much opportunity in the way of special decorations for the building, an attempt will be made to have each room laid out to the best advantage. The main building will be arranged along lines similar to those of previous years, with the registration booth and some of the larger exhibits in the lobby.

W. Berry, Carnegie Steel Company, chairman of the finance committee, is organizing that committee, but the names of the members are not yet available for publication.

POWER COSTS AT WORCESTER CONSOLIDATED PLANT

In connection with a report recently prepared by George T. Delaney, inspector, for City Solicitor E. H. Vaughan, of Worcester, Mass., on operating conditions upon the Worcester Consolidated Street Railway, data are presented on the cost of power production at the company's generating plant at Millbury. The Millbury plant is the most modern street railway generating station in central Massachusetts and at present contains four Edgeworth 820-hp boilers with Murphy stokers, two 300-kw, 600-volt direct-current generators driven by horizontal compound condensing engines, and a 5000-kw steam-turbo unit, supplying the Worcester system through step-up transformers and two 13,000-volt lines carried on steel towers to a 3000-kw substation at Madison Square, Worcester, 6.5 miles distant. The operating steam pressure is 185 lb. The cost of operation taken from the station log on Feb. 18, 1913, was as follows:

Labor:	
Two machinists	$5.00
Three engineers	14.30
Three laborers	6.00
Three helpers	4.50
Six firemen	12.00
Three water tenders	6.75
Three coal laborers	5.25
Total labor cost	$53.80
Total cost of fuel and supplies	337.72
Total cost of manufacture	$391.52
Total cost of manufacture per kw-hr	0.67
Kw-hr. output	57,448

NORFOLK & WESTERN ELECTRIFICATION PLANS

The plans for the electrification of the Norfolk & Western Railway, which are being prepared by Gibbs & Hill as designing and constructing engineers, call for the unusual condition of handling coal trains only, passenger trains being handled through the electric zone by steam locomotives. As outlined in a preliminary account in the ELECTRIC RAILWAY JOURNAL for May 3, 1913, page 800, the electrified section constitutes practically a separate gathering division for the coal traffic from the Pocahontas region, comprising about 30 route miles. The heavy coal business originates west of the summit and is in large part hauled eastward over grades of from 1.5 per cent to 2 per cent. The coal trains originating on the division are at present filled out generally to a weight of 3250 tons from the various workings along the line and hauled over the grades at a speed of about 7½ m.p.h. by three Mallet engines, one at the head end of the train and two pushing. The Mallet engine equipment is used locally on this division, and under electric operation these engines will be displaced by electric locomotives, allowing the Mallets to be used on the other regular divisions of the road.

It is not the intention at present to conduct the through merchandise freight or passenger service by electricity, the electric service being confined to traffic designated as "tonnage trains" originating on the electrified section. These tonnage trains of 3250 tons will be electrically operated by head engines and pushers at a speed of about 13 miles per hour up the heaviest grades. The number of trains handled up the grade will be about twenty per day, comprising a daily tonnage of 65,000, but the design of electrical equipment will be such that this tonnage can be progressively increased in the future as the occasion requires.

Electric power will be generated in a steam power house to be erected by the company at Bluestone, which is on the line of the railway, about one-third the way from Bluefield to Vivian. This power house will have an installed capacity at present of 24,000 kw. All work is to be completed for service in the summer of 1914.

INDIANA BLOCK SIGNALS

Details of the contracts with the Union Switch & Signal Company for the installation of block signals on some of the Indiana interurban lines as reported in the ELECTRIC RAILWAY JOURNAL for May 10, 1913, page 843, have been announced. It is stated that the installation from Gary to South Bend, Ind., on the Chicago, Lake Shore & South Bend Railway, comprising 55 miles of single track, has twenty passing sidings and is to be protected by eighty one-arm semaphore signals of the style "B" type. The installation from siding No. 6 to siding No. 20, on the Indianapolis, Columbus & Southern Traction Company's line, covering approximately 24 miles of single track, will use semaphore signals at passing sidings and light signals for the intermediate signals, making a total of twenty-six style "B" one-arm semaphore signals and twenty-six light signals.

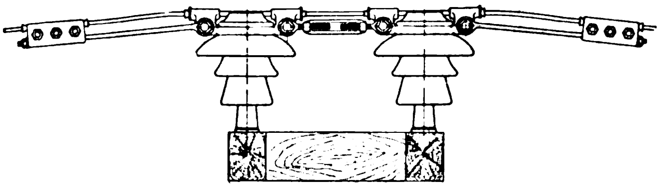
The section from Sellersburg to Watson Junction, on the Louisville & Northern Railway & Lighting Company's line, covering 3½ miles of single track, has two passing sidings to be protected by four semaphore signals of the style "B" type and four light signals. The semaphore signals will be placed at passing sidings, and light signals will be used as intermediate signals. From the Michigan City limits to the Laporte carhouse on the Chicago, South Bend & Northern Indiana Railway, covering 9½ miles of single track, with five passing sidings, the line will be protected by twenty style "B" one-arm semaphore signals.

All of the railways mentioned employ direct-current propulsion, with the exception of the Chicago, Lake Shore & South Bend Railway, where twenty-cycle alternating current is used. Summed up, the signaling for the four railways covers about 92 miles of single track, with forty passing sidings and with 160 signals, of which 130 are of the style "B" semaphore type and thirty of the light-signal type.

SAFETY CLAMPS FOR LINE CROSSINGS

Recognizing the necessity of protecting transmission, telephone and telegraph lines from other lines which may cross over or under them, the Clark Electric & Manufacturing Company, New York, N. Y., has developed individual insulator clamps and clamping sets to afford safety at crossings for all types of straight and angle overhead work. Clamps of copper composition of high tensile strength are used with bare copper conductor and clamps of galvanized or sherardized malleable iron with steel or aluminum conductor, to avoid all chance for electrolytic action between metals electrically dissimilar.

It was recognized at the outset that the insulator clamps to be most effective should be so fastened to the insulator heads that they could not possibly become detached from them. Cemented caps were discarded as being unsafe and likely to work loose. The clamping set shown in the accompanying illustration was specified by the Pennsylvania Railroad for potentials in excess of 2500 volts. The clamps extend well beyond the insulators, directly under the line, so that should arcs arise they will form between the clamp and the ground rather than from the line. Heavy bushings also protect the conductor at the insulators. If the conductor should fuse at the insulator, the extension clamps, which are held to the main insulator clamps by steel eyebolts, will still hold the line in place. The insulator clamps are all made extra heavy to provide a high factor of safety in excess of the ultimate strength of the conductor and are provided with large heat-radiating surfaces. Usually turnbuckles fasten the clamps together although flat steel connecting members are often used. A clamping set has also been developed for use with strain insulators.


Overhead Clamping Set

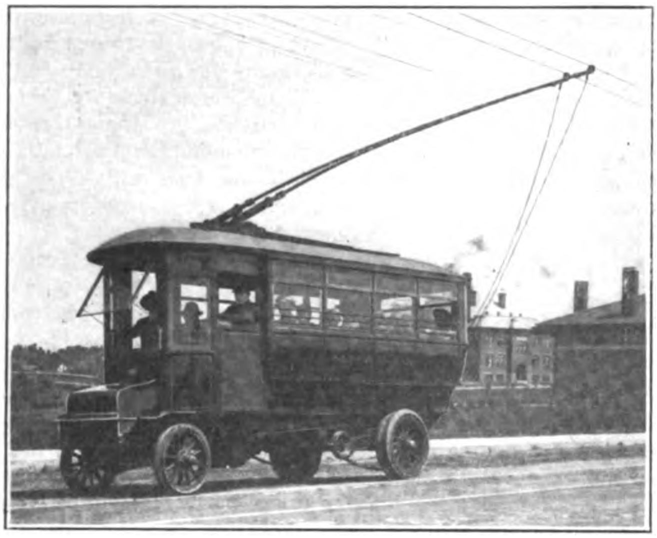
Tests have been made which show that if the line used with the clamping sets either for more or less than 2500 volts is cut on the insulator head, directly between the two clamping members of an insulator clamp, the conductor may be broken without pulling through the clamp. Although the line is protected from arcs, no members are brought out at right angles to the line to extend beyond the insulators, as is sometimes recommended at present. The use of these pieces is considered unnecessary and, in fact, rather a menace than otherwise. It is held to be much better to use insulators of suitable length rather than to take any chances with arcs.

The Cleveland, Southwestern & Columbus Railway is making a number of improvements in its power plant at Elyria, Ohio, involving a total expenditure of $125,000. The previous capacity of the plant was 4000 kw. A G.E. 5000-kw horizontal turbine has been installed, making the total present capacity of the plant 9000 kw. About July 1 the company will begin to use natural gas for fuel at this plant. The transformers are now in the basement of the building, but a new transformer room, 35 ft. x 65 ft. in size, has been built, and the equipment will be moved into this addition.

TRACKLESS TROLLEY BUS AT MERRILL, WIS.

A single trackless trolley bus has been put in operation in Merrill, Wis., by the Merrill Railway & Lighting Company. The bus seats eighteen passengers and is equipped with a 500-volt, 15-hp series motor. A five-step railway-type controller anl standard resistances are used.

The car is of the one-man, pay-as-you-enter type and operates over a route of about 1 mile, connecting at one end with the regular street railway cars of the company. The company plans to extend the bus system to other parts of the city and also to build one or two suburban extensions. The trackless trolley system was used instead of the ordinary car on rails for several reasons. One was that in the mile of route the line crossed three steam railroad tracks and passed over one long bridge. With a street railway franchise, the company would have been obliged to keep the bridge in repair, as well as the roadway between the tracks and for 1 ft. outside. This expense was saved as well as the expense of installing and maintaining three steam railroad crossings. Altogether the company estimates that it made a saving of $70,000 in track, exclusive of repairs and depreciation, and that it is also saving about $400 a year in power. The bus does not hold as many passengers as an electric car, but is amply sufficient for the present traffic.



Trackless Trolley Car at Merrill, Wis.

The single motor drives the two rear wheels by means of a universal shaft and bevel gear, connected with a jack shaft with differential gear, the jack shaft being connected with the rear wheels by chains, the method of connection being very similar to that of an ordinary automobile. Solid rubber tires are used. Connection is made to the two overhead trolley wires by means of two separate trolley poles with swiveled harps and bases. The poles are extra long to give a lateral freedom of movement of 10 ft. to 12 ft. on both sides of the trolley wire. This prevents interference with the bus from other street traffic. The two trolley wires used by the bus are fed from the two trolley wires of the local railway system, which is equipped with a complete metallic circuit. The operating expenses per car mile are estimated as follows: Management, salaries and wages, 3.2 cents; electric power, 4.85 cents per watt-hour, or 1.6 cents; tire renewals, 3.4 cents; maintenance, 1.8 cents—or a total of 10 cents per car mile.

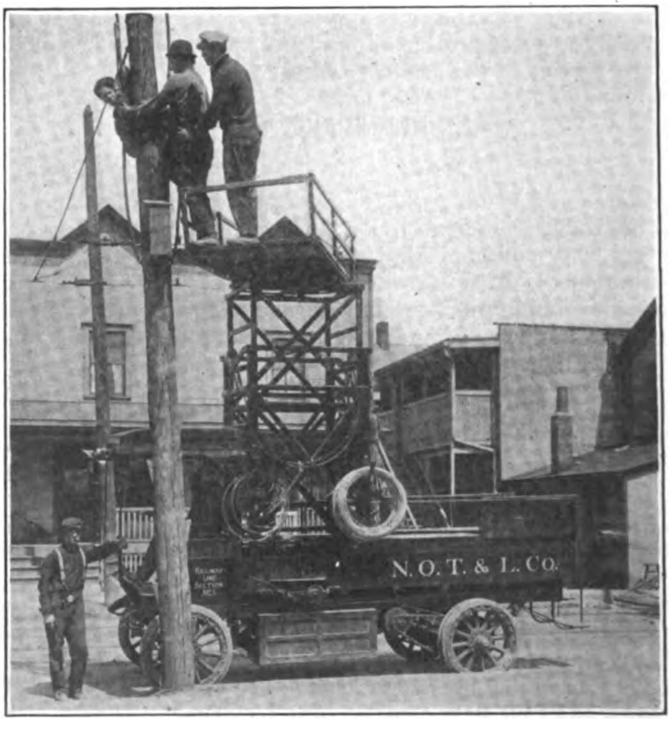
The main dimensions of the bus are: Length over all, 18 ft. 6 in.; width, 6 ft.; height in passenger compartment, 6 ft. 8 in. The weight empty is about 3 tons. The bus was supplied by the Field Electric Bus Company, New York, manufacturer of the storage battery buses using Edison batteries and running in Chicago.

ELECTRIC TRUCKS FOR NORTHERN OHIO TRACTION & LIGHT COMPANY

The Northern Ohio Traction & Light Company, Akron, Ohio, purchased some time ago from the Baker Motor Vehicle Company, Cleveland, Ohio, one tower wagon and a 1-ton and a 2-ton line truck of the storage battery type. These trucks have been stationed in Akron and replace two two-horse wagons, but the railway company states that since installing the trucks it has increased construction work fully 100 per cent. The company expects the trucks to take care of all new construction for some time to come as they are not by any means running to capacity even with the present doubled work. The operating radius of each of the trucks is 65 miles on a single battery charge, but the batteries have not been exhausted since their installation. Although Akron and the surrounding country are very hilly, the average daily run has been from 30 to 35 miles. One of the special duties of the trucks in construction work has been to pull and stretch cables over cross-arms.

The equipment of each truck includes a battery of forty-two cells, a series-wound motor having 300 per cent overload capacity, a Renold silent chain from the motor to jack shaft and two roller chains from jack shaft to rear wheels; also regular and emergency brakes. The tower wagon has a body of 144 in. x 60 in. with 14-in. sides. It is equipped with a McCardell tower which stands 12 ft. from the ground when lowered and 17 ft. 9 in. when raised. A 24-in. railing incloses the platform. The tool boxes are so arranged that there are seats for ten men when the truck is completely loaded. The 1-ton line truck has a body of 108 in. x 56 in. and has 12-in. sides. The 2-ton line truck has a body of 144 in. x 60 in. and has 14-in. sides.

A special feature in the equipment of these trucks is a lamp socket under the driver's seat where a lamp cord can be plugged in, thus affording a light that can be carried up onto the poles by linemen when working at night. The trucks are garaged in a storage shed belonging to the railway company and they are charged from an exciter dynamo in the power plant so that the cost of charging current is a small item.



Electric Tower Wagon with Tower Raised

News of Electric Railways

Decision by Wisconsin Supreme Court in Milwaukee Fare Case

The Supreme Court of the State of Wisconsin has dismissed the complaint of The Milwaukee Electric Railway & Light Company against the decision of the lower court in the case involving the ticket rate of fare within the city of Milwaukee fixed by the order of the Railroad Commission of Wisconsin. The opinion of Chief Justice Winslow says in part:

"The power to fix rates and tolls to be charged by public utilities is one of the attributes of sovereignty. With us this great power is vested in the Legislature, and when the Legislature speaks upon the subject its voice is controlling and supreme, unless indeed some constitutional guaranty is invaded. (Madison vs. M. G. & E. Co., 129 Wis., 249.) A century ago this great power was of little practical importance, and very seldom used. The progress of science and invention, combined with the tremendous growth of congested urban areas, has made the great mass of the people absolutely dependent upon the great public utilities of the time. Modern business and modern life could not go on without them. We must catalog our public utilities and try to imagine how we would get along without them if we would realize our dependence upon them; only by so doing can we appreciate the supreme importance of the rate-making power and the necessity of keeping that power intact in the hands of the Legislature; if it be not so kept the opportunities for abuse are numerous. Clearly the Legislature should not part with the power even for a limited time, except upon the most potent and convincing considerations.

"No presumption can be indulged that it has parted with the power, nor will doubtful words be construed as having that effect. He who asserts that the State has surrendered any part of its sovereign power even temporarily in his favor must prove the fact by the most convincing evidence. The presumptions, if any there be, must run the other way. If it were to be admitted for the purposes of argument that the Legislature could by express language authorize municipal authorities to make contracts with public utilities fixing rates which should exist for definite periods in the future and be beyond legislative control during these periods (a proposition concerning which we intimate no opinion), the question here is whether such express language is to be found in Section 1862.

"This State has adopted an eminently just and wise policy in dealing with the matter of rates and tolls. By the Railroad Commission legislation it has laid down the general rule that every rate must be reasonable, and has left it to a commission of experts to determine, after full investigation, the reasonable rate, and apply it. It is believed that this board passes on these questions with judicial fairness after the most careful and searching investigation of the conditions, and with a single eye to the attainment of a fair result. So long as these provisions of law remain in force, and are allowed to control the situation, all danger of immature, hasty or vindictive changes in rates is practically eliminated. On the other hand, the citizen is protected from unreasonable and excessive fares; the capitalist and investor is assured a reasonable and fair return upon his investment. No door is open for any serious injustice.

"The view which is here taken of the meaning and effect of the provisions of Section 1862 renders unnecessary any consideration of the question whether the ordinances in question are subject to alteration or repeal under Section 1 of Article II of the constitution, which authorizes the enactment of general laws for the formation of corporations without banking powers, and forbids the creation of corporations by special act except in certain instances, and reserves the right to alter or repeal at any time all such general laws or special acts.

"The proposition decided in this case is that Section 1862 does not empower municipal authorities to make any contract with a street railway fixing rates of fare so that they may not be changed by the Legislature, or through a legislative agency in the manner provided by law."

J. D. Mortimer, president and general manager of The Milwaukee Electric Railway & Light Company, is quoted as follows:

"The case just decided by the Supreme Court of Wisconsin involved the right of the city of Milwaukee to enter into an agreement for a term of years with The Milwaukee Electric Railway & Light Company providing for a rate of fare to be charged for street railway service. The absence of judicial decisions in this State interpreting the statutes on which this question depended inevitably gave rise to honest differences of opinion. The decision by the Supreme Court does not mean that the coupons which have been and are being sold with tickets are immediately good for rides. Time must elapse for the entry of an order by the lower court, and in the meantime the company will determine on action to be taken with respect to a further test of the binding nature of the franchise provisions."

Offer of Jamestown Companies Rejected by the Employees

Frank W. Stevens, Jamestown, N. Y., formerly a member of the Public Service Commission of the Second District of New York, is at the head of a citizens' mediation committee that has undertaken to bring about an adjustment of the differences between the officers of the Jamestown Street Railway and the Chautauqua Traction Company, Jamestown, and the employees of these companies. As a result of the appeal of this committee to the companies A. N. Broadhead, president of both companies, addressed a letter in part as follows to Mr. Stevens recently:

"I am willing for the general good of the city that the differences between the company and its employees be decided by a committee of citizens composed as follows: Five men selected by them from among the former employees of the railway companies, five citizens selected by the management of the railway companies, the ten men so selected to act with the committee of fire recently appointed by the Common Council of Jamestown, of which you are chairman. The questions to be decided by this committee shall include all matters of difference between the employees and the companies except the recognition of the union. It is distinctly understood that such men as have remained faithfully in the employ of the companies shall retain their present positions. Until the decision of such committee the street railways are to be operated as fully as possible without the employment of additional help. The decision of a majority of the whole committee shall be binding on all parties in interest."

Mr. Stevens and the other members of the committee of which he is chairman in turn addressed a communication to the public referring to the letter from Mr. Broadhead in which they said that it would take considerable time to submit the proposition of Mr. Broadhead to the men and have them act on it. They suggested that it would be well to have the cars operated at night in the meantime. This communication was concluded in part as follows:

"We ask all persons whatsoever to refrain from any and all acts of violence or interference with the street cars while this proposition is being considered and also, in view of the probability that the differences may be adjusted in some manner, refrain from all interferences and assist in every way in straightening out the differences that are now before the public."

The employees have replied in part as follows through their representative:

"The proposition submitted to us is not arbitration, it is annihilation. We are unalterably opposed to a large number of members upon the board of arbitration; it has been fully demonstrated that the best results to both interested parties are obtained when the number is small, say three or five, as there is less likelihood of delay resulting from disputed views among the members. I am instructed, therefore, to submit as a counter proposition the following:

"First.—All men employed by the company on April

21 and up to May 1, 1913, to be reinstated in their former positions without discrimination, and with full seniority rights.

"Second.—All other matters in dispute to be submitted to a temporary board of arbitration, to be composed as follows: One representative of the company to be chosen by it; one representative of the association to be chosen by the employees; these two to select a third man, and these three parties shall constitute the board of arbitration. In the event of the said representatives failing to agree upon a third man within forty-eight hours, Frank W. Stevens shall then become the third arbitrator. The decision of the board to be final and binding upon both parties involved for a period of one year from June 1, 1913."

Mayor Marx of Detroit in Cleveland

Mayor Oscar Marx of Detroit, Mich., his personal counsel, Allan H. Frazer, and Police Commissioner John Gillispie, inspected the street railway system at Cleveland, Ohio, on June 5, and conferred with Street Railway Commissioner Peter Witt of the latter city. Neither Mayor Marx nor Mr. Witt would consent to be quoted in regard to the subjects discussed, but Mr. Witt did state that he urged municipal ownership. On his return to Detroit Mayor Marx announced that he has a plan of procedure that will accomplish his purpose, but he declined to say anything more about it.

The forenoon of June 3 was given over to the consideration of the street railway section of the proposed new charter for Detroit before the charter commission. Attorney Lawson said that the language of the Verdier act is so plain that 2 per cent of the city's assessed valuation could be issued in bonds for the purchase of the property, even if the charter is silent on the subject, provided authority to acquire the property has been obtained. The attorneys, however, agreed that it would not be wise to provide for the issuance of bonds without regard to the city's bonding limit, so the phrase in the section relating to this subject was changed to read "in addition to bonds issued for the general indebtedness." It was also decided that the interest rate and the time of maturity should be made sufficiently flexible to meet market conditions rather than to offer the bonds at less than par. The amount of the bond issue will be left to the street railway commission to decide in order that the members of the commission may be able to handle the matter as seems best to them. This feature of the charter cannot be finally approved until the Supreme Court passes upon the validity of the Verdier act. This decision may not be rendered until fall.

Report on Geary Street Municipal Railway, San Francisco

Mayor Rolph of San Francisco, Cal., has prepared a financial statement and forecast of the Geary Street Municipal Railway of which the following is an abstract:

"The total sum available for the construction of the Geary Street road from the ferry to the beach is $2,022,341, of which $2,341 was premium paid upon bonds. Of this amount it is estimated that $353,708 will be returned to the fund unexpended, leaving an actual cost of the completed municipal road of $1,668,633.

"In January the expenses equaled 56.31 per cent of the receipts; in February they were 56.18 per cent; in March 58.14 per cent; in April 52.86 per cent. This proportion is larger than the normal will be when the road is in operation from the ferry to the beach, as the road now must bear practically the same overhead charges as when the line will be completed. In April the excess of receipts over expenditures was $10,385.

"Before the road began to operate $125,147 was paid in interest on bonds, and this, in accordance with an Interstate Commerce Commission ruling, is charged against capital and not against interest, the commission requiring that interest on all bonds during the construction be included as part of the capital expenditure. While $1,668,633 is the complete cost of the road as now estimated, $1,700,000 may be taken as a round figure on the safe side. The interest to be charged on that amount at 4½ per cent is $76,500 a year. This amounts to $6,375 per month.

"Depreciation is a matter difficult to determine absolutely. Bion J. Arnold has fixed 2½ per cent as a proper proportion to be charged against the total for depreciation. Taking this average, we may start from the very first year with 2½ per cent of $1,278,252, which equals $28,760 per year for depreciation. That sum is larger than need be at the present time.

"It is certain that the depreciation will increase with the life of the road, but after 1915 the interest charge will decrease as part of the principal is paid off. Therefore the decrease in interest can be added to the depreciation account without increasing the total of charges against the road. If the decreased interest be added each year to depreciation, it will bring up the percentage of depreciation to 3.2 per cent in 1917, 4.3 per cent in 1920 and 5.3 per cent ten years hence. By this arrangement an entirely adequate sum would be provided for replacements as they become necessary. This makes a charge for depreciation of $2,396 per month to be added to the $6,375 per month to be charged for interest on the total investment. The total of these two amounts is $8,771.

"After 1915 the interest will gradually recede as the capital is paid off. By 1920 the interest will have been reduced to $49,230 per year, or $4,102 per month, as against $6,375 at this time. By 1927, when the principal United Railroads franchises will expire, the outstanding bonds will have been reduced to $387,000 of the original $1,700,000 cost. The Geary road is paying its way now by meeting operating and maintenance expenses, interest on its bonds and depreciation. It is not paying a sinking fund, the first payment of which is not due for two years, but it is assured of enough earning power to meet this charge for a reduction of its principal when it falls due."

Public Utility Bill in Effect in West Virginia

Senate bill No. 31 passed by the Legislature of West Virginia last February has recently gone into effect in that State. This bill provides for a public service commission to consist of four members who shall be appointed by the Governor by and with the consent and advice of the Senate for a term of eight years with a salary of $6,000 per annum. Any commissioner may be removed by the Governor after due investigation for incompetency, neglect of duty, gross immorality or malfeasance in office. Not more than two members of the commission may belong to the same political party and one member must be a lawyer of not less than ten years' experience at the bar. No person while in the employ of or holding any official relation to a public service corporation subject to the provisions of the act, or holding any stocks or bonds thereof, and who is pecuniarily interested therein, is eligible to the office of commissioner.

The jurisdiction of the act extends to and includes: (a) common carriers, railroads, street railroads, sleeping-car companies, freight lines, car companies, toll bridges and ferries; (b) telegraph and telephone companies and pipe lines for the transportation of oil, gas and water; (c) gas companies, electric lighting plants and municipalities furnishing gas or electricity for lighting, heating or power purposes; (d) hydroelectric companies for the generation and transmission of light, heat or power and water companies, and (e) all persons, associations, corporations and agencies employed or engaged in any of the businesses before mentioned.

The words "public service corporation" as used in the act include all persons, associations of persons, firms, corporations, municipalities and agencies engaged or employed in any business before enumerated or in any other public service business whether above enumerated or not, whether incorporated or not. Every person, firm or corporation engaged in the public service business must perform such service in a reasonable, safe and sufficient manner. All charges, tolls, fares and rates must be just and reasonable. The commission is to have power to change any intrastate rate, charge or toll which is unjust or unreasonable and may prescribe such rate, charge or toll as would be just and reasonable and change or prohibit any practice or device or method of service in order to prevent undue discrimination or favoritism between persons, localities or classes of freight, provided that the commission does not reduce any rate, toll or charge within ten years after the completion of the railroad or plant to be used below a point which would prevent such public service corporation, person, persons or firm from making a net earning of 8 per cent per annum on the cost of construction and equipment of the same.

No change is to be made in the rates, fares or charges, or joint rates, fares or charges which have been filed and published by any public service corporation or by any person or corporation under the purview of this act, except after thirty days' notice to the commission and to the public, which must plainly state the changes proposed to be made in the schedule then in force and the time when the changed rates, fares or charges are to go into effect. The proposed changes must be shown by printing new schedules and are to be plainly indicated upon the schedules in force at the time.

The commission also receives power to ascertain the quantity, healthfulness and quality of the water or quality and quantity of gas or electricity supplied by such persons, firms or corporations, and examine the methods employed, and also power to order such improvements as will best promote the public interests and preserve the public health.

The commission receives definite instruction to collect full and complete information concerning the value of the property owned and controlled by any person or corporation subject to the act as of April 1 each year and to tabulate in statistical form and furnish the same to the Board of Public Works on or before June 1 each year, which information shall be used by this board in fixing the value of a property for assessment purposes.

All public service corporations subject to the act must pay a special license fee in addition to those already required by law. This fee is to be fixed by the auditor upon each corporation according to the value of its property based on the last assessment and is to be apportioned among public service corporations upon the basis of such valuations so as to produce a revenue of $60,000 a year, which will be used for the purpose of meeting the expenses of the commission.

A violator of this act for the first time is guilty of a misdemeanor and upon conviction is to be fined not more than $1,000 or to be confined in jail not more than one year, or both. For the second offense the fine is not less than $200 nor more than $2,000, and the jail punishment not less than thirty days or more than one year or both, while for the third offense the fine is raised to not less than $500 nor more than $5,000, and in addition to the fine the guilty party must spend not less than three months nor more than one year in jail.

Decision by Supreme Court in Omaha Bridge Case

A decision handed down on June 9, 1913, by the United States Supreme Court in the case of the Omaha & Council Bluffs Railway & Bridge Company, Omaha, Neb., has nullified the ruling of the Interstate Commerce Commission in regard to fares between Omaha and Council Bluffs. The court decided that the Omaha line was not a railroad coming within the purview of the interstate commerce act, and that the commission had no authority over it. The opinion by the court says:

"On the argument of the appeal in this court the sole question discussed was whether the provisions of the commerce act as to railroads applied to street railways, the appellant relying among other things on the fact that during the discussion in the Senate the author of the bill and the chairman of the Senate committee to which it had been referred said that the bill is not intended to affect the stage coach, the street railway, the telegraph lines, the canal boat or the vessel employed in the inland or coasting trade, even though they may be engaged in interstate commerce, because it is not deemed practicable or necessary to cover such a multitude of subjects."

The Commerce Court held that points brought out during debate are not controlling in interpreting an act after it is passed and the Supreme Court concurred in this view. Nevertheless, it found in the act itself material out of which it built up a distinction between an interstate railroad and a local street railway, even though the street railway crosses a state line. The statute applies in terms, stated the court, only to railroads. State decisions heretofore have been even divided on the point which the court adjudicated.

"If the scope of the act is such as to show that both classes of companies were within the legislative contemplation," the court explains, "then the word railroad will include street railroads. On the other hand, if the act was aimed at railroads proper, then street railroads are excluded from the province of the statute. Applying this universally accepted rule of construing the word, it is to be noted that ordinary railroads are constructed on the company's own property. The tracks extend from town to town and are usually connected with other railroads, which themselves are further connected with others so that freight may be shipped without breaking bulk across the continent. Such railroads are channels of interstate commerce.

"Street railroads, on the other hand, are local, are laid in streets as aids to street traffic and for the use of a single community, even though that community be divided by state lines or under different municipal control. When these street railroads carry passengers across a state line they are, of course, engaged in interstate commerce, but not the commerce which Congress had in mind when legislating in 1887. Street railroads transport passengers from street to street, from ward to ward, from city to suburbs, but the commerce to which Congress referred was that carried out by railroads engaged in handling passengers and freight 'between states,' 'between states and territories,' and 'between the United States and foreign countries.'"

The court declared, in seeking to make more clear its distinction, that all of the provisions of the act to regulate commerce refer to railroads, but that very few of them refer to street railways; for instance, a street railway could not post its tariffs in depots, stations or offices, "as required by the act."

The court then distinguished between street railways and interurban railways. The latter have developed since the commerce act was passed, but the court declared that it is not called upon to pass upon the status of interurbans, thus allowing the belief that interurban lines carrying freight and actually competing with steam lines might come under the control of the Interstate Commerce Commission.

New Road Placed in Operation in Connecticut.—The Bridgeport & Danbury Electric Railway has been completed and placed in operation between Bridgeport and Long Hill, Conn.

Vote on Extension of Municipal Railroad in San Francisco.—The electors of San Francisco, Cal., will vote on July 1, 1913, on the proposal to issue $3,500,000 of bonds to provide funds to finance the proposed extension of the Geary Street Municipal Railway.

Progress of Arbitration in Cincinnati.—The first question taken up by the arbitrators who are considering the differences between the Cincinnati Traction Company and its employees was the reason for the discharge of motormen and conductors between March 15, 1913, and May 9, 1913.

New Minnesota Road Placed in Operation.—The Minneapolis Northern Suburban Railway has been completed and placed in operation between Minneapolis and Anoka, Minn. The line extends through Camden Place, Fridley and Coon Rapids to Anoka. It is 18 miles long. Five trains are being operated each way daily.

Halifax Strike Terminated.—The strike of the employees of the Halifax (N. S.) Electric Tramway was terminated on May 20, 1913, the men accepting the offer which the company made of 21 cents, 22 cents and 23 cents an hour according to length of service. The company is said to have agreed to take all the men back to work.

Bill to Increase Power of I. C. C.—A bill to give the Interstate Commerce Commission control over all issues of stocks by railroads or other common carriers was introduced in the Senate on June 10, 1913, by Senator Lewis, of Illinois. It would require railroads to make a satisfactory showing of value to justify any increases in issue of securities.

Petition for Vote on Provisions of Colorado Utility Law.—A petition is being circulated in Denver to secure the reference to a vote of the people in November, 1914, of two sections of the public utilities bill passed by the Legislature of Colorado last winter. These two sections affect only the issue of stocks, notes and bonds by utilities companies and the selling or buying of one company to or by another.

Injunction Secured by Pennsylvania & Ohio Railway.—The Pennsylvania & Ohio Railway, Ashtabula, Ohio, has secured an injunction against the city of Conneaut, Ohio, restraining the municipality from annulling the road's franchise because certain changes asked by the city had not been made. The city is also restrained from preventing the company crossing the tracks of the Lake Shore Railroad.

Municipal Ownership Under Consideration in Superior.—The Mayor and the commissioners of Superior, Wis., have under consideration the advisability of exercising under the new Wisconsin law their right to take over the property of the Superior Rapid Transit Company under condemnation proceedings. The stock of the Superior Rapid Transit Company is controlled by the Duluth-Superior Traction Company.

Strike in Port Arthur Ended.—The strike of the employees of the Fort William & Port Arthur Electric Railway has flattened out. The road is a municipal line operated by commissioners appointed by the officers of both cities. The men violated their agreement by going on strike before the contract which they had with the officers of the road had expired. The public refused to countenance the strike.

Hearing on Uniform Rules for Interlocking Plants.—The third hearing on the proposed rules for the maintenance and construction of interlocking plants in Indiana, Illinois, Wisconsin and Minnesota was held at Madison, Wis., on June 12, 1913, to permit the engineers of the four commissions represented to present their revised rules to meet the objections raised by the steam and electric railway signal engineers.

Judge Gary on the Price of Rails.—At the continuation of the suit for the dissolution of the United States Steel Corporation on June 3, 1913, Elbert H. Gary, chairman of the board of directors, said in regard to the price of steel rails: "The basic price of $28 has continued largely because the Steel Corporation refused to advance it. We have taken our position and the others have been obliged to follow, notwithstanding that the cost of manufacture has materially increased."

Minnesota Public Utility Committee Meets.—The first meeting by the House special committee on public utilities, named after Governor Adolph O. Eberhart of Minnesota had announced that he would call a special session of the Legislature to consider this subject, was held at St. Paul on June 3, 1913. The members of the committee will try to ascertain what demand there is for such legislation in Minnesota and how such laws are working in states where commissions have been created. W. I. Nolan, Minneapolis, Minn., is chairman of the committee.

Public Service Commissioners Appointed in West Virginia.—The names of the members of the Public Service Commission appointed by the Governor of West Virginia on May 31, 1913, follow: V. L. Highland, chairman, Clarksburg, W. Va.; Charles H. Bronson, Huntington, W. Va.; Howard N. Ogden, Fairmont, W. Va., and Wade C. Kilmer, Martinsburg, W. Va. All the members of the commission will have their office at Charleston, W. Va. A digest of the provisions of the bill creating the commission is published elsewhere in this issue of the Electric Railway Journal.

Newspaper Publicity Law Constitutional.—The Supreme Court on June 10, 1913, upheld the constitutionality of the newspaper publicity law, enacted as a part of the postal appropriation act of 1912. The particular section attacked was the one which would bar every newspaper and periodical from the second-class privileges of the mails unless the editors or owners filed with the postal authorities semi-annual sworn statements giving the names of the editors, owners, stockholders, and bondholders and the average daily circulation, and thereafter immediately published the statement.

The Disposition of the Commerce Court.—President Wilson has advised Senator-elect Broussard and Assistant Attorney-General Dennison, who consulted him recently in regard to the continuance of the Commerce Court after July 1, 1913, to get into touch with Chairman Fitzgerald of the appropriations committee, Chairman Adamson of the committee on interstate and foreign commerce, Judge Clayton of the committee on the judiciary and Representative Sims. As matters now stand Congress has neither abolished the court nor made any provision for the payment of expenses of the body after July 1, 1913.

Approval of Equipment for New Subway Lines in New York Urged.—At a hearing recently before the Public Service Commission of the First District of New York William G. Gove, superintendent of equipment of the Brooklyn (N. Y.) Rapid Transit Company, urged the commission to approve plans for the type of cars submitted by the company for use on the lines which it will operate under the terms of the dual subway contract. Mr. Gove said that deliveries of equipment could not be secured in less than six months after the contracts were let. The type of car which the company is urging the commission to approve was described and illustrated in the Electric Railway Journal of Dec. 30, 1911, page 1322.

Bill to Amend Erdman Act.—An amendment to the Erdman act was introduced in the Senate at Washington on June 10, 1913, by Senator Newlands. It is designed to enlarge the board of arbitration to six members. The law now provides three. A commissioner of mediation and conciliation would be created, who, with two other government officials to be appointed by the President, with the ratification of the Senate, would constitute a board of mediation and conciliation. The board would name disinterested arbitrators to act with arbitrators chosen by employers and employees. The proposed amendment relies upon voluntary arbitration. It covers only controversies arising between interstate railroads and their trainmen.

Attitude of New York Commission to Complaints.—Chairman Edward E. McCall of the Public Service Commission of the First District of New York is reported to have said at a recent meeting of the South Brooklyn Board of Trade: "It is an incalculable aid to us when a real body, a representative one, presents a complaint or makes a request. The commission is gratified and extends a hearty invitation to you to come to it with what concerns you. We have no other way of keeping in touch with the various localities. We are always glad to receive members of delegations who present their subject in an intelligent manner and avoid abuse of public officers. Let them confine themselves to the subject they came to represent. We guarantee them respectful treatment. The hour of the blackguard has gone."

United Railways, St. Louis, Protests Against Assessment.—The United Railways, St. Louis, Mo., has asked the State Board of Equalization to decrease its assessment from $21,991,028 to $16,500,000. The company in requesting the reduction said: "Some of our franchises will soon expire. The Jefferson Avenue franchise expired last year, and the Baden expires next year. Now, if not extended, as we contend, by the central ordinance, this means a big reduction of franchise values. Our stocks and bonds are worth less on the market than last year. We are paying no dividends on our preferred stock, the net earnings going to betterments. The gross earnings of the company last year were $12,063,000, and our net earnings $1,285,000. We paid in taxes last year $710,000, and if we must still pay the mill tax that would increase the amount to $981,974."

Differences Between Company and Men Settled in Asheville.—Reference was made in the Electric Railway Journal of May 10, 1913, page 863, to the settlement of the strike of the employees of the Asheville Power & Light Company, Asheville, N. C., on the basis of a small increase in wages. A question having arisen in regard to the interpretation of the new agreement, the matter was referred to a committee of ten citizens and has been adjusted satisfactorily by the members of this committee. The terms of the agreement as interpreted by this committee have not been made public, but the following statement was issued in regard to the successful termination of the negotiations: "The misunderstanding in regard to the wages to be paid some of the men has been settled to the satisfaction of the company, the employees and the committee appointed by the mass meeting of the citizens and the board of trade."

Charter Commission Controversy in Cincinnati.—A controversy has developed in Cincinnati over the campaign for the election of members of the charter commission. Walter A. Knight, president of the Federated Improvement Associations, supports a plan that will allow the people to decide certain points for themselves, while Herbert S. Bigelow, member of the last House of Representatives, is making municipal ownership the paramount issue. Mr. Knight invited all labor organizations to send delegates to conferences to be held by his faction, and at a meeting of the Labor Council recently, at which he and Mr. Bigelow both presented their views, organized labor appeared to be about equally divided on the issues. Mr. Knight is supported by many organizations in his view that the operation of public utilities under the supervision of the city would be more satisfactory and economical than municipal ownership under present conditions.

Officers of Canadian Electric Railway Association.—The following officers were re-elected by the Canadian Street Railway Association at the annual meeting held at Hamilton, Ont., May 28 to May 31, 1913: President, Patrick Dubee, secretary-treasurer of the Montreal (Que.) Tramways; vice-president, C. B. King, manager of the London (Ont.) Street Railway; secretary-treasurer, Acton Burrows, Toronto; assistant secretary, A. A. Burrows, Toronto. The executive committee consists of the president and vice-president and James Anderson, general manager of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.; E. P. Coleman, general manager of the Dominion Power & Transmission Company, Hamilton, Ont.; James D. Fraser, director and secretary-treasurer of the Ottawa (Ont.) Electric Railway; H. M. Hopper, general manager of the St. John (N. B.) Railway; Wilson Phillips, superintendent of the Winnipeg (Man.) Electric Railway, Winnipeg; Albert Eastman, general manager of the Windsor, Essex & Lake Shore Railway, Kingsville, Ont.

Extension of Loop Platforms Considered in Chicago.—A sub-committee of the local transportation committee of the City Council of Chicago, Ill., considered on June 6, 1913, the subject of proposed extensions in the loop platforms of the elevated lines. The members of the sub-committee demanded a definite promise from the elevated railways that the companies would use subways when constructed by the city and would pay an agreed rental therefor. The sub-committee decided that it would not proceed further with the negotiations for extension of the loop platforms until assurance on this point was received from the companies. W. G. Beale, representing the elevated companies, said that this proposition would involve further delay, but that he believed the roads would accept an ordinance specifying certain subway routes and stipulating the rental to be paid for their use. The sub-committee finally referred to question of subway routes to the Harbor and Subway Commission, the Board of Supervising Engineers, the city law department and the companies with the idea that a satisfactory agreement could be reached by conference between these interests.

Municipal Ownership Negotiations in Toronto.—Comptroller McCarthy of Toronto, Ont., said recently: "The city will not enter into the proposed deal to purchase the street railway and electric light properties unless it embraces every electric light and power company within the city." The city's letter embracing the offer of the municipality for the purchase of the properties subject to indorsement by the ratepayers was addressed to the companies on June 7. After the companies have answered the letter the valuation experts will proceed with their work. The valuation experts who have been named by the board of control to value the property of the Toronto Railway and the Toronto Electric Light Company are Bion J. Arnold, Chicago, who compiled the traffic report for the city some time ago; J. W. Moyes, Toronto, Ont., who was associated with Mr. Arnold in his former work, and A. W. Ross, consulting engineer for the Toronto Hydroelectric System. The appointments which have been made to this board by the board of control remain to be ratified by the City Council. An understanding has been reached by which the city will operate the cars of the radial railway within the city limits if the purchase of the properties within the city shall be consummated.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CONNECTICUT

According to Governor Baldwin of Connecticut, the session of the Legislature in that State which has just come to a close "will long be remembered in the history of Connecticut for its work in framing and enacting a workmen's compensation act." The Governor says that this measure is a carefully considered statute well calculated to attain its declared object and wisely planned with respect to the classes of employers and employees which come within the scope of its operation. The bulk of the bills passed during the session was smaller than that of the previous session. Ranking among the important measures is the fifty-five-hour law for women and minors. Among the bills which were passed of interest to the electric railways were the following: Extending the time for the construction of the Canaan & Berkshire Tramway; authorizing the Westchester Northern Railroad to operate a line from White Plains to Danbury as an extension of the New York, Westchester & Boston Railroad; amending the charter of the Attawaugan Street Railway and authorizing an extension of the lines of the company; extending the time for the construction of the Meriden, Middletown & Guilford Electric Railway; incorporating the Stafford & Monson Street Railway; amending the charter of the New London & East Lyme Street Railway by permitting an extension of the line through the town of Old Lyme; amending the charter of the Shore Line Electric Railway as to the sale of electricity; extending the time for the construction of the Windsorville & East Hartford Electric Railway.

ILLINOIS

The House on June 6 made the Dunne administration public utilities bill a special order for June 10. An amendment offered by Representative Browne on June 10 was adopted which exempts interurban railways from the operation of the proposed law. Elevated roads are not exempt. Representative Burns, Chicago, sought to have re-incorporated the section requiring utility companies to obey the orders and requests of city utility commissions. This had been stricken out in the committee, but a motion to reinstate it was tabled. Representative Browne sought to have stricken out the section conferring upon cities the right to name city utility commissions. The utility bill as well as the semi-monthly pay day bill have been made administration measures and will have priority in consideration.

The Senate has passed the Forst bill providing that in case of the failure of a common carrier to settle a claim for damages within sixty days attorney's fees may be recovered when damages are awarded in court.

The Gorman bill providing for the sale of liquor on buffet and dining cars has been defeated in the House.

MASSACHUSETTS

The bill providing for electric railway development in western Massachusetts through the acquisition of the Springfield, Worcester and adjacent systems by the New York, New Haven & Hartford Railroad has been vetoed by Governor Foss. In the memorandum accompanying his veto the Governor said:

"This act is the last of a series of measures conceived in the interest of the New York, New Haven & Hartford Railroad by which it has been sought to break down the established laws and policy of this Commonwealth. It has been skilfully drafted in such manner as to legalize unlawful acts hitherto committed by the railroad companies, without giving any satisfactory assurance that the transportation facilities needed in Western Massachusetts will ever be provided."

The Governor is considering the so-called "nine hours in eleven bill." The Washburn railroad bill to increase the powers of the Railroad Commission and confer on the railroads increased facilities for the disposal of securities was vetoed by the Governor on June 12, 1913. On the same day the House passed the western Massachusetts bill over the Governor's veto.

The Senate and House hope to adjourn the present sitting within another week. An act has been passed providing that all street cars operated in the State, whether for passenger or freight service, shall be equipped with an emergency lifting jack and such other emergency tools as may be approved by the Railroad Commission. Among the bills killed recently are the following: A bill to authorize the Railroad Commission to compel street railways to operate cars over routes the franchise for which has been previously granted; a bill to require the equipment of all street cars with both air and hand brakes and setting a minimum seating capacity of forty persons for all street cars; a bill to prohibit the use of prepayment cars in the State; a bill to grant half fares to students of business colleges and normal schools and a bill to provide for State ownership of street and elevated railways.

NEW YORK

Governor Sulzer has approved an act to amend the tax law in relation to the tax imposed on transfers of stock. In cases where shares or certificates of stock are issued without a designated monetary or par value, the stock transfer tax is to be at the rate of 2 cents for each share of stock. Also there must be filed in the office of the State Comptroller a certificate executed by every person, firm, company, association or corporation engaged in making sales, agreements to sell, deliveries or transfers of shares of stock and giving the true or real full name or names of the persons conducting the same with their post office addresses.

WISCONSIN

Senate bill 44, relating to the liability of street railways for injuries, has been referred to the judiciary committee by the Senate. Passage was recommended recently by the same committee, with two members dissenting. A bill has been introduced in the Senate making minor changes in the assessment of taxes against railroads, street railways and electric light companies. It was introduced by the judiciary committee. The joint resolution to adjourn from June 12 to Jan. 13, 1913, passed by the Senate, has been refused concurrence by the House. The Legislature will probably continue its session for several weeks.

PROGRAM OF ASSOCIATION MEETING

Central Electric Railway Association

The following program of papers has been announced for the meeting of the Central Electric Railway Association which is to be held on board the steamer *St. Ignace* on June 26 and 27, 1913:

JUNE 26, 1913, 9 A. M.

Paper, "Recent Development in Car Control," by F. E. Wynne, of the engineering department Westinghouse Electric & Manufacturing Company.

Paper, "Car Ventilation," by H. E. Lavelle, representative Automatic Ventilator Company.

Paper, "The Claims Department," by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway.

JUNE 27, 1913, 9 A. M.

Paper, "The Duty of the Manufacturer in the Electric Railway Field," by J. H. Drew, president of the Drew Electric & Manufacturing Company.

Paper, "Physical Valuation," by Robert B. Rifenberick, consulting engineer of the Detroit (Mich.) United Railway.

As previously stated in the ELECTRIC RAILWAY JOURNAL, the D. & C. steamship *St. Ignace* has been chartered for the exclusive use of the association members and families. The steamer will leave the dock at the foot of Madison Street, Toledo, Ohio, at 3 p. m. sharp, on June 25, 1913, and will return to the same place at the corresponding hour on June 27, 1913. The fare from Toledo for the round trip, including stateroom berth and meals, will be $12 per person. Reservations can be made by applying to L. J. Drake, Jr., 410 Traction Terminal Building, Indianapolis, Ind., chairman of the hotel and arrangement committee. All reservations must be accompanied by remittance and the name and address of person or persons desiring accommodations, so as to comply with marine regulations. No applications received by mail after June 21 can be acted upon. Applicants at the boat on June 25 will have space asisgned them if any is left.

Financial and Corporate

Stock and Money Markets

June 11, 1913.

The opening quotations on the New York Stock Exchange to-day showed substantial overnight advances in many cases, but after the first hour the market yielded and a new low level for the year was established in some of the leading issues. The general level of quotations, however, did not reach as low a figure as on Tuesday. Rates in the money market to-day were: Call, 1½@2¾ per cent; sixty days, 4@4¼ per cent; ninety days, 4¾@5 per cent; four months, 5¼@5½ per cent; five and six months, 5½@6 per cent.

Trading in Philadelphia followed closely the trend of the market in New York. The market opened strong, but extreme weakness ruled at the close.

The Chicago market to-day was narrow and weak. The bond market was extremely dull.

In the Boston market to-day there were few investment buying orders. The supply of stocks was large and at the close the tone was weak.

The trading in the Baltimore market to-day was very restricted. Only six issues were dealt in. There was little demand for bonds.

Quotations of traction and manufacturing securities as compared with last week follow:

	June 3	June 11
American Brake Shoe & Foundry (common)	90	89
American Brake Shoe & Foundry (preferred)	129½	128
American Cities Company (common)	37¼	34
American Cities Company (preferred)	69½	68⅜
American Light & Traction Company (common)	370	345
American Light & Traction Company (preferred)	106	106
American Railways Company	39	37½
Aurora, Elgin & Chicago Railroad (common)	41½	38
Aurora, Elgin & Chicago Railroad (preferred)	84	82
Boston Elevated Railway	90	86
Boston Suburban Electric Companies (common)	7½	a7½
Boston Suburban Electric Companies (preferred)	*66	*66
Boston & Worcester Electric Companies (common)	a8	a8
Boston & Worcester Electric Companies (preferred)	43	40
Brooklyn Rapid Transit Company	89⅞	84⅜
Capital Traction Company, Washington	120	120⅛
Chicago City Railway	*150	150
Chicago Elevated Railways (common)	*25	24½
Chicago Elevated Railways (preferred)	*87	75
Chicago Railways, ptcptg., ctf. 1	92	91
Chicago Railways, ptcptg., ctf. 2	20	18½
Chicago Railways, ptcptg., ctf. 3	7	6½
Chicago Railways, ptcptg., ctf. 4	3	2¾
Cincinnati Street Railway	112	104½
Cleveland Railway	103¾	103
Cleveland, Southwestern & Columbus Ry. (common)	*5¼	6
Cleveland, Southwestern & Columbus Ry. (preferred)	*28¼	29
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	a69½
Columbus Railway (preferred)	83	83
Denver & Northwestern Railway	109	107
Detroit United Railway	70	70
General Electric Company	..	130
Georgia Railway & Electric Company (common)	117	116
Georgia Railway & Electric Company (preferred	84	83½
Interborough Metropolitan Company (common)	13⅝	12¾
Interborough Metropolitan Company (preferred)	47½	46½
International Traction Company (common)	40	30
International Traction Company (preferred)	95	a95
Kansas City Railway & Light Company (common)	20	18
Kansas City Railway & Light Company (preferred)	40	36
Lake Shore Electric Railway (common)	*9	6
Lake Shore Electric Railway (1st preferred)	*91	a92
Lake Shore Electric Railway (2d preferred)	*25	a25
Manhattan Railway	127	126
Massachusetts Electric Companies (common)	14	13
Massachusetts Electric Companies (preferred)	72	68
Milwaukee Electric Railway & Light Co. (preferred)	*100	100
Norfolk Railway & Light Company	26½	25
North American Company	68¼	63
Northern Ohio Light & Traction Company (common)	80	a80
Northern Ohio Light & Traction Company (preferred)	105	a105
Philadelphia Company, Pittsburgh (common)	41	37
Philadelphia Company, Pittsburgh (preferred)	40	40
Philadelphia Rapid Transit Company	23½	20½
Portland Railway, Light & Power Company	*67½	62
Public Service Corporation	114	112
Third Avenue Railway, New York	30	28¼
Toledo Railways & Light Company	a12	2
Twin City Rapid Transit Co., Minneapolis (common)	103	101½
Union Traction Company of Indiana (common)	*7½	4½
Union Traction Company of Indiana (1st preferred)	*82	80
Union Traction Company of Indiana (2d preferred)	*32	30
United Rys. & Electric Company (Baltimore)	26¾	24
United Rys. Inv. Company (common)	21	17
United Rys. Inv. Company (preferred)	42	30
Virginia Railway & Power Company (common)	50	50
Virginia Railway & Power Company (preferred)	92	90
Washington Ry. & Electric Company (common)	89	84
Washington Ry. & Electric Company (preferred)	89	87⅜
West End Street Railway, Boston (common)	71½	71
West End Street Railway, Boston (preferred)	88	88
Westinghouse Elec. & Mfg. Company	60	54
Westinghouse Elec. & Mfg. Company (1st preferred)	110	111

*Last sale. a Asked.

ANNUAL REPORTS

Washington Railway & Electric Company

The earnings of the Washington Railway & Electric Company, Washington, D. C., for the year ended Dec. 31, 1912, as compared with those of the previous year, are as follows:

	1911	1912
Gross earnings from operation	$4,336,519	$4,648,328
Miscellaneous income	16,152	13,233
Gross income	$4,352,671	$4,661,561
Operating expenses (including taxes)	2,410,203	2,528,224
Gross income, less operating expenses and taxes	$1,942,468	$2,133,337
Fixed charges:		
Interest	$1,077,667	$1,087,336
Miscellaneous	13,893	20,271
Total	$1,091,560	$1,107,607
Surplus	$850,908	$1,025,730
Percentage of operating expenses, including taxes, to gross earnings	55.57	54.39

Clarence P. King, president, says in part:

"The expenditures by the railway companies for additions, extensions and new equipment chargeable to construction account amounted to $422,538. This was reduced by credits from the retirement of cars, destruction by fire of Thirteenth and D Streets carhouse and contents, abandonment of tracks and other items, amounting to $244,500, leaving the net charge to construction account $178,037. This is exclusive of considerable amounts not yet due on contracts for cars and electrical equipment. The expenditures by the Potomac Electric Power Company for additions, extensions and new equipment amounted to $641,419. This amount was reduced by credits from the sale or the dismantlement of equipment to the extent of $107,373, leaving a net charge to be carried to the construction account of $534,046.

"The Washington Railway & Electric Company issued during the year $399,000 of additional consolidated mortgage 4 per cent bonds, $250,000 being issued in exchange for a similar amount of Brightwood Railway first mortgage 6 per cent bonds maturing on Oct. 1, 1912, and $149,000 being issued for extensions, betterments and improvements. Of the bonds above issued $313,000 were sold during the year.

"This mortgage provided that bonds to the amount of $1,500,000 should be issued from time to time only to pay the actual costs of extensions, betterments and improvements. These bonds have now been entirely issued so that the mortgage is closed, with the exception of bonds to be issued from time to time in exchange for bonds covered by prior liens.

"The Potomac Electric Power Company issued during the year $638,000 of consolidated mortgage 5 per cent bonds for extensions, betterments and improvements, of which $381,000 were sold and the proceeds used for the purposes of the company. This mortgage provided that bonds to the amount of $4,379,000 should be issued from time to time only to pay the actual cost of extensions, betterments and improvements. Of these bonds all but $271,000 have now been issued.

"As provided in the act of Congress approved on June 5, 1900, consolidation was effected during the year with the Anacostia & Potomac River Railroad and the Brightwood Railway, thereby adding 37.78 miles single track to the mileage actually owned by the Washington Railway & Electric Company.

"During the year the Washington Railway & Electric Company made a transfer of its entire interest in the Great Falls Power Company to the Potomac Electric Power Company.

"The year's requirements for the sinking fund of the Potomac Electric Power Company amounted to $84,700. This sum was deducted from surplus earnings and invested partly in consolidated mortgage 5 per cent bonds of the Potomac Electric Power Company and partly in consolidated mortgage 4 per cent bonds of the Washington Railway & Electric Company. The amount now invested in the sinking fund is $326,538.

"The Washington & Rockville Railway receivership was terminated by order of the court in October, 1912, and the property returned to its stockholders. The company (with the approval of the Public Service Commission of Maryland) refunded its debts by issuing $100,000 of new first mortgage 5 per cent bonds, out of a total authorized issue of $250,000, and increased its capital stock in the amount of $200,000, making a total sum now issued and outstanding of $250,000.

"This settlement caused a material scaling of the liabilities of the Rockville Company, with the result that the Washington Railway & Electric Company charged to profit and loss the sum of $50,192.

"The Maryland Legislature has enacted a law restoring to the company the four-zone method of fares, instead of the three-zone method prevailing in 1911.

"The railway companies carried 83,961,241 passengers during the year, of which 20,424,051 were free transfers. The average fare was 4.305 cents per pay passenger carried. The average fare was 3.221 cents per passenger carried, including transfers.

"On Dec. 31, 1912, the records of the Potomac Electric Power Company showed a total of 19,447 customers for the year, or an increase over the previous period of 3235.

"The companies have continued liberal expenditures out of earnings for the maintenance and upkeep of their properties. The amount disbursed or set aside for maintenance of railway and lighting equipment, including way and structures for the past five years, is as follows: For 1908, $512,266; for 1909, $630,901; for 1910, $669,631; for 1911, $657,379; for 1912, $674,928; or a total of $3,145,105.

"In addition to the maintenance charges as above set forth, profit and loss account has been charged during the year with $65,574 as depreciation on equipment. This is in accord with the policy adopted in 1909, since which time there has been charged off as depreciation on equipment the sum of $245,574.

"In general, the work of the track and roadway department has been the most significant for several years, due largely to special track work renewals and the improved method of repairing rail joints by means of an electrically operated, reciprocating rail grinder. The first mentioned includes complete renewal of special track layouts at five different intersections on our underground trolley system, the most important being at Ninth and G Streets. This work cost $40,000 and is the most complicated and expensive piece of special work in Washington. Partial renewals and repairs were made to special track layouts in sixty-nine localities; renewals were made to curve wheel rails at fourteen points and nine different sections of straight track were brought to line and surface.

"Among the many improvements was the installation of automatic electric switches at twelve important intersections, doing away with switchmen at those points and effecting a substantial saving, as did also the abandonment of two switching towers at the Capitol and Union Station Plaza.

"On the overhead trolley system special track work was renewed at several localities, straight track raised to line and surface and trolley wire renewed where necessary. The rail bond efficiency for return circuits on suburban lines is being improved each year. The double track on Fourth Street, Northeast, between T Street and Rhode Island Avenue, a distance of about 1300 ft., was reconstructed.

"Repairs to pavement, macadamizing track space on the Brightwood division, together with a general improvement of the line on Upshur Street from Georgia Avenue to Soldiers' Home Gate, were completed.

"On the suburban lines improvements were made during the year in the form of the installation of fourteen waiting stations and 150 lights and the renewal of approximately 23,000 cross ties and 362 trolley poles.

"In addition to the regular routine work of the shops, the mechanical department assembled and put in service during the year fifty new fourteen-bench open cars, thirty-one new center-entrance cars and one snow sweeper; converted two cars from 'pay-as-you-enter' to 'pay-within' type; rebuilt nine cars for suburban service; painted and varnished 150 cars and rebuilt fifty motors damaged by fire. New transfer tables for the better movement of cars were added to two carhouses."

Questions of Chicago Railways Protective Association Answered by Company

In a letter dated May 21, 1913, to the registered holders of participation certificates, Series 1, Series 2 and Series 3, under the participation certificate agreement dated as of Aug. 1, 1907, Henry A. Blair, chairman of the board of directors of the Chicago (Ill.) Railways, has answered various questions propounded to the officials of the company by the Protective Association that were not covered in the annual report of the company, mention of which was made in the Electric Railway Journal of May 3, 1913, page 829. No report was made concerning salaries, for it was thought that members of the association would not know the duties of the officers or what reasonable compensation would be, and such information would only be the source of useless attack. In answer to the question regarding the consolidation of the offices of president and chairman of the board of directors, it was stated that these offices were utterly dissimilar and that the union would effect no economies. The criticism in regard to maintaining the offices in the Borland Block was met with the statement that this floor space even with its own North Side building is barely sufficient for all needs. The company was asked what the trustees of the stock had done for the company and the stockholders, but the reply was made that the company was not a party to the participation certificate agreement and had not the slightest control over the trustees. Their office was provided for and required in the plan of reorganization of the company and was created, and their duties and rights, both as trustees and as depositaries prescribed, by the participation certificate agreement to which every holder of a participation certificate is a party; and they themselves should be approached for any information concerning their acts.

One of the points against which most of the attack has been directed is in connection with the advertising contract of the company, for it is claimed that the Chicago Railways receives only $100,000 for advertising while the Chicago City Railway receives more and has only two-thirds as many cars. The reply states that this price is based on a contract for $39,000 in existence when in 1906 the Chicago Union Traction System was taken over by the Chicago Railways. The report continues:

"A controversy concerning this contract resulted in a new agreement for the sum of $63,000 per year, covering advertising privileges in cars owned, controlled or operated upon the lines then owned by the Chicago Railways, but expressly excepting all lines that might be thereafter acquired or controlled by the company through purchase or consolidation. Therefore, when on Dec. 27, 1910, the company obtained by purchase through foreclosure sale that part of the system of the Chicago Consolidated Traction Company within the city of Chicago, a new contract had to be made. The management insisted that it should receive for its advertising privileges a price which would be in excess of that received by the Chicago City Railway, for the Chicago City Railway had less mileage and fewer cars than the Chicago Railways. To these claims the contractor replied that relatively the Chicago City Railway's territory was better per mile than that of the Chicago Railways, that the amount paid to the Chicago City Railway was in any event in excess of the value of the privileges granted, that the advertising company having the contract with the Chicago City Railway had actually been losing money under that contract and that it did not propose to enter into a contract with the Chicago Railways which in like manner would result in actual loss. The sum of $100,000 per annum was finally agreed upon as representing the full fair value of the advertising privileges for the term of the contract.

"The company having the advertising contract with the Chicago Railways is Barron G. Collier, Inc., with its principal offices in the Flatiron Building, New York City, N. Y. We are authorized by the Barron G. Collier Company, Inc., to state that the foregoing is an absolutely correct statement of the facts and to extend to each certificate holder an invitation to call upon or write to the representatives of that company at the above address for any details respecting this matter."

In answer to the question as to why the rehabilitation bonds could not be sold by the company instead of through bonds, Mr. Blair said:

"This proposition is impracticable. The ordinance requirements as to rehabilitation and re-equipment were and are such as to require large sums of money, extending into the millions, to be expended in each year. Under the terms of the trust deed securing the rehabilitation bonds, bonds cannot be issued except against work actually done and materials actually furnished and certified to by the Board of Supervising Engineers under the ordinance. The company has had no working capital and it has been and is impossible, therefore, to furnish the labor and materials required in rehabilitation and re-equipment and provide the means therefor out of current funds; and as bonds have not been and are not available, it has been necessary to make arrangements with bankers whereby interim certificates calling for bonds in the future could be sold and the proceeds applied to the furnishing of labor and materials, and whereby the bonds when obtainable could be used to retire such interim certificates.

"A public offering of the bonds by the company, without enlisting the active co-operation and support of the bankers, would have placed the Chicago Railways, with its tremendous financial requirements, at the mercy of the comparatively small number of investors in and around Chicago, who would have, under those circumstances, bought the bonds. Most of the bonds were really sold in outside markets, $28,000,000 out of $49,000,000 in New York, Boston and abroad, and this was due to the active work, international prestige and distributing capacity of the bankers concerned."

Resale of Chicago & Milwaukee Electric Railroad Ordered

The order for the resale of the property of the Chicago & Milwaukee Electric Railroad, Chicago, Ill., has been confirmed by Judge Francis E. Baker in the United States Court of Appeals. The opinion sustains Federal Judge K. M. Landis in rejecting the bid of the reorganization committee and holding the property worth at least $2,600,000. Sales of the properties were held at Waukegan and Racine on Sept. 25, 1912. The Illinois sale resulted in a bid by the reorganization committee of Wisconsin and Illinois bondholders, composed of George M. Reynolds, Ernest Hammill, John R. Thompson, R. Floyd Clinch, E. A. Shedd and others, of $1,650,000. The Wisconsin sale resulted in a like bid of $1,600,000. The legality of the sale was contested, the objectors maintaining that the road should have brought at least $4,500,000. Judge Landis held that the bid was inadequate. The opinion of Judge Baker, which was concurred in by Judges Seaman and Carpenter, in part says:

"'In this case the sale was set aside because of suppression of competition that resulted in one inadequate bid. If there was no stifling of intending bidders the sale should have been confirmed; but a bid for 50 or 60 per cent of the after-option value of property offered at public sale is not shockingly inadequate. By offering to raise their bid appellants, in our judgment, did not waive their right to insist that they had not chilled the sale. Their conduct was not a confession of wrongdoing, not even, as we regard it, an admission of the inadequacy of their first bid, but amounted at most to only this: that if the objections were withdrawn and the resale confirmed, they would pay into the court for the appellee and other non-depositing bondholders their part of the increase rather than have the estate suffer the expense and loss by delay from resale.'"

Chicago (Ill.) City Railway.—The Illinois Supreme Court has denied a re-hearing to Clarence H. Venner, New York, in the case which he brought against the Chicago City Railway. Mr. Venner sought a writ to enjoin the merger of the Chicago City Railway and other street railways in Chicago.

Denver (Col.) City Tramway.—The Denver City Tramway has increased the number of its directors from nine to thirteen. The additional directors are A. V. Hunter, president of the First National Bank, Denver; George C. Clark, of Clark, Dodge & Company, New York, N. Y.; Horace W. Bennett, of Bennett & Myers, Denver, and Claude K. Boettcher, of the firm of Boettcher, Porter &

Company, Denver. The bonds of the Denver & Northwestern Railway, which has abandoned its transportation business through the sale of its Leyden and Golden lines to the Denver City Tramway, are to be exchanged for sinking fund bonds of the latter (of which $6,300,000 are reserved for the purpose) at 105, the premium to be paid either in cash or in scrip at the option of the directors. The Denver & Northwestern Railway will continue for the present merely as a holding company, but in case all its bonds are exchanged it will go out of existence and its stock will be exchanged for shares in the Denver City Tramway.

Interborough-Metropolitan Company, New York, N. Y.—By a recent decision the Federal District Court has thrown out the two suits brought by the Continental Securities Company, with which Clarence Venner is identified, against the Interborough-Metropolitan Company and a number of other traction corporations. The court held that not only had the plaintiff no technical right to sue, but that the merger of which it complained was legal. The court said: "The Metropolitan had exhausted the possibilities of surface transportation, and with its enormous fixed charges could not earn dividends, but subways were new and of unknown capacity, both as money raisers and money earners. It was a bold and ingenious move for the Metropolitan to put forward as a possible addition to its system connecting subways." J. P. Morgan & Company, New York, N. Y., announce that they are prepared to exchange new first and refunding mortgage 5 per cent gold bonds of the Interborough Rapid Transit Company for the old forty-five-year mortgage 5 per cent bonds of the company which have been drawn for redemption on Nov. 1, 1913. The exchange may be made on a basis of 98 and interest for the new bonds and 105 and interest for the old. The first and refunding bonds are dated Jan. 1, 1913, and are due Jan. 1, 1966. They may be redeemed at 110 and interest on any interest day in any amount from the sinking fund or by the company at its option, either as a whole or in blocks of not less than $500,000. Coupon or registered bonds are interchangeable.

Lehigh Valley Transit Company, Allentown, Pa.—Refunding and improvement mortgage 5 per cent gold bonds of the Lehigh Valley Transit Company, in denominations of $1,000 and $500, are being offered by Edward B. Smith & Company, Philadelphia. They are due in 1960, but callable at 105 and interest until 1920 and at 110 and interest thereafter. These bonds are a mortgage on about 160 miles of electric railway, power plant, shops and equipment, subject to $5,311,000 of underlying bonds, and are further secured by stock of the controlled electric light and power companies serving Allentown, Bethlehem, South Bethlehem and various towns in the Lehigh Valley district. These bonds are followed by $5,000,000 of preferred stock, upon which dividend payments began in 1911, and by $3,000,000 of common stock.

New York State Railways, Rochester, N. Y.—Edward B. Smith & Company, Philadelphia, Pa., are offering for sale first consolidated mortgage 4½ per cent bonds, Series A, of the New York State Railways, due 1962, but redeemable after Nov. 1, 1913, at 105 and interest, with coupons, registerable as to principal. These bonds are secured by a direct lien on the electric railway system of 585 miles controlled by the New York Central & Hudson River Railroad and serving a territory with 900,000 population, including Rochester, Syracuse, Utica and Schenectady. Excepting for a few minor extensions under fifty-year franchises, the operating companies have perpetual rights. The bonds are a direct lien, subject to underlying bonds whose retirement is provided for in the mortgage, on all the properties and franchises of the system.

Public Service Corporation of New Jersey, Newark, N. J.—The Board of Public Utility Commissioners of New Jersey concludes as follows an opinion which it handed down recently: "In the judgment of this board the Public Service Corporation of New Jersey is not prohibited by Chapter 18 of the Laws of 1913 from subscribing for and taking its pro rata allotment of the issue of the capital stock of the Public Service Gas Company, which is hereby approved." The Public Service Corporation prior to February, 1913, the date on which Chapter 18 of the Laws of 1913 became effective, acquired, and on that day held, substantially all of the then outstanding shares of capital stock of the Public Service Gas Company.

Republic Railway & Light Company, Youngstown, Ohio.—Proceeds of the $600,000 of 5 per cent notes recently sold by the Republic Railway & Light Company will be used to reimburse the treasury of the company for advances made to subsidiary companies on account of miscellaneous betterments and improvements made on properties of subsidiaries and to retire floating debts incurred by these subsidiaries on account of such betterments. The notes are part of an authorized issue of $5,000,000 made in April, 1912, of which $2,000,000 was issued last year for the construction of a central generating station, the acquisition of new properties, improvements to properties and to retire other notes, as reported in the Electric Railway Journal of April 20, 1912.

Southern Pacific Company, San Francisco, Cal.—The Southern Pacific Company, which controls several electric railways in California, has applied to the Railroad Commission of that State for authority to issue $30,000,000 of two-year 5 per cent collateral trust notes. The notes are to be dated June 1, 1913, and will be due June 1, 1915. They will be subject to redemption at par with interest on June 1, 1913, and Dec. 1, 1914, upon thirty days' notice. As collateral the Southern Pacific proposes to place in trust approved securities now in its treasury, including issues of the Pacific Electric Railway and of the Northwestern Pacific Railway of California. The petition states that the Southern Pacific Company estimates its capital requirements for the year 1913 at $48,526,000. It asks for authority to issue $30,000,000 in notes and states that it will supply the balance out of its surplus earnings. Of this total amount, $9,775,000 is to be devoted to additions to the facilities of the Pacific system's lines, including the proprietary companies of the Southern Pacific, and the item includes new lines, extension of existing lines, continuation of construction work, improvements in and additions to electric lines and other constructions.

United Properties Company, Oakland, Cal.—The committee in charge of the financial affairs of F. M. Smith has extended from May 25 to July 1, 1913, the time for depositing the notes, etc., made or guaranteed by him, with the Mercantile Trust Company, San Francisco, the choice of which depositary was noted in the Electric Railway Journal of May 31, 1913. The committee states that the larger banks in San Francisco and Oakland have given their approval to the work undertaken by the trustees. The collateral held by each creditor, it is stated, will follow the notes to the end, and there will be no pooling of assets to the detriment of the better secured creditors.

Western Ohio Railway, Lima, Ohio.—The Western Ohio Railway has been authorized by the Public Service Commission of Ohio to issue its second preferred capital stock of the par value of $50,000 at not less than 80, the proceeds to be paid to the Western Ohio Railroad, the lessee of its property and railway, in partial reimbursement for the moneys, now aggregating $141,932, expended by the lessee for the construction of additions, extensions and improvements to the railway and property of the Western Ohio Railway since July 1, 1910.

Dividends Declared

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred; quarterly, 2 per cent, common.

Continental Passenger Railway, Philadelphia, Pa., $3.

Indianapolis (Ind.) Street Railway, 3 per cent.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1¾ per cent.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, 1¼ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 2 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, MAINE

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. April '13	$23,639	$22,155	$1,484	$615	$869
1 " " '12	26,078	21,887	4,191	582	3,609

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

1 mo. April '13	$57,448	*$27,554	$29,894	$17,131	$12,763
1 " " '12	51,492	*24,655	26,837	16,492	10,345
12 " " '13	730,006	*330,171	399,835	203,590	196,245
12 " " '12	631,572	*292,039	339,533	170,364	169,169

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1 mo. April '13	$92,389	*$55,488	$36,901	$24,277	$12,624
1 " " '12	81,280	*47,236	33,972	21,508	12,464
12 " " '13	1,114,520	*671,582	442,947	277,122	165,825
12 " " '12	973,366	*576,167	397,199	248,002	149,197

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1 mo. April '13	$545,577	*$308,824	$236,753	$140,868	$95,885
1 " " '12	490,119	*285,632	204,487	120,911	83,576
12 " " '13	6,658,634	*3,814,047	2,844,587	1,604,174	1,240,413
12 " " '12	5,752,364	*3,326,198	2,427,166	1,321,472	1,105,694

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1 mo. April '13	$167,748	*$95,553	$69,195	$56,872	$12,323
1 " " '12	156,756	*93,807	62,949	52,718	10,231
12 " " '13	2,189,830	*1,219,612	970,218	665,760	304,458
12 " " '12	2,058,270	*1,262,903	795,367	588,682	206,685

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1 mo. April '13	$204,769	*$117,010	$87,759	$48,844	$38,915
1 " " '12	179,744	*104,779	74,965	47,962	27,003
12 " " '13	2,528,522	*1,401,849	1,126,673	582,908	343,765
12 " " '12	2,323,951	*1,285,591	1,038,360	558,059	480.301

GRAND RAPIDS (MICH.) RAILWAY

1 mo. April '13	$100,108	*$60,308	$39,800	$15,010	$24,790
1 " " '12	94,339	*55,191	39,148	14,515	24,633
12 " " '13	1,254,600	*717,747	536,853	176,224	360,629
12 " " '12	1,197,830	*674,404	523,426	177,693	345,733

LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

1 mo. April '13	$124,493	$64,675	$59,817	$45,818	$13,999
1 " " '12	110,209	55,038	55,172	41,615	13,557
12 " " '13	1,619,396	692,107	927,288	526,906	400,382
12 " " '12	1,411,297	624,849	786,448	472,409	314,039

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1 mo. April '13	$49,274	*$32,424	$16,850	$14,659	$2,191
1 " " '12	45,045	*29,515	15,530	14,446	1,084
12 " " '13	641,473	*393,033	248,440	173,508	74,932
12 " " '12	602,692	*376,861	225,832	171,170	54,662

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1 mo. April '13	$176,036	*$103,929	$72,107	$37,653	$34,454
1 " " '12	168,976	*101,158	67,818	35,161	32,657
12 " " '13	2,119,585	*1,213,839	905,746	444,526	461,220
12 " " '12	1,996,106	*1,153,206	842,900	410,656	432,244

PORTLAND (MAINE) RAILROAD

1 mo. April '13	$74,793	*$58,209	$16,584	$10,298	$6,286
1 " " '12	70,472	*54,380	16,092	10,206	5,586
12 " " '13	1,001,573	*702,603	298,970	123,472	175,498
12 " " '12	968,238	*718.808	249,430	115,115	134,315

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1 mo. April '13	$546,231	*$273,458	$272,773	$161,730	$111,043
1 " " '12	532,762	*277,700	254,862	167,108	87,754
12 " " '13	6,691,264	*3,291,334	3,399,930	1,815,505	1,584,425
12 " " '12	6,430,429	*3,176,630	3,253,799	1,592,519	1,661,208

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.

1 mo. April '13	$97,718	*$55,192	$42,526	$19,829	$22,697
1 " " '12	90,423	*53,248	37,175	19,541	17,634
12 " " '13	1,205,438	*680,077	525,361	237,735	287,626
12 " " '12	1,131,727	*686,057	445,670	232,551	213,119

UNION RAILWAY, GAS & ELECTRIC COMPANY, ROCKFORD, ILL.

1 mo. April '13	$363,898	*$213,776	$150,122	$100,570	$49,552
1 " " '12	279,725	*171,187	108,548	69,147	39,401
12 " " '13	4,344,031	*2,495,338	1,848,693	1,082,505	765,188
12 " " '12	3,368,445	*1,947,832	1,420,613	776,417	644,196

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1 mo. April '13	$697,429	$350,659	$346,770	$144,804	$201,966
1 " " '12	631,462	325,787	305,674	143,079	162,595
4 " " '13	2,733,883	1,446,037	1,387,846	583,280	704,566
4 " " '12	2,543,073	1,380,848	1,162,225	569,317	592,908

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*Includes taxes.

Traffic and Transportation

Employees' Publication in Milwaukee

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has begun the publication of *Rail and Wire* in the interest of its employees. The first issue is dated June, 1913. The foreword says that the magazine has been established "as an aid to the general ends of maintaining a homogeneous working organization and better performing the duties imposed upon us by the nature of our business." The paper is 6 in. wide by 9 in. high. There are twenty-four pages and cover. The leading article, "Welfare Work," is contributed by Bert Hall, in charge of the welfare department of the company. Mr. Hall tells briefly about the work of the department and recites a number of cases that have arisen in families where the welfare department has been able to give assistance. During the year ended March 1, 1913, loans totaling $13,764 were made to employees in amounts ranging from $10 to $100. Mr. Hall says that "the employees and their families should understand that "the welfare department is prepared to give assistance in solving serious problems * * * which employees cannot master themselves without loss of time or loss through the expense to which they would be put if they attempted to solve them alone and without assistance." There are several pages of current news from the various departments of the company. Under the heading "Transportation" there appears an illustrated biography of Peter Bell, superintendent, who is referred to as the Nestor of the service, he having been with the company continuously since March 10, 1881. On the first left-hand page of the publication proper there is a half-tone reproduction of a portrait of J. D. Mortimer, president and general manager of the company.

Re-routing in Philadelphia

The Philadelphia (Pa.) Rapid Transit Company issued under date of June 4, 1913, Co-operative Bulletin No. 17, which contains the details of the second step in the re-routing plan for the surface lines of the company. The changes which are noted in the bulletin are largely of local interest. As a foreword the company says in part:

"The object of all the changes under the re-routing plan is to increase materially the rush-hour capacity of the tracks in the downtown business district and permit the company to give adequate service during the coming winter and insure the greatest convenience to the greatest number. The importance of providing the patrons of the several lines with the most direct routes to and from the business district is evident. To the home builder the distance from the business district is in minutes, not in miles. The Stotesbury management acknowledges the uniform forbearance and consideration shown by the public in meeting the changes thus far undertaken. The company recognizes that a certain degree of inconvenience must temporarily attend any re-routing of cars, and it bespeaks the continued good-will and co-operation of the public in this effort to route the cars by the quickest and most direct routes, and thus build up a perfect system of transportation. The changes which are being made will not only provide the increased capacity required to give adequate service during the coming winter but will permit the expansion necessary to care for the future growth of those districts that can be served satisfactorily by surface railway transportation."

Restoring Service in Rock Island

The Tri-City Railway, whose carhouse in Rock Island, Ill., was destroyed by fire on the morning of June 1, 1913, as noted in the ELECTRIC RAILWAY JOURNAL of June 7, 1913, page 1033, succeeded in re-establishing regular service on June 1, and while the cars which are being operated are not up to its standard, the company was on June 5 operating on regular schedule and had about a dozen extra cars for rush hour and park business. The company has placed orders for additional cars and will have sixty pay-as-you-enter cars in service in the Tri-cities before the end of August. The contracts for the car bodies were awarded to the American

Car Company and the St. Louis Car Company. The motors will be furnished by the Westinghouse Electric & Manufacturing Company and the air brakes by the General Electric Company. The loss sustained by the company from the fire is more than covered by the insurance, as on an estimated loss of $300,000 insurance to the amount of $355,000 was carried.

Increase in Wages in Portland, Ore.

Franklin T. Griffith, the newly elected president of the Portland Railway, Light & Power Company, Portland, Ore., announced an increase recently of 1 cent an hour in the wages of all men employed on the city and the interurban lines of the company effective from June 1, 1913. The present schedule as paid by the company to its employees in the train service and to which 1 cent will be added is as follows:

	City	Interurban
First six months	$0.24	$0.24
Second six months	.25	.25
Second year	.26	.27
Third year	.27	.28½
Fourth year	.28	.30
Fifth year	.29	.31½
After	.30	.33½

Fare Complaint Dismissed by California Commission.—The Railroad Commission of California has dismissed the petition of William R. Bowker, who complained that the commutation rates of the San Diego (Cal.) Electric Railroad between Coronado and San Diego were excessive.

Free Excursions for Poor Children.—Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., has renewed the company's offer of last summer to transport free of charge indigent children and their mothers to and from Bronx Park and Van Cortlandt Park during the summer months.

No More Smoking on Cars in Victoria.—The British Columbia Electric Railway, Vancouver, B. C., issued an order recently that no more smoking be allowed on its city cars in Victoria and that parcels be carried no longer except when in charge of a passenger. Smoking has been prohibited on cars in Vancouver for some time.

Inquiry Into Service in Camden.—The Board of Public Utility Commissioners of New Jersey has ordered an inquiry into the service furnished by the Public Service Railway on its lines which are operated to and from the ferries at the foot of Federal Street, Camden. The first hearing will be held at the court house in Camden on July 9, 1913.

Safety Campaign Proposed in Ontario.—Chairman McIntyre of the Ontario Railway & Municipal Board and Commissioner Ingram are arranging a conference with the Board of Education of Toronto, the Board of Trade of that city, the Toronto Railway and the Motor League to consider the subject of conducting an educational safety campaign in the schools throughout the Province.

Decision in Oregon Fare Case.—The validity of the Oregon Railroad Commission's orders requiring the Portland Railway, Light & Power Company, Portland, Ore., to reduce its fares from Portland to Milwaukie, a suburb, to 5 cents, and to give passengers to and from that point the same transfer privileges as accorded passengers from Lentz, was upheld by the Supreme Court of Washington on June 10, 1913. The reduction ordered from the Oak Grove district was also upheld.

Handling Freight in Oklahoma City.—The Oklahoma (Okla.) Railway is preparing to handle freight in all classes on its interurban line between Oklahoma City and El Reno. A team track and a freight depot are being installed on the terminal property at Oklahoma City and freight facilities are being provided at the different stations along the interurban line. Freight service will begin about June 15 and special freight cars will be put in operation to handle this class of traffic. Heretofore only express packages have been handled on the interurban line.

New Agreement with Employees in New Orleans.—The New Orleans Railway & Light Company, New Orleans, La., through Hugh McCloskey, president and general manager, has signed a five-year agreement with its platform employees dating from July 1, 1913, with the following scale of wages: For the first three years ending June 30, 1916, 24 cents an hour; from July 1, 1916, to July 1, 1917, 24¼ cents an hour; from July 1, 1917, to July 1, 1918, 24½ cents an hour. The scale of wages paid on the agreement that expires on July 1, 1913, was 23¼ cents an hour.

Washington Transfer Law to Be Enforced.—A decision to enforce the provisions of the act of Congress approved on Aug. 24, 1912, requiring the exchange of transfers between the electric railway lines and the herdic line of the Metropolitan Coach Company at Fifteenth Street and Pennsylvania Avenue and Fifteenth Street and New York Avenue, Washington, was reached on June 2, 1913, by the Public Service Commission of Washington, D. C., following a public hearing. Attorneys for the Washington Railway & Electric Company and the Capital Traction Company denied that the commission had jurisdiction in the matter.

Increase in Wages in Indianapolis.—The Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company voluntarily increased the wages of all motormen and conductors on June 1, 1913. Employees of both systems are paid in accordance with the length of service. Under the new rate the interurban trainmen will receive from 21 cents to 30 cents an hour, and the city railway men from 20 cents to 25 cents per hour, instead of the old rates of 20 cents to 28 cents and 19 cents to 24 cents respectively. These increases will probably aggregate an additional expense to the companies of approximately $70,000 a year.

Results in Accident Prevention Campaign in Philadelphia.—Statistics compiled by the Philadelphia (Pa.) Rapid Transit Company show that as a result of the accident prevention crusade inaugurated by it to safeguard children the number of accidents in the last ten months has been reduced 30 per cent. The company plans to extend the safety crusade by having an experienced lecturer visit the schools and talk on the dangers of street play in sections traversed by trolley cars. Periodical fifteen-minute cautionary talks are being given by teachers in the public schools on the dangers of playing in the streets. These talks are made particularly forcible by the aid of pictures displayed on the blackboards in the classrooms.

Hearing in Regard to Transfers in Brooklyn.—The Public Service Commission for the First District of New York has ordered a hearing to be held on June 19 to inquire whether the exchange of transfers shall be ordered between the Coney Island & Brooklyn Railroad and certain intersecting lines of the Brooklyn Rapid Transit System. There is now pending before the commission the application of the Coney Island & Gravesend Railway, one of the Brooklyn Rapid Transit companies, to purchase the stock of the Coney Island & Brooklyn Railroad. At the hearings on this application the commission was asked by certain civic associations to order the exchange of transfers before granting permission for the purchase of the stock. The commission decided to make a separate proceeding of the transfer matter.

Service Improvements in Atlanta.—As a result of the inquiry which it conducted into service in Atlanta, Ga., the Railroad Commission of Georgia has ordered the Georgia Railway & Power Company to improve service on ten routes during the morning and afternoon rush hours and make a monthly report showing passengers handled during those hours, the number of cars operated and the number of seats in those cars. The report of the commission, as explained by C. M. Candler, chairman, carries two separate and distinct changes in the service. One is that which was suggested to the commission by President Arkwright, and the other is ordered by the commission. P. S. Arkwright, president of the company, in concluding his letter to Mr. Candler in regard to the improvements, said: "In considering the suggestions you have made as to increasing the service I want you to understand that we approach them in the spirit of meeting your suggestions. It may seem out of place for me to say that we desire to do what you want us to do, inasmuch as the commission has the power, of course, to compel us to do what it deems proper without regard to our wishes or desires, but I say it in order that you may know that we have not considered your suggestions with the view of combating them but from the standpoint of agreeing with them."

Personal Mention

Mr. J. G. Baukat has resigned as superintendent of equipment of the Lehigh Valley Transit Company, Allentown, Pa.

Mr. Robert C. Brown, managing director of the Mexico (Mex.) Tramways, has been elected vice-president of the company.

Mr. Chester Michaels has been appointed inspector of transportation for the Galesburg & Kewanee Electric Railway, Kewanee, Ill.

Mr. F. H. Brooks has resigned as general superintendent, purchasing agent and chief engineer of the Lincoln (Neb.) Traction Company.

Mr. F. B. Flahive has been appointed assistant treasurer of the Paducah Traction Company and the Paducah Light & Power Company, Paducah, Ky., to succeed Mr. J. H. Bissell.

Mr. E. Dana Durand, former director of the United States Census, has accepted the position of director of the bureau of research in agricultural economics at the Minnesota Agricultural College.

Mr. George S. Cameron, who has been general manager of the Stockton Terminal & Eastern Railroad, Stockton, Cal., has been appointed manager of the San Joaquin Valley Electric Railway, Stockton, Cal., to succeed Mr. Morris L. Brackett, resigned.

Mr. G. A. King has been appointed assistant superintendent of the Plank Road shops of the Public Service Railway, Newark, N. J., to succeed Mr. E. A. Palmer, who has been appointed master mechanic of the Central division of the company.

Mr. J. H. Bissell, for the last seventeen months assistant treasurer of the Paducah Traction Company and the Paducah Light & Power Company, Paducah, Ky., has been appointed assistant treasurer of the Mississippi River Power Company at Keokuk, Ia.

Mr. Elmer E. Strong, who has been superintendent of transportation of the New York State Railways, Syracuse lines, has been appointed superintendent of transportation of the New York State Railways, Rochester lines, to succeed Mr. W. C. Callaghan.

Mr. R. R. Smith has been appointed purchasing agent of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., to succeed Mr. T. D. Sheerin, who has accepted a position as manager of the bond department of the Fletcher Trust & Savings Company, Indianapolis, Ind.

Mr. D. J. Haren has been appointed general superintendent of the Syracuse & Suburban Railroad, Syracuse, N. Y., in charge of track, power and transportation under Mr. J. P. Barnes. Mr. Haren was formerly superintendent and master mechanic of the Hornell (N. Y.) Traction Company.

Mr. C. B. Graves, formerly third vice-president and general manager of the Manila Electric Railroad & Light Company, Manila, P. I., has been appointed general manager of the Mexico (Mex.) Tramways to succeed Mr. Harro Harrsen, who has been elected managing director of the company.

Mr. E. A. Palmer, who has been assistant superintendent of the Plank Road shops of the Public Service Railway, Newark, N. J., has been appointed master mechanic of the Central division of the company to succeed Mr. J. R. Case, who has been appointed master mechanic of the Essex division.

Mr. Samuel Riddle, traffic manager of the Louisville (Ky.) Railway, was recently elected to membership in the Louisville Rotary Club, representing the electric railway interests of the city. Election to this organization is highly esteemed, inasmuch as only one representative of each line of business is eligible.

Mr. Harmon Bell has resigned as counsel of the San Francisco-Oakland Terminal Railways, Oakland, Cal. Mr. Bell served that company and its predecessor, the Oakland Traction Consolidated, for fifteen years. He will hereafter devote himself entirely to the interest of Bell, Bell & Smith, attorneys, of which firm he is a member.

Mr. Harro Harrsen, general manager of the Mexico (Mex.) Tramways, has been elected managing director of the company to succeed Mr. R. C. Brown, who has been elected vice-president of the company. Mr. Harrsen is also managing director of the Pachuca Light & Power Company and the Mexican Steel & Chemical Company.

Mr. J. R. Case, master mechanic of the Central division of the Public Service Railway, Newark, N. J., has been appointed master mechanic of the Essex division of the company to succeed Mr. T. H. Shaughnessy, whose appointment as assistant superintendent of equipment of the Chicago (Ill.) Railways was noted in the ELECTRIC RAILWAY JOURNAL of June 7, 1913.

Mr. George A. Valentine has been appointed chief inspector of the New York State Railways, Syracuse lines, a new position with that company. Mr. Valentine was formerly dispatcher for the Oneida Railway with headquarters in the Terminal Building in Clinton Square. He was born on a farm in Oswego County in 1876 and entered the employ of the Syracuse Rapid Transit Railway as a motorman on June 20, 1898. He was appointed dispatcher of the Oneida line on Nov. 6, 1909.

Mr. C. H. Baker has been appointed mechanical engineer of the Public Service Electric Company, Newark, N. J. Mr. Baker was graduated from Lawrence Scientific School in 1902 and since then has been identified with Westinghouse, Church, Kerr & Company, New York, N. Y., as construction engineer, the Brooklyn (N. Y.) Rapid Transit Company as power station inspecting engineer, the New York, New Haven & Hartford Railroad as assistant chief engineer of its Cos Cob plant, and the Hoosac Tunnel power station of the Boston & Maine Railroad and the Berkshire Street Railroad as chief engineer.

Mr. Anderson G. Moore, commercial manager of the Insull properties in Indiana, whose offices are in New Albany, Ind., has been appointed chairman of the publicity committee in charge of the arrangements for the centennial celebration to be held in New Albany from Oct. 12 to Oct. 16, 1913. The company with which Mr. Moore is connected is establishing a precedent for public service corporations in the extent to which it takes part in general "boosting" work in the cities in which it owns properties, and in New Albany, where it owns the electric railways and the gas and electric light and power plants, the company has been especially active in civic betterment work.

Mr. Henry Branson has been appointed superintendent of equipment of the Lehigh Valley Transit Company, Allentown, Pa., to succeed Mr. J. G. Baukat, resigned. Mr. Branson was formerly superintendent of rolling stock and equipment of the Philadelphia (Pa.) Rapid Transit Company, with which he was connected for seventeen years. He was a carhouse foreman of the Philadelphia Rapid Transit Company for six years, and for four years was in charge of the shops of the company on Fifth and Sixth Streets, Philadelphia. In December, 1909, he was appointed to succeed Mr. Fred H. Lincoln as assistant general manager of the company, with the title of superintendent of rolling stock and equipment.

Mr. W. N. Gorenflo, general manager of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., who was recently elected president of the Mississippi Electrical Association, was born in Biloxi, Miss., in 1877. He was graduated from the public schools in that city and entered the Mississippi Agricultural & Mechanical College at Starkville, completing the mechanical course in 1899. He entered the oyster-canning business and later became assistant cashier of the Bank of Biloxi. He helped organize the Biloxi Electric Railway & Power Company in 1903 and became the first secretary and manager of the company. In 1905 the property of the Biloxi Electric Railway & Power Company was sold to the Gulfport & Mississippi Coast Traction Company and in the following year Mr. Gorenflo was made general superintendent of the system. In January, 1911, he was promoted to the position of general manager.

Mr. R. H. Crozier, whose appointment as assistant general passenger agent of the Spokane, Portland & Seattle Railway, Oregon Electric Railway, Oregon Trunk Railway and United Railways, with headquarters at Portland, Ore., was noted recently in the Electric Railway Journal, has been connected with railway work for more than sixteen years. For thirteen years he was with the passenger department of the Chicago, Burlington & Quincy Railroad, and for more than three years he has been with the Spokane, Portland & Seattle Railway and associated lines. During his connection with the Chicago, Burlington & Quincy Railway he served in various positions in the general offices at Chicago, St. Louis and St. Paul and as traveling passenger agent at Kansas City and division passenger agent at St. Joseph. From Jan. 1, 1910, until April 10, 1913, Mr. Crozier was advertising agent of the Spokane, Portland & Seattle Railway, Oregon Trunk Railway and United Railways, Portland. He also served in a similar capacity with the Oregon Electric Railway from July, 1910, until April 10, 1913.

Mr. Thomas N. McCarter, president of the Public Service Corporation of New Jersey, Newark, N. J., had tendered to him a testimonial dinner on the evening of June 2, 1913, at Delmonico's in New York by the directors of the company in celebration of the tenth anniversary of its organization. Mr. Walton Clark, one of the directors, acted as toastmaster. Mr. Frank Bergen, counsel of the company, on behalf of the officers and directors presented Mr. McCarter with a punch bowl, which was concealed during the dinner under an imitation birthday cake in which ten candles had been stuck. Mr. McCarter expressed his appreciation of the gift and then reviewed the history of the company briefly. He said that since June 2, 1902, more than $75,000,000 had been spent in improvements to the properties which are controlled by the company. Among the officers and directors of the company not previously mentioned who were present were Messrs. George J. Roberts, J. J. Burleigh, A. R. Kuser, E. W. Hine, Thomas Dolan, J. Horace Harding, P. S. Young, M. R. Boylan, H. V. Drown, John L. O'Toole, R. E. Danforth and Newton W. Bolen.

Mr. William E. Holstock has been appointed superintendent of transportation of the New York State Railways, Syracuse lines, to succeed Mr. Elmer E. Strong, who has become superintendent of transportation of the New York State Railways, Rochester lines. Mr. Holstock was formerly assistant superintendent of transportation of the New York State Railways, Syracuse lines. Mr. Holstock began his railroad career with the Saginaw (Mich.) Street Railway in 1881 as a horse car conductor and remained in the service of that company until 1889. He was appointed to the People's Railroad, Syracuse, in 1889 in charge of the horse car stables. When the new South Salina Street station was built in Syracuse Mr. Holstock was placed in charge of that station as foreman and served in that capacity until 1905. He was then promoted to the position of general foreman, in which capacity he continued until March 18, 1912, when he was promoted to the office of assistant superintendent of transportation. His advancement from the post of assistant superintendent of transportation to superintendent of transportation of the Syracuse lines was made effective from June 4.

Mr. J. H. Miller, whose appointment as general passenger agent of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., was noted in the Electric Railway Journal of June 7, 1913, began his railway career in 1905 as night ticket agent for the Rock Island System at Washington, Ia. He next entered newspaper work as a reporter, but returned to the Rock Island System as night ticket agent at Washington in 1906. In the spring of 1907 he became ticket agent, cashier and bill clerk of the Rock Island System at Columbus Junction, Ia. Later in the year he was appointed ticket agent for the company at Eldon, Ia., and in July, 1908, was appointed assistant city passenger agent for the Rock Island System at St. Joseph, Mo. He continued in the last mentioned capacity until September, 1912, when he was made acting city passenger agent. Upon the return of the city passenger agent in December, 1912, Mr. Miller was made chief rate clerk in the general passenger office of the Rock Island at Topeka, Kan., under Mr. J. A. Stewart, general passenger agent, and remained in that capacity until he was appointed to the Kansas City, Clay County & St. Joseph Railway. Mr. Miller is twenty-five years old.

Mr. Edward M. Raver resigned as superintendent of transportation of the Michigan United Traction Company, with offices at Battle Creek, Mich., on May 31, 1913, to become superintendent of transportation of the Lincoln (Neb.) Traction Company. Mr. Raver began his electric railway career in 1892 as a motorman with the Fort Wayne & Northern Indiana Traction Company in Logansport, Ind. He was made road officer of that company in 1902 and a short time later his jurisdiction was extended over the interurban division from Logansport to Wabash, Ind. In October, 1904, Mr. Raver was appointed division superintendent of the Fort Wayne & Wabash Valley Traction Company's lines between Logansport, Peru and Wabash, and in May, 1907, he was transferred to the Fort Wayne city division as superintendent, in which capacity he remained until April, 1911, when he resigned to accept the position of city superintendent at Jackson, Mich., with the Michigan United Railways, now the Michigan United Traction Company. In April, 1912, Mr. Raver was appointed superintendent of transportation of the lines of the Michigan United Traction Company.

Thomas Finigan

Mr. Thomas Finigan has resigned as purchasing agent of the United Railroads, San Francisco, Cal., to accept the vice-presidency of Pierson, Roeding & Company, San Francisco, representatives for manufacturers of street railway supplies, with branches in Los Angeles, Cal., Portland, Ore., and Seattle, Wash. Mr. Finigan entered the employ of the Consolidated Traction Company, Newark, N. J., now the Public Service Corporation, in 1898 and was advanced rapidly to the position of assistant master mechanic. He resigned from the company to become associated with the mechanical department of the United Railroads, San Francisco, in 1903. He has since remained continuously in the employ of that company. He took entire charge of the commissary department created by the United Railroads to meet the unusual conditions arising from the earthquake and fire of 1906 and the strike of 1907, when the company fed and cared for more than 2000 employees. In the latter part of 1907 he was appointed purchasing agent of the company. Mr. Finigan is well known in the electric railway field. He has served on various committees of the American Electric Railway Association and is acting secretary for the recently organized Pacific Coast Electric Railway Association. Although Mr. Finigan has had no previous experience in the commercial end of the electric railway business, he has the advantage of fifteen years' knowledge of materials, a wide acquaintanceship and a genial personality. Before he severed his connections with the United Railroads the officials of that company tendered a farewell dinner to Mr. Finigan. In accepting the vice-presidency of Pierson, Roeding & Company, Mr. Finigan succeeds Mr. Safford K. Colby, who, as previously mentioned in the Electric Railway Journal, has been elected one of the vice-presidents of the firm of Allen & Peck, Inc. Mr. Colby continues as a director of Pierson, Roeding & Company.

OBITUARY

George Hoeger, superintendent of the Schuylkill Valley Traction Company and general manager of the Montgomery Transit Company, Norristown, Pa., is dead. Mr. Hoeger was born in Germany in 1860. His first experience in railway work was gained in Milwaukee, Wis., in the horse car days. Some nineteen years ago he became electrician of the Roxborough, Chestnut Hill & Norristown Railway under Mr. J. C. Lugar. He was appointed general manager, superintendent and electrician of the Schuylkill Valley Traction Company when that company took the Roxborough, Chestnut Hill & Norristown Railway over under lease of 1902.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Springfield & Central Illinois Railway, Springfield, Ill.**—Incorporated in Illinois to build an electric railway from a point south of Springfield to connect with the main line of the Terre Haute, Springfield & St. Louis Railway. Capital stock, $5,000. Incorporators: George W. White, Alfred L. Lynch, N. E. McMillan, and W. C. Neubauer, East St. Louis, and William Larberg, C. P. Johnson, W. D. Owens, Isaac Smith and A. C. Skillman, St. Louis.

***Cushing (Okla.) Railroad.**—Application for a charter has been made by this company to build a 12-mile electric railway from Cushing to Drumwright. Incorporators: Paul Arbon and C. R. Perry, Tulsa, and T. J. Hughes, J. H Bellis and R. C. Jones, Cushing.

***Guadalupe Traction Company, Seguin, Tex.**—Chartered in Texas to build an electric railway between Austin and San Antonio. Capital stock, $100,000. Incorporators: W. B. Dunlap and Walter J. Crawford, Beaumont; E. W. Brown, Orange; J. M. Abbott and J. M. Abbott, Jr., Seguin.

FRANCHISES

Corona, Cal.—The Pacific Electric Railway, Los Angeles, has received a franchise in Corona. The company has also received permission to construct a double-track line along San Pedro Street between Aliso Street and Ninth Street in Los Angeles.

Glendale, Cal.—The Board of Trustees has been asked to grant a fifty-year franchise for an electric railway in Glendale.

Santa Monica, Cal.—The Pacific Electric Railway has received a twenty-year franchise in Santa Monica.

Atlanta, Ga.—The Georgia Railway & Power Company has asked the Council for a franchise to double-track Ivy Street, Atlanta. The company has received a franchise in Clarkston for its extension from Atlanta to Stone Mountain.

Augusta, Ga.—The Atlanta & Carolina Railway has asked the Council for a franchise in Augusta. This line will connect Atlanta, Augusta and Athens.

Freeport, Ill.—The Freeport Railway & Light Company has received permission from the Council to remove its tracks on Gund Avenue and Hancock Avenue in the city of Freeport.

Springfield, Ill.—The Springfield Traction Company has asked the Commissioners for a franchise in Vigo County, Ind.

Taylorville, Ill.—Mayor Walter M. Provine, Taylorville, has again vetoed the franchise granted by the Council to the Decatur, Sullivan & Mattoon Transit Company on the ground that the term of fifty years is too long. [E. R. J., May 31, '13.]

Terre Haute, Ind.—The County Commissioners have granted a fifty-year franchise to the Springfield & Central Illinois Traction Company to cross the highways of the county. [E. R. J., May 24, '13.]

Humboldt City, Kan.—The Union Traction Company, Independence, has received a franchise from the Council in Humboldt City.

Portland, Maine.—The Cumberland County Power & Light Company has received a franchise over certain streets in Portland.

Templeton, Mass.—The Northern Massachusetts Street Railway has received a franchise for a connection with the lines of the Boston & Albany Railroad at Templeton Station.

***Brownstown, Mich.**—The citizens of Brownstown have voted to grant a franchise to the Arthur J. Greenway Company, Detroit, for right-of-way through Brownstown. This is part of a plan to build an electric railway to connect Rockwood, Flat Rock, Dundee, Brownstown and Adrian.

St. Louis, Mo.—The St. Louis & Jennings Railway has received a fifty-year franchise from the County Court from Florissant Avenue and Jennings Road to Melrose Avenue, St. Louis.

Medford, Ore.—S. S. Bullis & Sons, New York, have taken over a franchise for an interurban line to be constructed in the Rogue River Valley. The franchise was originally granted to the Minney Company, Oakland, Cal., later transferred to Col. F. B. Waite, Sutherland, Ore., and still later turned over to the city of Medford. The new owners will immediately begin building the line from the heart of the business district of Medford to Siskiyou Heights. Later the railway will be extended from Medford south to Phoenix, Talent and Ashland, thence north to Central Point. The company has petitioned the County Court for a right-of-way over several of the county highways.

Portland, Ore.—The Clackamas Southern Railway has asked the Council for a franchise in Portland. This line will connect Oregon City with the Molalla Valley in Clackamas County. A. E. Clark is interested. [E. R. J., April 16, '10.]

Hazel Dell, Pa.—The Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, has received a ninety-nine year franchise in Hazel Dell. Work will soon be begun by the company on its line from Ellwood City to Beaver Falls.

Chattanooga, Tenn.—The Chattanooga Railway & Light Company has received a franchise over Seventh Street in Chattanooga.

Chattanooga, Tenn.—The Eastern Tennessee Traction Company has received a franchise from the James County Court to build its lines in James County. This 30-mile line will connect Chattanooga and Cleveland. L. M. Coleman is interested. [E. J. R., May 24, '13.]

El Paso, Tex.—The El Paso Electric Railway has asked for a franchise over certain streets to the eastern city limits in El Paso.

Salt Lake City, Utah.—The Salt Lake & Ogden Electric Railway has received a franchise over certain streets in Salt Lake City.

Huntington, W. Va.—The Ohio Valley Electric Railway has asked for a franchise to double-track its lines on Third Avenue and Fourth Avenue and to build an extension to Ritter Park in Huntington.

Madison, Wis.—The Chicago & Wisconsin Valley Street Railway has notified the Council that it is willing to complete a railway from Pinckney Street to the east side of Madison, with a fifteen-minute schedule, within sixty days, or to complete the entire city system. If the city wishes to delay the construction of the city line for another year, the company will build lines to Portage and Prairie du Sac this year and after finishing the city line will extend the railway to Janesville.

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has asked for a franchise on State Street to Thirty-fifth Street and on Howell Avenue from Russell Avenue to the city limits in Milwaukee.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—Plans and specifications have been completed and bids are being asked by this company for grading its extension to Biddle.

Pacific Electric Railway, Los Angeles, Cal.—Work will soon be begun by this company on a short line between Los Angeles and Pasadena, which will cut the running time fifteen minutes.

Pacific Electric Railway, Los Angeles, Cal.—This company plans to lay 5 miles of new track at Riverside.

Crescent City Railway, Riverside, Cal.—Work has been begun by this company on its line between Bloomington and Rialto.

***San Francisco, Cal.**—The Board of Works has been directed by the Board of Supervisors to file plans and estimates of the cost of a system of municipal electric railways from the Embarcadero to terminals at the Exposition grounds and the Presidio; also over certain streets and avenues in San Francisco.

San José & Santa Clara Electric Railroad, San José, Cal.—Work has been begun by this company on the extension in Santa Clara to the railroad station.

***Washington, D. C.**—The Public Utilities Commission has been asked to approve plans for the construction of an electric railway between Anacostia, Suitland and Bradbury Heights.

Albany (Ga.) Transit Company.—Material has been ordered by this company for the extension of its Madison Street line west for about 1 mile in Albany.

Lewiston-Clarkston Valley Railway, Lewiston, Idaho.—It is stated that this company has completed its financial arrangements and will begin the construction of its line at once. Material for 18 miles of track has been ordered from the General Electric Company. F. L. Sturm, president. [E. R. J., May 24, '13.]

Northwestern Elevated Railroad, Chicago, Ill.—Plans are being considered by this company to extend its lines to Wilmette.

Danville, Crescent & Kankakee Traction Company, Crescent City, Ill.—This company has secured right-of-way from Kankakee to Cissna Park, 40 miles, and will begin grading about Aug. 1 on its line to connect Kankakee, Le Rable, Crescent City, Woodworth, Cissna Park, Rankins, Ellis, Potomac, Jamesburg and Danville. The power station and repair shops will be located at Crescent City. Capital stock authorized, $250,000. Officers: E. E. Meyer, Crescent City, president; Jules Lemenager, Ashkum, vice-president; G. H. Clark, Crescent City, secretary, and W. R. Nightingale, Crescent City, treasurer. [E. R. J., Aug. 21, '09.]

Peoria, Canton & Galesburg Railroad, Peoria, Ill.—This company announces that steps will be taken soon to increase its capital stock from $5,000 to $2,500,000. W. T. Irwin, Peoria, president.

Fort Wayne & Northwestern Railroad, Fort Wayne, Ind.—It is stated that this company plans to build a line from Huntertown to Churubusco in the near future.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Work will be begun at once by this company removing its tracks from Glen Miller Park and building its extension into Belleview.

Keokuk & Columbus Junction Transit Company, Keokuk, Ia.—Surveys have been made by this company on its 80-mile electric railway between Columbus Junction, Keokuk, West Point, New London, Winfield and Donnellson. It has not been determined when construction will be begun. T. A. Craig, Keokuk, secretary. [E. R. J., Feb. 13, '09.]

Arkansas Valley Interurban Railway, Wichita, Kan.—Work will be begun at once by this company on the extension north from Newton to Bethel College, 2 miles. A part of the plant for the extension includes a $12,000 concrete bridge, the expense of which is to be borne jointly by the company, the city and the county.

Owensboro (Ky.) City Railway.—Plans are being made by this company to extend its line on Breckenridge Street, Owensboro, to the Elmwood cemetery.

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—This company has awarded the contract for the construction of the first division of its line from Paducah to Murray, via Mayfield. Work will be begun Aug. 1.

Paducah (Ky.) Traction Company.—This company is making improvements to its lines. Heavier rails are being laid on Jefferson Street from Fountain Avenue to the city limits. Track repairs have also been made on the West Broadway line from Eleventh Street to Fountain Avenue in Paducah.

Orleans-Kenner Electric Railway, New Orleans, La.—Preliminary arrangements are being made by this company to build its electric railway between New Orleans, Kenner and Hanson City. A. Smith Bowman, New Orleans, is interested. [E. R. J., Feb. 8, '13.]

Sandy Springs Railway, Kensington, Md.—Grading is being done by this company for a 1-mile extension in Kensington.

Bay State Street Railway, Boston, Mass.—This company has been asked to consider plans to extend its Highland Circuit line from Rock Avenue and Hollingsworth Street to connect with its present line at Hollingsworth Street in Lynn.

Berkshire Street Railway, Pittsfield, Mass.—This company and the Council have reached an agreement on the Wahconah Street double-track improvements. This will be sent to the railroad commissioners for approval so that work may be begun as soon as possible.

Worcester (Mass.) Consolidated Street Railway.—Plans are being made by this company to lay 1 mile of new track from Southbridge to Brimfield.

***Minneapolis, Minn.**—Plans are being considered to build another suburban electric railway between Minneapolis and St. Cloud. E. G. Potter, Minneapolis, is interested.

***Riverhead, N. Y.**—Plans are being considered to build a 30-mile railway to connect Riverhead, Aquebogue, Jamesport, Laurel, Mattituck, Cutchogue, Peconic, Southold, Greenport, East Marion, Orient and Orient Point. Among those interested are Edward B. Eaton and W. S. Davis, Hartford, Conn.; H. B. Howell and Dwight Corwin, Riverhead.

New York State Railways, Rochester, N. Y.—Work has been begun by this company relaying its tracks on Onondaga Street to the city limits. Work will soon be begun double-tracking its James Street line from Sedgwick to the city limits.

***Waynesville, N. C.**—Plans are being considered to build an electric railway to connect Waynesville, Canton, Clyde, Hazelwood, Bellwood and Woodrow. Among those interested are Alden Howell and John P. Swift, Waynesville.

Stark Electric Railroad, Alliance, Ohio.—Work on this company's line to Akron will be begun as soon as the extension from Alliance to Cleveland via Ravenna has been completed.

Poland Street Railway, Youngstown, Ohio.—This company, which plans to build an electric railway between Poland and Youngstown, has mortgaged its property, consisting of the right-of-way, for $200,000 to defray the cost of construction. The mortgage is to secure bonds of which the Union Trust Company, Pittsburgh, is trustee. John Harrington, Poland, is interested. [E. R. J., Jan. 27, '12.]

Kansas-Oklahoma Traction Company, Nowata, Okla.—Preliminary surveys are being made by this company for a line from Winfield via Arkansas City, Blackwell and Tonkawa to Perry. Clyde A. King, Coffeyville, is interested. [E. R. J., May 10, '13.]

Lake Erie & Northern Railway, Brantford, Ont.—Work has been begun by this company on its line between Galt, Brantford and Port Dover.

Oregon Electric Railway, Portland, Ore.—Preliminary surveys are being made by this company for a line from Forest Grove to Gale Creek and eventually to Tillamook.

Oregon Short Line Railway, Portland, Ore.—According to reports this company contemplates electrifying its entire system in southern Idaho from Pocatello to Huntington.

Altoona & Logan Valley Electric Railway, Altoona, Pa.—Plans are being made by this company to begin work on its extension from Twenty-second Street and Pleasant Valley to the Altoona Driving Park in Altoona.

West Side Electric Street Railway, Charleroi, Pa.—Grading has been begun by this company on the Charleroi end of its line, together with grading in the center of the proposed line to Bentleyville and on the Bentleyville end. The company is doing the grading on both ends of the line and the Parsons Construction Company, Brownsville, is engaged in the work at the center.

Schuylkill County Railway, Harrisburg, Pa.—This company and its subsidiary, the Shenandoah & Wiggins Railway, which have just been chartered, announce that work will be begun at once on the first section of the line between Frackville and Pottsville. A spur will be built from Shenandoah to Fountain Springs. [E. R. J., May 31, '13.]

Renova & Gleasonton Street Railway, Renova, Pa.—This company states that it has no definite plans as to when work will be begun on its 6-mile electric railway between Renova and Gleasonton via Farwell and North Bend. W. B. Reilley, Renova, treasurer. [E. R. J., Jan. 22, '10.]

Moose Jaw Electric Railway, Moose Jaw, Sask.—This company plans to extend its line through Boulevard Heights and Parkdale Boulevard in Moose Jaw.

***North Anderson Development Company, Anderson, S. C.**—Work will be begun at once by this company on its interurban railway between North Anderson and Anderson.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—Plans are being considered by this company to make Atlanta its southern terminus.

***Chattanooga, Tenn.**—J. W. Adams, Chattanooga, and associates are considering plans to build an electric railway from Chattanooga to Dalton.

Memphis (Tenn.) Street Railway.—Plans are being made by this company for an extension on Lane Avenue in Memphis from Claybrook Street to Evergreen Street.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—During the next thirty days this company plans to build 2 miles of new track with 72-lb. T-rails with continuous joints and 10-in. compression bond.

Dallas Eastern Interurban Railway, Dallas, Tex.—Surveys are being made by this company from Dallas to Glen Rose, via Cement City, Grand Prairie, Webb, Mansfield, Venus, Alvarado, Keene and Cleburne. E. P. Turner, promoter. [E. R. J., May 10, '13.]

Blue Ridge Interurban Railway, Greenville, Tex.—It is reported that this company has placed in operation its 5-mile line between Westminster and Anna. Grading is being done between Westminster and Blue Ridge, 7 miles. It is planned ultimately to extend this line to Greenville. A. R. Nicholson, Greenville, is interested. [E. R. J., April 5, '13.]

Lynchburg Traction & Light Company, Lynchburg, Va.—Work has been begun by this company on the extension from the city line in Rivermont to the Peakland property.

Virginia Railway & Power Company, Richmond, Va.—Work has been begun by this company on its Hull Street line out the New Road to the Broad Rock Road in Richmond.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—This company plans to spend $30,000 on improvements to its lines in Aberdeen.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Plans are being made by this company to extend its lines to McConnellsville, Ohio, in the near future.

Wheeling (W. Va.) Traction Company.—This company plans to extend its double track at McMechen to the lower section of the city during the summer.

SHOPS AND BUILDINGS

Tri-City Railway & Light Company, Davenport, Ia.—This company has secured an option on property at Second Street and Perry Street in Davenport on which it plans to build a new interurban station and an office building.

Cape Breton Electric Company, Sydney, N. S.—This company is building an addition to its carhouse in Sydney, increasing its capacity about 50 per cent.

Oregon Electric Railway, Portland, Ore.—It is reported that this company will receive bids for the construction of a $50,000 depot in the near future.

Greenville, Spartanburg & Anderson, Greenville, S. C.—Plans have been completed by this company for a new depot at Greers, S. C. The company has awarded a contract for a new combination passenger and freight depot to the Wilkinson-Moffitt Construction Company, Durham. The cost is estimated to be $15,000.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Announcement has been made that the Fidelity Securities Company has purchased property at Union Street and Second Avenue in Nashville, and will build passenger and freight terminal stations for the Nashville-Gallatin Interurban Railway. H. H. Mayberry is president of both companies.

Northern Texas Traction Company, Fort Worth, Tex.—Plans are being made by this company to build a new terminal building at Jackson Street and Browder Street in Dallas. The structure will be nine stories high, the train sheds 200 ft. x 270 ft. and of terra-cotta and brick construction.

Salt Lake & Ogden Electric Railway, Salt Lake City, Utah.—This company has received permission to change its terminal from its present location on Third West Street to a central point in the uptown district of Salt Lake City.

Monongahela Valley Traction Company, Fairmont, W. Va.—This company has awarded a contract to the Richards Construction Company, Clarksburg, for the construction of a new combination brick substation and passenger station at Janelew.

POWER HOUSES AND SUBSTATIONS

Chicago (Ill.) Railways.—This company will add to its substation equipment three 4000-kw rotary converters with 600-kva reactances and three 4200-kva air-blast transformers with three 20,000-cu. ft. blower sets and switchboard apparatus. All three units have been ordered from the General Electric Company.

Fort Wayne & Springfield Electric Railway, Decatur, Ind.—During the next thirty days this company will award contracts for a new 50-hp electric motor and pumps for a gravel pit.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—During the next few weeks this company expects to purchase three 500-kva, 2300-44,000-volt step-up transformers.

Washington, Baltimore & Annapolis Electric Company, Baltimore, Md.—This company has placed an order with the General Electric Company for new substation equipment consisting of two 360-kw and one 120-kw, two-unit, two-bearing frequency changer set, three 200-kva and one 100-kva transformer and switchboard apparatus.

Providence & Fall River Street Railway, Swansea Center, Mass.—This company will install a 300-kw rotary converter, three 100-kva transformers and switchboard in one of its substations. The apparatus has been ordered from the General Electric Company.

Twin City Rapid Transit Company, Minneapolis, Minn.—New substations are under construction by this company and brick stacks in all plants are being replaced by self-supporting steel stacks to increase the plant capacity. The company is installing two 3000-kw rotary converter units in the Snelling Avenue substation at University Avenue and Snelling Avenue, St. Paul. A new substation is building in the vicinity of Hennepin Avenue and Lake Street, Minneapolis. This station will complete a line of substations for South Minneapolis lines.

Belt Line Railway Corporation, New York City, N. Y.—This company has placed an order with the General Electric Company for two 200-kw rotary converter charging sets and six 85-kva transformers.

Toledo Railway & Light Company, Toledo, Ohio.—This company has placed an order with the General Electric Company for a 12,500-kw Curtis turbo-generator.

Philadelphia (Pa.) Rapid Transit Company.—Plans are being prepared by this company to build a new substation at its Thirteenth Street and Mifflin Street carhouse in Philadelphia. The structure wll be 96 ft. x 54 ft.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—During the next few weeks this company will purchase one 150-kw generator and four-valve engine suitable for same and a switchboard.

Dallas Electric Light & Power Company, Dallas, Tex.—This company will add to its substation equipment a 1000-kw three-bearing motor-generator set. The apparatus has been ordered from the General Electric Company.

Southern Traction Company, Dallas, Tex.—Work has been begun by this company on its new substation on North Waco Street in Hillsboro. The structure is 40 ft. x 50 ft. and of brick construction. The remainder of the lot on which this substation is to be constructed will contain tracks and sheds and an express and baggage station. All of the buildings will be of brick.

Manufactures and Supplies

ROLLING STOCK

Louisville (Ky.) Railway is in the market for ten new cars.

Calgary Street Railway, Calgary, Alta., Can., is in the market for six cars.

Halifax (N. S.) Electric Tramway is in the market for six closed street cars.

Cleveland (Ohio) Railway is in the market for fifty center-entrance cars.

Salt Lake & Ogden Railway, Salt Lake City, Utah, it is reported, will purchase additional cars.

Great Falls (Mont.) Street Railways has ordered four double-truck cars from The J. G. Brill Company.

Detroit (Mich.) United Railway is reported as expecting to purchase from ten to twenty steel interurban cars.

Charlotte (N. C.) Electric Railway has placed an order with the Southern Car Company to rebuild sixteen of its cars.

Panama (Panama) Railway has ordered fifteen storage battery cars from the Federal Storage Battery Car Company.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is building thirty new cars at its Cold Springs shops.

Asheville Power & Light Company, Asheville, N. C., has purchased six 20-ft. 8-in. semi-convertible cars from The J. G. Brill Company.

Toledo Railways & Light Company, Toledo, Ohio, has ordered thirty cars from the McGuire-Cummings Manufacturing Company.

United Traction Company, Albany, N. Y., has ordered twelve pay-within cars from the Cincinnati Car Company, through W. R. Kerschner, New York.

Greenville, Spartanburg & Anderson Railway, Charlotte, N. C., has ordered six 60-ton, 1500-volt electric locomotives from the General Electric Company.

Oakland, Antioch & Eastern Railway, Oakland, Cal., has ordered four 56-ft. 8-in. combination passenger, smoking and baggage cars from the Cincinnati Car Company.

Meridian Light & Railway Company, Meridian, Miss., has ordered two 20-ft. 8-in. pay-as-you-enter cars, mounted on Brill 21-E trucks, from the American Car Company.

Hagerstown & Frederick Railway, Hagerstown, Md., has ordered seven 34-ft. 6-in. semi-convertible combination passenger-baggage-smoking cars from The J. G. Brill Company.

Kalamazoo-Grand Rapids Electric Railway, Kalamazoo, Mich., has placed an order with the St. Louis Car Company for seven 66-ft. 10-in. all-steel limited cars, ten 52-ft. steel local cars and four steel express cars.

Brooklyn (N. Y.) Rapid Transit Company is urging the Public Service Commission to approve plans for the type of cars submitted by the company for use on the lines which it will operate under the terms of the dual subway contract.

Tri-City Railway, Davenport, Ia., noted in the ELECTRIC RAILWAY JOURNAL of June 7, 1913, as expecting to purchase sixty city cars, has ordered thirty cars from the St. Louis Car Company, and thirty-five from the American Car Company.

Chicago (Ill.) Railways has completed plans and specifications for 200 semi-steel cars. It has decided to build 100 of them in its own shops and will purchase the other 100. In general the cars will be all-steel underframe with plate girder sides up to the belt rail. The bodies are designed for double-end operation and are to be 32 ft. 5 in. long with two 8-ft. platforms, making the over-all dimensions 48 ft. 5 in. The cars will seat forty-eight passengers within the car body and five slat seats will be provided on the platform. The body will be mounted on maximum traction trucks. The weight of the cars complete is estimated at 37,000 lb. each.

Tri-City Railway, Davenport, Ia., has specified the following details for the thirty pay-as-you-enter closed cars now being built by the St. Louis Car Company:

Bolster centers, length	19 ft. 2 in.
Length of body	30 ft. 8 in.
Length over vestibule	43 ft. 8 in.
Width over sills	8 ft. 3⅝ in.
Width over all	8 ft. 6 in.
Height, rail to sills	31 in.
Sill to trolley base	8 ft. 7 in.
Body	composite
Interior trim	polished bronze
Headlining	agasote
Roof	monitor
Underframe	composite
Axles	hammered steel
Bumpers	6 x ⅜-in. plate
Car trimmings	St. L.
Conduits and junction boxes	St. L.
Couplers	Tomlinson
Curtain fixtures	Cur. S. Co.
Curtain material	Pantasote
Destination signs	Elec. Serv. Sup.
Fenders	Providence
Gongs	St. L.
Hand brakes	St. L.
Headlights	U.S.
Journal boxes	Symington
Registers	International
Sanders	Keystone
Sash fixtures	Edwards
Seats	H. & K.
Step treads	Universal
Trolley catchers or retrievers	Keystone
Trucks	St. L.
Wheels	33-in. chilled

San Antonio (Tex.) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of March 29, 1913, as having ordered ten closed prepayment cars from the American Car Company, has specified the following details for these cars:

Seating capacity	40
Bolster centers, length	17 ft. 4 in.
Length of body	28 ft. 10 in.
Length over vestibule	41 ft. 4 in.
Width over sills	8 ft. 0 in.
Height, rail to sills	32 in.
Sill to trolley base	9 ft. 1½ in.
Body	wood
Interior trim	polished brass
Headlining	agasote
Roof	plain arch
Underframe	composite
Air brakes	West.
Axles	Brill
Bumpers	American
Cables	G. E.
Car trimmings	Brill
Control	G.E. K-28
Couplers	American
Curtain fixtures	Cur. S. Co.
Curtain material	Pantasote
Destination signs	Hunter
Gears and pinions	G.E.
Gongs	Brill
Hand brakes	American
Headlights	Crouse-Hinds
Journal boxes	Brill
Motors	4 G.E. 200 outside-hung
Paint	American
Sanders	American
Sash fixtures	Edwards
Seats	Brill
Seating material	cherry slat
Springs	Brill
Trolley retrievers	Trolley S. Co.
Trolley base	G.E.
Trucks	Brill 27-G-1
Ventilators	Brill exhaust
Wheelguards	H-B
Wheels	St. L. Car W. Co.

TRADE NOTES

E. W. Clark & Company, Philadelphia, Pa., have opened an office in suites 311 and 313, The Rookery, Chicago, Ill.

The J. G. Brill Company, Philadelphia, Pa., has received an order from the Dallas (Tex.) Consolidated Electric Street Railway for twenty-six 39-E trucks.

Southern Car Company, High Point, N. C., has elected A. H. Sisson its vice-president and treasurer. Mr. Sisson was formerly connected with Forsyth Brothers, Chicago, Ill.

Universal Safety Tread Company, Boston, Mass., has received an order for safety treads, to be used on the thirty new cars of the Tri-City Railway, Davenport, Ia., which are now being built by the St. Louis Car Company.

Safety Car Heating & Lighting Company, New York, N. Y., has elected A. C. Moore vice-president of the company with offices in Chicago, Ill. Mr. Moore, who was formerly general manager of the company, will have charge of the entire Western business.

Pyrene Manufacturing Company, New York, N. Y., has received recent orders for its fire extinguishers from the Berkshire Street Railway, Pittsfield, Mass., the Duquesne (Pa.) Light Company and the Edison Electric Illuminating Company, New York, N. Y.

Railway Utility Company, Chicago, Ill., has received the orders for ventilators from the New York (N. Y.) Railways for the 175 cars now being built by the St. Louis Car Company and for the forty-five storage battery cars being built by the American Car & Foundry Company.

American Veneer Company, Hoboken, N. J., has announced the resumption of business at its new location. The new plant, being four times the former capacity, will have vastly increased facilities for handling orders promptly and effectively. The company has also acquired the large plant of Joel H. Woodman and has added the business of this concern to its present activities.

Electric Service Supplies Company, Philadelphia, Pa., has opened an office in the Oliver Building, Pittsburgh, Pa., under the supervision of R. D. Brown of that city. The company also states that it has recently received orders for the automatic trolley guard from the American Railways, Philadelphia, Pa.; the Illinois Traction System, Peoria, Ill., and the Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.

Canadian General Electric Company, Ltd., Toronto, Ont., which owns and controls as subsidiary companies the Canada Foundry Company and the more recently acquired Canadian Allis-Chalmers Company, Ltd., has decided to consolidate the selling organizations of the two latter companies and conduct the selling organizations of both companies under the name of the Canadian Allis-Chalmers Company, Ltd.

Pierson, Roeding & Company, San Francisco, Cal., announce the election of Thomas Finigan as vice-president of the company to succeed Safford K. Colby, resigned. As previously noted in the ELECTRIC RAILWAY JOURNAL, Mr. Colby has been elected one of the vice-presidents of the firm of Allen & Peck, Inc. Mr. Colby continues as a director of Pierson, Roeding & Company. A portrait and a biography of Mr. Finigan are published elsewhere in this issue.

Lord Manufacturing Company, Brooklyn, N. Y., is placing on the market a so-called drive type of hydroground for lightning arrester ground. The advantage in this type over the Lord disk hydroground consists in the convenience and ease with which it may be placed in the ground. In shape it is a metal sheath 1½ in. in diameter, 2½ ft. in length, or with a 4-ft. extension, making an over-all length of 6½ ft. It is equipped with a sharpened point at the lower end and a malleable iron driving cap at the top. The sheath is highly perforated so that the hydroscopic body or element has large contact surface. Though the sheath is affected by electrolysis the element is not, and thus with age the hydroground improves, as more surface is brought into contact with the soil.

General Electric Company, Schenectady, N. Y., has received equipment orders from the following railways: Springfield (Mass.) Street Railway, six GE-80-A, 40-hp four-motor equipments and nine GE-87-A 60-hp two-motor equipments; Worcester (Mass.) Consolidated Street Railway, fifteen GE-87-A 60-hp two-motor equipments; Gary & Interurban Railway, Gary, Ind., four GE-226 45-hp four-motor equipments; Twin City Rapid Transit Company, Minneapolis, Minn., fifty-three GE-203 50-hp four-motor equipments, with straight-air-brake equipments and CP-25 compressors; Union Electric Company, Dubuque, Ia., six GE-203 50-hp two-motor equipments, with straight-air-brake equipments and CP-25 compressors; San Diego (Cal.) Electric Railway, thirty-five GE-201 60-hp two-motor equipments, with straight-air-brake equipments and CP-25 compressors, and the Tidewater Southern Railway, Stockton, Cal., three GE-201 60-hp four-motor equipments.

J. P. Devine Company, Buffalo, N. Y., has recently completed its new plant in East Buffalo. The plant has been erected on three acres of land conveniently located along the Erie Railroad. The main building is 220 ft. x 90 ft., constructed of brick with a concrete foundation. In this building all of the heavy machine tools, milling machines, lathes and boring mills are set on solid concrete foundation. A 20-ton Chisholm & Moore electric traveling crane is installed for quick handling of heavy material. The boiler shop, testing room, transformer room, laboratory and power plant are in another new building adjoining the main building. The administration building, in which are the main offices of the company, has also been removed to this location. The extensive increase in business and the constantly increasing size of units of the drying and impregnating apparatus manufactured by the company have made the construction of this new plant necessary.

Ohmer Fare Register Company, Dayton, Ohio, has, as an expression of appreciation of the remarkable record established by the conductors of the Portland Railway, Light & Power Company, Portland, Ore., after one year's experience with the recording system of the company and to lend encouragement to make their efforts worth while during the current year, offered cash prizes for the year ending Dec. 31, 1913. These prizes are: to the division making the highest average for the year, $100; to the division making the next highest average, $75, and to the division making the third highest average, $25. These prizes will be paid at the completion of the records for the year. The disposition of the prize money will be submitted to the vote of the conductors of the divisions, the only restrictions being that it must be applied to the purchase of something for the club rooms so that all may participate in the benefits. A year ago Mr. Ohmer, president of the company, made a similar offer to the conductors of the Denver (Col.) City Tramway. The winning division finished with a record of 96.57 per cent for the year.

ADVERTISING LITERATURE

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued a folder on its type PG porcelain strain insulators.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a pamphlet illustrating and describing how Horn type apparatus is being used.

Industrial Works, Bay City, Mich., have issued Bulletins Nos. 210 and 211, illustrating and describing "Pile Drivers, Crane Pile Drivers and Steam Hammers" and "Locomotive Cranes," respectively.

Automatic Flagman Company, Los Angeles, Cal., has issued Bulletin No. 3, describing its signals and containing views of several signals that have recently been installed on different railways.

Easterline Company, Indianapolis, Ind., has issued a small folder describing its "Golden Glow" headlights for railway service and also containing several illustrations of the headlights, both for roof and dash mounting.

American Brass Company, Ansonia, Conn., has issued an attractive pamphlet on Tobin bronze, illustrating and describing some of its many uses. The pamphlet also contains numerous testimonials from companies that have used this bronze.

National Quality Lamp Division of the General Electric Company, Cleveland, Ohio, has issued in pamphlet form the article read before the National Electric Light Association at its thirty-sixth convention held at Chicago, June 2-6, 1903, on "The Relation of the Incandescent Lamp to Lighting Service," by Robert E. Campbell and M. D. Cooper.

Pyrene Manufacturing Company, New York, N. Y., has issued a small booklet on its "Pyrene" fire extinguisher for electric service. The booklet contains a number of illustrations of railway tests in which arcs of high voltage have been extinguished by its use. It also contains much interesting information in reference to the application of the extinguishers.

J. G. White & Company, Inc., New York, N. Y., have reprinted in attractive pamphlet form the address "Some Mistaken Popular Notions Concerning Public Service Corporations" delivered by Frederick Strauss, of J. N. Seligman & Company, at the midyear meeting of the American Electric Railway Association held in New York in January, 1913. Mr. Strauss is a director of J. G. White & Company, Inc., and was a member of the Railroad Securities Commission appointed by President Taft.

Electric Service Supplies Company, Philadelphia, Pa., has issued the 1913 edition of its catalog on protected rail bonds and appliances. The seventy-two-page book covers the subject of rail bonding in its every phase. It is well illustrated, and besides showing the several types of rail bond, it illustrates clearly the value of proper installation, the importance of accurate testing apparatus and the use of bond compressors. The section of the catalog describing and illustrating the methods of installing rail bonds enters into the subject in detail and shows graphically the importance of assuring a perfect moisture-proof contact with the rail.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JUNE 21, 1913 No. 25

PUBLISHED WEEKLY BY
McGraw Publishing Company, Inc.
James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.
Chicago Office..............................1570 Old Colony Building
Philadelphia Office.........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere; United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

AN ACTIVE CAREER

The youth of the electrical industry is brought vividly before us every so often by the realization that all progress in it has practically been accomplished during the active business career of many men who are still prominent in the industry and presumably have many years of usefulness before them. This thought is suggested by the announcement this week of the retirement as president of the General Electric Company of C. A. Coffin and his election as chairman of the board of directors of the company. Those best acquainted with Mr. Coffin will realize that this change in title will not mean the loss to the industry of his services or any abatement of his interest in the field which he has served so ably during the past thirty years. It may relieve him from some of the more exacting duties involved in the direction of a large manufacturing company, but it cannot change the man or repress his energy or activity. An event of this kind, besides bringing a realization of the shortness of the period of electrical development, also emphasizes the indebtedness of those engaged in electrical work to the efforts of individuals, especially in the pioneer days. We are usually too prone to accept conditions, especially when they mark rapid progress, as inevitable and to assume that things would have occurred about as they did without the services of this or that individual. But this is not true. The human element is as inseparably linked with the history of a business organization or of an industry as with that of a nation, and the stories of nations have shown that they have risen or fallen because a strong or a weak man has directed their affairs. The present status of the electrical industry in this country is certainly due very largely to the fortunate combination of circumstances which early in the art brought to the front the individuals who have left their permanent mark upon it, and to look back occasionally at the work of such men as Mr. Coffin and to remember the obstacles which they overcame should be an incentive and encouragement to those who have entered later into the field.

SMOKING ON NEW YORK CITY LINES

The inalienable right of mankind to breathe pure, uncontaminated air, as set up by the Non-Smokers' Protective Association of New York, and the inalienable right of man to indulge in a good Havana while riding on a surface car, as maintained by the smokers during the recent hearing in New York, revive a dispute which has been waged in a great many cities of this country. The non-smokers' testimony at the New York hearing dealt mostly with the dangerous aspects of the habit and its baneful influence on "ethical purity," but they made no reference to conditions in other cities and the general public attitude. The other side, too, might have stated that in the West and in many Eastern cities smokers are more liberally treated than in New York. At any rate, it was brought out that smoking in public conveyances is generally restricted to the three or four rear seats of open cars and to platforms and stations in the open air. But, upon the claim that the city ordinance and the provisions of the Sanitary Code are not being strictly enforced by the railway companies, an order by the commission was requested either further restricting the smoking privilege on city lines or preferably abolishing it altogether, on the ground that a violation of this order would cause a penalty of $5,000 to be imposed on the convicted carrier. It would seem, however, that such a step would not exactly serve to fix the blame. As a representative of the railways testified, they are aware of the fact that a very large percentage of the public are smokers, and accommodations were furnished for them only with the idea that it would be both agreeable and acceptable to the majority of the traveling public and with the intention that when such ceased to be the case the privilege would be withdrawn. The rights of all must be respected, of course, and it is well that the smokers should be reasonably restricted. When they pass beyond these limits, however, they and not the company should be held primarily liable. The matter is a difficult one to regulate to the satisfaction of all, but whatever method is adopted, the wishes of the majority should first be considered, and then such steps used as will place the blame where it properly belongs and not penalize the carrier for endeavoring to serve better the traveling majority.

AIR-BRAKE FAILURES AS EXCUSES

On Thursday of last week the second section of a passenger train on the New Haven railroad ran past a distant signal and hit the first section, which was standing some distance beyond the following home semaphore mast. The wreck has proved to be an extraordinary one—not because of the manner in which it occurred, for that is, unfortunately, only too common, but because of the number of lessons which may be drawn from it. A vast amount of effort is now being devoted to demonstrate that the New Haven's rolling stock was defective, that the locomotive was "stiff" and, above all, that the "brakes would not hold." This last is the perennial argument which is brought forward to account for daylight wrecks whenever the real cause is not perfectly obvious. Judging from its popularity, it might seem to be a good excuse, yet the fact remains after many years of practical experience that air brakes do not have sudden or inexplicable failures. This does not include, of course, cases where the apparatus has been tampered with, as when a revengeful tramp, kicked off a freight train at the top of a mountain grade, risked his life to close an angle cock at the head end after the train had started, letting it drop down the hill to inevitable derailment at the first sharp curve. But it does cover the cases, such as the Stamford wreck appears to be, where through the incapacity or inexperience of an engineer the brakes are called upon to do something for which they were not designed or to accomplish a physically impossible result. The Stamford wreck is still under investigation, and the final report upon it has yet to be made, but from the testimony thus far adduced it is obvious that the engineer of the overtaking train did not realize a most elementary feature in air-brake operation—that to get a full emergency application after the train-line pressure has been drawn down by service applications it is necessary to release and recharge. This misconception appears to be a common one—just why, it is impossible to say—but this will hardly absolve the unfortunate engineer from responsibility if it shall be found that he wasted time and potential brake cylinder pressure by dribbling away his air in the expectation that he could still make an emergency stop by turning his brake valve handle to the right.

PLANNING A CITY AND ITS TRANSIT FACILITIES

The science of city planning as it is now discussed has the appearance of being something of a luxury that asks serious recognition long years after communities have worked out step by step and under the spur of necessity the conditions of development that are now criticised. It is in reality, however, a subject well worthy of consideration, whether early or late in the history of a city, and one that is particularly appropriate in the study of the transportation situation. This is shown by the fact that in Europe, where the cities are much older than in this country and are growing much less rapidly, the science of city planning is receiving the most careful consideration of the authorities, and its principles are being put in force successfully in many places.

The paper prepared by Milo R. Maltbie, of the New York Public Service Commission, First District, for presentation at the fifth National Conference on City Planning, held in Chicago on May 6, suggests a number of points which should be studied. While naturally he speaks from the point of view of a resident of New York, the factors in the transportation problem in all cities have marks of resemblance. In other words, the type of railway construction adopted by companies furnishing urban transit facilities in large cities, the volume of service rendered the public and the distribution of population and territorial extent of the city are factors that must stand in somewhat the same relation to each other in all communities.

Neither a railway system nor a city which has been in existence a long period of years can be born again over night. If either or both could have the benefit of a fresh start it would be a very simple matter to do away with mistakes arising from haphazard or unplanned growth and to perfect ideal arrangements. Railway facilities ordinarily precede development, but since it is not possible to foresee on what lines developments will take place, mistakes have been unavoidable. It is not true by any means, however, that early mistakes cannot be at least in part corrected by subsequent wise action. For instance, New York City would be in a better position to-day, so far as its available transportation facilities are concerned, if it had entered into any reasonable arrangement for additional subway construction five years ago and was now enjoying the full benefits of the facilities whose construction had been started then than it is to-day, when after long negotiation it has just completed arrangements for a comprehensive subway system which will take years to develop.

Mr. Maltbie says that the correlation of the various facilities for transportation of passengers is perhaps the most difficult phase of the problem. That this is so is due in part to the very rapid growth of American municipalities and to the corresponding progress of transportation facilities. With individual and other private property interests, as well as with the railway companies, this development has followed the lines that necessity or self-interest demanded. Now, with the time of more intelligent city planning at hand, the problem is to effect a means of correlation not only between the transportation facilities but also between the many public and private interests concerned. The aspect which such a problem assumes in crowded Manhattan is, however, without a parallel in any other city. Thus in some of the cities of the Central West interurban facilities are the best means afforded the public for transportation between centrally located terminals and homes within easy riding distance in the country.

The discussion of Mr. Maltbie on the question of whether all cities can have subways is of particular importance in view of the vociferous demand that arises from time to time in nearly every community for this form of rapid transit. He emphasizes the fact that in order to offset the burden of large fixed charges there must be dense traffic and that that in turn means congestion of population. This is not exactly what the city planning experts favor. We believe that in a community which has not the great density of population needed to support a subway the most practicable form of development after the reasonable car capacity of its streets has been exceeded is the construction of a terminal subway or elevated line over which all or part of the cars can be routed while in progress through the crowded business district. The subway plan has given great relief in Boston and the elevated plan is being considered in modified form in Los Angeles. Both methods offer a desirable means of settlement of the problem in other cities where the traffic available will not justify the construction of complete subways.

CONSTRUCTION EXPENSES IN THE MINNESOTA RATE DECISION

A question has been raised by a correspondent as to the correctness of the statement made last week in the editorial on the Minnesota rate case decision to the effect that "It is also evident that the court, in objecting to the use of multipliers, did not intend to eliminate the construction costs such as grading, and it also recognized the propriety of such intangible elements as engineering, superintendence, legal expenses, contingencies and interest during construction, when based on a proper valuation." Our correspondent quotes this passage from the decision of the court: "We also think it was an error to add to the amount taken as the present value of the lands the further sums, calculated on that value, which were included in the items of 'engineering, superintendence, legal expenses,' 'contingencies,' and 'interest during construction,'" and he doubts the propriety of our drawing from this the conclusion stated above. The fact is that the section just given is the one generally quoted in the newspaper reports, but it sheds less light on the point at issue than do other clearer portions of the decisions, although it in itself contains the generalization of the facts.

To be specific, in the case of the Northern Pacific, for example, the valuation of the lands for right-of-way, yards and terminals, including an estimated cost of acquisition and consequential damages and an allowance for the "railway value" of the land, was $21,024,562. The cost of constructing the road with all the existing structures brought a total of $58,728,685. Upon this, 4½ per cent was taken for engineering, superintendence and legal expenses. The value of the equipment added to the above total made $74,209,789, upon which 5 per cent was taken for contingencies and also 4 per cent for two and one-half years for interest during construction. From this summary of the procedure it will be observed that the item for lands, right-of-way, yards and terminals was in all cases included in the total on which the percentages were taken for the incidental construction expenses.

This is the exact point against which the Supreme Court directed its criticism. The normal market value of the land was increased by the use of an artificial multiplier, and then on this value a percentage was taken for expenses that concerned not the land itself but the construction accounts. The court objected to the use of a multiplier to cover hypothetical outlays in connection with the acquisition and condemnation of the land, but we believe we are correct in our interpretation of the decision as meaning that if the construction expenses are not calculated in that inflated value the court will take cognizance of them. A second point then arises: Shall the land, properly valued at the normal market price, be included in the total upon which these expenses are calculated, or shall they be based upon all the other asset accounts, exclusive of the land? The court does not say, but the point is inconsequential, for if a reasonable amount is to be allowed for these items, they can be figured on either basis. The one conclusion to be reached, as we read the decisions, is this, that the land value cannot be increased by any conjectural railway value and then be used as a partial basis for calculating construction expenses, but that the court will take cognizance of these charges when based on a proper valuation.

THE DECISION OF THE WISCONSIN COURTS AGAINST THE MILWAUKEE COMPANY

The decision in the Milwaukee fare case rendered by the Supreme Court of Wisconsin is in effect that the city of Milwaukee did not have authority to enter into a contract with The Milwaukee Electric Railway & Light Company fixing unchangeable rates of fare for a definite period, so that the agreement was void. No doubt the city entered into the contract in good faith. It believed that it was driving a good bargain for itself when it extended the life of the franchise and got as one of the considerations therefor a reduction in the rate of fare. If the city had told the company that it had not the legal right to bind itself as to the rate of fare for a number of years in the future, of course the contract would not have been made. Unless other great benefits of equal or higher value were received, the company would not have been justified in abandoning the higher rate of fare which it held under the earlier unmatured franchise and in giving the lower rate of fare which it took under the new franchise. It felt, however, that it was getting a quid pro quo in the increased franchise life which the new contract gave.

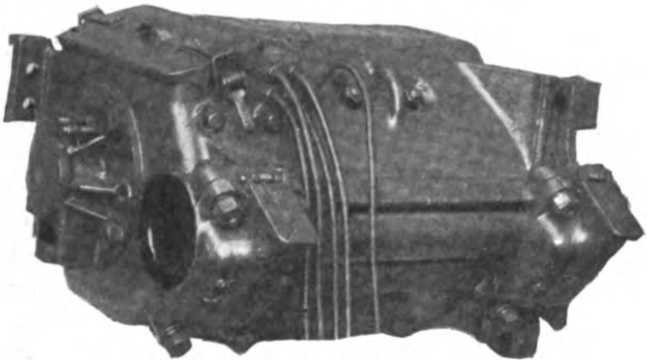
Through the years that intervened between the execution of the contract and the decision of the Railroad Commission reducing the rate of fare the citizens of Milwaukee had the benefit of the lower rate of fare which the new contract provided. Stated in another way, during this period the company lost the advantage of the higher rate of fare which the earlier franchise would have permitted it to charge. It seems from the angle which the events of the last few years have taken that the repudiated contract was another case of "heads we win, tails you lose." The city might have said to the company: "We will agree to this lower rate of fare now, but if the policy of the State should change in the future and we can secure a further reduction in the rate of fare, we shall take that way and disregard the contract." Although this in effect is what the Wisconsin court permits to be done, the city did not say that at the time the contract was made. It took what it could get, and the company on its part did what it thought was the best for itself under the circumstances.

When limited franchises were the policy of the State they were given and accepted as the basis for the relations between a municipality and a company. But later the State adopted an indeterminate franchise policy and a system of regulation through a State commission. It not only applies this policy to new franchise arrangements but also applies the substance of it so as to annul old franchise arrangements. What will happen in Wisconsin if the State should again decide to change its policy and return to the limited franchise policy? We think that such a change is wholly improbable, and we believe that limited franchises as a matter of general policy are not in the true interest of either the companies or the public; but we also believe that if parties to a contract made under earlier conditions desire to continue its vitality and integrity, they should have the right to do so.

Electric Welding and Motor Rejuvenation

The Third Avenue Railroad, New York, Carries on Many Forms of Electric Welding, and It Is Also Rejuvenating Two Types of Motors Along Novel Lines—The Methods Are Described and Costs Are Included

The adaptability of electric welding to a wide variety of railway repair and renewal work is illustrated by the practices of the Third Avenue Railway, New York. Early last year, after some experiences with outside welding, the company determined to do this important work in its own shops at Third Avenue and Sixty-fifth Street. Since last August it has had in operation the equipment hereinafter described for all classes of light and heavy welding.

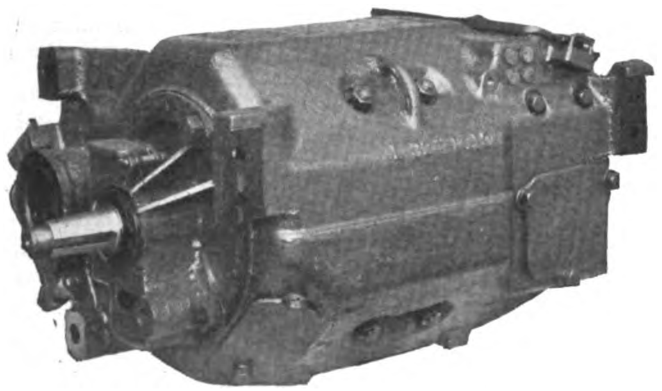


Third Avenue Welding—Commutator End of New Frame No. 57-U Motor

THE WELDING EQUIPMENT

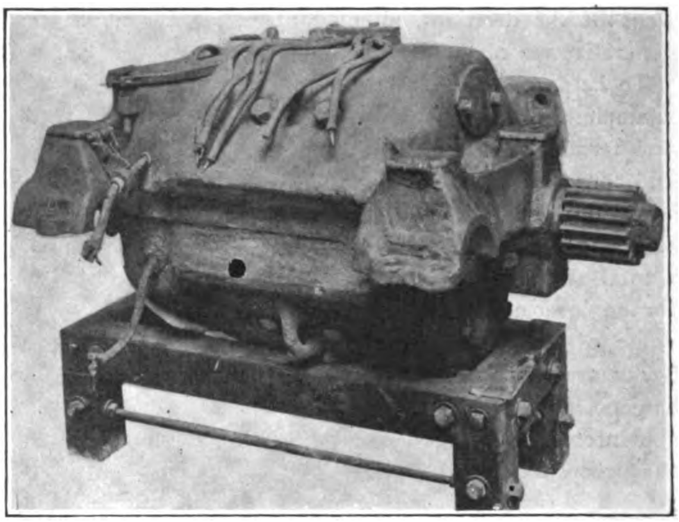
As an essential condition to good work, the company decided to install the principal welding outfits and appurtenances where the welders could labor under the best conditions. The welding room is part of the high truck-shop basement, and it is bounded by the whitewashed brick piers which were originally erected to carry cable machinery. This room has a large opening at the top for air and natural light, but two fans and several clusters of lamps are also installed. The welding section really comprises two rooms, one in which the work is done and the other, a side passage, where the resistances and switchboards are installed.

As energy is taken direct from the 550-600-volt substation bus, enough resistance was provided to reduce the voltage at the arc to approximately 50-75 volts. These resistances are obsolete car grids which are suspended from the ceiling of the side passage. Three switchboards are installed as follows: The first, nearest the welding room, supplies currents of 200, 250 and 350 amp for such work as welding broken motor shell lugs, broken truck frames, etc.; the second board furnishes currents of 75, 125, 150 and 200 amp for welding gear cases, filling in worn axles, dowel-pin holes, etc., and the third switchboard gives currents of 170, 220 and 270 amp. The middle board has a connecting switch so that any current within its range can be transmitted to a board on the truck-shop floor where work is done directly on the trucks. This board is also fitted with a Sangamo recording watt-hour meter in order to record the energy consumed for any particular job, should such data be wanted. This watt-hour meter can also be readily transferred to the other boards if desired. The total energy supplied for all welding work is recorded by means of an integrating wattmeter in the feeder circuit, and a regular charge is made at the rate of 1 cent per kw-hr. to each job for the energy used.



Third Avenue Welding—Pinion End of New Frame No. 57-U Motor

Current for each set is taken through two circuit-breakers, one on each leg of the line, the negative side passing directly through a flexible cable to the burner or torch, while the positive is applied to the work after being led through the proper combination of resistances. All work is placed on an insulated table, and the men stand on fiber mats. The operator's torch consists of a pipe ½ in. in diameter and about 2 ft. long. The outer end of this torch carries a carbon pencil while the inner end is attached to the negative lead. The back of the pipe is well insulated to permit its use as a handle, and a round fiber shield is also applied at the middle of the pipe to protect the hand of the operator from the arc. Each welder is guarded about the head and eyes by a hood made of canvas and framed with light tin in the form of a head band. The hood carries an eyepiece of red, green or blue glass. A canvas shield also separates the two operators.

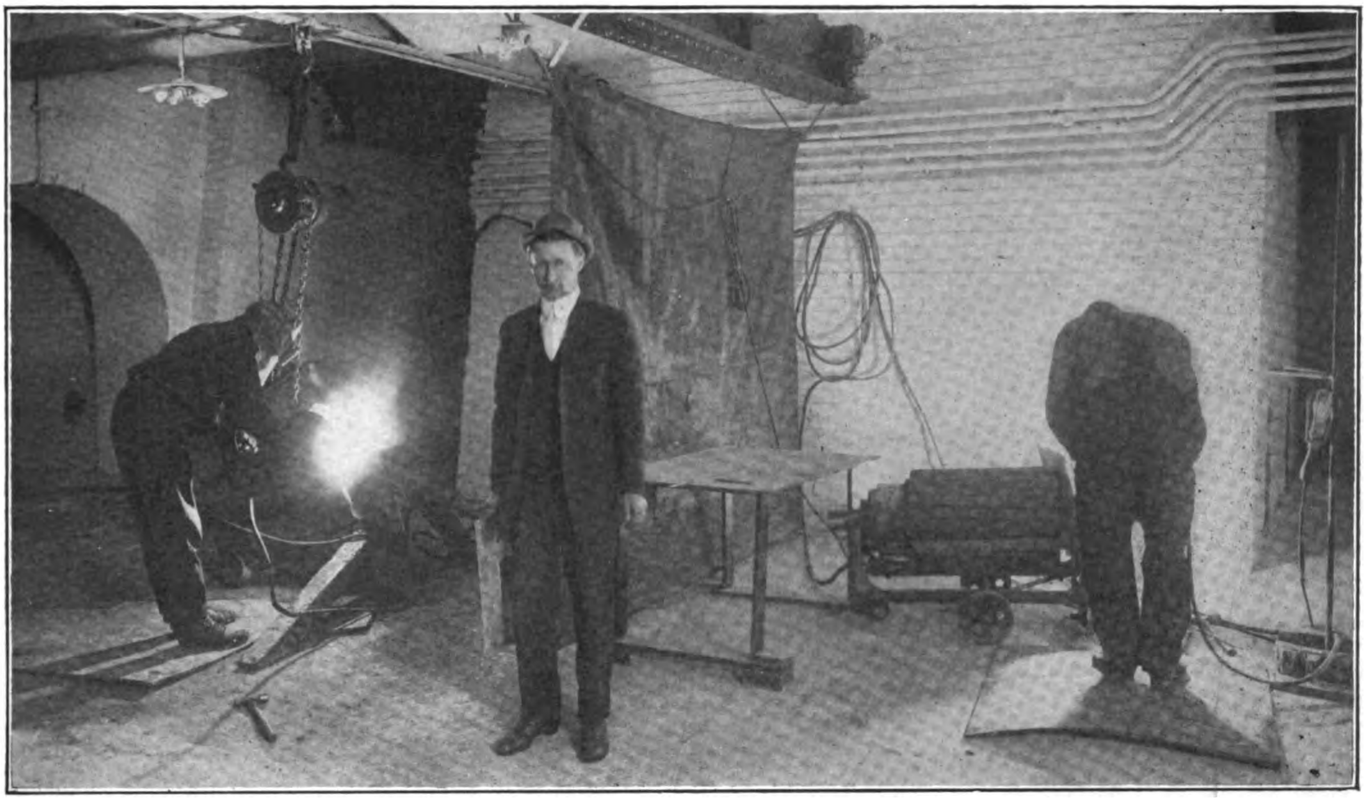


Third Avenue Welding—No. 57 Motor with Original Frame

Table I.—Record of Welding Done During Week Ended Jan. 25, 1913

Work Done	Unit Cost New	Total Cost New
Welding axle lugs on seven Westinghouse-56 motors (half shell without fittings)	$50.00	$350.00
Welding one K-8 broken controller frame	9.00	9.00
Welding five pony axles around button	7.50	37.50
Welding Westinghouse-310 armature shafts, one broken and two with worn keyway and pinion fit (shaft)	8.60	26.40
Total		$422.90
Cost of labor	$36.50	
Cost of material	1.50	
Cost of current at 1 cent per kw-hr	30.00	
Total		68.00
Saving		$354.90

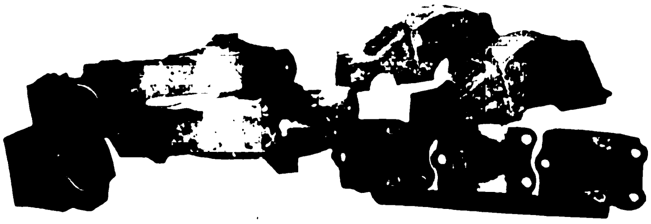
The chief supplies necessary for this work are the carbon pencils, welding powder and additional metal. The carbon is ⅜ in. in diameter and 6 in. long, costs about 3 cents and will last a full working day. Instead of a flux, the company simply uses for cast-iron parts a white welding powder which costs but 8 cents per lb. Pure Norway iron free from carbon is used for any work which necessitates finishing—namely, boring, turning, planing, drilling, etc.



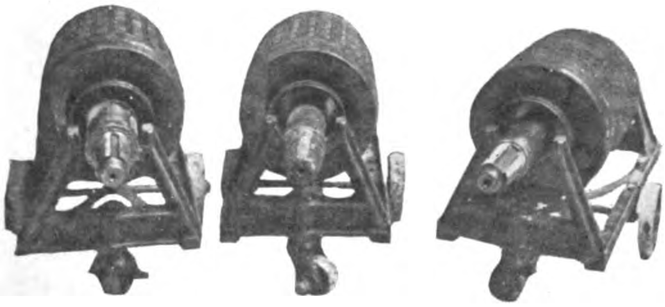
Third Avenue Welding—Scene in the Welding Basement, Showing Operators Standing on Insulating Mats While at Work

COSTS AND SAVINGS

The following data, which are taken from the weekly reports of the electrical foreman to J. S. McWhirter, superintendent of equipment, will convey an adequate conception of the importance of electric welding from the standpoints of costs (neglecting the small overhead charges) and savings.



Third Avenue Welding—Broken or Worn Journal Boxes, Gear Cases and Dowel Holes Before Welding



Third Avenue Welding—Worn, Filled and Completed Keyways of Armature Shafts

For the week ended Jan. 25, 1913, the record was as shown in Table I, which is printed on the opposite page.

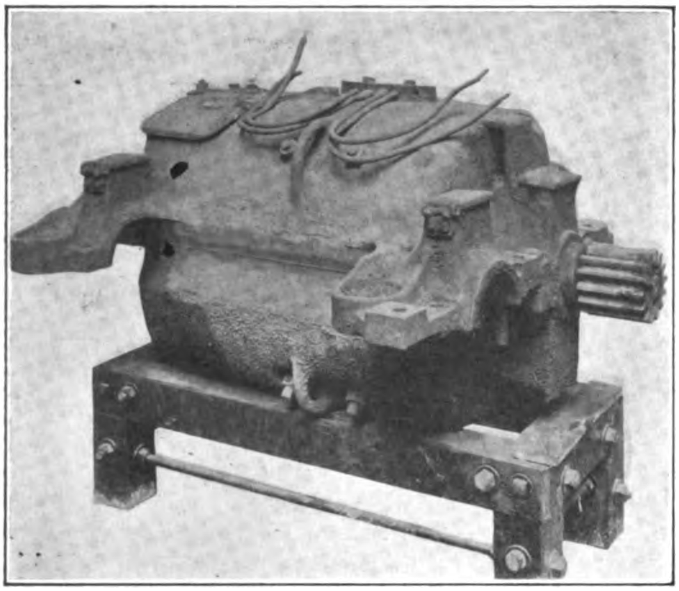
In addition to the work tabulated, dowel holes were refilled in thirty-seven armature caps, seventeen axle caps and four motor shells. The exact saving in the case of dowel-pin holes cannot be given, but it is estimated that a badly worn dowel hole in a motor shell adds $50 a year to the maintenance cost of an armature and $25 a year to that of an axle cap. The man who welded the motor shells also repaired the controller frame and eleven axle caps and this work required ten out of the sixty hours which constitute a week's work in the shops. His wages for the week were

Third Avenue Welding—Resistances and Control Apparatus in Basement

$18. Of the charge of $10 for electrical energy, $8 was due to repairs on the motors. Consequently the cost of repairing seven motor shells was $15 for labor and $8 for current, or about $3.25 per shell. This compares with $18 and $23.50 charged by outside contractors for similar jobs.

For the week ended Feb. 3, 1913, the record of the three operators was as shown in Table II on the next page.

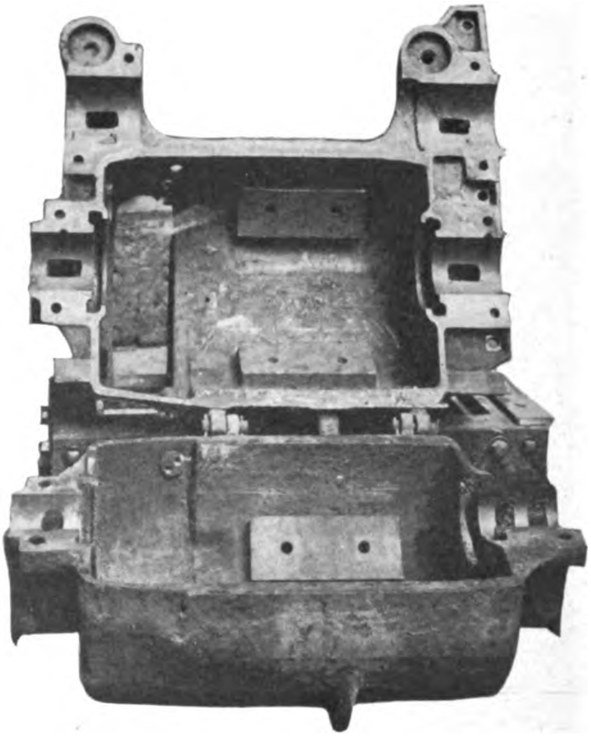
The data presented are sufficient to demonstrate the low cost of electric welding, but it should be added that the welded equipment has proved good in service as well.



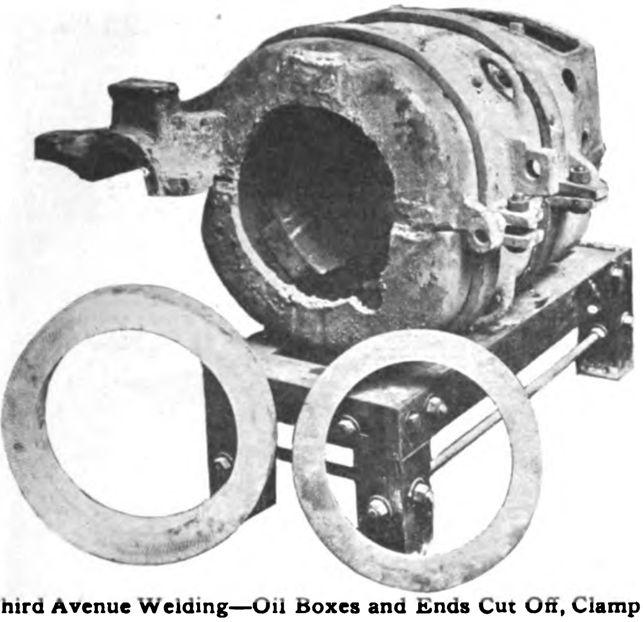
Third Avenue Welding—No. 56 Motor with Original Split Frame Construction

MOTOR REJUVENATION

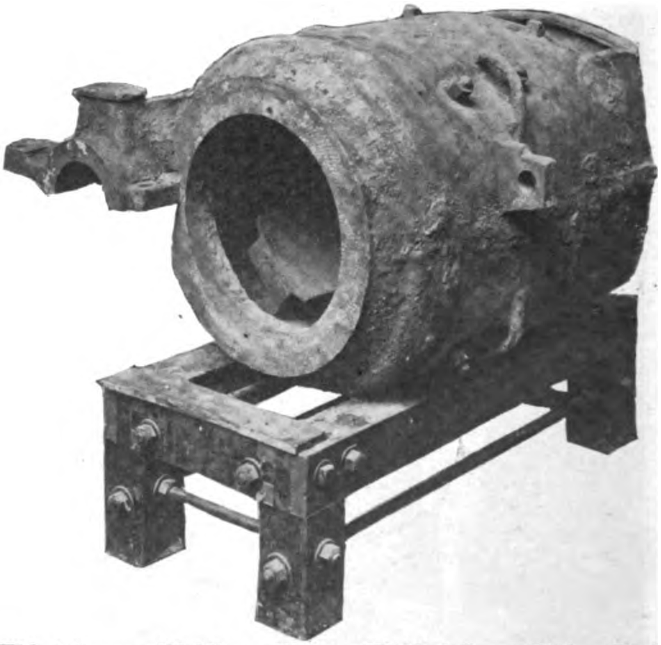
In addition to the foregoing work electric welding has been adapted to convert the No. 56 motor into practically an entirely new machine. The company has long been confronted by the problem of making its 220 GE-57 and 571 Westinghouse-56 motors as reliable and efficient as later equipment. These motors had been in constant service for from twelve to fifteen years, but after the purchase of interpole motors some three years ago they were retained chiefly as reserve equipment. The growing business of the company and the recent purchase of the Fifty-ninth Street crosstown line have made it desirable, however, to see what can be done to make this equipment economical for constant service. The GE-57 motor is receiving an entirely new box frame, as noted later, but the Westinghouse-56 is being welded from a split-frame to a box-frame motor. Six pairs of No. 56 motors have already been welded to be used experimentally for six months to a year before the remainder are changed. In one set of the No. 56 motors ball bearings will be tried.



Third Avenue Welding—Split Frame Motor Open, Showing Original Construction



Third Avenue Welding—Oil Boxes and Ends Cut Off, Clamp Holding Split Frame; Also Machined Welding Rings



Third Avenue Welding—Ring as Welded On at Pinion End and Lug Reinforcement at Left

Had the No. 56 motors been continued in service with split frames it would have been necessary to rebore the frames for larger bearings, but this change would not have eliminated the faults of the original design. Electric welding, on the contrary, offered the opportunity of reinforcing

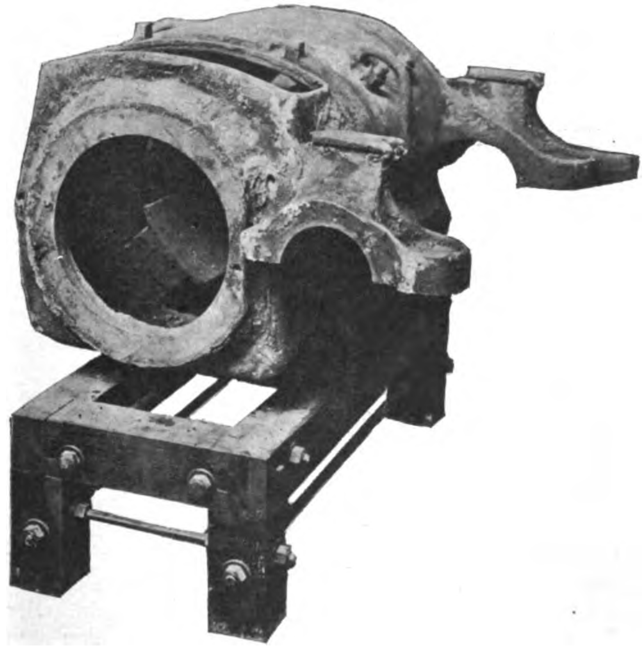
Table II.—Record of Welding Done During Week Ended Feb. 3, 1913

Work Done	Unit Cost New	Total Cost New
First Man		
Welding seven motor shells (half shells)	$50.00	$350.00
Welding one axle	7.50	7.50
Total		$357.50
Cost of labor	$15.00	
Cost of material	1.00	
Cost of current	8.00	
Total		24.00
Saving		$333.50
Second Man		
Welding eleven axles	$7.50	$82.50
Welding one motor inspection cover	2.00	2.00
Total		$84.50
Cost of labor	$15.00	
Cost of material	1.00	
Cost of current	10.50	
Total		26.50
Saving		$58.00

Third Man

The work done by the third man was of widely miscellaneous character, but it was estimated that he produced a greater saving than the others, his jobs being as follows:

Filling dowel holes in fifty-three armature bearing shells.
Renewing nine Brill brakeshoe heads.
Filling eleven dowel holes in axle caps.
Welding one journal box.
Welding one Westinghouse-56 motor shell.
Filling dowel holes in six motor suspension angles.
Welding one controller frame.

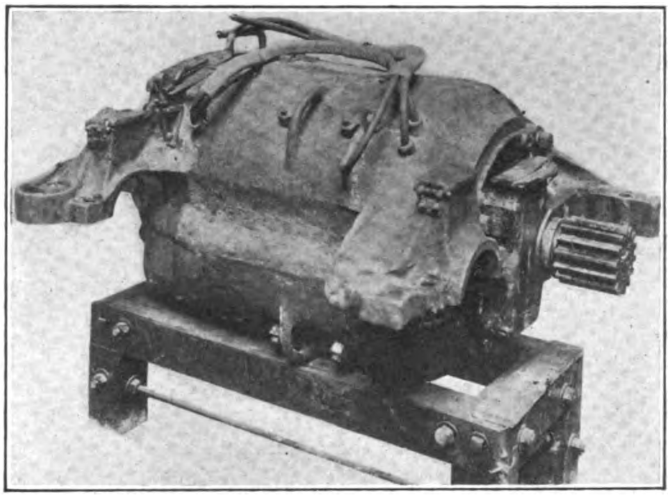


Third Avenue Welding—Ring Welded on Commutator End of Former Split-Frame Motor

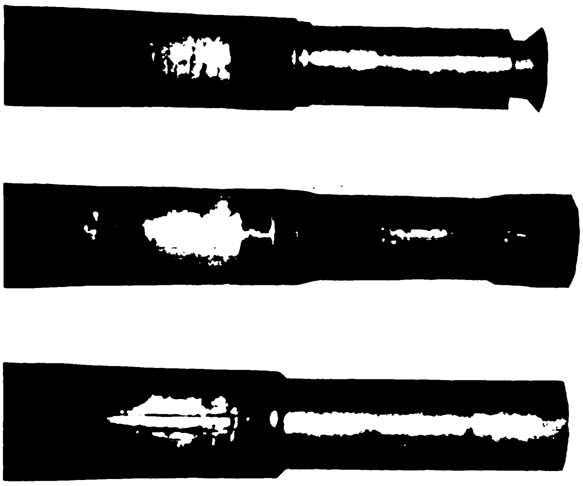
the axle-bearing supports and other weak portions. The cost of welding the first frame, including new frame heads, gear cases, brush holders and other material required to make the motor operative, was $90; that of the second was $80, and in quantities the unit cost will be only $65.

In welding a No. 56 frame the first step is to place a clamp around the split frame and then apply the electric arc to cut off the old grease boxes and ends of the motor. Following this, the halves are bound permanently by two cast-steel rings—one of 1¼-in. thickness which is welded to the commutator end and one of 2½-in. thickness which is welded to the pinion end. The rings are set off about ⅜ in., and owing to the irregular shape of the motor ends, the metal added may extend to a depth of 4 in. In addition, the weld is further reinforced by the frame-head bolts which pass clear through the ring, the intermediate metal and the shell. Two extra ribs are also welded in to strengthen the axle lugs. The final step is to weld the seam between the halves of the motor shell, but the seam weld is not relied upon to keep the motor intact, the real strength being in the rings and bolts. The welding rings are machined, of course, to take the frame heads.

The GE-57 shells will not be rebored, but as this machine is a good motor electrically, it has been decided to make a hybrid motor by placing all except the brush holders into a new box frame of a design very similar to the GE-210 motor. The cost of this change will be about $185 per motor. This is not the price charged by the General Electric Company, but it is the approximate cost after allowance is made for the scrap value of the old material. It does not include any charge for labor because the work of placing the old armature, fields and pole pieces in the new frames is considered as part of maintenance expense that would have to be gone through with in any event. Before adopting this scheme for all of the No. 57 motors a sample assembly was made at the Schenectady works of the General Electric Company. The tests which were conducted there on April 18 showed that the characteristics of the motor were normal in every particular.



Third Avenue Welding—No. 56 Motor Changed to Solid Frame and Furnished with New Ribs, etc.



Third Avenue Welding—Axle Worn, Filled and Partly Machined

Evidence of the efficiency of the inclosed vestibule with folding doors operated by the motorman and conductor in the prevention of boarding and alighting accidents has been furnished by the Texarkana Gas & Electric Company, Texarkana, Ark. In 1911 this company had 102 accidents coming under this head. In 1912, after all cars had been provided with inclosed vestibule, there was not a single boarding or alighting accident.

Transportation and City Planning*

The Author Emphasizes the Close Relation Between Symmetrical City Development and Proper Transportation Facilities and Discusses the Functions of Subways and the Economy of Freight Distribution on Street Railway Tracks

BY MILO R. MALTBIE, MEMBER OF NEW YORK PUBLIC SERVICE COMMISSION, FIRST DISTRICT

In the discussion of city planning there has been a noticeable lack of consideration of transportation facilities. Yet I venture to assert that there is no one factor, with the possible exception of topography, which has a greater influence not only upon the direction of city development but upon the character of the city from every standpoint.

It is impossible for a considerable number of people to live in a small area without many transportation facilities. The country village without a railroad never passes the rural stage. There is competition between cities, and the one which has the best transportation facilities by land and water is ordinarily the one which increases most rapidly in population and is the largest center of trade, industry and commerce. The city which has the cheapest, most rapid and most convenient transportation facilities for communication between its various parts is the city, other things being equal, which has the most productive and healthful citizenship.

It has been found that the commuting zone is generally limited to the area which can be reached within forty-five minutes or an hour from the heart of the city, and usually the great mass of population is within a half hour's radius. It is not so much a question of distance as a question of time and the convenience of travel, and persons will go further if it is not necessary to change facilities, as from rail to boat or from one railroad to another railroad, than they will if the trip involves such inconvenience. Attractive housing schemes may be planned and their advantages widely advertised; a fine system of parks, beautiful streets, adequate systems for water supply, lighting and sewerage, beautiful school buildings, libraries and every other social advantage may be provided; but people will not and cannot live there, no matter how beautiful and attractive the scheme, unless they are served with cheap and rapid transportation. Thus, when one examines the map of any large city, he notes that population has followed transportation lines and that along these radial lines there are the ganglia which center at railroad stations. Between these radial lines there are areas which are comparatively unoccupied and which, as the crow flies, are nearer the center of population than the settled areas along the railroads.

It seems to have been taken for granted frequently that one may plan a city and then depend upon transportation experts to provide transit facilities—that different areas can be set aside for factories, shops, theaters, offices, residences, parks, etc., and that then some sort of transportation system may be evolved to fit the necessities of the plan. But if conscious city planning is to be substituted for accident and haphazard development the two things must go hand in hand; that is, transportation facilities must be considered at the same time that other factors are under discussion.

THE VALUE OF STRAIGHT STREETS

There is a marked tendency among city planners to use curved streets and broken streets—streets that constantly change their direction. From an artistic standpoint, these plans are often very successful, and the treatment of the long, straight street is a difficult matter, but the old epigrammatic statement that the curved line is for pleasure and the straight line for business holds true to-day. Cheap rapid transit would be practically impossible in a city wholly composed of curved streets or streets which change their direction at short distances. The cost of construction would be large. Private property would have to be taken at many points. Large cost of construction would mean large fixed charges. Operating expenses would be increased because the loss of current in acceleration and retardation and cost of maintenance and repairs would be heavy. Curves reduce speed; reduced speed means increased time in transit; an increase in time means a reduction in the area which can be served, which in turn is a cause of congestion.

Compare the elevated roads in Manhattan with those in Brooklyn. The former have few curves and hence speed. The latter, in the central portion of Brooklyn, are so crooked and complicated with numerous crossings and connections that trains must be operated slowly. As a result one can travel on the Third Avenue elevated line in Manhattan 50 per cent farther in the same length of time from City Hall Park than he can by taking any of the elevated lines over the Brooklyn bridge. This is not the only cause, but it is one of the reasons, why the city of New York has grown so much more rapidly to the north than it has to the east and why there are undeveloped sections in Brooklyn within a few miles from City Hall, Manhattan, whereas, within the same distance in Manhattan there are no areas which are not solidly built upon.

CORRELATION OF FACILITIES

The correlation of the various facilities for transportation of passengers is probably the most important, and perhaps the most difficult, phase of the problem. The location of terminals and lines devoted exclusively to interurban traffic is not especially difficult, but practically every railroad does a suburban business, and in some cases it carries a large percentage of the population of the city itself.

In this connection there are several principles of considerable importance. In the first place, terminals should be eliminated as far as possible. They are costly to acquire, expensive to maintain and increase rather than decrease congestion. So far as possible, the lines should be operated through a city and not terminate therein. Secondly, there should be a sufficient number of station stops to distribute the traffic and to afford convenient means of connection with other facilities. It is almost impossible to utilize the same set of tracks for interurban, suburban and purely urban business. Ordinarily, the first two classes can be combined, and every railroad should be required, so far as practicable, to transport persons and property between points within the city boundaries. But it will be difficult in metropolitan cities for all three classes of business to be satisfactorily carried on a single system. Sooner or later most of the urban business must be done by separate lines. When the time of separation comes the through lines should not be permitted to unload their passengers at the outskirts of the city and to compel the urban lines to distribute their traffic. They should be obliged to operate lines through the heart of the city and so far as possible distribute their own business. This does not mean that the through lines should be operated without relation to the urban lines, but that they should not be allowed to take the cream of the traffic without some of the skim milk.

Thirdly, it is essential that the interurban and suburban lines be so located that they shall have a relation to the purely urban facilities. The stations upon the through lines should coincide with express and local stops on the urban rapid transit lines, and the surface lines should radiate from express as well as local stations. In the New York subway the idea of local and express service on parallel tracks was worked out quite successfully and was a distinct contribution to the science of urban transportation. Experience has shown, however, that the relation of express to local stations was not so adjusted as to secure the greatest utility for every track. During rush hours the express tracks are loaded to their maximum capacity and trains of ten cars are run at intervals of one and three-quarter minutes. The service on the local tracks at no time of the day reaches the maximum capacity of those tracks. The maximum number of cars in a train is six and the minimum headway is about one and three-quarter minutes. The ratio of use between the local tracks is greater than the cost of the express tracks and would be whether the latter were on the outside of the local tracks or in the center, as they are to-day, for there are many more local stations than there are express stations. It is apparent, therefore, that the city of New York is getting, from a transportation point of view, less than one-half as much service from the investment in local tracks as from the express tracks. The explanation is that the express stations are not far enough apart to distribute the traffic properly. In the new lines which are under way an attempt has been made to meet this criticism by placing the express stations further apart. It is natural for everyone to want all trains to stop at the station which he patronizes, and there is usually danger that too many express stations will be constructed, rather than that there will be too few.

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*Abstract of paper presented at fifth National Conference on City Planning, Chicago, Ill., on May 6, 1913.

CAN ALL CITIES HAVE SUBWAYS?

The question of cost is a factor which must not be overlooked. The success of subways in a few cities has given rise to the idea that every city should have subways and that all will be profitable. This is a mistaken notion, and the experience of London shows that there is no particular financial virtue in an underground railroad and that unless they are properly located and made co-ordinate parts of a comprehensive system they are likely to have limited success. Subways are easily operated, but they are expensive to construct and the large cost of construction means large fixed charges. In order to offset this burden there must be dense traffic or many persons riding short distances. Dense traffic, however, means congestion of population. Areas given over to private houses, each with its own grass plot and garden, cannot furnish a sufficient population to support a subway unless the ride is very short and the rate of fare high. The ride is not apt to be short, for land values in the central part of a city are ordinarily so high that people must go some distance from the center of the city to have single houses, and if the fares are high the great mass of the population cannot afford to pay them and will be forced to live in tenements. The area naturally tributary to a subway or any line is also limited in extent, for experience has shown that persons will not ordinarily walk more than ten minutes to reach a point where they can board a transportation line. Unless the city is to enter a new field of activity, therefore, or defray part of the cost of subways by some method which relieves the enterprise from high fixed charges, it is impossible for cities to have subways unless at the same time they are content to have congestion—tenement houses, solidly built blocks and not separate dwellings.

The smaller the construction cost the greater the number of lines that can be built, and if many lines are constructed and many areas are opened to development, the competition between these areas will tend to keep prices down, assuming of course that the gradual growth in population is not stimulated by some other force which makes the demand for land unusually large. Consequently more attention should be given to reducing the cost of rapid transit lines. A subway is the most expensive kind that can be built. The old-style elevated road is very much less expensive, and the solid floor, or so-called "noiseless," type stands between the two. Those interested in a suspended railway claim that it has many advantages, particularly from the view of cost of construction. All of these elevated types are more comfortable than subways, having better ventilation and light. The principal objection to the suspended railroad is that it cannot be operated in connection with any other line and that there can be no interchange of equipment.

FREIGHT TRANSPORTATION IN CITIES

There are a few instances where attempt has been made to reduce the cost and loss of time in the transportation of property from terminals to factory and warehouse, and successfully, too, but these scattered instances are so few that they have not yet had a far-reaching effect. However, the movement must be in this direction; the location of factories, warehouses and shops where they are not directly connected with water and rail transportation is uneconomic and wasteful.

The distribution of food products represents a somewhat different problem. These must go to every home, and consequently the facilities for distribution must reach every part of the city. In this connection the country trolley and the city street car line have not been fully utilized. During the night time and early morning hours these lines are practically unused. The cost of operating cars at these times would entail practically no fixed charge, and the operating expenses would be small. If the country trolley roads should establish collection points at short intervals, and if the products could be brought into the very heart of the city and distributed in the early morning hours, a very valuable and useful service could be performed. The street car systems could also be used for the distribution of property from railroad centers, and thus connections could be established with the more remote districts tributary to every large city. Even the rapid transit lines might be utilized if found necessary during the night hours.

CITY CONTROL

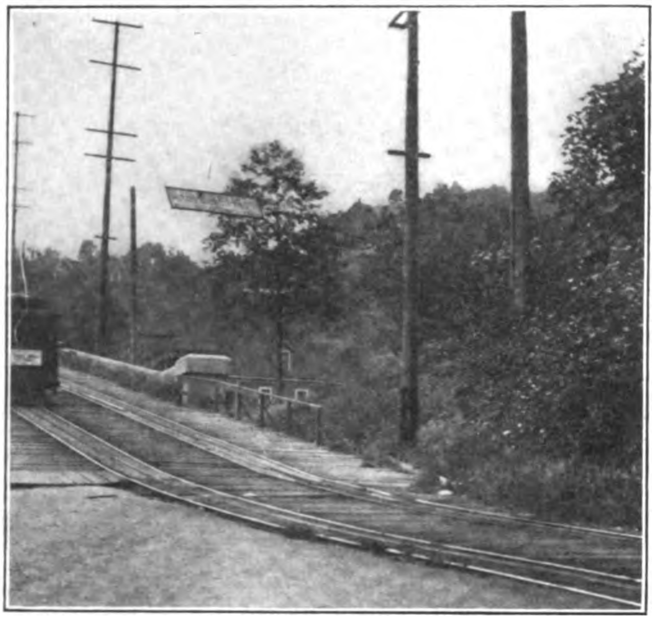
In conclusion, a word regarding the city's control of transportation development. As long as the various facilities are in the hands of private individuals and controlled by different corporations it is obvious that they cannot be brought into correlation and each made to serve the public in a proper way without a superior force. Each ought not to be permitted to carry out its own wishes regardless of its relations to other facilities. It is absurd that a company should locate a terminal removed from other transportation facilities and insist that the city should provide means for the distribution of the traffic which it brings to this inconvenient point. Moreover, conditions change and what is proper and adequate in one generation is often inadequate and ill-suited to the demands of the succeeding generation. Consequently there must not only be public control over the first location or first scheme of development, but there must be in the hands of the city the means whereby continually the varied interests may be kept in harmony and whereby the ever-changing needs may be met by changes in transportation facilities. The city should always be in a position where it can dominate the situation.

Work is well in hand on the conversion of the railway between Christiania and Drammen, Norway, a distance of about 33 miles, from 3 ft. 6 in. to the standard gage and also to electric traction. As far as Sandviken, 8¼ miles, double track will be laid. The question whether the necessary energy shall be taken from privately owned companies or whether the government will establish its own power station has not yet been decided. As regards the rolling stock, seventeen electric locomotives of from 320 hp to 800 hp and eleven combined locomotives and carriages of 300 hp have been ordered. The latter are intended for use with a trailer on the Christiania-Asker section of the line, which has a length of about 14 miles.

Improvements to a Cable Road in Seattle

Notes Upon the Operating Features of Cable Lines in Streets with Heavy Grades, Including an Account of the Substitution of Electricity for Steam for the Cable Drive

The Puget Sound Traction, Light & Power Company, of Seattle, Wash., has recently electrified the driving equipment of the Yesler Way cable line, replacing a steam engine by a 500-hp, 2200-volt, three-phase induction motor, thus modernizing a type of installation still considered necessary in Seattle on account of the very severe grades encountered. The Yesler Way line extends from Pioneer Square eastward to Lake Washington and is double-tracked throughout the length of the round trip, being about 5.4 miles. The line has maximum grades up to 18 per cent and for this reason is peculiarly suited for a cable drive. This road has been in operation about twenty-three years, the rated speed of the cable prior to the installation of the motor drive being 1000 ft. per minute. Schedule time for a round trip is thirty-four minutes, but since the motor was placed in service it has been found possible to maintain this schedule with a cable speed of 888 ft. per minute, the service being much smoother all along the line. In fact, the immediate cause of the substitution of electricity for steam in the driving of the cable system was the irregularity of service given by the latter type of equipment, serious difficulties having been encountered from jerks in the cables. With the establishment of service from the White River hydroelectric plant of the company it was also considered decidedly economical to change from steam to electricity. A large increase in traffic on the Yesler Way line was also a factor in this decision.


Seattle Cable Lines—View at East End of Yesler Way Cable Line

CAUSE OF JERKS

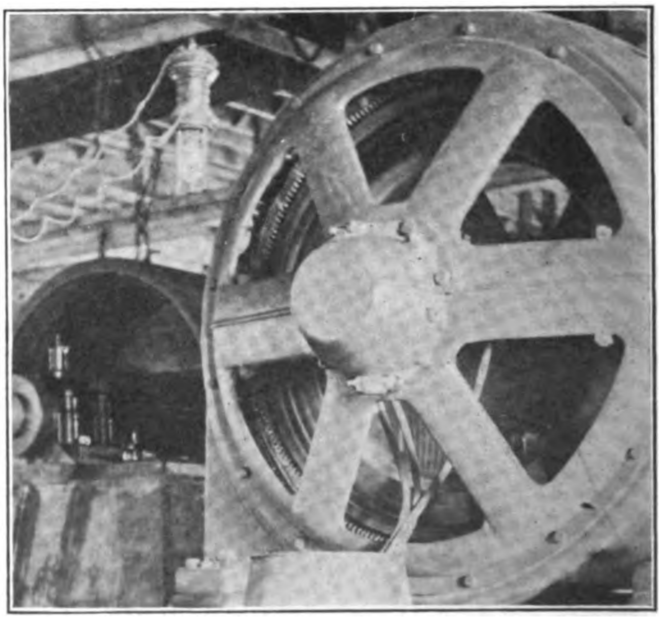
An investigation of the subject of cable jerks was made on all of the cable lines at Seattle in the early spring of the past year, and it was found that the Yesler Way line contributed about three-fourths of the accidents and one-half the damages due to this cause. With few exceptions all jerks occurred on up-grades, usually while a car was starting or shortly after it had started. Accidents on the Madison and James Street cable lines of the company, which in general had easier grades, were comparatively few and well distributed over the routes, the heavier grades giving the most trouble. The investigation indicated that the Madison and James Street accidents bore a close relation to the times of changing, piecing or stranding the cables and that they were probably dependent almost entirely upon the condition of the rope with respect to these factors, combined with the grade, rather than upon any other factor of operation of the mechanical equipment. The Yesler Way accidents showed a decided tendency to bunch shortly after the installation of a new cable, continuing to a smaller extent throughout its life and being dependent upon the age of the cable and its early lubrication rather than upon the occurrence of strands, splices or patches. Data as to the distribution of accidents with respect to the style and age of grips and dies were not available.

Aside from such causes of trouble as defects or failures in equipment or carelessness of car crews, the investigation showed that the principal factors concerned in the great majority of accidents coming under the classification of cable jerks were grade of start and load on car, speed of rope, tension of rope, physical condition of rope, including age and lubrication, style and condition of grips and dies, overheating of dies by friction of cable, and knowledge of conditions by gripmen and care of gripmen under unfavorable conditions.

REMEDIES CONSIDERED AND INTRODUCED

Following this investigation it was found that the company was unable materially to change the grade of its lines or points of stopping, but it appeared desirable to avoid stops and starts on grades exceeding 13 per cent. This feature of operation was adopted by the transportation department.

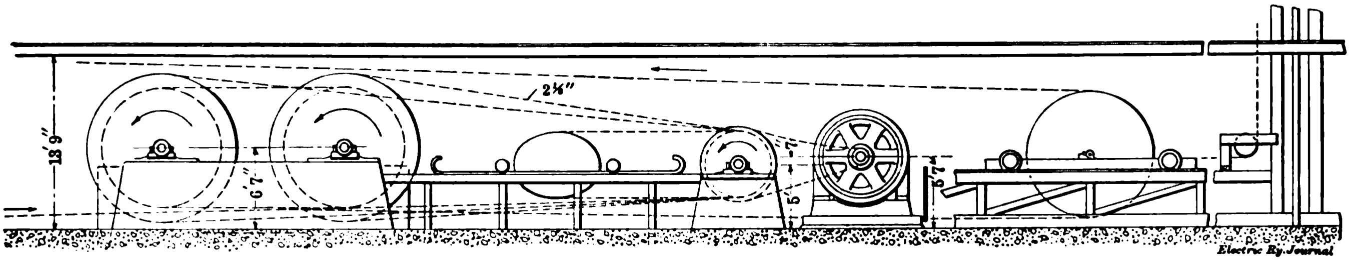
The faster speed of the Yesler cable, as well as its more numerous jerks as compared with those on James and Madison Streets, together with the effect of overheated dies, led to the conclusion that a reduction of the cable speed on the Yesler line would materially reduce trouble and a speed of about 10 m.p.h. was found to be about the maximum that could safely be operated upon the existing grades in Seattle with the present type of equipment.


Seattle Cable Lines—500-hp Induction Motor Driving Yesler Way Cable

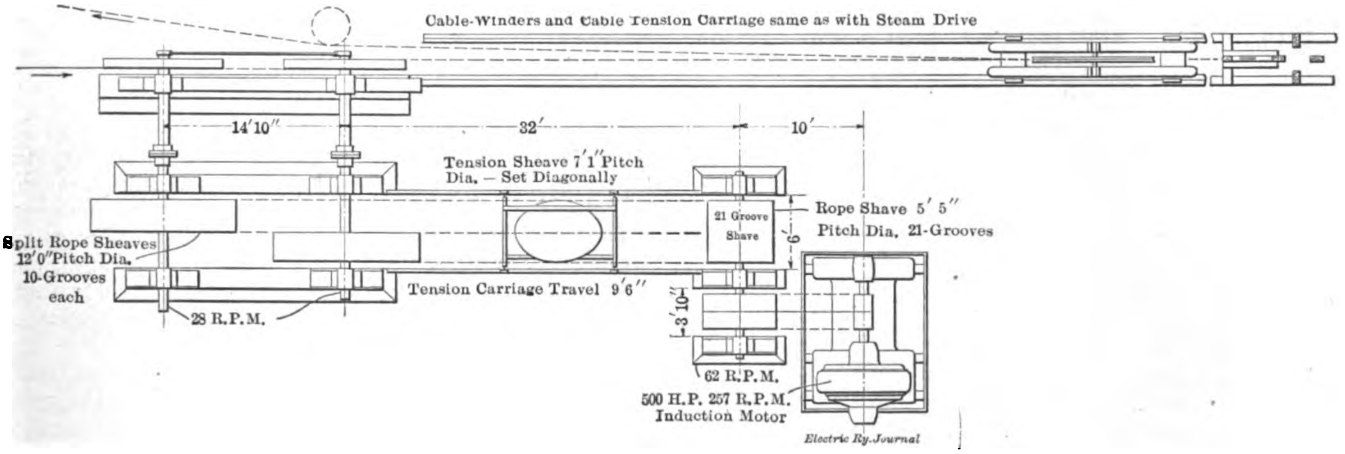
The Madison and James Street cables both ran with a more even tension than the Yesler cable under steam driving, but with the electric drive the conditions of the latter were greatly improved.

A study of the accidents occurring brought out a number of cases where a splice, strand or unequally sized rope coming into the grip while starting the car caused a violent jerk. Increased care in patching and splicing was seen to be necessary. A log book is now kept at each cable station by the cable crews, and in this are entered the time and results of all cable inspections, with a description of all work done on the system. It was suggested by the investigating committee that the company's cable splicer be broken in as a gripman in order that the relation of cable condition to car operation may be better judged.

It appeared that many jerks on the Yesler line occurred from the overheating of the gripping surfaces of the dies as the grip was being closed to bring the car up to rope speed to a point where the surfaces suddenly adhered to the metal of the cable and caused the grip to lock prematurely. In one instance the dies were actually welded to the cable to such a degree that the cable had to be shut down before the car could be stopped. In other cases the dies were found to be burned at the points where the greatest friction would have been expected at the time of the accident. As the starting of a cable car is produced through the gradually increasing friction of the dies on the cable, there is always more or less heating of the dies, but as only excessive heating causes trouble, it appeared that a reduction in cable speed would in most cases help matters. Here the constant torque of the electric motor was a great advantage, and on the Yesler cable it is noteworthy that the schedule can be maintained electrically with a reduction of more than 10 per cent in the maximum speed required by steam operation.



Seattle Cable Lines—Elevation of Rope Drive for Main Cable


Cable-Winders and Cable Tension Carriage same as with Steam Drive
14'10"
32'
10'
Tension Sheave 7'1" Pitch Dia. — Set Diagonally
21 Groove Shave
Rope Shave 5' 5" Pitch Dia. 21-Grooves
6'
Split Rope Sheaves 12'0" Pitch Dia. 10-Grooves each
Tension Carriage Travel 9'6"
28 R.P.M.
3'10"
62 R.P.M.
500 H.P. 257 R.P.M. Induction Motor
Electric Ry. Journal

Seattle Cable Lines—Plan Showing Motor Connected to Rope Drive by Silent Chain

NEW EQUIPMENT INSTALLED

Although the Yesler Way line is in operation about nineteen hours per day, the original steam engine drive was removed without serious traffic interruption and replaced by the present electrical installation, in which twenty driving ropes are in use, with a greatly improved mechanical layout. The motor is installed at the company's Lake Washington carhouse, with three step-down transformers rated at 200 kw each for lowering the potential from 13,200 volts to 2300 volts, the supply being taken through the James Street substation over a three-phase No. 4 copper overhead line 11,500 ft. long. The transformers are of the water-cooled type and with the motor are of General Electric make. The motor is designed for operation at various speeds ranging from 25 to 257 r.p.m., the changes being effected by an external resistance in the rotor circuit. Two Morse silent chains, each 17 in. wide, are installed between the motor and a countershaft which is connected by rope drives to 12-ft. sheaves on the winder shafts. The latter are driven at a speed of about 28 r.p.m. The cable-winding sheaves are 10 ft. in diameter. The winder shafts are spaced 14 ft. 10 in. apart on centers, and the motor and machinery foundations are of concrete construction and are installed on piles. An operating switchboard at the carhouse includes in its equipment an ammeter for each phase of the motor circuit, a reversing 2300-volt oil switch for running the cable system backward, a wattmeter and a rheostat. Seventeen cars are at times operated on the line, each weighing about 20,000 lb. The installation of the motor has reduced the cost of boiler service at the carhouse to that required for low-pressure steam heating in the winter. About 20,000 passengers per day are carried on the Yesler Way line.

Renzo Norsa, an electrical consulting engineer of Milan, Italy, has reprinted in pamphlet form, from the April transactions of the Milan Engineering and Architectural College, an extended survey of traction problems in metropolitan cities. Signor Norsa devotes particular attention to the United States, where he resided for several years. The publication is divided into four chapters as follows: (1) Growth and distribution of population and causes of congestion in New York, Chicago, Philadelphia, Boston and Pittsburgh. (2) Traffic statistics and diagrams of large American cities compared with several European cities. (3) Transit systems of American cities. (4) American elevated and subway construction. (5) Economic and financial aspects of large urban transit systems.

CHANGES IN THE GENERAL ELECTRIC COMPANY

The important announcement was made this week that Charles A. Coffin had been elected chairman of the board of directors of the General Electric Company and that E. W. Rice, Jr., had been selected his successor as president. Although it is understood that this action signifies in no sense Mr. Coffin's retirement from active work or any alteration in the policies of the company, his change in title will seem an important event in the industry.

Mr. Coffin was born in Maine in 1844 and, after an early graduation at the Bloomfield (Me.) Academy, embarked in commercial pursuits. In 1881, when in the boot and shoe and leather trade, then as now a very important industry in eastern Massachusetts, his attention and that of a number of his friends at Lynn was called to the rising technical genius of Prof. Elihu Thomson, who with Professor Houston had then recently organized the American Electric Company at New Britain. Mr. Coffin directed an investigation into the affairs of this company and the future possibilities of practical electrical development throughout the world. This resulted in the purchase of the American Electric Company by the Lynn financial group, so called, and the formation of the Thomson-Houston Electric Company, one of the predecessors of the present General Electric Company. Mr. Coffin was elected vice-president and treasurer of this new organization and from the first became its guiding spirit.

At the outset he adopted these fundamental business principles which, directed by his genius, have been primarily responsible for the success of the Thomson-Houston and General Electric companies: First, the advancement of the art through fearless expenditures for technical talent and experiments; second, that moral and financial assistance rendered to local electrical enterprises expands the market for electrical appliances and material, and, third, the creation of a commercial organization whose members should be imbued with a spirit of loyalty and co-operation paramount to personal ambition and advancement.

His self-sacrifice for the interests which he has served, with his magnetic personality, have been a constant inspiration to his associates and subordinates, no matter whether they have been financiers, engineers or commercial men. As early as 1888 the Thomson-Houston Electric Company had outstripped all of its manufacturing competitors in the number of central lighting stations installed in the United States. Mr. Coffin at this time, with his usual foresight, became alive to the possibilities of electric railway development and so caused the purchase of the Bentley-Knight and Vandepoele electric patents by the Thomson-Houston company, and in an extremely short period this company had become even more prominent in this field than in that of electric lighting.

The first absorption of a leading competitor by the interests under Mr. Coffin's direction was that of the Brush Electric Manufacturing Company about 1890. Early in 1892 came the consolidation of the Edison General Electric Company and its associate interests with the Thomson-Houston company, into the present General Electric Company, of which Mr. Coffin was elected president. Shortly following this organization came the financial crash of 1893 and the subsequent years of depression. A further complication for the new organization was the fact that in many of the important cities and towns in the United States there were local companies operating under the Edison-Brush and Thomson-Houston licenses, seriously competing with each other and serious handicaps not only upon the General Electric Company but upon the development of the central station industry as a whole. Nevertheless, Mr. Coffin piloted and brought his company through the storm most successfully and at this time inaugurated a system of accounts and publicity in connection with the affairs of the General Electric Company that has since served as a model in this regard for all other large industrial companies.

The subsequent growth and success of the General Electric Company under his guidance are so well known as to require no elaboration, but it may be well to emphasize in this connection that the company in its later and more prosperous years, following Mr. Coffin's policy outlined at the outset of his career in the electrical field, has aimed at the development of the electrical art above all else and considered this to be the keynote to future business successes.

CAREER OF MR. RICE

E. W. Rice, Jr.

Edwin Wilbur Rice, Jr., the new president, is a native of Wisconsin, where he was born in 1862, and entered the General Electric Company through the Thomson-Houston company. He became acquainted with Professor Thomson in the later seventies and joined the forces of Professor Thomson's organization at New Britain, the American Electric Company, in 1880. The principal business of this company then was the manufacture of arc-lighting apparatus under the Thomson-Houston patents, and Mr. Rice took an active part in the work not only in the details of manufacture but also as an inventor in association with Professor Thomson.

In 1882 control of the company was purchased by H. A. Pevear, C. A. Coffin and S. A. Barton, and it was moved to Lynn and renamed the Thomson-Houston Electric Company. There the enterprise grew with great rapidity, and in 1885 Mr. Rice, although only twenty-three years of age, was asked to accept the position of superintendent of the works. A short trial of the new duties was sufficient to show those about Mr. Rice that he was the right man for the place and also to convince him that his new responsibilities would not necessarily impair his fertility as an inventor. Under his able and tactful management work was systematized, production was hastened and costs were cut down. To constant-current arc-lighting were quickly added motor work, constant-potential, incandescent and railway work, while the alternating-current transformer system of lighting was developed.

From the few hundred who were employed in the Thomson-Houston factory at Lynn when Mr. Rice took charge in 1885 the number of hands grew until 3700 were at work in 1892, when the next great change in his career took place —the Thomson-Houston and Edison General Electric companies being consolidated into a new concern known thereafter as the General Electric Company, with Mr. Coffin as president and Mr. Rice as technical director. To follow his career after 1892 would be to write a history of the technical department of the General Electric Company. On June 26, 1896, he was elected to the office of third vice-president of the company in charge of all its technical and manufacturing departments, eventually becoming senior vice-president and on the retirement of Mr. Coffin the unanimous choice of the directors as president.

Mr. Rice is a member of the American Institute of Electrical Engineers, the Institution of Civil Engineers and the Institution of Electrical Engineers of Great Britain, the Engineers' and University clubs of New York, the University Club of Boston and the Pilgrims. After the Paris Exposition in 1900 he was created Chevalier of the Legion of Honor. In 1903 the degree of A.M. was conferred on him by Harvard University, and in 1906 Union College honored him with the degree of D.Sc.

MEETING OF COMMITTEE ON SIGNALS

A meeting of the joint committee on signals, composed of representatives of the American Electric Railway Engineering and Transportation & Traffic associations, was held in New Haven on Friday, June 13. There were present J. M. Waldron, signal engineer Interborough Rapid Transit Company, chairman; John Leisenring, superintendent overhead lines Illinois Traction System; C. H. Morrison, signal engineer New York, New Haven & Hartford Railroad; Gaylord Thompson, vice-president New Jersey & Pennsylvania Traction Company; C. D. Emmons, general manager Chicago, South Bend & Northern Indiana Traction Company; J. J. Doyle, general manager Washington, Baltimore & Annapolis Electric Railroad Company, and G. K. Jeffries, general superintendent Terre Haute, Indianapolis & Eastern Traction Company. Mr. Jeffries has been appointed to this committee in place of C. F. Conn, who has severed his connection with the electric railway industry.

Mr. Morrison, whose offices are in New Haven, had made special arrangements for the reception of the committee, including the erection of a set of standard light signals 1500 ft. away from the windows of the room in which the meeting was held so that the arrestive effect of the different colors could be compared by the committee members under the varying sunlight conditions during the day. A trip in a special car was arranged for Saturday in order to give the committee a chance to inspect the signals in use on a number of the Connecticut Company's lines. This was followed by a visit to the Cos Cob power station of the electrified lines of the New York, New Haven & Hartford Railroad.

At the opening of Friday's session Mr. Waldron presented the report of the sub-committee to which had been assigned the work of bringing the record of signal progress up to date. In the discussion it was decided to consider in the records only the actual installations which were made prior to July 1 of the present year.

It was decided by the committee to obtain the most accurate data possible with regard to all installations of signals on electric railways in addition to those which had been made during the year. This information would establish the total mileage of electric railway signals in the different states of the country.

The sub-committee on standards, composed of Messrs. Waldron and Morrison, reported that Mr. Leisenring had been requested to confer with a committee from the signal manufacturers with regard to the matter. Mr. Leisenring stated that he had endeavored unsuccessfully to establish through the manufacturers a list of the parts of signal equipment which were susceptible to standardization at the present time. Owing to the difficulty of getting the manufacturers together, it was decided by the committee as a whole to continue the subject until next year, making a special effort to get the manufacturers together on the fundamental requirements of a signal.

The matter of the various recommendations for signal installations for five different classes of service, as requested by the association from the committee, had been assigned to a committee composed of Messrs. Leisenring, Emmons, Thompson and Merwin. Owing to the important influence of local conditions in the present state of the art, it was decided by the committee to avoid making direct recommendations at this time but instead to submit schemes representative of the practices now followed by electric railways. An extended discussion took place during the presentation of this sub-committee's report regarding the desirability of the exclusive use of trolley contact signals for city service under the present state of development of the art of signaling. The advisability, with trolley contact systems, of having the signals located beyond the limits of the blocks so that motormen could see that they were properly operated by the cars was also discussed at length. On account of the necessity, with such an arrangement, of having cars run past red lights, the use of a pilot light was generally considered preferable, although the former scheme was in satisfactory use. The use of car-counting devices with double-track trolley contact systems and indicators for their operation was also discussed and accepted by the committee as desirable.

A number of different schemes for each of the five different operating conditions as submitted at the last convention to the committee had been prepared by Mr. Leisenring, and these after review by the committee were referred back to him for consideration in collaboration with the signal manufacturers in order to harmonize the methods of operation suggested by the different makers of apparatus.

It was decided that the committee in its report should make no reference to the matter of clearances, a subject which had been asssigned to Messrs. Morrison, Leisenring and Thompson, owing to the wide variations necessarily existing on different railways on account of local physical conditions. The sub-committee which was appointed to confer with the committee on rules, and which was composed of Messrs. Doyle and Waldron, gave an account of the proceedings at its conference, and the sub-committee on the subject of progress with automatic stops, which was composed of Messrs. Waldron and Morrison, presented a report giving a brief history of the development of the device leading up to the present time.

HEARING BEFORE PUBLIC SERVICE COMMISSION ON SMOKING IN CARS

On June 18 a hearing was held before the Public Service Commission for the First District of New York relative to the practice of smoking in the street cars, railway trains, waiting rooms, ferry stations, etc., of all railroad corporations, street railway companies and other common carriers subject to the jurisdiction of the commission within the district. The purpose of the hearing, as set forth in the order, was to inquire and determine whether the regulations and practices of the corporations, particularly as to the "smoking and carrying of lighted cigars, cigarettes or pipes," are "unreasonable, unsafe, improper or inadequate," and if so to determine and prescribe the proper regulations and practices.

The order for the hearing followed the receipt of complaints from the Non-Smokers' Protective League, of which Charles G. Pease is president and Twyman O. Abbott general counsel. The first complaint from this organization was received last year, but owing to the demands of the subway situation, which was then absorbing the attention of the commission, no action was taken upon it. With the beginning of the open-car operation this year the organization renewed its complaint and asked for a public hearing. In the complaint it is set forth that the fundamental principle upon which the league is founded is "that the right to breathe fresh and pure air, uncontaminated by unhealthful or disagreeable odors, is one of the inalienable rights guaranteed by the constitution and laws of the land," and that the purpose of the organization is "to protect said right from invasion by the users of tobacco in public places and semi-public places and to secure the enactment and enforcement of laws, ordinances, rules and regulations prohibiting tobacco smoking in all such places."

Supervising Inspector Edward D. Hutchinson, C. A. Standford and C. J. Pommerer, of the commission, were first placed on the stand to testify to the present regulations concerning smoking on the various car lines, such information being obtained both by interviews with the railroads and by personal observation. Mr. Hutchinson reported that the steam railroads under the jurisdiction of the commission carried one smoker and sometimes a maximum of three. Mr. Standford said that the Interborough Rapid

Transit Company allowed smoking in subway stations that were above ground, and on the elevated lines it was permitted in the stations and on the open cars of the Third Avenue line. According to Mr. Pommerer, the New York Railways allowed smokers to occupy the four rear seats of the open cars, and Mr. Smith, assistant supervising engineer, reported that on the Brooklyn surface lines smoking was allowed on the four rear seats and the running board opposite them on open cars, on the back platform of closed cars, and in the three rear seats of semi-convertible cars. In general it was testified that on the Manhattan and Bronx surface lines the three or four rear seats of open cars were open to smokers, and that the rule forbade smoking on the rear platforms of closed cars, although this rule was often violated.

Before the hearing proceeded farther, Commissioner Maltbie asked for information concerning any existing laws or ordinances. Mr. Chamberlain, of counsel for the commission, said that he had been able to unearth only two restrictive acts, one (Part III, Section 60, of the code of ordinances of Greater New York) which makes it unlawful to smoke inside or on the platforms of cars or public conveyances in Brooklyn; the other (Section 187 of the Sanitary Code) prohibiting the carrying of any lighted cigarette, pipe or cigar into or upon the stairways, platforms, stations or cars of the subway. A report had also been made that there was a Fire Commission order prohibiting smoking on the elevated lines, but the counsel was unable to secure any copy of such order.

Those in favor of the abolition of smoking were led by Dr. Charles G. Pease, of the National Non-Smokers' Protective Association. The burden of testimony was that smokers, even restricted as they are, make trolley rides uncomfortable and unpleasant. The witnesses testified concerning hats and gowns burned by lighted cigarettes and cigars and eyes and throats filled with smoke and ash. Dr. Pease himself took the stand to testify that he thought the present ordinances poorly enforced, and he brought out the point that more attention would be paid to an order of the commission than to any present ordinance, as a violation of a commission order would carry with it a penalty of $5,000. This would be an inducement to the companies to take more active steps to eliminate smoking than they did at the present time.

After more than two hours of testimony, Dr. Pease and his witnesses, who included many women, were compelled to give way to the smokers. C. L. Addison, of the Long Island Railroad, immediately recalled Dr. Pease to the stand. "You consider smoking detrimental to the public health and a nuisance?" he asked, and Dr. Pease assented. "Then I ask the commissioner to dismiss the motion, as the Court of Appeals has decided that the commission has no jurisdiction over nuisances." Counsel Chamberlain objected, and Commissioner Maltbie denied the motion, reserving, however, his decision on the legal point involved. Roy McCardell, a newspaper man, furnished considerable amusement by relating incidents of his family life and personal ambitions and concluded his plea by asking the indulgence of the commission in order that he might finish saving up cigar coupons for a yacht, which privilege would be denied him if the only place where he could now smoke was closed to him.

All the railroads in the case were represented by counsel, but their attitude in the whole proceeding is shown by the statement of Mr. Peacock, representing the Interborough Rapid Transit Company and the New York Railways, to the effect that the railways desire to please the public, that they have set aside a certain number of seats for smokers with the idea that the majority of the public was being pleased by such accommodations, and that they are willing to adopt any steps that the public as a whole desires. With this statement from the railroad companies the hearing was closed.

DECISION IN THE CLEVELAND CASE

The board of arbitrators in the Cleveland hearing, which has been reported fully in the Electric Railway Journal during the last few weeks, rendered a decision on June 19. The board was requested to decide nine questions and the decisions are presented below:

(1) The allowance for operating expenses was unanimously increased from 11.50 cents to 12.10 cents per car mile, effective as of March 1, 1913. The board unanimously recommended that the over-expenditure of the allowance, as of March 1, 1913, be made up by transfer from the interest fund forthwith.

(2) The majority of the board, Mr. Duffy dissenting, refused to increase the allowance for maintenance, renewal and depreciation. The board unanimously recommended that, after operating over-expenditure was made up, the Council should authorize transfers to make up over-expenditures in the maintenance, renewal and depreciation fund, as of March 1, 1913, as rapidly as possible, out of the interest fund, without reducing the latter below the sum of $400,000.

(3) As an alternative to the making up of the over-expenditures in the two funds, in case of default by the Council to follow its recommendations, the board awarded an increase in each allowance in an amount sufficient to make up the several over-expenditures by Feb. 1, 1914.

(4) In answer to the question: "Is there $700,000 in the interest fund as of April 1, 1913?" the board decided that after the deductions which the board recommends are made from the fund there will be less than $700,000.

(5) The board decided that the Cleveland Railway Company had a legal right to exceed the ordinance allowances without the consent of the city or an award.

(6) On the point whether the Cleveland Railway Company had a legal right to maintain other reserve or surplus funds than those specifically provided for, the board unanimously decided that insurance reserve may not be maintained. A majority, Mr. Duffy dissenting, determined that no accident reserve should be carried over the expiration of an ordinance year.

(7) The board unanimously held that the stock of the company held in the name of Horace E. Andrews, trustee, was the property of the company, and that it should, through a sale or otherwise, be exchanged for that which would enhance the physical property without adding to the capital value. The earnings on these securities should be put into the interest fund.

(8) The question of the surpluses of the old companies was disposed of by stipulation.

(9) The board decided that the scrapping of the company's old power equipment should be charged off at once.

The fees and expenses for the hearing as reported by the board were $19,561.80, divided as follows: Mr. Duffy, $5,327.60; Mr. Du Pont, $5,000; Judge Killits, $5,079.85; Nau, Rusk & Sweringen, accountants for the city of Cleveland, $1,950; the Cleveland Railway Company, to cover the employment of Ernst & Ernst and other expenses incurred, $1,243.10; Fred H. Kruse, reporter, $961.25.

The new Bernese Alps Railway (Berne-Lötschberg-Simplon) was opened on June 1. This event realizes the idea of a passage through or over the Bernese Alps which has been attempted again and again since the Middle Ages and so solves an ancient traffic problem. Berne, besides taking a leading part in the construction of the new railway, has lately steadily worked for a consolidation of the several subsidized Berne railways. The canton of Berne, as chief stockholder, has combined under one management the Lake of Thun Railway, the steamer services on the lakes of Thun and Brienz and the Bernese Alps Railway, an enterprise which represents an aggregate capital of $40,000,000.

LIBRARY OF THE UNIVERSITY

PAPERS AT THE MASTER CAR BUILDERS' CONVENTION

At the Master Car Builders' convention held at Atlantic City during the past week, a number of matters of particular interest to electric railways were discussed. The papers dealing with these subjects are given in abstract in the following paragraphs.

STEEL CENTER-SILL DESIGN

Owing to statements to the effect that in some of the new all-steel and steel underframe equipments the center-sill section had been reduced to such an extent that the cars were no stronger than the wooden cars, the committee on car construction made a report upon center sills for new and for existing cars.

It was generally agreed that the relative values of steel and wood used in car construction for direct tension or compression should be based upon the elastic limits of these materials, or in a ratio of four to one. Compared with a wooden car having two 4-in x 8-in. center sills the equivalent steel car must have an effective center-sill area of not less than 16 sq. in. between the points where the end strains take effect.

The strains in underframes due to loading were not, in the opinion of the committee, an important factor in adding to the stresses due to end shocks. Modern steel cars had the center line of draft generally below the horizontal neutral axes of the center sills, and this tended to set up eccentric strains in center sills which were not properly tied together at the rear draft stop. The strains acting on the longitudinal members of the car framing were liable to buckle the long sills so that it was customary to set limits for ratio of length to radius of gyration in order to restrict the excess strains caused by this tendency to buckle. The committee recommended the adoption of a ratio of seventy for length to radius of gyration, which corresponded to a ratio of twenty between length and depth of a rectangular section. In other words, the length of a member should not be greater than twenty times its depth, or else the member must be securely anchored at intervals not exceeding twenty times its depth. The committee therefore recommended that steel or steel underframe cars having center sills with an area of less than 16 sq. in. and with a ratio of stress to end strain more than 0.09 and in which the distance between braces was greater than twenty times the depth of the center sills should be classified with wooden cars and should be subject to the same rules for combination defects.

For new cars the committee considered that a greater strength was required and that for all cars built after 1913 the area of center sills should be not less than 24 sq. in., the ratio of stress to end strains not more than 0.06 and the length of center or draft sills or parts of these members between braces not more than twenty times the depth of the member measured in the direction in which buckling might take place.

END DOORS FOR FREIGHT CARS

The committee also recommended the use of metal reinforcements for the car ends owing to the increase in damage from shifting loads. In answer to a communication it was stated that cars both with and without end doors had been commonly used for loading lumber in the past and that each year fewer new cars were built with end doors because end doors were available only on roads handling long lumber directly from the lumber yards. Roads which formerly had equipped all box cars with end doors had eliminated them from new cars and were permanently fastening them in place on some of their older equipment, leaving the end doors operative only on the shortest types of box cars.

This indicated, in the opinion of the committee, that with the adoption of the 40-ft. box car the end door would gradually become obsolete. The committee recommended that, since end doors were necessary only on roads having long lumber loaded in box cars as an essential feature of traffic, when end doors were used they should be so constructed that when closed they would lock automatically by means of an inside lock, thus avoiding necessity for taking seal records. Sealing appliances in use at the present time and not accessible from ground or from end ladders should be changed in order to promote the safety of employees.

At the convention the question was considered of eliminating further interchange service in the case of all cars of 40,000 lb. and 50,000 lb. capacity and restricting the use of this light-capacity equipment to the lines of the owners.

AIR-BRAKE EQUIPMENT

The committee on train brake and signal equipment at the convention presented a report in which it was recommended that all freight cars weighing between 37,000 lb. and 58,000 lb. should be equipped with 10-in. brake cylinders and that the braking power for freight equipments should be made 60 per cent of the light weight of the car based upon a brake cylinder pressure of 50 lb. Under these circumstances a total leverage ratio of 9 to 1 need never be exceeded.

Since it was one of the primary aims of the Master Car Builders' Association to standardize equipment wherever possible, the committee considered that the time was now opportune for adopting a standard triple valve for all freight car equipment. After correspondence with the manufacturers it was decided to recommend the use of K-1 triple valves for 8-in. brake cylinders and K-2 triple valves for 10-in. brake cylinders as permanent standards. In regard to the proper size of brake pipes for passenger cars the committee recommended that no pipe having an internal diameter less than that of 1-in. standard-weight pipe should be used on passenger cars and that for all new equipment 1¼-in. extra heavy pipe should be used. The use of galvanized pipe and fittings for refrigerator and coal cars was also recommended in order to decrease the deterioration on account of acid and salt water drippings from the car bodies.

The committee further recommended that for passenger cars the ends of the brake pipe and air signal line should be supported by swinging clamps or hangers so that no trouble need be experienced from hose parting while the train was passing over crossovers. The recommended plan was the use of a pipe clamp with a swinging hinge at one end, the other part of the butt being bolted to the end sill so that when hanging in normal position the signal line should be 10½ in. from the center of the car and the brake pipe 13 in. from the center of the car. From the pulling face of the coupler back to the opening of the angle cock of the brake pipe and the elbow of the signal line the dimensions were recommended to be 10¾ in. and 13 in. respectively, not less than 15 ft. being provided between the face of the coupler and the first connecting fitting or clamp on either of the two pipes.

AIR-HOSE SPECIFICATIONS

The committee on air-brake hose specifications recommended a new label for hose and proposed a revision of the specifications for air-brake and signal hose which included the following list of tests:

"Porosity Test.—A hose will be selected at random and filled with air at 140 lb. pressure for five minutes. At the end of this time the rubber cover will be split with a knife and the hose submerged under water. This test is to determine the porosity of the inner tube. The escape of air must be distinct enough so that the porosity will not be confused with the escape of air which is confined within structure of the hose. This test determines whether or not the lot of 200 is accepted or rejected.

"Bursting Test.—The hose selected for test will have a section 5 in. long cut from one end, and the remaining 17 in. will then be subjected to a hydraulic pressure of 100 lb. per square inch, under which pressure it shall not expand more than ¾ in. in circumference nor develop any small leaks or defects. This section must then stand a hydraulic pressure of 500 lb. per square inch for ten minutes without bursting.

"Friction Test.—A section 1 in. long will be taken from the 5-in. section previously cut off and the quality determined by suspending a 20-lb. weight to the separated end, the force being applied radially, and the amount of unwinding shall not exceed 8 in. in ten minutes.

"Stretching Test.—Another section 1 in. long will be cut from the remainder of the 5-in. piece, and the rubber tube or lining will be separated from the ply and cut at the lap. Marks 2 in. apart will be placed on the section, and then the section will be quickly stretched until the marks are 10 in. apart and immediately released. The section will then be re-marked as at first and stretched to 10 in. and will remain so stretched ten minutes. It will then be completely released, and within thirty seconds of the time of releasing the distance between the marks last applied will be measured and the initial set must not be more than ¼ in. At the end of ten minutes the distance between the marks will be again measured, and the final set must not be more than ⅛ in. The small strips taken from the cover will be subjected to the same test.

"Tensile Strength.—Test pieces ½ in. wide and with a net length of 2¼ in. will be cut from the tube and cover and pulled in a tensile machine with a test speed of 20 in. per minute. After an elongation of at least 12 in. the inner tube must have a tensile strength of between 800 lb. and 1200 lb. per square inch, and the cover 700 lb. to 1100 lb. per square inch.

"Sampling.—For each lot of 200, one extra hose shall be furnished free of cost."

COUPLER AND DRAFT EQUIPMENT

The committee on coupler and draft equipment submitted a report showing the progress which is being made toward the development of a proposed universal standard coupler. A number of tests of present types of couplers were reported which showed among other results that in pulling tests the load giving ⅝-in. permanent set to the knuckle opening ranged from 192,000 lb. to 255,000 lb. for all couplers tested. The ultimate strength of coupler lugs was found to range from 147,000 lb. to 273,000 lb. for the top lug and from 210,000 lb. to 235,000 lb. for the bottom lug. Ultimate strengths of material ranged between 50,000 lb. and 87,000 lb. A number of road tests were also reported by the committee.

The committee reported that the general investigation of coupler conditions and the result of tests had demonstrated beyond a doubt that the present types of coupler were inadequate in strength to meet the increased demands placed upon them. In consequence the life of couplers was becoming considerably curtailed. The investigations made during the past year had satisfied the committee that the required increase in strength could be accomplished but that the weight of the coupler with the necessary increase in strength would have to be raised between 30 and 40 per cent. The committee proposed to select several designs to be tried out in service during the coming year in order to determine definitely the best contour lines, efficiency of operation and strength of the various parts, with a view to harmonizing all of the different designs and eliminating unsatisfactory details so that a universally standard coupler might be established.

The April 5 issue of the *Tramway and Railway World* contains the following figures showing the number of journeys per head of the population per annum in the larger English cities: Birmingham, 144; Liverpool, 145; Newcastle, 164; Bradford, 167; Leeds, 172; Manchester, 184; Glasgow, 240; Sheffield, 198.

COMMUNICATION

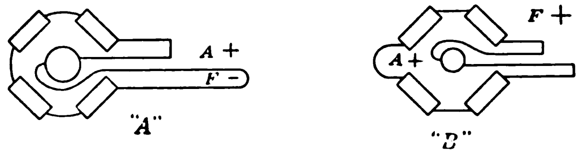
RAILWAY MOTOR CONNECTIONS

Richmond, Va., June 1, 1913.

To the Editors:

Will you kindly explain how with an ordinary sewing needle and a positive lead from a water rheostat one can test the polarity of the fields and then that of the armature of any new motor so that the motor will rotate in the right direction upon the first application of emf? There should be some method more scientific than connecting up the field with ground wire absolutely right and taping the joints of the same but leaving the armature terminals bare for reversing the connections in case the motor does run in the wrong direction. After once connecting any new motor, applying the current and noting the direction of rotation, anyone should be able to figure out the various connections for all different local conditions. In short, it should be possible to figure out the correct connections, then connect up by all four motors, tape the twenty connectors, cleat the wires and upon starting find that all four motors run correctly.

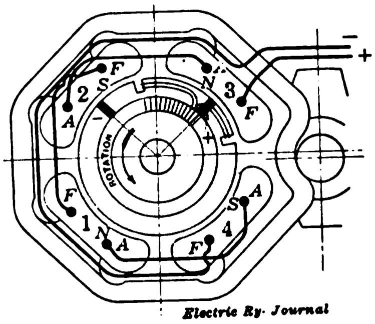
I should also like to know why a series motor when running full speed will not generate a dynamic braking load if the free $A+$ and $F-$ leads are connected as shown in the left-hand sketch, whereas it will do so when connected as shown in the right-hand sketch, herewith, and furthermore will draw a big arc if opened before the rotation of the armature ceases. Joseph L. Crane.



Non-Effective and Effective Connections to Make Motor Act as Generator

REPLY

The using of a sewing needle is not desirable as the polarity of the needle is liable to change because of the influence of the fields. One method of determining the polarity of field magnets is by means of a compass. If a small current is passed through a field coil and a compass is held a short distance away, the south pole end of the needle will point toward the field if it is a north pole and the north pole end will point toward it if it is a south pole. When the direction of the winding about the pole is known, its polarity may be determined by the direction in which the current flows around it. One simple rule for remembering this relation is that when a person is looking at a north pole the current is flowing around that pole in a counter-clockwise direction to him, and when he looks at a south pole the current is flowing around that pole in a direction which is clockwise to him.



Determining the Direction of Rotation

The following method of testing the polarity of the fields of railway motors after they are connected is employed by several large railway shops. Two bars of iron about 8 in. long are used. One end of each bar is placed in the center of two adjacent pole faces, and the other ends are held about 1 in. apart. A current of about 1 amp is then passed through the field coils, and if the connections are properly made the iron bars will be drawn together by their attraction for each other. With one end of each iron in the center of two opposite pole faces, the other ends will be forced apart. Care should be taken to use but a small current through the fields, or the iron bars will be drawn together with such force as to be liable to injure the person holding them. If much testing is to be done it is best to provide the irons with handles about 3 ft. or 4 ft. long so that a man can hold them without danger. The accompanying illustration shows the polarities of a four-pole railway motor. The two north poles are directly opposite each other, and the two south poles are opposite each other.

When the polarity of the field magnets of a motor is known the direction that the current must pass through the armature coils to produce a given direction of rotation is easily determined. One simple rule, sometimes called the rule of the thumb, is the following: Place the palm of the left hand toward a north pole and the extended thumb pointing in the direction it is desired to have the armature rotate. Then the current through the armature coils underneath this pole must flow in the direction the fingers are pointing.

Referring again to the accompanying illustration, the poles 3 and 1 are north poles, and to make the armature rotate in the direction indicated by the arrow—that is, counter-clockwise—the current in the armature coils under 3 and 1 must flow away from the observer. Looking at the commutator end of this armature, it is therefore necessary that the positive brush holder should be located in front of field coil 3, so that the coils to which it is connected through the commutator will have the current flowing in the proper direction.

In reply to the second question: a series motor will not generate if the field excitation and the residual magnetism are not in the same direction. When the current used to drive a motor is shut off, a small emf is generated in the armature by the residual magnetism of the fields. This sends a small magnetizing current through the fields, and if this current produces lines of force in the same direction as the residual magnetism there will be an increase of the emf and field current so that the motor will build up and generate. If this current does not excite the field in the same direction as the residual magnetism, the field magnetism is decreased so the motor cannot build up and generate. To use a motor for electric braking it is therefore necessary to reverse the connections from those used as a motor so that the current generated will flow through the fields in the same direction as when the machine is used as a motor.—[EDS.]

RELATIVE COSTS OF ALUMINUM AND COPPER CABLES

In the issue of May 24, page 924, the possibilities lying in the use of aluminum for feeder cables in place of copper were outlined in accordance with a report presented before the Christiania convention of the International Street & Interurban Railway Association last year. A formula was included which had been worked out by the Copenhagen Tramways and expressed in the cost in English currency to show the relative economy of the two metals and the price at which it would be advantageous to use aluminum. The report was presented by K. Otto, of the Grosse Berliner Strassenbahn. When the prices are expressed in cents per pound for both metals this formula will read as follows:

It will be advantageous to use aluminum if its price in cents per pound is less than the amount given in the subjoined expresssion:

$$2.08N - 6.4,$$

where N is the price of copper in cents per pound.

It will be seen from this that if copper should cost 15 cents per pound the expression would work out to the equivalent one of $(2.08 \times 15) - 6.4$ cents, which again is equivalent to $31.2 - 6.4$, or 24.8. In consequence aluminum would have to sell at less than 24.8 cents per pound to be an advantageous substitute for copper at 15 cents.

AUTOMATIC TRAIN STOP AND SPEED CONTROL

The offer of the New York, New Haven & Hartford Railroad to award a prize of $10,000 for the best train control device has led to the submission to that and other railroads of a new system, devised for use with standard block signal systems and any means of motive power, by L. W. Horne and W. N. Crane, two engineers of the car equipment department Interborough Rapid Transit Company, New York. Their system is based on using the varying force with which trains travel at various velocities to actuate their own tripping mechanism. The faster a train may be traveling at a speed control point, the greater will be the train line reduction and the longer the period of the corresponding brake application. The Horne & Crane devices are made to meet all of the requirements of the train control board of the Interstate Commerce Commission, some of which are referred to below.

This system is mechanical and pneumatic, although an electrically operated cab signal for giving a continuous indication can be added if desired. The only part that can be removed is the plug of the friction valve which holds the handle at open position after the engagement of the track trip. This removal would leave the train line pipe open and exhaust the entire train pressure, this action thus corresponding to the display of a stop signal. The device is made to operate even under conditions of heavy snow, as it is only necessary to counterweight the track trips enough to offset the snow pressure.

The apparatus permits two or more engines to be used with one train, or a train may be allowed to assist another train without causing the brakes to be set on the second or following engine when passing a signal which indicated "proceed" when passed by the head of the train. This is provided for by a detent which prevents the track trip from rising as a train bridges the insulated section until after the rear wheels have left the section. The system also provides for operation only in the normal direction of traffic except in connection with signals governing reverse movements. The train may also back up without engaging its control devices.

The device carries a speed control rocker handle which is actuated by the speed control trip, causing it to strike a valve stem in a cylinder connected to the air-brake system. The amount of kinetic energy in the rocker handle determines the speed of the train passing the trip. Any force applied to the compression spring back of the valve stem causes a slide valve to move upward in proportion to the force exerted. The spring immediately exerts a downward pressure on the slide valve equal to the force which caused it to compress, but it is held from creating any independent movement by the automatic engagement of a valve pawl with a dash-pot rack. The downward pressure exerted by the spring therefore acts through the dash-pot piston, which responds to the pressure by forcing the fluid in the dash-pot through a regulating port. The exact method of timing the return of the slide valve is therefore obtained as in a door check, and the brakes are thereby released after the train speed has been reduced to a predetermined limit.

If the train speed is within the regulation rate, the kinetic energy of the trip handle will not be sufficient to cause the brake pipe exhaust port to be opened. When the engineer realizes that his train has been tripped, he moves the handle of his brake valve to release position, and a timing device releases the brakes automatically.

News of Electric Railways

Electrification of the Paoli Line of the Pennsylvania

An official of the Pennsylvania Railroad whose name is not given is quoted as follows by the Philadelphia *Ledger* in a recent issue in regard to the progress of the plans of that company for the electrification of its Paoli line out of Philadelphia:

"We have sought information from manufacturers of electrical supplies, from railroad managers and in every place where facts worth getting could be supplied, but we are at the beginning of this problem. We do not know whether we will use the direct or alternating current. So rapid are the improvements in the field of electricity that equipment that will be modern to-day may be antiquated a year or so hence. We are finding out new things about the steam locomotive, while even swifter development is being made in the rival field of electrical propulsion, so it is impossible to give detailed information, for we do not know, except in a general way, what the coming installation will be like. We must all come to the use of electricity for operating trains, and, therefore, it is not a question of rivalry but of what is best and at the same time most economical. But whatever system is adopted the expenditure will be very great. We cannot discard our locomotives, but we will have to place many of these engines at less remunerative work. That, alone, is no small consideration."

It is stated that the installation of electricity at the Pittsburgh terminal has not been considered in the information now being collected.

Sixty trains a day are run as far as Paoli and back. More than thirty other trains run to local points beyond.

Detroit Settlement Plan Ready for Submission to Council

Allan H. Frazer, special attorney for Mayor Marx of Detroit, Mich., has completed a revision of the street railway settlement plan devised by Attorney Lawson. It is said that the plan now meets the ideas of the Mayor so well that it will be presented to the Common Council for consideration at once. The plan is said to be based upon certain concessions from the company, including lower fares, increased service and specified extensions, in return for the privilege of operating on Fort Street and other thoroughfares where its franchises have expired.

Police Commissioner Gillespie is working out plans to relieve congestion in the business section of the city during the evening hours. He says that the suggested plan to limit the number of passengers to be carried in cars would result in people in the downtown section having to wait until 8 p. m. for cars. He advocates additional trackage and additional lines.

Philadelphia's Rapid Transit Plans

Transit Commissioner A. Merritt Taylor's preliminary report on the Broad Street subway is expected by Director Cooke, of the Department of Public Works of Philadelphia, Pa., to be ready by July 1, 1913. The bills to enable the city to build the subway system have been signed by Governor Tener as noted in the department "Legislation Affecting Electric Railways" elsewhere in this issue.

Common Councilman John P. Connelly, chairman of the finance committee, is quoted as follows:

"There will not be undue delay of a day as far as Councils are concerned, but every step must be taken with care. I have not heard a single voice in opposition to the subway plans among members of Councils. I am informed that at least a year and six months will be required to make the engineer's plans; then will come the interim in which bids are sought. I am satisfied from what I have learned that at least two years will elapse before the contractors can be ready to go on with the work."

The finance committee has reported with favorable recommendation all the bills desired by Commissioner Taylor, and according to Mr. Connelly will report favorably the bill authorizing a contract with Ford, Bacon & Davis, New York, N. Y., involving the expenditure of $60,000 for expert assistance to the transit department.

In regard to legal obstacles likely to be encountered Mr. Connelly is quoted as follows:

"I am informed that a bill in equity will be filed to test the personal property act. In this instance the city proposes to borrow on what has been assessable for a county tax, and one of the questions to be brought before the court will be whether Philadelphia is part of the county, whether city and county are co-extensive and whether a county and a city tax are co-determinate."

Union Station Plans in Chicago

A statement reviewing at length the terminal plans now under consideration by the committee on railway terminals of the Chicago City Council was presented before that committee on June 9, 1913, by Robert Redfield, attorney for the Union Station Company, and was signed by officials of the Pennsylvania Lines, the Chicago, Burlington & Quincy Railroad and the Chicago, Milwaukee & St. Paul Railway. The statement is made that during the hearings held before the committee on railway terminals of the City Council the data presented, while complete, have necessarily been more or less scattered and the primary consideration sometimes obscured on this account. Besides, as a result of their observation and experience, the railroads have arrived at certain views which they consider pertinent, and it seemed that an analysis of the various plans might aid the committee, the Council and the public in understanding the problem and in reaching a correct conclusion. The statement which has been submitted is made in three parts—first, a brief outline of the various plans which have been proposed for the railroads; second, a consideration of the essentials of these plans from the standpoints of efficiency and feasibility, and, third, an analysis of the plans evolved by the railroads themselves. Four plans have been proposed as alternatives to the plan of the West Side railroads which is embodied in the ordinances now pending before the Council. They are the Wacker plan, the Hunt plan, the Delano plan and the Pond plan. These plans all embody provisions for passenger facilities and suggestions for freight terminals, although the freight aspects of the plans are in general rather vaguely developed. Each of the four plans as an alternative to the plan of the West Side railroads is taken up in turn and dealt with at length in its various phases. The terminal plans of the West Side railroads as proposed by these roads involve, first, a passenger terminal for the railroads now using the Union Station to be erected in the block bounded by Adams Street on the north, Jackson Boulevard on the south, Clinton Street on the west and Canal Street on the east, with a concourse located directly east of this block between Canal Street and the Chicago River. Tracks will be brought into the station from the north and the south below the street level at an elevation of approximately 4 ft. above the Chicago datum. In concluding the statements which it makes in regard to the terminal plans of the West Side railroads, the Union Station Company in the statement which has been submitted to the Council committee says:

"The essentials, therefore, of the problem before the City Council and the people of Chicago are these: There is an admitted need for new passenger and freight terminals for the Union Station group of railroads. On the one hand are various plans volunteered for the railroads, open to grave objections from the standpoint of efficient operation and public service and impossible of accomplishment. On the other are the plans which the railroads have evolved as a result of their experience and study of the situation. They will provide efficient terminal service, both for freight and passenger traffic, and they can be executed at once.

"The question is not between the plans evolved by the railroads and the plans proposed for the railroads, because the latter run counter to fixed railroad and business conditions and are therefore outside the realm of practical affairs; they cannot be realized. The question is between the essential principles of the plans which are embodied in the ordinances now pending before the City Council and the continuance of present conditions. This is the issue for the committee on railway terminals and ultimately for the City Council to decide."

The plans of the Pennsylvania Lines and the other railroad companies interested with that system in the Union Station at Chicago for a new and larger terminal are being held in abeyance pending action by the City Council. As previously stated, the proposed new terminal, according to the plans of the Pennsylvania Lines, will be near the present Union Station on the West Side of Chicago. It is intended for the use of the Pennsylvania Lines, the Chicago, Milwaukee & St. Paul Railway and the Chicago, Burlington & Quincy Railroad. The plan, however, conflicts with a suggestion which has been made by various public and private interests, including F. A. Delano, president of the Wabash Railroad, that the terminals of all companies be concentrated on Twelfth Street. In reference to the independent suggestion made by Pond & Pond, architects, for the retention of a terminal on the West Side, that firm says that its program contemplates electric services for the railway terminal and in the station, and that it offers a longer radius than that now being used successfully by the New York Central & Hudson River Railroad in New York City. No announcement regarding electrification has been made in connection with the proposed plan of the Pennsylvania Lines, but it has been stated that there is nothing in the plan which would prevent electrification. The City Club of Chicago has asked the City Council to postpone definite action until an expert inquiry can be made.

Proposed Agreement in Regard to Improvements in Akron

The Northern Ohio Traction & Light Company will be requested to consider a form of agreement for the construction of extensions and double track within the city limits of Akron, Ohio, prepared by A. B. duPont, Cleveland, acting in the interests of the City Council. The city has been insisting upon extensions for some time, but the company has contended that the business will not bear the additional investment. This proposed agreement was prepared as a kind of guarantee to the company, with the provision that the city may pay for and own the improvements at the date of expiration of the company's franchise. The proposed agreement as presented to the company follows:

"1. The company shall construct tracks as indicated by the city and operate cars thereon as a part of the existing railway in the city of Akron and according to the terms and conditions of said railway's franchise, excepting as modified herein.

"2. Before constructing the extensions to and doubling certain of its tracks, the plans and specifications shall be approved by the city and the railway shall keep true and accurate account of the cost thereof and these accounts shall be subject to inspection and verification by the city.

"3. The city of Akron shall pay to the railway this cost, modified as hereinafter provided at the end of the existing grant, on July 1, 1924. If said city should fail so to do, said railway shall have the right to operate its entire railway system, within the limits of Akron, under the terms of its existing franchise, except as modified herein, until said cost is paid by the city of Akron or from earnings as herein indicated.

"4. Addition to said construction cost shall be made annually in the amount of the operating deficit, if any, accruing from the operation of said extensions and double track. Deductions from said construction cost shall be made annually in the amount of the operating surplus, if any, accruing from the operation of said extensions and double track.

"If at the end of any year prior to ——— there is a surplus after paying all operating expenses greater than the amount of said construction cost at the beginning of the same year, the excess of said surplus shall be paid to the city, and if on July 1, 1924, or at any time thereafter (if said city fails to purchase the property herein contracted to purchase) said surplus becomes as great as said construction cost, the railway shall at once convey to the city title to said property, which the city hereby contracts to purchase in the same manner as if the city had paid said cost at said date.

"5. In determining operating surplus or deficit, the following methods of accounting shall be used as applied to such extensions and double track:

"(A) The gross earnings of track extensions and double track shall consist of that part of the gain in all the earnings of said railway within the city of Akron above $——— (the ——— to be filled by the total of said gross earnings during the past year) that the number of car miles operated on the extensions and one track of double track bears to the whole number of car miles operated by the railway in Akron.

"(B) Operating expenses shall be at the same rate per car mile that the entire cost of operating the railway within Akron (without interest or dividends) is per car mile, excluding maintenance of extensions and of double track, of power plant and cars in each year with the following modifications.

(a) On track extensions add per mile ——— cents for power, ——— cents for car rental, and add the actual cost of maintaining said extensions and 6 per cent on the cost of said extensions.

"(b) On double track charge only for the excess of car miles made on one track of the double track above one-half of the car miles made in the past year on the single track replaced. Add 1¼ cents per car mile for power and 2 cents per car mile for car rents for the number of car miles charged for and add the actual maintenance, cleaning and sprinkling cost of one track and 6 per cent on the cost of said track.

"6. The city shall have the right to require said railway to make to it monthly reports of a form satisfactory to the city of the earnings and operating expenses herein indicated, and shall have opportunity to verify the same.

"7. At any time the company is paid for the cost of the extensions and double track herein provided—first, by the application of the surplus provided for in Section 4; secondly, by payment at the termination of the existing grant—the company shall thereupon convey to the city all its right, title and interest in said track extensions and double track, free and unencumbered, including good will, franchise value and physical property of every kind, and upon said payment in any of the methods provided herein all rights of the company in said extensions and said double track shall cease forthwith, and to insure the faithful performance of said conveyance and the release of the rights therein the company, its successors or assigns, on the acceptance of this proposal, shall forthwith give bond in the sum of $——, it being the true intention of this agreement that upon payment of the city for the extensions, as herein provided, the said city shall own said extensions absolutely free from claims of any nature or description."

No action was taken at the recent meeting of the City Council at Akron, Ohio, on the agreement proposed between the city and the Northern Ohio Traction & Light Company relative to extensions and improvements. Arrangements were made, however, for conferences between the street railway committee and officers of the company. A. B. duPont will meet with those interested and explain the various points in the proposed agreement. The company has notified the Public Service Commission that its orders regarding extensions and improvements in Akron and Canton will receive attention within the time specified.

Chicago Association of Commerce on Electrification

The Chicago Association of Commerce issued on June 11 an open letter to Mayor Harrison, the City Council of Chicago and citizens of the city, urging delay in action on the proposed smoke abatement and electrification ordinance until its report on this subject is ready. The letter says in part:

"Briefly stated, the facts are:

"That the association undertook the study of the problem of smoke abatement and electrification because it recognized this issue as one of greatest moment to the people of Chicago.

"When the results of this study showed the necessity of a comprehensive engineering investigation the association undertook this task because it was qualified to conduct a co-operative investigation, fairly representing all parties at interest, which neither the city nor the railroads acting alone were then in a position to carry out successfully.

"That as a result of this investigation the association will be able to lay before the City Council and the citizens a constructive report that may be the basis of intelligent legislation not for the abatement merely but for the elimination of smoke.

"That the period of this investigation has been a period not of delay but of progress and that Chicago is vastly nearer the realization of the desired solution of this vexing problem by reason of the association's undertaking.

"In October, 1909, the association appointed a special committee of seven to study the feasibility of electrification and the elimination of smoke in general. This committee reported to the executive committee of the association on July 8, 1910. On Aug. 19, 1910, this report was the subject of a joint meeting of the board of directors and the executive committee with the committee of seven. On Sept. 22, 1910, this report was the subject of a joint meeting of the board of directors and the executive committee with railroad officials.

"A complete stenographic record of the proceedings of this latter conference was referred back to the committee of seven, and in consideration of the facts developed the committee of seven on Nov. 28 supplemented its findings with the recommendation 'that the features involved in the problem of electrification should have proper detailed study and investigation.'

"Accordingly, the Association of Commerce conferred with the city administration and learned that the city desired a comprehensive investigation of smoke abatement and electrification, that it had made such preliminary inquiry through engineers selected by it as to determine that such an investigation would involve an expense of from $300,000 to $500,000, and that the city had no funds available for this purpose.

"Receiving from the city administration and from the City Council as well as the railroads both concurrence and co-operation, the association took the initiative in the organization of a committee of seventeen members, four selected by and representing the city of Chicago, four the railroads of Chicago and nine the general public as represented in the membership of the Association of Commerce. This investigation has been most searching, and the expense, now approaching $300,000, has been defrayed by funds contributed by the railroads of Chicago, the association, like the city, having no funds for so large an undertaking.

"It is expected that a complete and constructive report will be presented about Jan. 1, 1914.

"The full text of the preliminary report was not published for the same reason that the present incomplete data of the committee on smoke abatement and electrification have not thus far been published—for the reason that this problem, in the opinion of the Chicago Association of Commerce, is too important to the city's welfare to permit the solution that may be found most advantageous to the entire community to be jeopardized by a general understanding, or misunderstanding, based upon an incomplete review of the facts.

"Early realization of the city's desire for a practical and complete solution of the problem of railroad smoke can be obtained more surely, the association submits, through cooperation than through litigation. The electrification of the extensive freight terminals of Chicago is not a matter to be determined by legislation enacted without proper comprehension of the facts. The solution of this problem demands the kind of an investigation that the association is now conducting, and we confidently believe that time, which reverses all hasty decisions, will prove the wisdom of the association's course and prove no less surely its value to the citizens of Chicago and to the city's future."

Subway Construction Accident in New York.—In an accident which happened at 6.30 p. m., on June 14, 1913, in section No. 8 of the Lexington Avenue branch of the dual subway, which is being constructed under the supervision of the Public Service Commission of the First District of New York, nine men were killed and several others were severely injured.

Funds Authorized for Electrification.—The Ontario government has authorized the Buffalo & Fort Erie Ferry Railway Company, Buffalo, N. Y., to increase its capital stock and its bonded debt to provide funds to electrify the line of the company between the Fort Erie ferry and Fort Erie Beach, Ont. It is said that the company plans to extend the line to Bridgeburg and Port Colborne.

Prospectus of the Society for Electrical Development, Inc.—The Society for Electrical Development, Inc., New York, N. Y., of which J. M. Wakeman is general manager, has issued a twenty-four-page prospectus setting forth the aims, personnel and plans of the society. The president of the society is Henry L. Doherty and the board of directors includes five representatives of the central stations, five representatives of the manufacturers, five representatives of the jobbers and five representatives of the contractors.

No More T-Rail in Houston.—David Daly, manager of the Houston (Tex.) Electric Company, is quoted as follows by the Houston *Chronicle*: "Our company will lay no more T-rails on paved streets in Houston, unless specially requested to do so by the people and the city administration. We intend to replace all the T-rails on Main Street from Capitol Avenue to the viaduct within the next six months. The grooved girder rail will be put down and the entire foundation and the street paving between the tracks will be replaced by our company."

Differences in Buffalo Before Arbitrators.—Mayor Louis P. Fuhrmann, Assemblyman Edward D. Jackson and Bert L. Jones, the arbitrators who are to adjust the differences between the International Railway, Buffalo, N. Y., and its employees, were to meet on June 17, 1913, in the Special Term court room at the city hall and begin their work. The sessions will be executive, Mr. Jackson having been outvoted by the other two members in his efforts to have them public. Each side is to be allowed three representatives to present its case. The evidence of the men will be submitted first.

Mr. Arnold Before Ontario Railway & Municipal Board.—Bion J. Arnold was called before the Ontario Railway & Municipal Board recently in regard to the report which he prepared on traffic in Toronto. Mr. Arnold said that the building and operation of the proposed new lines on the various streets mentioned in the report would open up districts not served by the existing routes. He favored cross-town lines to develop the city symmetrically and properly and avoid congestion. Mr. Arnold stated that in his report he had not considered the people living adjacent to the city to any great extent. The hearing was adjourned until June 25, 1913.

Punitive Measures Adopted in Roanoke.—Steps are being taken by the employees of the Roanoke Railway & Electric Company, Roanoke, Va., who have been on strike since May 1, 1913, to form a corporation for the operation of a bus line in the city. An interesting feature in connection with the strike is that every candidate for public office has been requested to state whether or not he is a user of the company's service. The introduction of punitive measures in the Council has also been attempted. It has been proposed that the company be taxed $5 on every car operated and that it be required to place all high-tension lines underground. The company has maintained normal service from the beginning of the trouble.

Marginal Railway Plans for Brooklyn.—Collector of the Port Mitchel, who while president of the Board of Aldermen acted as chairman of the terminal committee of the Board of Estimate, has completed his report on the organization and construction of the proposed marginal freight railway along the waterfront of Brooklyn between the Brooklyn Bridge and Sixty-fifth Street, Bay Ridge. The report recommends that the city acquire the property of the New York Dock Company and part of that owned by the Bush Terminal Company, and that it build the marginal railway and lease it to the various trunk line railways entering New York. The cost is estimated at $11,236,510. The Bush Terminal Railroad is operated by electricity.

Examinations for Appointments in Connection with Interstate Valuation Work.—The United States Civil Service Commission has issued announcements of examinations to be held for filling positions in the Interstate Commerce Commission under the act providing for the valuation of the property of the carriers. The examinations which are to be held include senior electrical engineers, inspectors of car equipment and electrical engineers. The positions will pay respectively $1,800 to $4,800, $1,200 to $1,500 and $1,080 to $1,500. Necessary expenses when absent from headquarters in the discharge of official duties will be allowed. The announcement in regard to the examinations is made by John A. McIlhenny, acting president, by direction of the United States Civil Service Commission, Washington, D. C.

Decision Reserved by Court in Brake Case.—The Appellate Division of the Supreme Court of New York has reserved decision in an application made by the Brooklyn Heights Railroad and subsidiaries, Brooklyn (N. Y.) Rapid Transit System operating companies, to the courts to dismiss the order of the Public Service Commission of the First District of New York which requires the company to equip its cars with power brakes in addition to the regular hand brakes. The company contended that the requirement was unreasonable, as to equip its cars with power brakes in accordance with the order of the commission would involve an expenditure of more than $500,000. The commission stated that every other company in Greater New York had obeyed similar orders of the commission, a concession having been made by the commission, however, in the case of a few very light cars in the Borough of Manhattan.

Franchise Negotiations in Kansas City.—The receivers of the Metropolitan Street Railway, Kansas City, Mo., and Mayor Jost of that city have concluded to take Judge Hook of the federal court at Kansas City into their confidence to see if a satisfactory agreement in regard to the value of the property of the company cannot be reached. R. J. Dunham, one of the receivers, told the Mayor that they could not accept the proposal to fix the physical valuation at $30,000,000 and deny the bondholders the right to participate in the surplus earnings until the capital valuation was reduced to the physical valuation. He submitted the following alternative propositions: A valuation of $35,000,000, stockholders to have a return of 6 per cent and the entire surplus after this payment and the payment of the operating expenses to go toward amortization. A valuation of $30,000,000, with a 6 per cent return to stockholders, who are also to receive 25 per cent of the surplus after this payment and the payment of operating expenses, the remaining 75 per cent of the surplus to be applied to amortization.

Appropriation Urged for Elimination of Grade Crossings.—The Public Service Commission for the First District has written a letter to Governor Sulzer asking him to urge the special session of the Legislature to make an appropriation of $1,278,025 as the State's one-quarter of the estimated cost of eliminating grade crossings on the Atlantic Avenue division of the Long Island Railroad between the end of the present elevated structure and the westerly end of the Jamaica improvement. This line is equipped with the third-rail. The crossings are twenty-four in number and extend from Norwood Avenue to Beech Street. Ultimately there will be about forty streets crossing between these points, but at present only twenty-four streets are opened across the tracks. In the letter to the Governor the commission sets forth the number of accidents which have occurred since the commission was organized on July 1, 1907. These include fifteen fatalities and a large number of serious injuries. The conditions at the most dangerous of the crossings are set forth in detail. The train movement over this division is very heavy, and one observation showed that in an hour and a half twenty-five express trains and eleven local trains passed over one of the crossings. So the commission recommends that the tracks be elevated on a structure having a solid concrete floor and resting on three columns, the streets to be carried underneath the tracks so that there will be no longer any grade crossings at all. It is on this type of structure that the estimate of cost is based. The commission says that hearings have been held and the required testimony taken in regard to these crossings; that the railroad is willing to undertake the work immediately and bear one-half of the cost, as provided by law. Before the elimination order can be issued, however, it is necessary that the State make an appropriation for its share of the cost and accordingly the Governor is urged to present the matter to the Legislature.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

The public utilities bill drafted by the public utilities committee of the House of Representatives passed the House on June 12, but the "home rule" features were eliminated on the floor of the House. A commission of five members will supervise rates, capitalization and service. Following the passage of the bill by the House it was reported that the Senate would pass the bill in practically the same form. Representatives spoke against the home rule features because the tendency in Illinois to merge companies and abolish isolated plants would make it difficult for a city to regulate a company doing business in ten other cities and towns.

The Senate sitting as a committee of the whole gave a hearing the night of June 16 on the public utilities bill which already had been passed by the House. The hearing was devoted to pleas for "home rule" coming from Chicago. Senator Dailey asked if a city commission for Chicago and a state commission would not conflict. Alderman John A. Richards, of Chicago, said the City Council would furnish to a state commission all data referring to utility investments in Chicago. C. E. Merriam said the bill would deal a death-blow to utility regulation in Chicago. Governor Dunne entered a plea for the restoration of the home rule feature. His original plan was to have all cities of 20,000 or over under the home rule plan with the privilege of going under the jurisdiction of the state commission if they desired. He favored changing this to 25,000 or 30,000, but declared that Chicago was in favor of home rule. The bill was passed to second reading in the Senate on June 17 without reference to a committee.

Senate bill No. 538, the administration bill authorizing cities to own and operate public utilities, has been advanced to third reading on the calendar of the House. The bill was amended by the House committee before it was reported out to require only 5 per cent of the voters of the city to petition for the submission of the question of ownership of the utilities. As passed by the Senate the bill called for 10 per cent.

MASSACHUSETTS

Unless an unexpected stand is made in the Senate, the nine-hours-in-eleven bill will be passed over the veto of Governor Foss. On June 18 the House passed the bill over the executive disapproval by a vote of 175 yeas to 43 nays, and on that date the Senate adjourned until June 20, when it was expected that a final vote would be taken. The new public service commission law, which was passed over the veto of Governor Foss, increases the power of the Railroad Commission, enlarges the membership and renders the issuance of securities by railroads less difficult. Another bill which has become a law in spite of the disapproval of Governor Foss authorizes the Berkshire Street Railway, a subsidiary of the New York, New Haven & Hartford Railroad, to purchase the Springfield Street Railway, the Worcester Consolidated Street Railway, the Milford, Attleboro & Woonsocket Street Railway, and the Chester & Becket Railroad, thus centralizing the important electric railway systems of the middle and western parts of the State under a single management. Fares are not to be increased or service decreased by reason of the purchase, which is granted on condition that $5,000,000 be expended in new electric railway construction in or near Huntington and other mid-state centers, under the general supervision of the Public Service Commission.

PENNSYLVANIA

The lower house of the General Assembly has passed a resolution providing for adjournment June 26, but the Senate has not as yet concurred in the action. The present session has been one of the longest on record and it is by no means certain that the two houses will be ready for adjournment on the date above mentioned.

The public utilities measure is ready to be reported favorably from committee of the Senate with a number of amendments, including one eliminating the provision which permits public utilities to build through municipalities without the consent of the local authorities, also an amendment eliminating the section compelling public utilities to interchange their facilities.

The McNichol bill to permit electric railways to operate self-propelled omnibuses over streets not now occupied by street passenger railway tracks, upon obtaining the consent of the local authorities, will be taken up by the Senate committee on corporations. This measure has been introduced in the interest of the Philadelphia Rapid Transit Company, which is understood to desire to operate self-propelled vehicles, independent of overhead wires, on a number of boulevards and highways in Philadelphia.

Governor Tener has signed the two all-Philadelphia bills enabling that city to build a system of subways, construct terminals, wharves and docks, and to raise the necessary funds to do this work through the personal property tax, all of which is to go to the city for this purpose. At present three-fourths of this tax goes to the county and one-fourth to the State. This bill will mean an annual increase in the revenue of Philadelphia County of about $660,000, thus increasing the borrowing capacity of the city of Philadelphia about $40,000,000. A. M. Taylor, transit commissioner of Philadelphia, is quoted as saying that work along Broad Street will be started soon. The third of the all-Philadelphia bills, providing that the work can be begun after the approval of the popular loan, is expected to pass next week.

Vigorous onslaughts have been made in the House on certain items in the general appropriation bill, without success in most cases. The unsuccessful attempts include efforts to reduce the amount for the expenses of the State Railroad Commission from $100,000 to $60,000 and to eliminate the item of $1,500 for clerical hire for a board to examine patent letters relative to underground railways and elevated railways.

PROGRAMS OF ASSOCIATION MEETINGS

Central Electric Railway Accountants' Association

The twenty-second regular meeting of the Central Electric Railway Accountants' Association will be held in the main cabin of the steamer *St. Ignace* on the afternoon of Thursday, June 26. The program will be as follows:

Report of standing committee on freight accounts.

Report of standing committee on passenger accounts.

Report of committee on query box questions and answers.

Address, "Essentials of Modern Accounting," by A. F. Elkins, auditor of the Columbus, Delaware & Marion Railway.

Address, "Voucher Indexing Simplified," by George L. Ford, auditor of the Evansville Railways.

Address, "Nuts to Crack," by A. J. White, traveling auditor of the Ohio Electric Railway.

On account of the length of the program, it may not be possible to finish on the afternoon of June 26, but the fore part of the afternoon of June 27 will be available in case any extra time is required.

The meeting has been so arranged that there will be no conflict with the meeting of the Central Electric Railway Association, which will hold its business sessions during the mornings of June 26 and 27. It is expected that the arrangement by which the two associations join in the trip will insure a larger attendance than usual at the meetings of both associations. As stated in previous issues of the ELECTRIC RAILWAY JOURNAL the steamer *St. Ignace* of the D. & C. line will leave the dock at the foot of Madison Street, Toledo, Ohio, at 3 p. m. on June 25.

For the benefit of members of the Central Electric Railway Association and their friends who will attend the meeting to be held on board the steamer *St. Ignace* on June 26 and 27, 1913, the Union Traction Company of Indiana will run a special car, leaving the Traction Terminal Station, Indianapolis, Ind., on June 24 at 3 p. m., for Fort Wayne, stopping over at Fort Wayne that night, and leaving at 7.20 a. m. on June 25, arriving at Toledo at 11.35 a. m., thus affording delegates several hours' time in the latter city before the steamer leaves.

Pacific Claim Agents' Association

The fifth annual meeting of the Pacific Claim Agents' Association will be held at Vancouver, B. C., on July 10, 11 and 12, 1913. The sessions will all be held in the social hall at the clubrooms of the employees of the British Columbia Electric Railway, which adjoin the general offices of the company. The convention will be called to order at 10 a. m. on July 10. The address of welcome will be delivered by T. S. Baxter, Mayor of the city of Vancouver. R. H. Sperling, general manager of the British Columbia Electric Railway, will respond. The rest of the morning will be given over to the routine business of the association. The program of papers which are to be presented at the meeting follows:

JULY 10—2 P. M.

Paper, "Required Legislation for the Modification of Court Procedure in the Trial of Personal Injury Cases," by Harrison Allen, attorney for the Portland Railway, Light & Power Company, Portland, Ore.; C. H. Winders, attorney for the Northern Pacific Railway, Seattle, Wash., and A. J. Falknor, attorney for the Puget Sound Traction, Light & Power Company, Seattle, Wash.

Oral discussion led by T. G. Newman, attorney for the Bellingham division of the Puget Sound Traction, Light & Power Company, and John Ferrin, claim agent of the Oakland (Cal.) Traction Company.

JULY 11—9:30 A. M.

Paper, "The Value of Safety Committees: How They Are Organized and Put to Work," by George Carson, claim agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash.; G. N. Smith, claim agent of the Oregon-Washington Railroad & Navigation Company, Portland, Ore., and T. G. Aston, claim agent of the Washington Water Power Company, Spokane, Wash.

Oral discussion by E. M. Grover, claim agent of the Northern Pacific Railway, Tacoma, Wash., and J. M. Hone, claim agent of the Spokane & Inland Empire System, Spokane, Wash.

JULY 11—2 P. M.

Paper, "The Value of an Index Bureau in Dealing with Fraudulent Claims," by B. F. Boynton, claim agent of the Portland Railway, Light & Power Company, Portland, Ore., and S. A. Bishop, claim agent of the Pacific Electric Company, Los Angeles, Cal.

General discussion.

Paper, "National Workmen's Compensation and Industrial Insurance Laws," by H. K. Relf, claim agent of the Spokane, Portland & Seattle Railroad, Portland, Ore., and A. M. Lee, district claim agent of the Northern Pacific Railway, Seattle, Wash.

Paper, "State Workmen's Compensation and Industrial Insurance Laws," by E. H. Odell, Tacoma, Wash., and T. J. Rupli, assistant claim agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash.

Oral discussion by A. E. Beck, claim agent of the British Columbia Electric Railway, Vancouver, B. C., and George Newell, superintendent of transportation of the Pacific Northwest Traction Company, Everett, Wash.

JULY 12—9:30 A. M.

Paper, "The Unreported Accident or 'Blind' Case," by J. H. Handlon, claim agent of the United Railroads of San Francisco, Cal.; W. H. Moore, claim agent of the San Diego (Cal.) Electric Railway, and C. F. Young, of the Puget Sound Traction, Light & Power Company, Seattle, Wash.

General discussion.

JULY 12—2 P. M.

General discussion of claim department work, such as settlement of claims, preparation of cases for trial, handling of witnesses, etc., led by D. L. Flynn, assistant claim agent of the Great Northern Railway, Seattle, Wash.; J. E. Newton, claim agent of the Northern Pacific Railway, Tacoma, Wash.; J. H. Handlon, of the United Railroads of San Francisco, Cal., and T. A. Cole, claim agent of the Los Angeles (Cal.) Railway.

The convention will close with the election and installation of officers. At the afternoon session on July 12 the report of the committee appointed for the purpose of selecting a place for the meeting which is to be held in 1914 will be presented.

Financial and Corporate

Stock and Money Markets

June 18, 1913.

The prices of securities dealt in on the New York Stock Exchange to-day rose enough to show a net gain of close to one point in the average level of quotations. The trading was moderate. The Interborough-Metropolitan issues maintained the strong tone shown recently and were established at a substantially higher range. Rates in the money market to-day were: Call, 2@2½ per cent; sixty days, 3¾@4 per cent; ninety days, 4¼@4½ per cent; four months, 4¾@5¼ per cent; six months, 5¼@5½ per cent.

In the Philadelphia market the demand for local issues was light, but toward the close prices were bid up sharply, Philadelphia Rapid Transit going at 22½.

In the Chicago market the tone was better to-day than for some time past and the demand for bonds increased.

The Boston market to-day was quiet but generally strong.

The Baltimore market to-day was broader than for some time past, but the volume of transactions was not large. In the bond market sales were recorded to-day of $5,000 of Chicago Railways 5's and $16,000 of United Railways incomes.

Quotations of traction and manufacturing securities as compared with last week follow:

	June 11	June 18
American Brake Shoe & Foundry (common)	89	91
American Brake Shoe & Foundry (preferred)	128	128½
American Cities Company (common)	34	35
American Cities Company (preferred)	68⅜	72¼
American Light & Traction Company (common)	345	365
American Light & Traction Company (preferred)	106	106
American Railways Company	37½	37¾
Aurora, Elgin & Chicago Railroad (common)	38	38½
Aurora, Elgin & Chicago Railroad (preferred)	82	*82
Boston Elevated Railway	86	87¾
Boston Suburban Electric Companies (common)	a7½	7½
Boston Suburban Electric Companies (preferred)	*66	*66
Boston & Worcester Electric Companies (common)	a8	a8
Boston & Worcester Electric Companies (preferred)	40	40
Brooklyn Rapid Transit Company	84⅜	87¾
Capital Traction Company, Washington	120⅝	117⅞
Chicago City Railway	150	*150
Chicago Elevated Railways (common)	24½	*24½
Chicago Elevated Railways (preferred)	75	*75
Chicago Railways, ptcptg., ctf. 1	91	91½
Chicago Railways, ptcptg., ctf. 2	18½	18½
Chicago Railways, ptcptg., ctf. 3	6½	6½
Chicago Railways, ptcptg., ctf. 4	2¼	2¼
Cincinnati Street Railway	104½	110
Cleveland Railway	103	102½
Cleveland, Southwestern & Columbus Ry. (common)	6	6
Cleveland, Southwestern & Columbus Ry. (preferred)	29	29
Columbus Railway & Light Company	18	18
Columbus Railway (common)	a69½	69½
Columbus Railway (preferred)	83	88
Denver & Northwestern Railway	107	*107
Detroit United Railway	70	70
General Electric Company	130	136
Georgia Railway & Electric Company (common)	116	115
Georgia Railway & Electric Company (preferred)	83½	83½
Interborough Metropolitan Company (common)	12¼	16¼
Interborough Metropolitan Company (preferred)	46½	59⅝
International Traction Company (common)	30	30
International Traction Company (preferred)	a95	95
Kansas City Railway & Light Company (common)	18	18
Kansas City Railway & Light Company (preferred)	36	36
Lake Shore Electric Railway (common)	6	6
Lake Shore Electric Railway (1st preferred)	a92	92
Lake Shore Electric Railway (2d preferred)	a25	25
Manhattan Railway	126	125
Massachusetts Electric Companies (common)	13	12½
Massachusetts Electric Companies (preferred)	68	68
Milwaukee Electric Railway & Light Co. (preferred)	100	100
Norfolk Railway & Light Company	25	25
North American Company	63	65
Northern Ohio Light & Traction Company (common)	a80	80
Northern Ohio Light & Traction Company (preferred)	a105	105
Philadelphia Company, Pittsburgh (common)	37	40⅛
Philadelphia Company, Pittsburgh (preferred)	40	39
Philadelphia Rapid Transit Company	20½	21
Portland Railway, Light & Power Company	62	62
Public Service Corporation	112	111
Third Avenue Railway, New York	28½	33
Toledo Railways & Light Company	2	2
Twin City Rapid Transit Co., Minneapolis (common)	101½	103½
Union Traction Company of Indiana (common)	4½	4½
Union Traction Company of Indiana (1st preferred)	80	80
Union Traction Company of Indiana (2d preferred)	30	30
United Rys. & Electric Company (Baltimore)	24	26
United Rys. Inv. Company (common)	17	19
United Rys. Inv. Company (preferred)	30	35½
Virginia Railway & Power Company (common)	50	52
Virginia Railway & Power Company (preferred)	90	87½
Washington Ry. & Electric Company (common)	84	85⅝
Washington Ry. & Electric Company (preferred)	87⅜	87½
West End Street Railway, Boston (common)	71	71
West End Street Railway, Boston (preferred)	88	88
Westinghouse Elec. & Mfg. Company	54	60
Westinghouse Elec. & Mfg. Company (1st preferred)	111	106

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*Last sale. a Asked.

Proposed Agreement for Refinancing of Terminal Railways

The trustees of F. M. Smith and the trustees of the United Properties Company, Oakland, Cal., have under consideration an agreement for the refinancing of the San Francisco-Oakland Terminal Railways, Oakland, Cal., with the underwriting syndicate, in which E. H. Rollins & Sons have joined N. W. Halsey & Company. In a statement issued by the trustees the proposed agreement is described as follows:

"Its purpose is to provide tentatively, according to the provisions of the memorandum, for financing the Oakland Railways and the San Francisco-Oakland Terminal Railways, which latter company owns and operates the Oakland Traction and Key Route properties. This financing consists in raising, by the issuance and sale of $4,000,000 of 6 per cent five-year notes, funds sufficient to pay off and retire the $2,500,000 note issue maturing June 12, to provide for new construction imperatively required, and to reimburse the company for improvements paid for out of earnings during recent months.

"Two million dollars of additional notes will be reserved for future issue for the purpose of providing for extensions and additions to the Terminal Railways property. Certain conditions, however, must first be complied with before it will be possible for N. W. Halsey & Company and E. H. Rollins & Sons to proceed with their plans, and the committees have agreed to use their best endeavors to see that the following conditions are fulfilled:

"1. To obtain authority from the Railroad Commission for the issue by the San Francisco-Oakland Terminal Railways of certain securities necessary for the carrying out of the plan.

"2. To secure a refunding of the outstanding $1,100,000 note issue of the Oakland Terminal Company guaranteed by the Oakland Railways and due on Aug. 20 this year.

"3. To secure the deposit of the shares of stock of the Terminal Railways, the Oakland Traction and the Key Route companies which are not owned by the Oakland Railways for the purpose of exchange, according to the plan.

"4. To secure the expenditure of the $1,000,000 cash now on deposit with the Union Trust Company, trustee, in the construction of a solid-fill pier out as far as the present official bulkhead line and such other construction as may materially increase the capacity of the Key Route system.

"The committees under the memorandum will have until July 15, 1913, to cause these things to be done. If by that time they have succeeded in complying with these and other incidental conditions, then N. W. Halsey & Company and E. H. Rollins & Sons will have until Aug. 15 to form an underwriting syndicate to purchase the $4,000,000 of notes.

"The success of this plan is dependent upon the co-operation of the creditors of F. M. Smith and of the Realty Syndicate and of the stockholders of the companies interested and of the note holders of the $1,100,000 note issue of the Oakland Terminal Company due Aug. 20.

"Meanwhile, the interest on the $2,500,000 note issue due on June 12 will be paid.

"It is believed that the successful consummation of the plan will put the railways' properties on a sound financial basis and permit of a decided improvement in the service afforded the various transbay communities."

Financing Plans of Columbus Consolidation Approved.

The Columbus Railway, Power & Light Company, Columbus, Ohio, has been authorized by the Ohio Public Service Commission to issue its common capital stock of the par value of $1,353,930. An amount of $500,000 thereof is to be sold for the best price obtainable but for not less than par value, it being the opinion and finding of the commission that the issue of all of said common capital stock and the money to be secured by the sale of $500,000 principal amount thereof are reasonably required for the proper purposes of the corporation.

The proceeds arising from the sale of the common capital stock of the par value of $500,000 are to be devoted to and used for the following purposes and no other: To provide a working capital, the expenditures wherefrom shall be made as follows:

Supplies, $235,503; coal, $5,233; accounts receivable, $147,-

000; bills receivable, $15,000; deposits with the city of Columbus, $1,900; prepaid insurance, $26,000, and cash, $79,364.

The common capital stock of the par value of $853,930 of the Columbus Railway, Power & Light Company is to be issued, transferred and delivered to the Columbus Railway & Light Company in full and final payment of the following indebtedness and securities: For the reimbursement of the Columbus Railway & Light Company for expenditures made by it for the extension and improvement of the properties of the Columbus Railway, the Columbus Edison Company, the Columbus Light, Heat & Power Company and the Columbus Railway, Power & Light Company, common capital stock of the par value of $534,630; in equal exchange for $253,000, principal amount, of the first consolidated 4 per cent bonds of the Columbus Railway now in the possession of the Columbus Railway & Light Company, common capital stock of the par value of $283,000; and in equal exchange for $36,300, principal amount, of the first mortgage 6 per cent bonds of the Columbus Light, Heat & Power Company now in the possession of the Columbus Railway & Light Company, common capital stock of the par value of $36,300. The Columbus Railway, Power & Light Company, upon the acquisition of the first consolidated 4 per cent bonds of the Columbus Railway and said first mortgage 6 per cent bonds of the Columbus Light, Heat & Power Company, must cancel the same.

The Ohio Public Service Commission on June 7 declined to grant the application of several stockholders of the Columbus Light, Heat & Power Company to reopen the proceedings in regard to the consolidation of the subsidiaries of the Columbus Railway & Light Company in order that they might present objections to the basis of exchange of securities, which opposition was described in detail in the ELECTRIC RAILWAY JOURNAL of May 31, 1913. Meetings of the stockholders of the various companies will now be called to approve the reorganization plans as submitted.

Attack on Elevated Roads in Chicago

State's Attorney Hoyne began quo warranto proceedings in the Cook County Circuit Court, Chicago, Ill., on June 16, against the Metropolitan West Side Elevated Railway, the South Side Elevated Railroad and the Union Elevated Railroad on the ground that they have violated their State charters by over-capitalizing. Mr. Hoyne says that the companies were organized under the railroad act and that the constitution and this act provide that a company shall not issue stock or bonds except for money, labor or property actually received and applied to the purposes for which the corporation was created, and that any stock dividends or other increase of capital stock or indebtedness shall be void. He declares that the suits will show the actual costs and real investments of the companies and clear the situation.

A similar proceeding against the Northwestern Elevated Railroad was filed a few days earlier. It is charged in the suit filed against that company that the railroad violated its charter by using the union loop and also in extending its lines northward beyond the prescribed limit.

The court is asked to compel the companies to answer the suits and to show by what right they operate under the alleged illegal conditions named by Mr. Hoyne.

Mr. Hoyne issued a statement in reference to his action in which he said that the difference between the companies and the city of Chicago arose in regard to the value of the properties concerned and that it was doubtful whether any substantial benefits could be obtained for the public through the pending negotiations with the city until the question of the real investment in the properties was determined. He said that the legislation suggested by the companies authorizing the extension of the loop platforms would be merely a temporary expedient.

Mr. Hoyne declared that if at any time it appeared that the prosecution of the suits was a hindrance rather than an aid to a settlement which would give the public more comfortable, convenient and rapid transportation, or if for any other reason the suits were ill-advised, they could be dismissed or discontinued. He thought that there was nothing in his action that should alarm legitimate investors or the holders of stocks or bonds issued legitimately under the laws of the State, but that apparently the elevated railways were over-capitalized.

Gilbert E. Porter, attorney for the Chicago Elevated Railways, said that if the courts should decide that the roads at some time in their history violated the provisions of their charters by issuing stock for which they exacted no return and their charters should for that reason be declared void, it would make no difference either to the companies or to the public. Such a ruling, he said, would mean merely that the franchises and other properties of the companies would be turned over to a new corporation organized for the purpose. Mr. Porter said that the negotiations with the local transportation committee of the City Council had never had any reference to the amount of capitalization of the elevated lines and that the suit brought by State's Attorney Hoyne would have no effect on the negotiations for new routes on the elevated lines and the use of a new subway to be built by the city and leased by the companies.

Mr. Byllesby on Results of Minnesota Rate Decision

In a recent interview with a representative of the ELECTRIC RAILWAY JOURNAL H. M. Byllesby of H. M. Byllesby & Company, Chicago, Ill., said in referring to the decision of the Supreme Court in the Minnesota rate case that he believed it was better that there should be few rather than many commissions with jurisdiction over the same properties. According to him, it is better to have questions of regulation decided by one responsible body, particularly if it is not political in character, than by several bodies. All recognize that the policy of regulation is here to stay. All that companies ask is that regulative policies be wise and framed and carried out in the interests of all concerned. One difficulty that will probably result from the decision will be a lack of harmonious action between different state commissions so that eventually federal action will be necessary. In some respects the states will be unhampered but in other matters the federal government should have control. Ultimately the situation will lead to a development of new conditions in which employees of properties will share in the profits, and this evolution will be an important factor in the settlement of problems which now exist.

Hudson & Manhattan Railroad, New York, N. Y.—The plan for the readjustment of the debt of the Hudson & Manhattan Railroad was approved at a special meeting of the stockholders of the company on June 12. The plan, as previously outlined in the ELECTRIC RAILWAY JOURNAL, provides for an issue of $65,000,000 of 5 per cent first lien and refunding mortgage bonds, payable on Feb. 1, 1957, and for the issue of $33,574,000 of 5 per cent adjustment income bonds, payable on the same date. It also provides for the delivery of mortgages and deeds on railroad property to Kuhn, Loeb & Company, New York, N. Y., Robert Fleming & Company, London, Eng., and Harvey Fisk & Sons, New York, N. Y.

Inter-State Public Service Company, Indianapolis, Ind.—The Inter-State Public Service Company, a subsidiary of the Middle West Utilities Company, in April, 1913, filed a mortgage to the Union Trust Company, Indianapolis, Ind., as trustee, to secure an issue of bonds, the present issue, if not the total authorized, amounting, it is reported, to $2,350,000. The making of this mortgage followed the purchase of the plant or control of the New Castle Light, Heat & Power Company. The Inter-State Public Service Company has a 999-year lease of the property of the Indianapolis, Columbus & Southern Traction Company.

Lackawanna & Wyoming Valley Rapid Transit Company, Scranton, Pa.—The reorganization of the Lackawanna & Wyoming Valley Rapid Transit Company will shortly be consummated under the title of Scranton & Wilkes-Barre Traction Corporation, in accordance with the plan presented as of March 15, 1913, by Guy E. Tripp, Charles A. Terry and Calvert Townley, the reorganization committee, which on May 29 bid in the holdings of the old company for $2,500,000 at the sale noted in the ELECTRIC RAILWAY JOURNAL of May 10, 1913. Under the proposed capitalization of the new company there will be an authorized issue of $5,000,000 of 5 per cent thirty-eight-year gold bonds callable at 105 and interest, under the trusteeship of the Guarantee Trust Company, of which $2,112,000 are to be issued forthwith, $888,000 reserved to retire 5 per cent collateral trust bonds held by the public, and $2,000,000 reserved for improvements and additions in connection with the subsidiaries. There will be 6 per cent preferred stock (7 per cent after June 30, 1914) in the amount of $1,250,000 and common stock in the amount of $3,000,000.

Lehigh Valley Transit Company, Allentown, Pa.—Owing to an oversight of the directors of the Lehigh Valley Transit Company in not appointing judges of election at a special stockholders' meeting of the company, which was scheduled to be held on June 12, as noted in the ELECTRIC RAILWAY JOURNAL of May 31, 1913, in Allentown for the purpose of voting on an issue of $1,000,000 ten-year 6 per cent bonds to be utilized, in part, in acquiring the Easton Consolidated Electric Company stock, it was necessary to adjourn the meeting until June 19 to give the directors an opportunity to appoint the judges.

Manila Electric Railroad & Lighting Company, Manila, P. I.—As European fiscal agents, the Municipal & General Securities Company, Ltd., has issued the eighth annual report of the Manila Electric Railroad & Lighting Company. The report states that the gross earnings for the year ended December 31, 1912, were $1,597,674, being an increase over the previous year of $144,986 or 9.98 per cent; operating expenses and taxes increased $821,648 or 12.87 per cent, while the net earnings from operation were $873,187, an increase of $62,337 or 7.68 per cent. Interest charges during the year were $277,500 and sinking fund requirements were $28,250, leaving surplus earnings for the year of $567,437. Dividends have gradually increased since 1906 from 3 per cent, and with the quarter ended March 31, 1913, the directors increased the rates from 6 per cent to 7 per cent per annum. Since the beginning of the current fiscal year, $33,000 face value of the 5 per cent fifty-year first lien and collateral trust sinking fund gold bonds have been added to the sinking fund, making a total of bonds in that fund of $183,000.

Middle West Utilities Company, Chicago, Ill.—The Middle West Utilities Company has sold to N. W. Halsey & Company, Russell, Brewster & Company, McCoy & Company and A. H. Bickmore & Company $2,000,000 of an authorized issue of $3,500,000 of three-year 6 per cent collateral notes, secured by a deposit of $8,667,000 of bonds of subsidiary companies. On April 30, 1913, the company had outstanding $7,356,200 of common stock, $8,470,100 of preferred stock, $1,600,000 of collateral loans and $563,500 deferred payments on purchase contracts.

New York (N. Y.) Municipal Railway Corporation.—The Public Service Commission of the First District of New York will hold a hearing on June 26 on the application of the New York Municipal Railway Corporation for permission to issue $400,000 of its capital stock. The company last January applied for permission to issue $1,000,000 of capital stock, and the commission at that time authorized an issue of $100,000. The company now asks for leave to issue $400,000 of the remaining $900,000 of such stock to provide working capital for the performance of the company's obligations under the dual system contracts

Oskaloosa Traction & Light Company, Oskaloosa, Ia.—New officers and directors have been elected for the Oskaloosa Traction & Light Company and the Oskaloosa & Buxton Electric Railway, which were taken over on June 1, 1913, by W. B. McKinley, president of the Illinois Traction System, and his associates. The new officers of the Oskaloosa Traction & Light Company follow: W. B. McKinley, president; H. E. Chubbuck, vice-president; H. W. Garner, secretary; George M. Mattis, treasurer and assistant secretary; H. W. Garner, George Kalbach, M. J. Cruzen, A. Rosenblatt, W. B. McKinley, George M. Mattis, E. A. MacNutt, H. E. Chubbuck and W. H. Carnahan, directors. The new officers of the Oskaloosa & Buxton Electric Railway follow: W. B. McKinley, president; H. E. Chubbuck, vice-president; H. W. Garner, secretary; George M. Mattis, treasurer and assistant secretary; H. W. Garner, Charles E. Lefland, W. R. Lacey, C. E. Sawyer, W. B. McKinley, George M. Mattis, E. A. MacNutt, W. H. Carnahan and H. E. Chubbuck, directors.

Philadelphia (Pa.) Rapid Transit Company.—Thomas S. Gates, president of the Philadelphia Trust Company, has been elected a director of the Philadelphia Rapid Transit Company to represent the city on the board. He succeeds the late James Hope.

South Shore Traction Company, Patchogue, N. Y.—Judge Chatfield in the United States District Court at Brooklyn, N. Y., on June 11, on application of Paul T. Brady, one of the stockholders, signed an order permitting the sale at auction of the assets of the South Shore Traction Company in Nassau and Suffolk Counties on June 27, in the District Court, Brooklyn. The assets consist principally of franchises in Amityville, Babylon Town, Islip Town and Sayville, a franchise to run a cross-island line from Sayville to Port Jefferson and steel, rails and cut-outs. The sale will be subject to the lien of the Babylon Railroad on its portion of the road lying between Babylon and Amityville, now operated by the receiver of the South Shore Traction Company as a separate concern.

Springfield, Clear Lake & Rochester Interurban Railway, Springfield, Ill.—Judge James A. Creighton of the Sangamon County Circuit Court has ordered the sale of the Springfield, Clear Lake & Rochester Interurban Railway within fifty-six days from June 9.

Springfield (Ohio) Railway.—The stockholders of the Springfield Railway on June 11 authorized an issue of $500,000 of preferred stock, of which $340,000 will now be issued, and a new $2,500,000 mortgage. The bonds, it is said, will be applied as follows: Reserved to retire first mortgage 6's due Jan. 1, 1933, $500,000; to pay floating debt, $700,000; to provide for improvements and additions, new carhouse, rolling stock, etc., $500,000; reserved for future requirements, $800,000.

United Properties Company, Oakland, Cal.—The trustees in charge of the affairs of F. M. Smith, the United Properties Company and other corporations which Mr. Smith controlled have made a revised estimate of his liabilities. The first estimate of the trustees placed the liabilities at $14,500,000, but it has now been found that the Pacific Borax Company is liable for $3,000,000 debentures and bonds issued by the Tonopah & Tidewater Railway, which, with the $3,000,000 it is said Mr. Smith owes the United Properties Company, brings the total liabilities up above the twenty-million-dollar mark. The trustees place Mr. Smith's resources, if properly conserved, at at least $20,000,000, not counting the prospective value of the lands held by the realty syndicate of which Mr. Smith owns all the stock.

United Railways, St. Louis, Mo.—The United Railways has announced that the following bonds will be paid at maturity on July 1, 1913: $1,000,000 of 6 per cent bonds of the Compton Heights Union Depot & Merchants' Terminal Railroad; $500,000 of 6 per cent bonds of the Taylor Avenue Railway, and $250,000 of 5 per cent bonds of the St. Louis Railroad.

Dividends Declared

American Cities Company, New York, N. Y., 3 per cent, preferred.

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1¾ per cent, preferred.

Boston & Worcester Electric Companies, Boston, Mass., $1, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Frankfort & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, preferred; 5 per cent, common.

Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., 2½ per cent, non-cumulative preferred; quarterly, 1 per cent, common.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly 1 per cent, preferred; quarterly, 1½ per cent, common.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; quarterly, three-quarters of 1 per cent, second preferred.

Union Traction Company, Philadelphia, Pa., $1.50.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 1½ per cent, preferred.

West End Street Railway, Boston, Mass, $2, preferred.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AURORA, ELGIN & CHICAGO RAILROAD, CHICAGO, ILL.					
1m., April, '13	$146,266	$95,923	$50,344	$32,735	$17,609
1 " " '12	141,975	86,432	55,543	32,005	23,538
10 " " '13	1,602,216	956,167	646,049	322,061	323,988
12 " " '12	1,504,799	887,858	616,942	317,070	299,872
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.					
1m., April, '13	$29,683	$16,501	$13,182	$10,607	$2,575
1 " " '12	27,838	17,619	10,221	9,809	412
4 " " '13	110,307	64,306	46,000	41,727	4,273
4 " " '12	100,245	66,676	33,569	39,525	†5,956
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO					
1m., April, '13	$94,941	$57,567	$37,374	$31,237	$6,137
1 " " '12	91,091	54,288	36,803	30,498	6,305
4 " " '13	304,163	231,043	123,889	124,213	326
4 " " '12	290,646	213,099	121,828	120,965	863
DETROIT (MICH.) UNITED RAILWAY					
1m., April, '13	$1,066,696	$687,013	$376,663	$179,882	$196,771
1 " " '12	931,829	590,045	341,777	177,052	164,725
4 " " '13	4,035,876	2,671,773	1,364,103	717,295	646,808
4 " " '12	3,449,918	2,226,441	223,477	714,217	509,260
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Mar., '13	$77,164	$43,009	$35,155	$4,181	$30,974
1 " " '12	63,055	33,523	29,532	7,019	22,513
12 " " '13	832,230	448,740	383,490	58,750	324,740
12 " " '12	712,372	405,751	306,622	82,412	224,210
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.					
1m., April, '13	$188,822	$107,001	$81,122	....	....
1 " " '12	169,127	100,549	68,578	....	....
4 " " '13	816,547	458,177	358,370	....	....
4 " " '12	710,912	404,128	306,784	....	....
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.					
1m., April, '13	$60,668	$30,148	$30,520	$19,177	$7,343
1 " " '12	55,938	33,277	22,661	17,102	5,558
10 " " '13	635,085	335,910	299,175	186,916	112,259
12 " " '12	589,421	350,832	238,589	173,655	64,933
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO.					
1m., April, '13	$100,219	$70,320	$29,898	$35,063	†$5,164
1 " " '12	97,806	59,889	37,918	34,854	3,064
4 " " '13	382,561	258,018	124,543	139,892	†15,348
4 " " '12	359,197	230,684	128,513	139,047	†10,536
NORTH CAROLINA PUBLIC SERVICE COMPANY, GREENSBORO, N. C.					
1m., Mar., '13	$415,722	$270,233	$145,489	$75,179	$71,310
1 " " '12	360,307	236,113	124,194	69,509	54,685
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1m., Mar., '13	$238,546	$154,621	$83,926	$45,214	$38,712
1 " " '12	221,784	128,168	93,616	43,821	49,795
4 " " '13	925,727	582,406	343,321	180,296	163,026
4 " " '12	845,271	495,537	349,733	175,287	174,446
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., Mar., '13	$67,003	$45,232	$21,772	$22,606	†$636
1 " " '12	58,964	42,965	15,999	15,993	6
12 " " '13	770,495	565,431	205,064	204,689	375
12 " " '12	712,263	525,021	187,243	186,098	1,145
TAMPA (FLA.) ELECTRIC COMPANY					
1m., Mar., '13	$65,678	$34,361	$31,318	$4,897	$26,421
1 " " '12	62,057	33,363	28,693	4,361	24,333
12 " " '13	767,559	400,169	367,389	54,621	312,768
12 " " '12	706,428	384,422	322,007	58,705	263,301
UNITED LIGHT & RAILWAYS COMPANY, GRAND RAPIDS, MICH.					
1m., April, '13	$462,870	$284,192	$178,678	$122,799	$65,899
1 " " '12	396,106	246,953	149,153	92,446	56,707
10 " " '13	4,743,665	2,750,297	1,993,368	982,220	1,011,148
10 " " '12	4,220,042	2,509,637	1,710,405	924,780	785,625
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.					
1m., April, '13	$406,086	$198,207	$207,879	$126,557	$81,122
1 " " '12	380,095	193,172	186,923	118,964	67,959
10 " " '13	4,099,747	2,012,128	2,087,619	1,243,990	843,629
10 " " '12	3,847,530	2,008,884	1,848,686	1,183,018	655,668

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*Includes taxes. †Deficit.

Traffic and Transportation

President Josselyn on Oregon Fare Case

In commenting on the decision of the United States Supreme Court confirming the right of the Oregon Railroad Commission to order the Portland Railway, Light & Power Company to reduce its fare between Portland and Milwaukie to 5 cents, B. S. Josselyn, president of the company, said:

"We contended in the Milwaukie rate case that we were entitled to a reasonable compensation owing to the fact that we run high-speed interurban trains from Milwaukie, a service which costs a great deal more money than ordinary electric railway service. The issue involved in the case was one of discriminatory rates. It was held that we charged 5 cents to carry a passenger to Lents and that therefore we should charge no more in carrying a passenger to Milwaukie. The service to Lents is very different from the service to Milwaukie. For that reason we believed that the court would take our viewpoint of the question. Insomuch as it did not we have decided to put the new rate into effect at once, and we have prepared a tariff which becomes effective June 11. It will take sixty days for the mandate of the court to reach us and we have decided to waive all formality and to give the patrons immediate benefit of the decision. Under the law of the State we are compelled to charge not to exceed 5 cents for the transportation of a passenger in one continuous direction within the city limits. Milwaukie and Lents are both outside the city limits, and for whatever distance they are beyond the city limits we shall receive no compensation for the service, and it is in this respect that we have felt that the rights were with our side."

Residents of Milwaukie, claiming that the 10-cent fare was discriminatory, that it retarded the growth of the community and that it was unjust, appealed to the State Railroad Commission of Oregon for relief in 1907. After hearings on the complaint the commission ordered a 5-cent fare. The Portland Railway, Light & Power Company secured a temporary injunction to prevent the commission from enforcing the new rate. In the summer of 1908 argument was heard in the Circuit Court and the modified order of the commission was affirmed. The case went to the Supreme Court of Oregon on appeal and this court adopted the finding of the Circuit Court and entered a decree. The case was then carried to the United States Supreme Court.

Since the appeal of the case from the order of the railroad commission about 300,000 rebate checks have been issued to the patrons on the line. The amount necessary to redeem these rebate checks is estimated at $15,000.

The decision was referred to briefly in the ELECTRIC RAILWAY JOURNAL of June 14, 1913, page 1091.

New Publication for Detroit Patrons

The Detroit (Mich.) United Railway issued under date of June 13, 1913, the first number of *Electric Railway Service*. The paper is 3½ in. wide by 8 in. high and the first number contained eight pages. Under the caption "The Reason for This Little Publication," the company said in part:

"*Electric Railway Service* is issued by the publicity department of the Detroit United Lines and will be followed weekly by succeeding numbers, and when occasion demands, there will be 'extra' editions. The distribution will be free through the medium of the little boxes you find in the cars. Copies may also be found in the interurban waiting rooms. The Detroit United Lines are composed of 800 miles of track of which less than one-quarter lie within the limits of Detroit. The major portion makes possible the magnificent interurban service of the company as well as the city service in the several cities along the system. The town man is a frequent patron of the interurban line and the country man is, likewise, a frequent patron of the city line. We desire that each become thoroughly familiar with all the lines and with the people and places served, for becoming more familiar all will learn of the social and business conveniences of the lines as the means of transportation. Advertising is the great necessity in the production of new business, and this publication is to be one of the several means used by the publicity department in telling the patrons of the purposes of the Detroit United Lines."

Electric & Cable Car Postal Service

According to a report submitted by the Second Assistant Postmaster General to Postmaster General Hitchcock for the year ended June 30, 1912, the appropriation for electric and cable car service for the fiscal year was $725,500. The sum estimated as necessary for the fiscal year ending June 30, 1914, is $847,400, being $119,400, or 16.40 per cent more than the appropriation for the previous year (3.763 per cent for normal increase and 12.637 per cent for increase due to parcels post).

The annual rate of expenditure for electric and cable car service authorized at the various rates provided by law was on June 30, 1912, as follows:

At 3 cents a mile	$207,496
At 4 cents a mile	27,492
Under special provision	6,898
At railroad rates	45,199
At schedule rates other than 3 and 4 cents a mile	38,652
At apartment and independent car regular rates	45,344
At apartment and independent car maximum rates	311,129
At special agreement rates less than regular rates	4,345
	$686,555

The appropriation act for the fiscal year of 1913 continued the provision in connection with the item for electric and cable cars authorizing the expenditure of not exceeding $100,000 of the appropriation for regulation screen or motor wagon service, which may be substituted in lieu of electric and cable car service. This could not otherwise be done on account of the fact that the appropriation for regulation screen-wagon service is generally no more than sufficient to care for existing contract obligations and increases in service which are foreseen.

For the year ended June 30, 1912, the number of electric and cable car routes was 557; the length of the routes 74,729 miles; the annual travel 12,239,638 miles; the annual rate of expenditure $686,555; the average rate of cost per mile of length $91.87; the average rate of cost per mile traveled 5.61 cents, and the average number of trips per week 15.75. A comparison with the previous year shows an increase in the number of routes of 10 or 1.828 per cent; an increase in the length of the routes of 125.46 miles or 1.707 per cent; an increase in the annual travel of 104,370 miles or 0.86 per cent; an increase in the annual rate of expenditure of $5,482 or 0.805 per cent; a decrease in the average cost per mile of length of $0.82 or 0.885 per cent; no change in the average rate of cost per mile traveled, and a decrease in the average number of trips per week of $0.13 or 0.819 per cent.

Calling the Streets

The Portland *Carman*, which is issued in the interests of the employees of the Portland Railway, Light & Power Company, Portland, Ore., published in its May number a very interesting article, "Calling the Streets," contributed by Edward Nedweig, a chorister. Mr. Nedweig says in part:

"If I were instructing conductors in calling out streets and in shouting instructions to passengers, about the first thing I should insist on would be to have every man practise saying the alphabet in a full voice, each letter to be pronounced distinctly before the next would be said. To do that would demonstrate to the pupil that it is not noise that counts as much as distinctness. How often do we sit in a car and hear the conductor utter something that sounds about as follows: 'W-a-a-abash av-vv-e-new a-n-d Penstreet, transferto northans outh bound cars.' The call is totally wasted and the passenger is perturbed by being forced to ask someone near by what the conductor said. It is learning to speak every word and every sentence clearly and distinctly, every syllable accented as it should be, before the next one is uttered, that develops elocutionists.

"Emphasis is not gained by drawling or allowing the voice to dwell on a tone, at least in speaking. The proper way to utter the syllable clearly and distinctly and gain the desired emphasis is by pausing between the words. This does not mean that the syllables of a word or the words of a sentence are to be chopped off with a click. It means that the syllables are to be said in an even tone, the accented one a little stronger than the others. In this way we obtain the desired effect and do not utter a lot of noise that nobody understands.

"My advice to any man who is endeavoring to learn the rudiments of correct speaking is to go to some place where a good speaker is to be heard. Listen to the way he utters his sentences and take particular pains to see that every syllable of each word and every word of a sentence is clear, regardless of the speed of his delivery or the softness with which he utters parts of his address. It is never necessary to drawl the voice to gain the effect and the good speakers never do. The tones are always full when a good speaker uses them, regardless of the volume he is lending to his voice. The softest word of a lullaby is understood in the remote corner of the theater, when sung by the finished singer, and the high note of the amateur is indistinguishable wherever heard.

"It is the same in using the voice any place. It matters little whether it is on the platform of the car or in the assembly halls, the elements of clear speaking are the same. The man who will give a little attention to the following rules will have no trouble in making his passengers understand every word of his calls:

"Never attempt to speak until you are sure of what you are going to say.

"Never say it any louder than necessary to make your voice carry to the farthest point from you which you wish to reach.

"Never drawl. Never hold the voice in the throat. Never shout.

"If any trainman will practise talking with the above rules in mind, I will assure him of success in calling the streets."

Service Order in Madison.—The Southern Wisconsin Railway, Madison, Wis., has been ordered by the Railroad Commission of Wisconsin to continue its owl service until 1 a. m. Heretofore the company has discontinued service at 12:20 a. m.

Through Service Between Albany and Cohoes.—The United Traction Company, Albany, N. Y., has re-established through service between Albany and Cohoes. The operation of through cars between the cities was suspended at the time of the recent floods.

Increase in Wages on Indiana Roads.—The Union Traction Company of Indiana, Indianapolis, Ind., has voluntarily increased the wages of its motormen and conductors. The new scale provides for 21 cents to 30 cents an hour, according to length of service. The old rate was 20 cents to 28 cents an hour. About 700 trainmen are affected by the new schedule.

Accident on California Road.—A two-car train of the San Francisco, Napa & Calistoga Railway, Napa, Cal., from Vallejo, running at high speed collided head on with an electric car from Papa on a curve a mile north of Vallejo on June 19. The accident was caused by a mistake in orders. Ten are reported killed and twenty-five injured. The passengers were mostly San Franciscans going to summer resorts. The Southern Pacific Company took the survivors to Vallejo on a relief train.

Attractive Traffic Folder.—The Northern Electric Railway, Chico, Cal., has issued a very attractive folder of six pages and cover in regard to the opening of its Marysville and Colusa branch. The folder is printed in brown and green on cream paper and contains considerable information in regard to the road and the territory through which it operates. In the center of the folder there is a map which covers the territory between Chico and Sacramento. The cover is of brown paper embossed in gold with the name of the company and its insignia.

Petition for Fare Inquiry in New Jersey.—The committee on internal trade affairs of the Board of Trade of Newark, N. J., has petitioned the Board of Public Utility Commissioners of New Jersey to conduct an inquiry to determine the reasonableness of the fares charged by the Hudson & Manhattan Railroad between Park Place, Newark, and Summit Avenue, Jersey City. It is declared that the rates charged by the railroad, which operates into New York under the Hudson River, are discriminatory and that they tend to divert trade to New York to the detriment of Newark.

Hearing in Regard to Standing on Train Platforms.—The Public Service Commission of the First District of New York has ordered that a hearing be held on June 24 to determine whether the practice of permitting passengers to stand on the rear platforms of the end cars of trains operated by the Interborough Rapid Transit Company, the New York Consolidated Railroad, the Nassau Electric Railway and the South Brooklyn Railway should be changed. Complaints have been made to the commission that the practice of riding on the rear platforms on the rear cars of trains on the elevated lines is on the increase, and that it has lately become a nuisance.

Motion Pictures in Safety Campaign.—A reel of motion pictures illustrating the classes of accidents common to the operation of street railways has been taken for the Chicago (Ill.) Railways and will be used by that company in a public safety campaign. The films were shown by the Chicago & Joliet Electric Railway at the efficiency show in Joliet, Ill., on June 10. A report shows that in the safety first campaign conducted jointly by the Illinois Steel Company and the Chicago & Joliet Electric Railway nearly 8000 public and parochial school children viewed the film "Dangers of the Streets" at the lecture room of the Steel company.

Meeting of New Albany Booster Club.—The Employees' Booster Club of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, with offices in New Albany, Ind., has held its final meeting before adjourning for the summer. Monthly meetings are held by the employees, and the year just closed has recorded some extremely valuable developments growing out of the meetings. The final session before the vacation was addressed by Chester P. Wilson, president of the companies and those associated with them in New Albany, Ind., where the Middle West Utilities Company controls the public service plants. Mr. Wilson emphasized the value of co-operation and stated that the booster meetings showed a fine spirit of this kind on the part of those who are connected with the properties controlled by the companies.

Opinion of Indiana Commission in Regard to Transportation of Policemen and Detectives.—The Public Service Commission of Indiana has notified the city attorney of Indianapolis that in the opinion of the commission it would not be a violation of the law for the street railways by the order of the proper authorities to carry free, while on duty, policemen and detectives in plain clothes who wear their badges for the purpose of identification and show their authority as prescribed by those over the police department. The commission, however, says that any determination it might reach would in no way modify the terms of the law and that a prosecution for the violation of the law might be had even though the commission should place a positive construction upon the law. The opinion is not a decision or an order and is subject to revision or change upon the proper hearing, and it is taken to mean nothing more than that the commission, in its present understanding of the matter, would not set on foot any prosecutions against street railways for violation of the law under the conditions previously mentioned. Before the Public Service Commission law became effective on May 1, 1913, policemen and firemen were permitted to ride free on cars when wearing their uniforms and badges, and plain clothes men were allowed to ride free on pass books issued by the company. The new public utilities act provided that only peace officers in full uniform and wearing their badges should be permitted to ride free upon the cars of any company, and on May 1, 1913, the privileges extended to firemen and plain clothes men were withdrawn. Under the opinion of the Public Service Commission passes will again be issued to plain clothes men until such time as a definite ruling may be given on the matter.

Personal Mention

Mr. C. A. Coons has resigned as superintendent of the Buffalo city division of the International Railway, Buffalo, N. Y.

Mr. Ralph Ward, manager of the Lowell (Mass.) Opera House, has been appointed publicity agent for the parks controlled by the Bay State Street Railway, Boston, Mass.

Mr. A. Benham, who has been assistant general manager of the Ohio Electric Railway, with offices in Springfield, Ohio, has been appointed general manager of the company to succeed Mr. B. J. Jones, resigned.

Mr. C. F. Handshy, who has been general superintendent of interurban lines of the Illinois Traction System, Peoria, Ill., has been appointed assistant general manager of the company in charge of the interurban lines, reporting to Mr. H. E. Chubbuck, vice-president executive.

Mr. John Reed has been appointed assistant superintendent of the Rapid Railway, Detroit United Lines, to succeed Mr. A. H. Cady, who has become assistant superintendent of the Detroit, Jackson & Chicago Railway, Detroit United Lines. Mr. Reed was formerly day carhouse foreman of the Flint city lines.

Mr. A. H. Cady has been appointed assistant superintendent of the Detroit, Jackson & Chicago Railway, Detroit United Lines, to succeed E. C. Allen, resigned. Mr. Cady was formerly assistant superintendent of the Rapid Railway, Detroit United Lines, with headquarters at Port Huron. He will reside in Ann Arbor.

Mr. H. E. Chubbuck, vice-president executive of the Illinois Traction System, Peoria, Ill., has been elected vice-president of the Oskaloosa Traction & Light Company and the Oskaloosa & Buxton Electric Railway, Oskaloosa, Ia., which have been taken over by Mr. W. B. McKinley, president of the Illinois Traction System, and those associated with him.

Mr. A. R. Myers, who has been assistant general manager and electrical engineer of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has been appointed general manager of the company to succeed Mr. J. S. Pevear, who continues with the company as vice-president. The election of Mr. Pevear as vice-president of the International Railway is referred to elsewhere in this column.

Mr. Edward C. Shankland has been elected chairman of the harbor and subway commission of Chicago, Ill., in place of John Ericson, city engineer, who had held the chairmanship since the organization of the commission. This is in pursuance of an agreed policy of rotating the chairmanship. Mr. Ericson expected to leave for Europe on June 21 to study harbor and subway projects in foreign cities.

Mr. J. S. Pevear, who has been vice-president and general manager of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has been elected vice-president of the International Railway, Buffalo, N. Y. Mr. Pevear became connected with the Buffalo & Lake Erie Traction Company in 1911 as general superintendent. He had previously been connected with the Twin City Rapid Transit Company, Minneapolis, Minn., and the General Electric Company. Mr. Pevear will continue as vice-president of the Buffalo & Lake Erie Traction Company.

Mr. N. H. Brown has been appointed superintendent of the Buffalo city lines of the International Railway, Buffalo, N. Y., to succeed Mr. C. A. Coons, resigned. Before he became connected with the International Railway in February, 1913, as assistant superintendent of the Buffalo city lines, Mr. Brown was superintendent of the Albany Southern Railway, Rensselaer, N. Y. Mr. Brown entered railway work with the Syracuse (N. Y.) Rapid Transit Railway in March, 1894, and was also connected with the Worcester (Mass.) Consolidated Street Railway.

Mr. B. J. Jones has resigned as general manager of the Ohio Electric Railway, Cincinnati, Ohio. He has been general manager of the company for the last four years and previous to that was general manager of the electrical department of the Union Gas & Electric Company, Cincinnati, Ohio, for four years. Mr. Jones has had a wide experience in the installation and operation of large electric railway and electric lighting systems, and supervised the installation of some of the early electric railways during the period from 1889 to 1894. He was general superintendent of the South Chicago City Railway from 1894 to 1897. From 1897 to 1905 he was with Sargent & Lundy, Chicago, engineers, and was supervising engineer during the changing of the motive power of the South Side Elevated Railway, Chicago, from steam to electricity. This was the first road on which the Sprague multiple-unit system of control was installed. Mr. Jones has also taken out a number of patents for improvements in electric railway apparatus. He has not yet decided his plans for the future.

Mr. Delos F. Wilcox has resigned as chief of the bureau of franchises of the Public Service Commission of the First District of New York, effective July 1, 1913, to engage in private practice as a consulting franchise and public utility expert, with offices in New York. Mr. Wilcox was graduated from the University of Michigan with an A. B. degree and later took his A. M. at Michigan and his Ph.D. at Columbia. In 1897 he was secretary of the Cleveland Municipal Association; in 1902, secretary of the Grand Rapids Civic Club and in 1905 secretary of the Detroit Municipal League. While in Grand Rapids and Detroit he edited and published a paper on civic affairs, called *Civic News*. In 1907 he became connected with the Public Service Commission of the First District of New York. His doctor's dissertation was written on "Municipal Government in Michigan and Ohio" in 1896; his other works are "The Study of City Government," 1897; "The American City," 1904; "Great Cities in America," 1910; "Municipal Franchises," 1910-11, and "Government by All the People," 1912. Mr. Wilcox has traveled widely over the States in connection with conferences on civic problems. He was one of the first to advocate the plan of decapitalization of public utilities by amortizing capital out of earnings so as to prevent increases in capital value such as characterize the Chicago and other franchise settlements. At present Mr. Wilcox is chairman of the committee on franchises of the National Municipal League.

Mr. P. D. Sexton has resigned his position with the elevated railway companies of Chicago to become treasurer of the banking and bond house of McCoy & Company, Chicago. Mr. Sexton was secretary of the Metropolitan West Side Elevated Railway, the Northwestern Elevated Railroad and the South Side Elevated Railroad. He was also assistant secretary of the Chicago Elevated Railways, the holding association which controls the operating companies. In addition to the duties of these offices Mr. Sexton has also been engaged in important work of investigation and inquiry for the companies, and in this connection has visited many cities of this country. He also made a trip to Europe on business for the companies. Mr. Sexton entered railroad work in 1890 in the office of the comptroller of the Kansas City, Fort Scott & Memphis Railroad at Kansas City, Mo. He remained there two years. In 1892 he went to Chicago, where he became transfer clerk in the office of the Metropolitan West Side Elevated Railway. Later he was made cashier and in 1901 he was elected assistant secretary and assistant treasurer. He held these offices for four years, when he became secretary and treasurer of the company. When the Chicago Elevated Railways was formed in 1911 to acquire control of the various elevated properties, Mr. Sexton resigned as treasurer of the Metropolitan company to devote his time to the new duties in the organization from which he has just resigned. The banking house of McCoy & Company is largely interested in public utilities and Mr. Sexton will continue to devote part of his time to properties of that character.

OBITUARY

Howard A. Mock, who was long connected with the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., as a department superintendent, is dead.

James W. Courtenay, managing director of the *Tramway and Railway World*, London, Eng., is dead. Mr. Courtenay was born at Newcastle in 1857, and at the age of twenty-three began business in the same city as a tramway advertising contractor. In 1892 he with others established the *Tramway and Railway World* and in the following year he acquired a controlling interest in the paper and became its managing director. In 1899 he transferred his headquarters to London. His business was extended in various directions. In India and South Africa the advertising house of James W. Courtenay became well known.

Amos F. Gerald, Fairfield, Me., a pioneer in the development of electric railways in that State, died in Portland on June 15. Mr. Gerald was interested in twelve of Maine's earliest electric railways, including the Portsmouth, Kittery & York Street Railway, now a part of the Atlantic Shore Railway, Skowhegan & Norridgewock Railway, Fairfield & Waterville Railway, Somerset Traction Company, Lewiston, Brunswick & Bath Street Railway, Brunswick, Freeport & Yarmouth Railway, Bangor, Orono & Old Town Railway and the Fairfield & Shawmut Railway. He was president and general manager of the last-mentioned line at the time of his death.

New Secretary of the Association

The executive committee of the American Electric Railway Association has selected a secretary to succeed Mr. H. C. Donecker, who, as previously mentioned in this paper, has resigned from the association to become assistant general manager of the Public Service Railway of New Jersey.

Copyr't by Harris & Ewing

E. B. Burritt

The new appointee is Mr. E. B. Burritt, who is now representative of the association at Washington, D. C., and also secretary to the president of the Washington Railway & Electric Company, with which he has been connected since 1907, first as secretary to the vice-president and since then in his present office. Mr. Burritt will not enter fully into the duties of the office of secretary of the association until after the next convention and the work of that office will be conducted in the meantime by Mr. Donecker.

Mr. Burritt is thirty-six years old and was educated in the public schools of Washington, D. C. Upon graduation in 1893 he began a six years' service in the general offices of the Southern Railway, Washington. In December, 1899, he enlisted in the army as a member of Troop A of the United States Cavalry and served for eleven months in the Philippines. After seven months of active service he was invalided back to Manila and honorably discharged for disability in November, 1900. After a month spent in an army hospital he took a position with the subsistence department in Manila and within a year was placed in a position of responsibility and trust with the commissary branch of the army transport service. In the discharge of these duties he visited all of the important ports in the islands and spent some time in China. Later he was recalled to assume charge of the manifest department of the Manila depot, probably the most important assignment in the establishment. Deciding to return to this country, he secured a transfer to the subsistence department at Washington Barracks, District of Columbia, but resigned from this department in January, 1907, to enter the employ of the Washington Railway & Electric Company, with which he has since been connected.

As the accredited representative in Washington, D. C., of the American Electric Railway Association during the past year, Mr. Burritt has been brought into contact with association work and has impressed the many association members who have met him as a man of pleasing personality, executive ability and energy, who will bring to bear on the work of his office a marked degree of intelligence and a familiarity with the wide phases of public utility policies that can come only to one who has been in a position where he received an insight into company affairs from the viewpoint of the executive.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Muskegon-Ludington & Manistee Electric Railway, Muskegon, Mich.—Application for a charter has been made by this company to build an electric railway from Muskegon to Ludington and from Ludington to Manistee. Headquarters, Muskegon, Mich., and Chicago, Ill. Capital stock, $1,500,000. Incorporators: Thomas Jacobs, Walter Hieston, Henry R. Baldwin and Sidney M. Well, Chicago, and Charles P. Williams, Washington.

***Scranton & Wilkes-Barre Traction Company, Scranton, Pa.**—This company will succeed the Lackawanna & Wyoming Valley Rapid Transit Company, the proposed reorganization of which is referred to in the Financial and Corporate department, page 1122, of this issue. Officers: Thomas B. Gray, president; E. B. Flippen, treasurer, and H. H. Chalkley, secretary.

FRANCHISES

Birmingham, Ala.—The Birmingham Railway, Light & Power Company has asked for a franchise for an extension of the East Lake line from the present terminus in Birmingham to Eighty-seventh Street, from which point the line will be extended ultimately to Roebuck Springs.

Birmingham, Ala.—The Kelley Street Railway has received a franchise in Birmingham. George C. Kelley is interested. [E. R. J., Aug. 10, '12.]

Little Rock, Ark.—The City Council has practically paved the way for an agreement between the city and the Little Rock, Pine Bluff & Eastern Traction Company, by which the latter company will be able to obtain a franchise to use the free bridge and construct an interurban line between Little Rock and Pine Bluff.

***North Vancouver, B. C.**—The Lynn Valley Scenic Railway has petitioned the City Council for a franchise to build an electric line through the Lynn Valley into the park of that name. J. P. Crawford is interested.

Fresno, Cal.—The Fresno Traction Company has asked the Supervisors for a fifty-year franchise over the Fresno County road.

Los Angeles, Cal.—The Los Angeles Railway has asked for a franchise on Hill Street from Temple Street to California Street in Los Angeles.

Los Angeles, Cal.—The Pacific Electric Railway has received permission from the Railroad Commission of California to construct a double-track line along San Pedro Street at grade across intersecting streets and tracks between Aliso Street and Ninth Street in Los Angeles.

Wood River, Ill.—The Alton, Granite & St. Louis Traction Company has asked for a franchise on the county road east of Upper Alton. This company plans to extend its line from Alton to Bethalto, passing the site of the new State Hospital east of Alton.

New Orleans, La.—The New Orleans Railway & Light Company will bid for the franchises of the proposed new Broadway and Claiborne lines and for the extension of the Clio line in New Orleans.

Rochester, N. Y.—The New York State Railways has asked the Common Council for a franchise to double-track and extend its lines over certain streets in Rochester.

Rochester, N. Y.—The Rochester & Suburban Railway has asked the Common Council for a franchise to extend and double-track some of its lines in Rochester.

Cincinnati, Ohio.—The Cincinnati, Newport & Covington Railway has asked the Council for a new twenty-five-year franchise in Cincinnati.

Dunnville, Ont.—The Dunnville, Wellandport & Beamsville Electric Railway has received a franchise from the Council in Dunnville.

York, Ont.—The Forest Hill Electric Railway has asked the Council for a franchise in York. [E. R. J., March 15, '13.]

Richmond, Va.—The Council committee on streets has recommended that the Virginia Railway & Power Company be granted permission to extend its Broad Street line to Roseneath Road in Richmond.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has asked the City Council for permission to change the route of the Fauntleroy Park Street line, asking that it be allowed to abandon service on the line between the steel works at Youngstown and Thirty-sixth Avenue, S. W. The company also asks permission to lay tracks on Avalon Way, Sixth Avenue, West, and West Snoqualmie Street, beginning at Youngstown and connecting with the present line at Thirty-sixth Avenue, S. W.

TRACK AND ROADWAY

Dauphin Island Railway & Harbor Company, Mobile, Ala.—Plans are being contemplated by this company for the development of Dauphin Island as a port and terminal. This company is under the management of the Tidewater Securities Corporation, of which J. M. Dewberry, Birmingham, is president. [E. R. J., May 20, '11.]

Calgary (Alta.) Municipal Railway.—This company is now building about 17 miles of new track in Calgary.

Vancouver Island Hydroelectric & Tramway Company, Victoria, B. C.—Arrangements have been completed by this company for building an electric railway at Ladysmith, Vancouver Island. The town has granted a franchise and the company proposes to build extensions to Chemainus, Duncans, Nanoose and Nanaimo. Montague Yates, Victoria, is interested. [E. R. J., April 12, '13.]

Northern Electric Railway, Chico, Cal.—This company has completed its line between Yuba City and Colusa, via Meridian. Plans are being made to build a 50-mile road from the Yuba City-Colusa line at Meridian, on the Sacramento River, and extending south through Fair Ranch to Woodland, forming a loop and giving direct connection for all points on the west side with Sacramento and San Francisco over the Vallejo & Northern Railway.

Fresno (Cal.) Traction Company.—Contracts have been signed by this company and the Bullard Land Company whereby the Fresno Traction Company agrees to extend the Roeding Park line through the Bullard lands to the San Joaquin River, 10 miles.

Geary Street Municipal Railway, San Francisco, Cal.—Work has been begun by this company on the extension down Market Street to the ferry building in San Francisco, the State Supreme Court having affirmed the compromise between the city and the United Railroads.

Southern Pacific Company, San Francisco, Cal.—This company plans to extend its electric lines into Contra Costa County and has completed the survey and purchased the right-of-way for a line extending from one of the Berkeley branches through the foothills into San Ramon Valley, where it will connect with the steam line extending from Avon through Walnut Creek to Livermore.

Big Four Electric Railway, Tulare, Cal.—Right-of-way has been secured by this company and grading has been completed as far as Tulare. This line will connect Porterville, Lindsay, Tulare and Visalia. [E. R. J., April 19, '13.]

Visalia (Cal.) Electric Railroad.—This company plans to build about 1 mile of new track to the Redbanks Orchard Company's packing house in Exeter during June.

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—Work has been begun by this company in Ancient City on surveys over its right-of-way. This is part of a plan to build a 55-mile railway between Jacksonville and St. Augustine and a 16-mile branch from Jacksonville to Diego and Pablo Beach. Thomas R. Osmond, general manager. [E. R. J., March 8, '13.]

***Benton, Ill.**—Plans are being considered to build a 30-mile electric railway from Benton to Christopher, then south to Herrin and Johnson City. Among those interested are George C. Ferguson and F. S. Tainter, New York, and D. F. Darnell, Decatur.

Danville, Crescent City & Kankakee Traction Company, Crescent City, Ill.—This company has voted to increase the capital stock from $10,000 to $250,000. This line will connect Kankakee and Danville. E. E. Meyer, Crescent City, president. [E. R. J., June 14, '13.]

Freeport Railway & Light Company, Freeport, Ill.—Work has been begun by this company on the extension to Krape's Park.

***Springfield, Ill.**—The Capital City Park & Amusement Company, which operates the Zoo Park, announces that a separate company will be organized to build an electric railway through the park.

Clinton (Ia.) Street Railway.—This company is building about 1¼ miles of new track in Clinton from the "Frisco" depot to the Orient depot.

Topeka (Kan.) Railway.—This company has been asked to consider plans for an extension to Gage Park in Topeka.

***Lancaster, Ky.**—Plans are being made to build an electric railway from Lancaster to Richmond, via Marcellus, Bryantsville and other contiguous points. The promotors of the railway are said to have secured all of the necessary right-of-way and expect to obtain power from the proposed hydroelectric power plant of the Dix River Power Company.

Paducah (Ky.) Traction Company.—During the next two months this company will award contracts to rebuild 1¼ miles of suburban track, using 60-lb. rails laid on standard oak ties with gravel ballast.

Nahant & Lynn Street Railway, Lynn, Mass.—This company is double-tracking its line on Flash Road.

Muskegon-Casnovia Land & Development Company, Muskegon, Mich.—This company, which was organized to promote the building of an interurban railway between Muskegon and Saginaw, is considering plans for the purpose of selecting a tentative route for this line. [E. R. J., April 19, '13.]

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company has purchased 60,000 lb. of copper wire and will make other improvements to its lines.

Jefferson City Bridge & Transit Company, Jefferson City, Mo.—Work has been begun by this company on the extension in the West End in Jefferson City.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—This company has awarded the contract for the construction of its line to the A. J. Jennings Construction Company, Joplin. C. H. Dameron, Huntsville, president. [E. R. J., Feb. 22, '13.]

Springfield (Mo.) Traction Company.—Work has been begun by this company double-tracking its Talmage Street line in Springfield.

Great Falls (Mont.) Street Railway.—This company is constructing 4000 ft. of new track, with 6-in. T-rails in paving, to form a loop in the business section of Grand Falls.

Fallon (Nev.) Electric Railroad.—About 4 miles of grading has been completed by this company on its line between Fallon, Stillwater and Harrigan South. Storage battery cars will be used. Power will be obtained from the power company in Fallon. Capital stock authorized, $500,000; issued, $18,000. Officers: C. A. Hascall, president; A. R. Merritt, vice-president; A. E. Wilson, secretary; J. S. Harmon, treasurer, and H. Latten, chief engineer, all of Fallon. [E. R. J., April 26, '13.]

***Asbury Park, N. J.**—It is reported that plans are being considered to build an electric railway from Asbury Park to Freehold. Charles Leland, Asbury Park, is interested.

***Albuquerque, N. M.**—The Commercial Club is advocating the construction of an electric railway to connect Albuquerque, Bernalillo, Jemez Springs, Silla, Santa Anna, Alameda, Pajarito, Padillas, Isleta, Los Linas and Belen. The use of the McKeon motor cars has been suggested. E. J. Hall, Albuquerque, is interested.

Falconer, N. Y.—Surveys are being made to build a 55-mile electric railway between Falconer and Buffalo, via Ellington, Clear Creek, Leon, South Dayton, Wesley, Persia, Gowanda and thence extending parallel with the Buffalo & Southwestern Railroad to Hamburg. This line will connect with the Jamestown Street Railway at Falconer and with the Buffalo & Lake Erie Traction Company at Hamburg. The terminals will be at Falconer and at Hamburg. C. D. Meade is interested. [E. R. J., Nov. 23, '12.]

New York & Queens County Railway, Long Island City, N. Y.—Work has been begun by this company double-tracking its line across the causeway at College Point. The company received permission from the Public Service Commission, First District, to proceed with the work.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—Plans are being considered by this company to build an extension to the Fifth Ward in Amsterdam.

New York, Westchester & Boston Railway, New York, N. Y.—This company is now building about 1.2 miles of double track between New Rochelle and Larchmont.

Chardon, Jefferson & Meadville Railway, Cleveland, Ohio.—This company has awarded the contract for the preliminary surveys for its line between Chardon, Jefferson, Meadville and Cleveland to the Pease Engineering Company, Cleveland. It is stated that this company will use storage battery cars.

Middletown, Reading & Cincinnati Interurban Railway, Middletown, Ohio.—Financial arrangements have been completed by this company and plans are being made to begin soon the construction of its line to connect Norwood, Reading, Sharonville, West Chester, Monroe, Middletown, Germantown and Dayton. George T. Atler is interested. [E. R. J., May 31, '13.]

***Muskogee, Okla.**—Plans are being considered to build an electric railway between Muskogee and Oklahoma City, via Okmulgee, Shawnee and Tecumseh. The plan is to extend a branch a few miles east of Okmulgee to Sapulpa, thence to Tulsa, utilizing a short interurban line now in operation between these points. Among those interested are John W. Shartel, vice-president of the Oklahoma City Railway, and R. D. Long, general manager of the Muskogee Electric Traction Company.

Berlin & Waterloo Street Railway, Berlin, Ont.—This company has been authorized to double-track its line from Wellington Street to the Waterloo lines to Niagara Falls, Port Colborne and thence along the Lake Shore to Fort Erie, 45 miles. T. R. Cumming, Welland, chief engineer.

Niagara, Welland & Lake Erie Railway, Niagara Falls, Ont.—This company plans to build at once a 1-mile branch up North Main Street to Parkway Heights, Welland. This will involve the construction of a pile trestle over the Welland River. It is also proposed to build a branch along East Main Street to Rosedale and an extension from the Michigan Central Railway on South Main Street to the Dain Manufacturing Company's plant at Dainville. These lines will involve the crossing of the Grand Trunk Railway in the one case and the Michigan Central Railway in the other. An interlocking plant will be installed at the Grand Trunk Railway, but it has not yet been decided whether the Michigan Central Railway will be crossed at grade or by a subway. The company has power to extend its boundary line. The by-law provides for an expenditure of $30,000.

Ottawa & St. Lawrence Electric Railway, Ottawa, Ont.—The Ontario government has authorized this company to increase its capital stock to $5,000,000 and to issue bonds for $30,000 a mile. The government has extended the time for construction and allowed the company to acquire the North Lanark Railway shares, etc. A meeting of the shareholders was held at Ottawa on June 3 to approve of an agreement with the Ottawa & St. Lawrence Construction Company for constructing the line. It is also proposed to change the main office from Ottawa to Toronto. F. Iveson, Toronto, secretary. [E. R. J., Feb. 22, '13.]

Dunnville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.—This company has nearly completed the grading on its line between Dunnville and St. Anns. Bridges have been built and ties have been laid for some distance. The line will connect at St. Anns with the Toronto, Hamilton & Buffalo Railway, and it is expected to have this section in operation by the fall. J. A. Ross, Wellandport, president. [E. R. J., Sept. 7, '12.]

Erroll Heights Railway, Portland, Ore.—This company, which is a subsidiary company of the Portland Railway, Light & Power Company, has completed its line from East Thirty-second Street and Knapp Street eastward 1½ miles to the old Milwaukee Road.

Portland, Eugene & Eastern Railway, Portland, Ore.—Work will soon be begun by this company on extensive improvements of its lines. Among the improvements will be a steel truss bridge over Mill Creek at the North Commercial Street crossing, and numerous curves will be eliminated on North Commercial Street. Grading for the line between Monroe and Eugene has been completed and the trestle in Long Tom Bottom is being erected. There will be twenty-six trestles on the 22-mile line. The work will be done under the supervision of J. W. Hall, assistant engineer. The company also plans to build an electric line from Albany to Independence.

East Berlin, Pa.—The citizens of East Berlin have voted stock subscriptions amounting to over $20,000 for the construction of an electric railway in East Berlin. This is part of a plan to build an electric line between East Berlin and York, via Weiglestown and Taxville. Surveys will soon be made. [E. R. J., Feb. 22, '13.]

West Penn Traction & Water Power Company, Pittsburgh, Pa.—Surveys are being made by this company in Avonmore for the extension of its Avonmore, Salina & Apollo Street line.

Quebec (Que.) Rapid Transit Company.—The Canadian House of Commons has authorized this company to construct electric lines from Quebec in an easterly direction through Limoilou and Beauport, thence northerly through Charlesbourg, Rivière Jaune, Lake St. Charles and Indian Loretto, also taking in Ste. Foy, Cap Rouge and Montcalmville. Another line will run from St. Grégoire to Ste. Anne de Beaupré, crossing thence the St. Lawrence to the island of Orléans and circling the island. The company is also empowered to construct a bridge from the north shore to the island. The capital stock is $1,000,000. [E. R. J., Jan. 11, '13.]

Chattanooga Railway & Light Company, Chattanooga, Tenn.—Grading has been completed and rails are being laid by this company on its extension to Walden's Ridge.

Nashville Railway & Light Company, Nashville, Tenn.—This company has been asked to extend its line 1½ miles from Eastland Avenue, Nashville, to Rock City.

Guadalupe Valley Railroad, Seguin, Tex.—This company, the Central Texas Traction Company and the Guadalupe Water Power Company announce that they are considering construction, and that all inquiries should be forwarded to Seguin, Tex.

***Charlottesville, Va.**—Surveys are being made for the construction of an electric railway from Charlottesville to Alberene, 12 miles. It is planned to connect this line with the branch of the Chesapeake & Ohio Railway from Warren to Alberene. The cars will be run by storage batteries.

***Anacortes & Eastern Railway, Anacortes, Wash.**—This company plans to build a 50-mile railway from Anacortes across Whidby Island, crossing Deception Pass and through Oak Harbor, Coupeville and Langeley. Right-of-way is being obtained. J. I. Buchanan and J. L. Wirtz are interested.

Willapa Harbor Railway, Olympia, Wash.—Plans are being made to begin surveys for a line from Raymond to Menlo at once.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—Plans are being considered by this company to build a line from Puyallup to Sumner, thence to Bluff, where it will join the main line to Seattle.

Grafton (W. Va.) Traction Company.—It is reported that surveys are being made by this company to build a connecting line on St. Mary's Street in Grafton.

***Lancaster, Wis.**—Thomas McDonald, Lancaster, and associates are considering plans to build a 65-mile electric railway from Lancaster to Stockton.

SHOPS AND BUILDINGS

Calgary (Alta.) Municipal Railway.—This company plans to build a new yard room and improve its shops and buildings in Calgary.

Sandpoint & Interurban Railway, Sandpoint, Idaho.—It is announced that this company plans to build a one-story brick building on Second Street and Main Street in Sandpoint for terminal office purposes.

Louisville (Ky.) Railway.—This company is adding to its carhouse equipment at Eighteenth and Walnut Streets in Louisville, having recently purchased a 26-ft. Aurora drill. Other machine tools will be purchased for installation at the new carhouses at Twenty-ninth Street and Garland Street.

Paducah (Ky.) Traction Company.—During the next two months this company will award contracts to rebuild its present carhouse, retaining a small portion of the old structure, but erecting an entirely new machine shop and storage shed.

St. John (N. B.) Railway.—This company plans to build an additional carhouse on Wentworth Street and to install four additional sidings in St. John.

Middle Tennessee Traction Company, Franklin, Tenn.—This company plans to build soon its new repair shops in Franklin. P. E. Cox, Franklin, general manager.

Southern Traction Company, Dallas, Tex.—Plans are being considered by this company to build a new carhouse on North Fourth Street in Waco.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company will add to its substation equipment four 1000-kw two-bearing motor-generator sets, which will be built and installed by the General Electric Company.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 750-kw synchronous motor-generator set consisting of one 11,000-volt, three-phase, 60-cycle motor and one 11,000-volt D.C. generator.

Peninsula Railway, San José, Cal.—During the next few weeks this company expects to purchase one 300-kw generator for its Los Altos substation and one 300-kw generator for its Alum Rock substation.

Rome Railway, Light & Power Company, Rome, Ga.—This company, which has been operated for some time with current from the hydroelectric power station of the Tennessee Power Company on Ocoee River, now has additional service of this character, having arranged for current from the plant of the Georgia Power Company, which was recently opened.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company has awarded the contract for building an addition to its Spy Run power house in Fort Wayne to the Adams Construction Company, Chicago. The structure will be 140 ft. x 34 ft.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 300-kw, 600-volt D.C., three-phase, 60-cycle, 1200-r.p.m. self-starting rotary converter and one 200-kw, 600-volt D.C., three-phase, 60-cycle, 1200-r.p.m. self-starting rotary converter, three 110-kva, 33,000-volt, single-phase, 60-cycle O.I.S.C. transformers and three 75-kva, 33,000-volt, single-phase, 60-cycle O.I.S.C. transformers and two two-panel switchboards, also one outdoor-type transformer substation consisting of a steel tower on which will be mounted three 37½-kva, 33,000-volt, 220-to-110-volt, 60-cycle O. I. S. C. transformers.

Detroit (Mich.) United Railway.—This company has placed an order with the General Electric Company for a new 7500-kw. Curtis turbo-alternator with a 100-kw motor-driven exciter and three 40-kw transformers.

Lake Shore Electric Railway, Cleveland, Ohio.—This company's power house and waiting rooms at Berlin Heights were destroyed by fire on June 16. The loss is estimated to be about $25,000.

Mansfield Railway, Light & Power Company, Mansfield, Ohio.—This company has placed a contract for two 500-kw rotary converters for its power house in Mansfield.

Portland Railway, Light & Power Company, Portland, Ore.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 500-kw synchronous motor-generator set consisting of one three-phase, 60-cycle, 720 r.p.m. motor and 600-volt D.C. generator with direct-connected exciter and starting apparatus.

Manufactures and Supplies

ROLLING STOCK

Regina (Sask.) Municipal Railway expects to build several cars in its own shops.

York (Pa.) Railways is building one car in its own shops and is reported as expecting to purchase four more.

Peninsular Railway, San José, Cal., is in the market for eight interurban cars and one combination freight-and-express car.

Edmonton (Alta.) Radial Railway has ordered twenty-five single-truck semi-convertible cars from the Preston Car & Coach Company.

Sioux City, Crystal Lake & Homer Electric Railway, Sioux City, Ia., is in the market for one single-truck motor car and one trail car.

Johnstown (Pa.) Passenger Railway has ordered five 28-ft. pay-as-you-enter motor cars mounted on 27-GE-1 trucks from the G. C. Kuhlman Car Company.

Toledo Railways & Light Company, Toledo, Ohio, has ordered thirty double-end motor cars from the McGuire-Cummings Manufacturing Company.

A. C. Torbert, First National Bank Building, Chicago, Ill., is in the market for one 70-ton locomotive for Eastern delivery, two 20-ton or 25-ton locomotives for delivery in Ohio and two 35-ton locomotives for Western delivery. These locomotives may have either alternating-current or direct-current motors.

Springfield (Mass.) Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of March 29, 1913, as having ordered six 30-ft. 3½-in. closed cars from the Wason Manufacturing Company, has specified the following details for these cars:

Seating capacity	44
Weight (car body only),	19,000 lb.
Length of body	30 ft. 2¼ in.
Length over vestibule,	39 ft. 8½ in.
Width over sills	8 ft. 2¾ in.
Width over all	8 ft. 6 in.
Height, rail to sills,	2 ft. 8¼ in.
Sill to trolley base	8 ft. 9¼ in.
Body	wood
Interior trim	mahogany
Headlining	agasote
Roof	monitor
Underframe	composite
Car trimmings,	oxidized bronze
Curtain material	Pantasote
Curtain fixtures,	Keeler Eccentric
Destination signs	Hunter
Fenders	Pfingst
Gongs	Brill Dedenda
Hand brakes	Peacock
Heaters	Consolidated
Headlights	Neal
Motors	4 G.E. 80
Paint	Sher.-Wil.
Sanders	Murphy
Sash fixtures	Standard
Seats	H. & K.
Seating material	rattan
Step	Stanwood
Trucks	Standard
Varnish	Murphy
Ventilators	Perry
Wheels	34-in. forged steel

Ohio Valley Electric Railway, Huntington, W. Va., has specified the following details for the ten prepayment closed cars which it recently ordered from the St. Louis Car Company:

Seating capacity	52
Bolster centers, length,	26 ft. 7 in.
Length of body	50 ft. 7 in.
Length over vestibule,	49 ft. 7 in.
Width over sills	8 ft. 4½ in.
Width over all	8 ft. 8 in.
Height, rail to sills	35⅜ in.
Sill to trolley base	8 ft. 11 in.
Body	composite
Interior trim,	polished bronze
Headlining	agasote
Roof	turtle-back
Underframe	steel
Bumpers,	Hedley anti-climber
Car trimmings	St. L.
Couplers	Tomlinson
Curtain fixtures	Cur. S. Co.
Curtain material	Pantasote
Destination signs	St. L.
Gongs	St. L.
Hand brakes	St. L.
Heaters	Smith
Headlights	Crouse-Hinds
Journal boxes	Symington
Motorman's stool,	E. S. Sup. Co.
Registers,	Rec. Reg. F. Box Co.
Sanders	Ohio Brass
Sash fixtures	Edwards
Seats	St. L.
Seating material	rattan
Step treads	Universal
Trolley catchers	Keystone
Trucks	St. L.
Wheelguards	H-B
Wheels	34-in. rolled steel

TRADE NOTES

Tilsonburg Electric Car Company, Ltd., Tilsonburg, Ont., has been organized to manufacture cars, snow sweepers, etc.

Grip Nut Company, Chicago, Ill., has moved its general offices from the Old Colony Building to 661 McCormick Building.

The J. G. Brill Company, Philadelphia, Pa., has received an order from the Wilkes-Barre (Pa.) Railway for two 27-M. C. B. special trucks.

Star Brass Manufacturing Company, Boston, Mass., has opened an office in Chicago, Ill., at No. 6 East Lake St. Arthur F. Mundy, Western representative, has been appointed manager of this office.

Baker Motor Vehicle Company, Cleveland, Ohio, recently received an order from the Northern Ohio Traction & Light Company, Akron, Ohio, for one tower wagon and a 1-ton and a 2-ton line truck, equipped with "Ironclad" batteries.

Canadian General Electric Company, Ltd., Toronto, Ont., has placed John S. MacLean, of Montreal, Que., in charge of its publicity and advertising. Mr. MacLean will also have charge of a similar line of work for the Canadian Allis-Chalmers Company, Ltd.

Buckeye Steel Castings Company, Columbus, Ohio, has appointed J. G. Bower manager of its New York (N. Y.) office, which it will soon open. Mr. Bower was formerly sales manager of the Hale & Kilburn Company, Chicago, Ill., which position he resigned a few weeks ago.

Curtain Supply Company, Chicago, Ill., has received recent curtain orders from the following railways: Meridian Light & Railway Company, Meridian, Miss.; Lookout Mountain Railway, Chattanooga, Tenn.; Toronto (Ont.) Suburban Street Railway: Calgary (Alta.) Street Railway and the Jefferson County Traction Company, Beaumont, Tex.

Pyrene Manufacturing Company, New York, N. Y., has received recent orders for its fire extinguishers from the Claremont Power Company, Cavendish, Vt.; the Great Shoshone & Twin Falls Water Power Company, Twin Falls, Idaho, and an additional order for 100 extinguishers from the New York Central Railroad.

Atlas Preservative Company of America, New York, N. Y., has received an order from the New York State Railways, Rochester, N. Y., for its "Atlas-A" weed killer, to be applied to 29 miles of track. The chemical is being shipped in a regular tank car, while a sprinkling car is also being sent by the company, from which to apply the liquid.

Lord Manufacturing Company, Brooklyn, N. Y., has received an order for its lightning arrester equipment from the Queensboro & Manhattan Street Railway. The multi-vapo-gap arresters and the drive hydroground are called for in the specifications. The Cedar Falls, Waterloo & Northern Railway has also ordered the multi-vapo-gap arrester for its 1913 extensions.

Electric Service Supplies Company, Philadelphia, Pa., has placed on the market a trolley car adapter known as the type RB. This adapter has been very popular in mining work for use in supporting grooved trolley wires after the groove has been badly worn or the wire twisted, owing to the fact that the wire is used a number of times and its location frequently changed. These adapters are used in connection with standard three-screw, 5-in. clamp ears and are also used by railway companies for emergency work. They are made for grooved trolley wire of all sizes and for any standard screw clamp ear.

Theodore Hardee has been appointed chief of the liberal arts department of the Panama-Pacific Exposition, to be held in San Francisco, Cal., in 1915. Mr. Hardee has had wide experience in exposition practice. He was assistant to Walter B. Stevens, who was the general secretary and also director of exploitation for the St. Louis World's Fair of 1904. Prior to the opening Mr. Hardee spent considerable time abroad, circling the globe as special commissioner with John Barrett, the commissioner-general for foreign countries. While in St. Louis he also acted as St. Louis representative for the Lewis and Clark Exposition, at Portland Ore. Mr. Hardee first became associated with this exposition in a voluntary capacity during 1910.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has maturing between June 23 and Sept. 27, this year, a total of $7,500,000 of 6 per cent collateral notes. Although final plans are not ready, part of these will probably be permanently retired through the sale of collateral and the balance refunded. The company has written down its foreign investments to a point where not more than $1,500,000 remains to be charged off. A very interesting fact has been the steady decrease in the item of royalties due to the dissolution of the patent pool with the General Electric Company. These royalties in 1911 were $628,177. By March 31, 1913, two years later, they had dwindled to the insignificant total of $53,768, a decrease of nearly $600,000, equal to more than 1½ per cent on the common stock.

Monarch Brake Company, Cumberland, Ohio, has recently made an improvement in the engaging principle of the "Monarch" worm-geared hand brake. The cam used in place of the grip-eccentric levers, which carries out the same automatic principle and makes a positive lock at any point, follows up all lost motion caused by wear or strain and holds the worm and gear wheel in perfect mesh when the heaviest pull is on. The torsion spring on the cam automatically re-engages the worm and gear wheel by forcing the cam against a roller concealed in the stem of the movable worm bearing. To release the brake for starting the car, or for operating from opposite end, the handle of the cam is pressed down, which disengages the gear by pulling against two small lugs on the end of the stem back of the rim on the cam. To hold the gear disengaged the pin is placed through the hole in the cam, which is held in position by a set-screw, giving it 1-in. travel.

Union Switch & Signal Company, Swissvale, Pa., has received the contract from the Butte, Anaconda & Pacific Railway, Butte, Mont., recently electrified at 2400 volts, for the installation of alternating-current block signals to be installed on 7 miles of single track on its smelter line, at the Anaconda Mines, Mont. The double-rail return scheme of track-circuit arrangement is being supplied, and the entire signaling system, including signals, switch indicators and track circuits, will operate and be controlled by alternating current. This will be distributed throughout the territory at 2080 volts, single-phase, 60 cycles, transmitted over two No. 8 bare copper wires carried on the pole line. The installation includes a total of sixteen one-arm style "B" signals, which are being arranged to clear at 60 deg. in the upper quadrant, left-hand indication. These signals are of the same design as those which have been installed on the Illinois Traction Company's line during the past two years.

ADVERTISING LITERATURE

Electric Service Supplies Company, Philadelphia, Pa., has printed a catalog on its "Protected" rail bonds and appliances.

Monarch Brake Company, Cumberland, Md., has issued a small booklet illustrating and describing its worm-geared hand brake.

Guy Morrison Walker, New York, N. Y., has published an article on "Reorganization as a Branch of Trust Company Business."

De Laval Steam Turbine Company, Trenton, N. J., has issued Catalog C, which illustrates and describes its velocity-stage type steam turbine.

Ohio Brass Company, Mansfield, Ohio, has issued a folder illustrating and describing its type D trolley frog, which is made either of all bronze or with a malleable iron pan and bronze tips.

Joseph Dixon Crucible Company, Jersey City, N. J., has issued *Graphite* for June, 1913. Among the feature articles are the following: "Graphite in the Boiler" and "Phoenix Bridge of the Beebe Trolley System."

Sprague Electric Works, New York, N. Y., have issued Bulletin No. 521, which illustrates and describes their steel armored hose and also contains several views of this hose installed on different types of cars.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 127, illustrating and completely describing its pneumatic drills, reamers, wood borers, flue rolling and tapping machines and grinders.

Steel Car Forge Company, Pittsburgh, Pa., has issued a folder describing its combination brace tie plates. The folder also contains a large track view taken on one of the lines of the Public Service Railway, Newark, N. J., which shows these braces installed.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder describing its improved rapid transit equipment, operating the Ohmer fare register. The folder also contrains illustrations of this equipment installed in cars of the People's Railway Company, Dayton, Ohio.

Kelsey, Brewer & Company, Grand Rapids, Mich., have published in pamphlet form an article by Joseph H. Brewer, vice-president and general manager of the American Public Utilities Company, on "Public Utility Companies, Their Construction, Financing and Management."

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued a folder describing its I. B. C. motorman's mirror for both open and closed cars, with views of how it is applied and the vision it gives the motorman of the full length of the car without his having to change his position.

Locomobile Company of America, Bridgeport, Conn., has issued a folder entitled "A Universal Catalog of Five-Ton Trucks." The folder, in addition to illustrating and describing its own truck and power-operated demountable dumping body, contains a table giving the specifications of all the leading makes of trucks.

Standard Underground Cable Company, Pittsburgh, Pa., has printed Bulletin No. 700-1 on outdoor cable terminals. The bulletin contains twenty-eight pages of descriptive matter, illustrations and tables of dimensions, voltages, weights, etc., together with instructions for ordering and installing these outdoor cable terminals.

Brown Hoisting Machinery Company, Cleveland, Ohio, has issued a very attractive catalog containing a general description of the Brownhoist locomotive cranes, portal-pier cranes, traction cranes and work-car cranes, showing by numerous illustrations how the cranes are used by contractors, manufacturers, railways, shippers, etc.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has printed a book entitled "Resuscitation," by Dr. Charles A. Lauffer, medical director of the company. The book includes a reprint of a paper on this subject delivered by the author before the Philadelphia Section of the National Electric Light Association. The author, after explaining a number of successful results which have been obtained from employing resuscitation methods on men who were supposedly dead, gives a clear description of the mechanism of respiration, illustrating this by a number of anatomical views. The prone pressure or Schaefer method of resuscitation, which has been adopted by the National Electric Light Association and a number of other technical societies, is described in detail. This book brings out in a concise manner the necessity of general acquaintance with principles of resuscitation and clearly shows how these can be learned so as to prove valuable to persons in the ordinary walks of life.

NEW PUBLICATION.

The Solution of Railroad Problems by the Slide Rule. By E. R. Perry. Cloth, 136 pages. New York: D. Van Nostrand Company. Price, $1 net.

This work was developed for the purpose of enabling engineers to solve problems in railroad curves with ease and rapidity by the use of the slide rule. It is intended primarily for the convenience of those who have studied railroad curves and also the theory of the slide rule. The author, however, devotes a chapter to the use and principles of the slide rule and also one to the theory of simple railroad curves. From these he develops a series of problems which are solved by typical slide-rule methods, including not only the laying out of curves but also the necessary work involved in changing actual installations in any desired manner. Chapters on the compound curve, the vertical curve, turnouts, the easement curve and on estimates of earthwork are included, and in addition a number of tables applicable to this class of engineering work are given at the end of the book.

Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JUNE 28, 1913 No. 26

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.

Chicago Office..............................1570 Old Colony Building
Philadelphia Office.........................Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

ELECTRIC WELDING ECONOMIES

The imposing scale on which electric welding is being carried out by the United Railroads of San Francisco and the Third Avenue Railway, New York, as described in the May 17 and June 21 issues respectively, is significant of something more than repair shop methods. First, it indicates a belief on the part of these companies that welding can be profitably used to repair or even reconstruct mechanically the older types of motors if their electrical efficiency is high; second, and far more important, is the tendency toward the conservation of resources which is indicated by this practice. Electric arc welding is a much later application, certainly so far as a commercial process is concerned, than transformer welding and has proved very useful for the rehabilitation of electric railway equipment of all kinds. Electric railway men may have been wastrels in the "boom" days of the industry, but designs are not now changed so rapidly as they formerly were, and present financial conditions demand a change to the spirit of economy that will patch a cloak ere buying a new one. The "before and after" views surely contain a profitable lesson for the companies now burdened with large quantities of supposed scrap.

THE LUZERNE CARHOUSE

At first sight it would seem that little practical novelty is possible in carhouse design and equipment, but a different conclusion will be reached on studying the Luzerne installation of the Philadelphia Rapid Transit Company as described at length in this issue. Even the method of construction deviates from previous practice in reinforced concrete carhouses inasmuch as the columns, posts, girders and other members were separately cast at a great saving in time as compared with monolith work. The views of the completed carhouse with its handsome brick and terra-cotta arches announce the desire of the Philadelphia management to make its structures worthy of their importance to the city's welfare. It is not customary for operating carhouses in Northern cities to be free of track doors, but the usual objections to working in an open building are answered here by the excellent drainage system and a warm-water supply for car cleaning. Since the bays are double-ended, doorless and small enough to hold no more than thirty-nine cars each, utmost flexibility of operation and freedom from heavy fire losses are assured. The novel gravity system of sand supply for outgoing cars eliminates all the obstruction and uncleanliness of the old-fashioned sand bin. The provision of a shop bay is in accordance with the present tendency to concentrate heavy repairs and manufacture at one shop while permitting each operating depot to conduct such work as truck, wheel and motor exchange. Finally, it is to be noted that in this installation the platform men and shopmen have been furnished with conveniences which are not a whit inferior to those in many executive offices.

PAPERS AT THE NEW YORK MEETING

The New York Electric Railway Association may well be felicitated on having secured so many high-grade papers for its annual meeting. Of these papers, that on "Operating Economies," by Messrs. Doyle, Gove and McWhirter, is likely to have the most immediate practical effect for its forceful presentation of methods which cannot be waved aside with the conservative's shibboleth: "Not suited to local conditions." The slotting of commutators, the welding of broken equipment, the impregnation of coils, the reboring of old motors, the use of manganese bronze for check plates, etc., are definite proposals which when carried out properly will decrease car defects and maintenance costs on any system, large or small. When, as in this case, the matter of adopting improvements is put squarely before the operator on a dollars and cents basis, his own mileage costs for like items will show him quickly enough whether or not he has anything to learn from the united experience of three of the largest railways in the country. This paper also discusses the opportunities for economies in the larger question of car design. Here, too, theory is backed by the first data on prepayment operation free from factors which have obscured results in other instances. When the Third Avenue Railway took over the operation of the Fifty-ninth Street line the entire equipment was changed in one night from the ordinary car to another type which differed chiefly in its provision for prepayment operation with fare boxes. During the month following the revenue increased 9.3 per cent, while the car mileage was cut down 3½ per cent, although no transfer privileges were changed, no holidays or special events occurred to stimulate traffic and there was practically no curiosity riding. Dovetailing with the paper on

"Operating Economies" is that by Mr. Dempsey on "Construction of Timetables and Schedules," in which the transportation man will find many practical data on traffic analysis. Mr. Barnard's study of "The Proper Location of Trolley Wire on Curves and Corresponding Location of Frogs" illustrates the unexplored areas for original work still existing in the electric traction field. Mr. Barnard's paper is the first, so far as we recall, in which the subject of the proper location of the trolley wire has been approached from an engineering standpoint. Yet all will admit that the subject is a most important one, not only because it affects the cost of maintenance, but because the transportation department is even more deeply interested in the effect on schedules and upon the comfort of passengers at night when the wheel leaves the wire. Mr. Bolen's warm-hearted discussion on the "Relations Which Should Exist Between the Railway Companies and Their Employees" necessarily is not of the same tangible nature as the papers on engineering economies, for it deals with the often indefinable human element in railway operation. But his words deserve careful consideration since the spirit of helpfulness advocated by him has been successfully inculcated in the system with which he is connected in spite of its great size and scattered territory. The other papers at the Brighton Beach meeting were also of a high order.

HIGHER ASSOCIATION EFFICIENCY

At the Brighton Beach meeting of the New York Electric Railway Association J. S. Doyle, superintendent of car equipment Interborough Rapid Transit Company, outlined a plan which if adopted should do much to make association work more effective. It is applicable in principle to any association, and if introduced by the New York organization will signalize a valuable advance in the practical application of association work to daily needs. Anyone who has attended the meetings of many associations cannot but be impressed with the interest and enthusiasm with which suggestions for improving the service, as made in the different papers, are received at the time of the convention and the quickness with which the same suggestions are forgotten after the return home of the delegates. It may be, it is true, in some isolated instances, that the idea obtained through a paper is applied by someone, but if that is the case, the author of the paper rarely hears of it. Hence a large part of the benefit which he might derive from describing his practice at the convention is lost because he never learns whether anyone using his plan has found it practicable or whether it has been improved.

Mr. Doyle's plan is for the association to devise a follow-up system which will enable it to determine how many operating economies previously made public at its meetings have really been adopted by its members. The character of data which Mr. Doyle had in mind is indicated by the paper on "Operating Economies" prepared by himself and Messrs. Gove and McWhirter, as noted elsewhere in this issue. This paper is largely a record of savings obtained by means of certain practices which are applicable to properties of almost any size. Mr. Doyle believes that such records should be continuous rather than spasmodic, that they should embrace the practice of all members, if possible, and that if they disclose a clearly evident economy, it will be available to all members of the association.

It may be, it is true, that methods suitable on one road will not be best for another, but in that case the systematic checking up of practice, as recommended by Mr. Doyle, would at least enable each manager to learn whether his department heads are applying the lessons derived at the convention, and if not, why not. Local conditions will naturally affect the direct use of many methods, but these local conditions could be classified and tabulated, and a committee of the association could then prepare a report which would interpret the figures and define their application to specified conditions. In the case of brakeshoe records, for instance, all of the member companies could be asked to give their operating conditions, such as speed, grades, territory, weight of car, types of trucks and wheels, etc., so that these factors could be taken into consideration in connection with the types of brakeshoe heads and shoes, the limiting wear of shoes and the cost in cents per 1000 ton miles. Such extended studies of single operating items would, of course, involve the expenditure of labor on the part of the committees in charge of the study and perhaps a certain amount of statistical work, which, however, would be much less arduous in the case of a territorial association than of a national body. But the subsequent saving to the members should more than repay for this labor and would greatly enhance the value of association membership.

THE ARBITRATED RESULT IN CLEVELAND

The report of the board of arbitration in the Cleveland case was rendered in less than two weeks after the completion of oral arguments, and the promptness with which the conclusions were reached is not only creditable to the board but it is effective in removing without long delay some of the causes of difference from which the arbitration arose. The company is upheld both as to its right prudently to exceed the car-mile operating expense allowance and in its application for an increase in this allowance.

On some of the points where the company did not carry its contention, a strict construction of the letter of the ordinance and a corresponding interpretation of the spirit in which it was framed were responsible for the decision of a majority of the arbitrators. Where the city lost it was in some respects willing to lose something, as for instance in the question of increase in the car-mile allowance, one of the principal respects in which the company needed relief from the burden of higher costs. The brief list of the main points in the decision which we published in our issue of last week shows the main conclusions. In our issue of this week we publish the report in full, believing that its discussion and findings, although we differ from them in some details, express a wholesome spirit of conciliation and point the way to co-operation in which the city and the company should engage in the future.

The board finds that the maintenance of an insurance reserve is not sustainable by any provision in the ordinance. The effect of its conclusion is that since the ordinance does not provide specifically for an insurance reserve, the company is not justified in keeping a reserve for that portion of its insurance which is not protected by policies.

The decision does not go beyond the statement that the ordinance fails to express itself on this point. The conclusion of the majority that no reserve other than that provided for specifically may be created and maintained beyond the expiration of an ordinance year to offset damage claims meets exactly the claim of the city on this point. Here again the board is bound by the written words of the contract, for it recognizes that safe business policy demands the creation of a reserve by a company acting under a general franchise. The majority, however, finds that there are controlling reasons why this practice is practically forbidden by the Cleveland ordinance. It also finds that the amount in the permissible annual reserve for damages remaining unexpended at the end of the year constitutes a surplus and should not be held as a reserve beyond the conclusion of the ordinance year. The decision recognizes the fact that a failure to maintain such a reserve tends to impair the capital under ordinary circumstances, but it says that in the opinion of the majority other provisions in this case provide an effective substitute for an action which would be necessary on the part of other companies. We think that the majority of the board assumes that the city will carry out in good faith any provisions which it may be called upon to enforce because of excessive or unanticipated damage claims. Hereafter the duty of living up to this assumption rests upon the city. The company sought to provide for these claims specifically by a reserve fund which could not be used or misapplied for other purposes, and its action in this respect was without fault when viewed in the light of good practice. In view of these conclusions the finding of the majority is that the sums in the insurance and accident reserves should be placed to the credit of the interest fund. As the amounts of these reserves are, respectively, $63,000 and $144,000, this change would have a material effect on the interest fund, and possibly on the rate of fare, if the other conclusions of the board were not so far-reaching.

The board criticises the present method of computation of the deductions from the interest fund, and as a reason for some of the existing differences points to the impracticability of the provisions governing this matter. It holds, however, that the company method is fairer than that of the city and that the results obtained under it more nearly approximate the condition in which the interest fund should be found. This conclusion should help to do away with the inconsistency between the city and the company methods of stating the condition of this fund.

The finding of the board on the question of whether the company has a right to exceed the allowance for operation without the consent of the city or the award of a board involves a definite question and a vital principle. The city would have had the company make its expenditures meet the allowance willy-nilly. The fact that the company did not do so for the reason that it could not reasonably do so is as plain as is the fact that the board grants a higher allowance because it thinks the company needs the money. The board decided not only that the company needed more money in the past but that it needs more in the future.

The board takes up the question propounded by the city with respect to the charge of $800,000 for the scrapping of power equipment, due to the contract for power with the Cleveland Electric Illuminating Company, and answers unanimously in the negative the query as to whether the charges shall be equally distributed over the entire period of time defined by the power contract when the scrapping has been authorized by the city. This forbids the practice urged by the city, which would have spread the retirement of this equipment over a period of ten years.

The unanimous allowance of 12.1 cents per car mile for operating expenses other than maintenance is an increase above the present allowance of 11.5 cents. The only specific reason announced by the board for this increase is the enhanced cost of labor. That is the extra cost which the company said made it necessary to increase the allowance. The change is effective March 1, 1913, and thus will correspondingly reduce the current deficit.

In declining to increase the maintenance, renewal and depreciation car-mile allowance, the majority of the board finds that the greater part of the over-expenditure of this fund occurred during the early operation under the ordinance, when the city did not have the same supervision over the outlays for renewal or replacement that it now holds. Its presumption that the present allowance is adequate because the officers of the company, having long experience, accepted it when the ordinance was framed is an argument that sounds logical; but it does not seem logical to those who have had personal contact with the successive steps in the Cleveland situation. Although the company legally acquiesced in these steps, it was practically the city that fixed the terms in all their details, just as it was the city that forced the stockholders to surrender 100 per cent of stock and to take 55 per cent in exchange therefor.

This, however, is of less importance than the action of the board regarding the over-expenditures in the operating and the maintenance fund of, respectively, $259,000 and $324,000, a total of $583,000. Although duly cautioning the company to use diligence and prudence in restricting its expenditures, the board recommends the transfer from the interest fund of enough directly to offset the over-expenditure of the operating fund, and also the transfer from time to time of such amounts as will offset the over-expenditure of the maintenance, renewal and depreciation fund without reduction of the interest fund to less than $400,000. It puts it beyond the power of the city to play with the company in this matter. However, as an alternative to action by the Council on this recommendation the board decides that both of the allowances shall be increased to such amounts respectively as will balance the over-expenditures in the funds by Feb. 28, 1914.

The action of the company in not adding overhead charges to renewal and replacement expenditures is commended, and this is a deserved recognition of the conservative policy of the company in this respect.

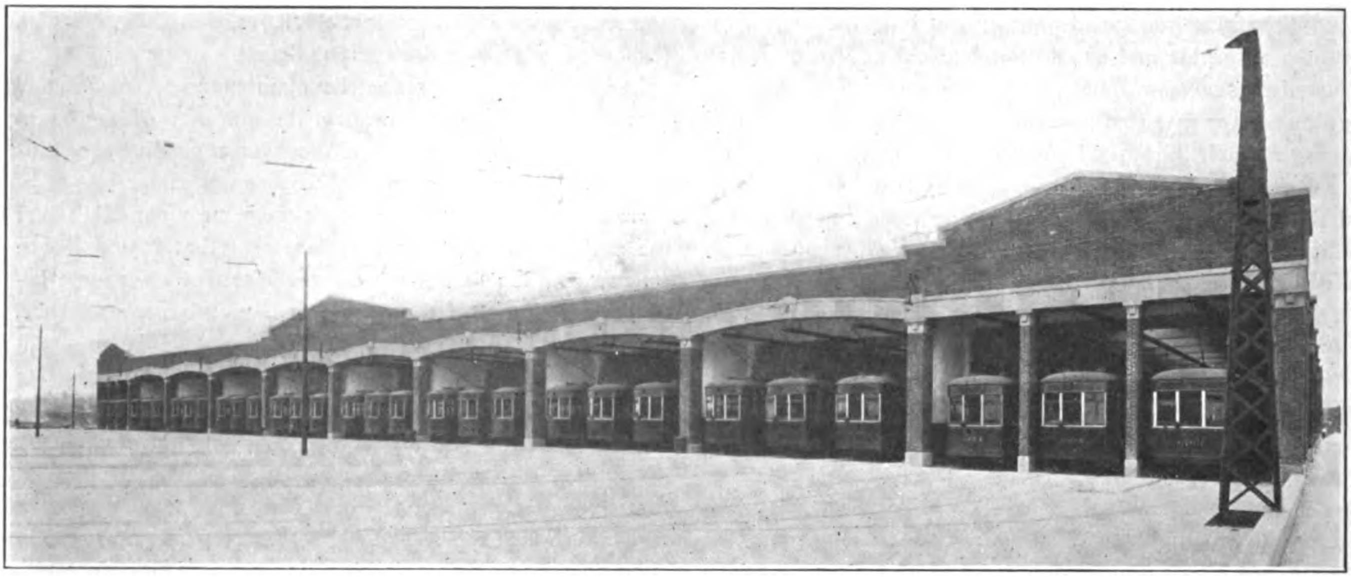
A fresh start in the relations between the city and the company is assured by the fact that the over-expenditures or deficits are to be wiped out, by the substantial increase authorized in the car-mile allowance for operating expenses and by the reiteration of the "safeguards" to "invested capital" fixed by the contract; and this should operate with the conciliatory findings of the board to make impressive the injunction of fair treatment with which the decision is concluded.

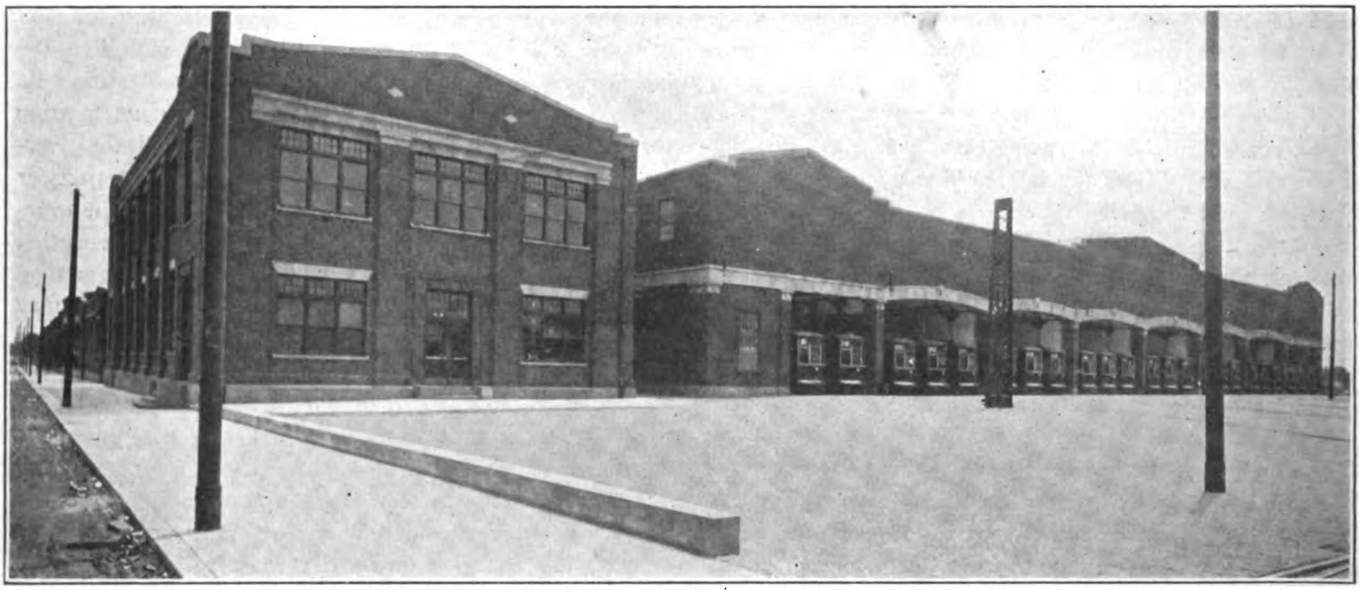
Luzerne Carhouse of the Philadelphia Rapid Transit Company

Description of a Unit-Type Reinforced Concrete Structure for 336 Cars, with Separate Buildings for Stores, Sand Handling, Heating and Transportation Purposes

Some interesting departures from usual practice in carhouse construction and operation are embodied in the reinforced concrete carhouse which the Stotesbury management of the Philadelphia Rapid Transit Company has recently placed in operation at Tenth and Luzerne Streets. The present installation not only comprises a double-end operating carhouse with light repair shop for 336 near-side 45-ft. 2-in cars but also a stock building, a building for the transportation department, a sand elevator and a boiler house. At this time the 252 cars of nine lines pass through the new carhouse, but it is likely that more lines will be cared for there in the near future. Additional room for future needs is afforded by a plot on the opposite side of Luzerne Street as shown on the general plan on page 1138. The construction cost of the fireproof group hereinafter described was $1,790 per car.

One striking feature in the design of the carhouse is that its functions are purely those of a track structure, all other utilities, such as stockrooms, sand bins, offices, etc., being placed elsewhere. Its ten bays are therefore of harmonious design and equipment with the exception of some deviations in the shop bay provided for light repairs. The building has a maximum width of 375 ft. and a maximum length of 611 ft. The shop and two adjoining bays were shortened, however, at the rear to 336 ft. in order to provide space for the utilities buildings. Not a single win-

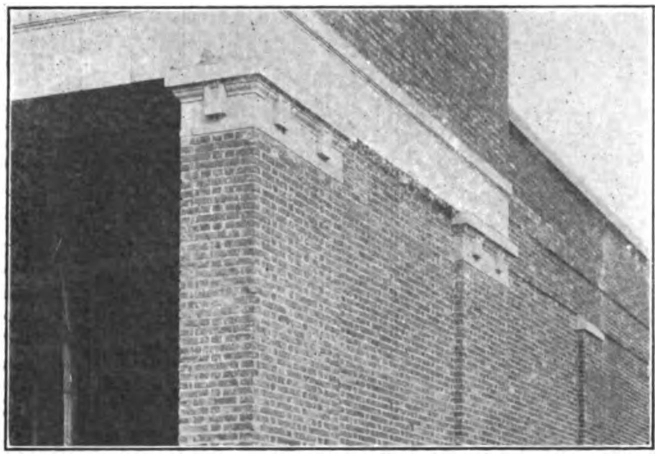

Luzerne Carhouse—Front View, Showing Shop Bay at Right, One of the Catenary Towers, Etc.

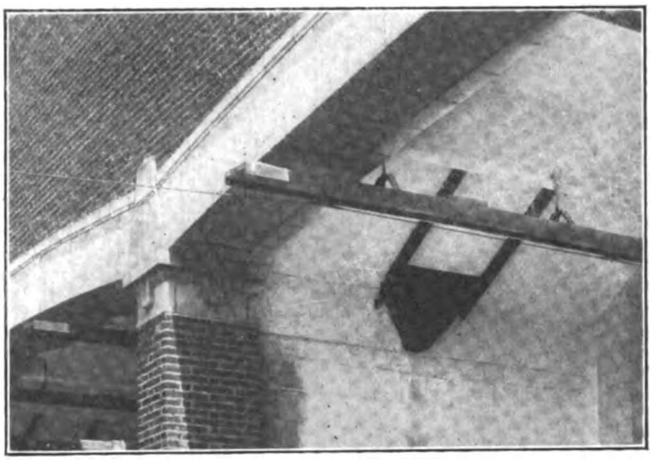

Luzerne Carhouse—Rear View, Showing Transportation Building at Left, Sand-Handling Bay Across the Rear of the Carhouse, Etc.

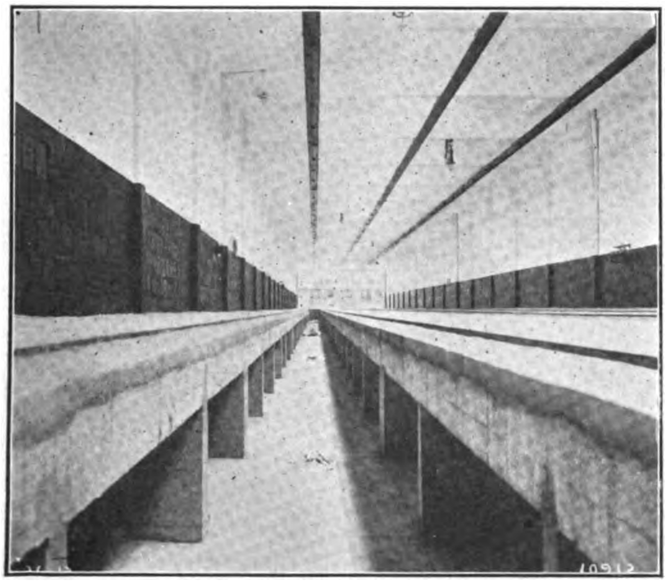
dow is built in the entire carhouse nor are any track doors used except for the repair bay. Fully 60 per cent of the inspection tracks, starting at the front of the building, are furnished with open pits and the tracks in the repair shop have pits throughout.

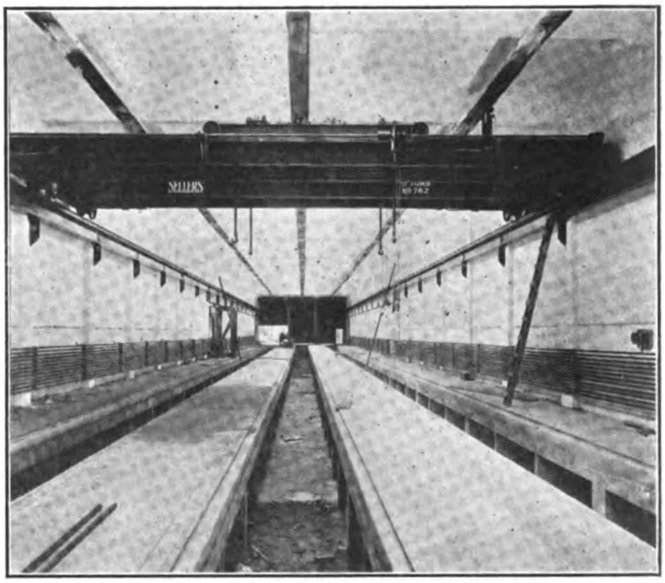
GENERAL APPEARANCE

While reinforced concrete is employed for the girders, posts, roof slabs and floors, the exterior appearance of the carhouse has been made very pleasing by using for the walls a hard red brick laid in modified Flemish bond with darker headers and stretchers and ¾-in. struck joints and turned extensively with buff terra cotta. This makes an attractive combination which harmonizes remarkably well with the style of architecture typical of Philadelphia dwellings. All bays except the one along each wall are slightly arched and are free of columns. Rectangular columns were required for the first or shop bay on account of the doors, and, for the sake of balance in design, like columns were installed for the tenth bay. The usual tangle of overhead wires and poles in front of many carhouses has been greatly simplified in this instance by the erection at each end of the building of two steel towers which carry a transverse catenary for the suspension of the overhead wires. Despite the great length of the span, only two intermediate poles have been required at the front and but one pole at the rear. The special work at the entrance consists of two ladders from the main line for thirty tracks, each ladder feeding five bays. Untidiness on the ground has been minimized by paving all track entrances and exits with hard-burned brick. Arc lamps which are suspended from brackets over the track entrances maintain the attractiveness of the building at night, insure greater safety in operation and keep prowlers off as well.


Luzerne Carhouse—Detail, Showing Blend of Brick Wall and Terra Cotta


Luzerne Carhouse—Detail, Showing Part of Arches and Column; Also Top of Sand Outlet


Luzerne Carhouse—Pit Construction

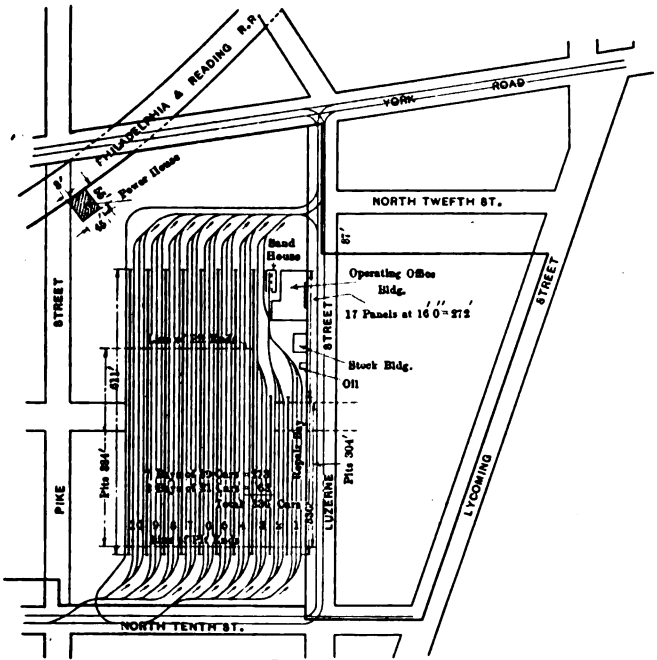


Luzerne Carhouse—Repair Bay

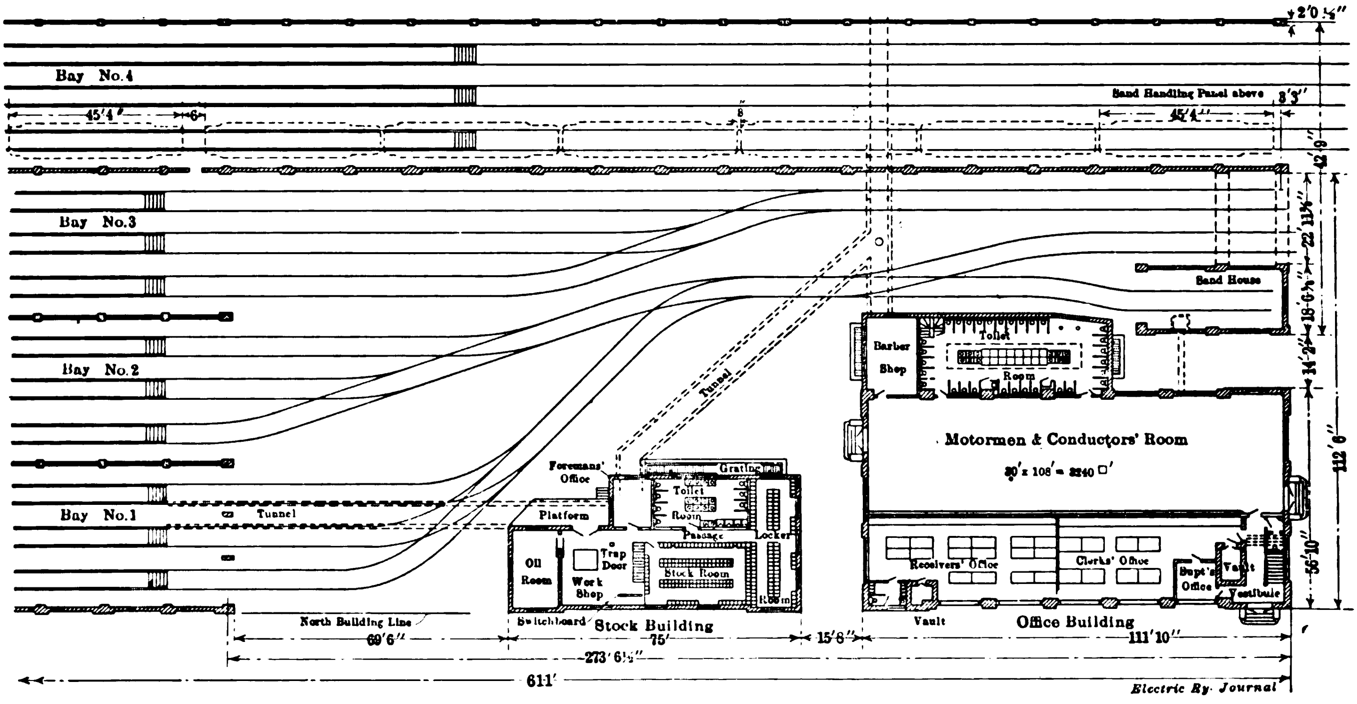
METHOD OF CONSTRUCTION

The carhouse was built in record time through the use of the "Unit-Bilt" reinforced concrete system of the Unit Construction Company, St. Louis, Mo. The superior speed of this form of concrete construction is due to the fact that the members can be cast on the ground long before the excavations and footings are finished. As the quantities handled are comparatively small, the concrete may also be poured under ideal circumstances and the individual girders, columns and floor slabs allowed to season for weeks before they become part of the building. Thus the possibility of failure due to the premature removal of forms is avoided. The Philadelphia Rapid Transit Company estimated that the construction would require one year, but the carhouse actually was completed within seven months after excavation had begun late in July, 1912.

In the unit system the connections between the members are made by leaving sufficient steel exposed at the joints, which are filled with a rich cement grout after the placing of the unit. It is contended that this method insures complete development of the steel and concrete for tension and shear stresses, and that it gives a more satisfactory structure than a monolith, because all joints come at predetermined points and not where the field conditions allow. The unit method also permits proper provision to be made for the prevention of shrinkage and expansion cracks before the members are in position. Furthermore, the members can be finished a few hours after being cast, thus avoiding the expensive process of cutting or the unsatisfactory practice of plastering. To take care of the appreciable expansion in a building of this size, two longitudinal and two transverse expansion joints were provided. These joints extend entirely through the building. The members are arranged on rollers so that a movement of several inches may be taken care of without difficulty.

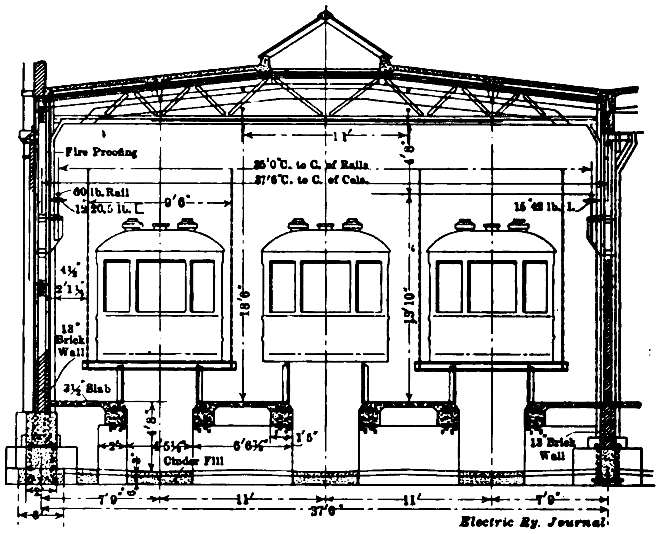

PHILADELPHIA & READING R.R.
YORK ROAD
Power House
8'
NORTH TWEFTH ST.
Sand House
Operating Office Bldg.
17 Panels at 16'0" = 272'
Stock Bldg.
Oil
STREET
LUZERNE STREET
PIKE STREET
LYCOMING STREET
Pits 304'
Pits 384'
611'
87'
NORTH TENTH ST.
Electric Ry. Journal

Luzerne Carhouse—General Plan


2'0½"
Bay No. 4
Sand Handling Panel above
8'3"
45'4"
6"
8"
42'9"
Bay No. 3
22'11⅝"
Sand House
18'0½"
Bay No. 2
Barber Shop
Toilet
Room
14'2"
Motormen & Conductors' Room
30' x 108' = 3240 □'
112'6"
Tunnel
Foremans' Office
Grating
Toilet Room
Passage
Locker Room
Bay No. 1
Platform
Oil Room
Trap Door
Work Shop
Stock Room
Receivers' Office
Clerks' Office
Supt's Office
Vault
Vestibule
56'10"
North Building Line
Switchboard
Stock Building
Vault
Office Building
69'6"
75'
15'8"
111'10"
273'6½"
611'
Electric Ry. Journal

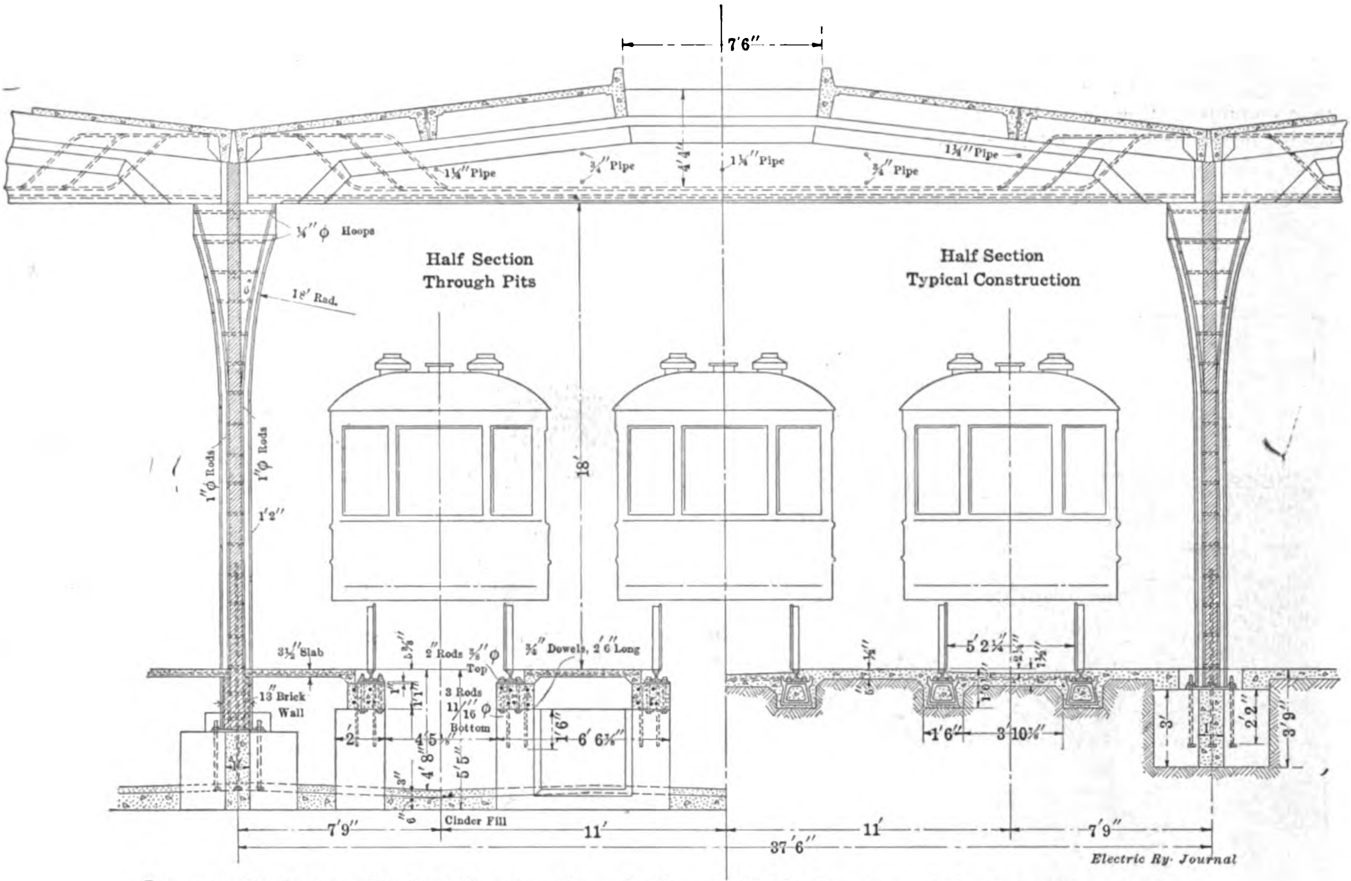
Luzerne Carhouse—Part Plan, Showing Utilities Buildings at the Rear of the Carhouse

Two steel stiff-leg derricks, each mounted on a steel tower as illustrated, were used for erection. Three bays were built complete and then the derricks were moved in order to repeat the operation. The largest girders handled in this manner weighed 12½ tons each. The usual members handled were as follows: Transverse girders, 154 cu. ft. volume, weight 23,100 lb., reinforcement with rods up to ⅞ in. square; roof slabs, 41.8 cu. ft. volume, weight 6270 lb., reinforcement with ⅜-in. round rods and ⅝-in. square rods; columns, 34.6 ft. volume, weight 5190 lb., reinforcement with 1-in. round and ¾-in. square bars. The beams and slabs were calculated for a maximum deflection of 1/30 in. per foot of span. The stresses in the concrete were specified not to exceed the following limits: Extreme fiber stresses on concrete in compression, 600 lb. per square inch; shearing stresses in concrete, 75 lb. per square inch; concrete in direct compression, 500 lb. per square inch; tensile stresses in steel, 16,000 lb. per square inch; shearing stresses in steel, 10,000 lb. per square inch. The concrete for the members named was a wet mixture of one bag Portland cement, 2 cu. ft. of coarse sand or gravel and 4 ft. of broken stone.

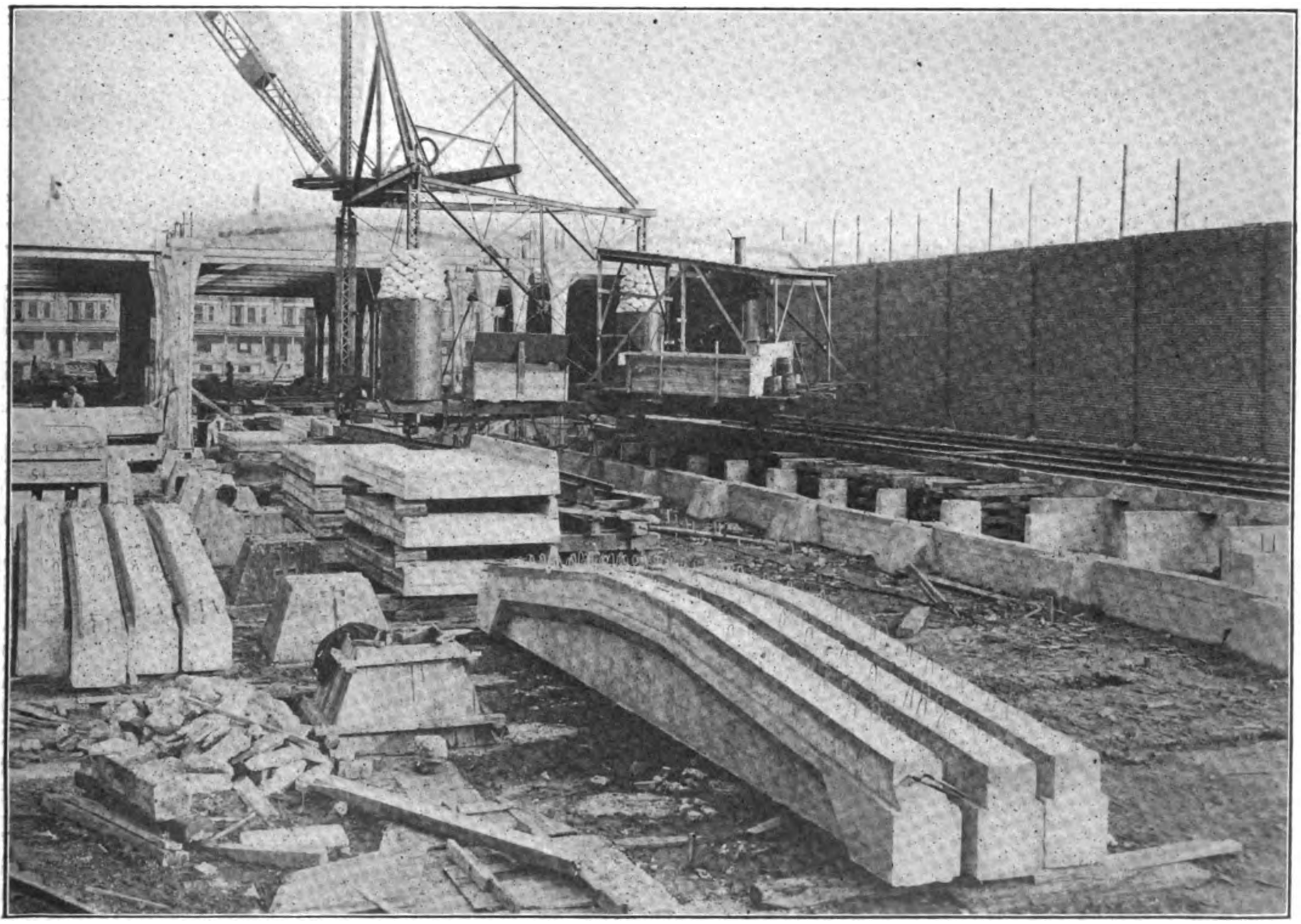

Fire Proofing
11'
4'8"
35'0" C. to C. of Rails
37'6" C. to C. of Cols.
60 lb. Rail
12" 20.5 lb. ⊏
9'6"
15" 42 lb. I.
4½"
2'1½"
18'6"
13'10"
13" Brick Wall
3½" Slab
4'8"
2½"
5½"
6'6½"
1'5"
Cinder Fill
13" Brick Wall
7'9"
11'
11'
7'9"
37'6"
Electric Ry. Journal

Luzerne Carhouse—Cross-Section of Bay for Light Repairs

Mass or monolithic concrete was used only for footings and floors. The concrete floors consist of cinder con-


7'6"
1¼" Pipe
¾" Pipe
4'4"
1¼" Pipe
¾" Pipe
1¼" Pipe
¾" φ Hoops
18' Rad.
Half Section
Through Pits
Half Section
Typical Construction
18'
1" φ Rods
1" φ Rods
1'2"
3½" Slab
13" Brick Wall
1'3⅜"
2" Rods ⅝" φ Top
3 Rods 11/16" φ Bottom
¾" Dowels, 2'6" Long
1'
1'1"
2'
4'5⅛"
4'8"
5'5"
3"
6"
1'6"
6'6⅛"
Cinder Fill
7'9"
11'
5'2¼"
½"
5"
1'0½"
2¼"
1½"
1'6"
3'10¾"
3'
2'2"
3'9"
11'
7'9"
37'6"
Electric Ry. Journal

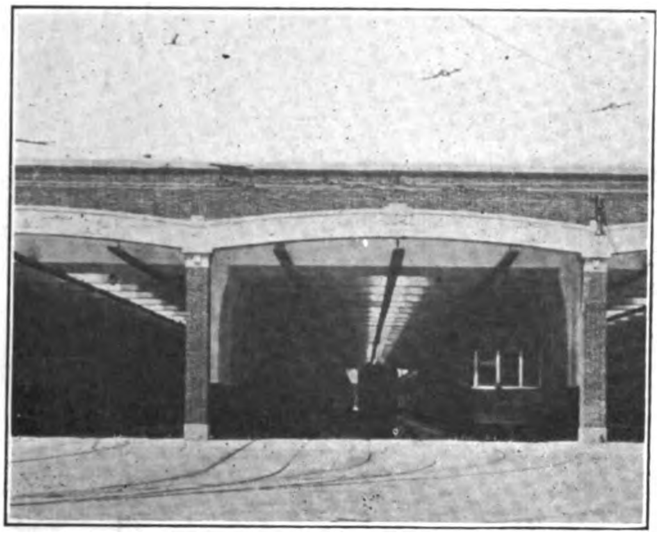
Luzerne Carhouse—Typical Construction of Pit and Flush Sections of the Inspection Bays



Luzerne Carhouse—Stiff-leg Derrick in Use to Install Unit Reinforced Concrete Girders, Columns and Slabs After They Had Been Formed on the Ground

crete and 1 in. of surfacing cement concrete. The remaining construction material consists of brick walls with granite base courses and terra cotta trim, four-ply felt and slag roof covering and bay partitions of 6-in. hollow tile. Inside communication from bay to bay is afforded by means of Underwriters' type sliding doors.

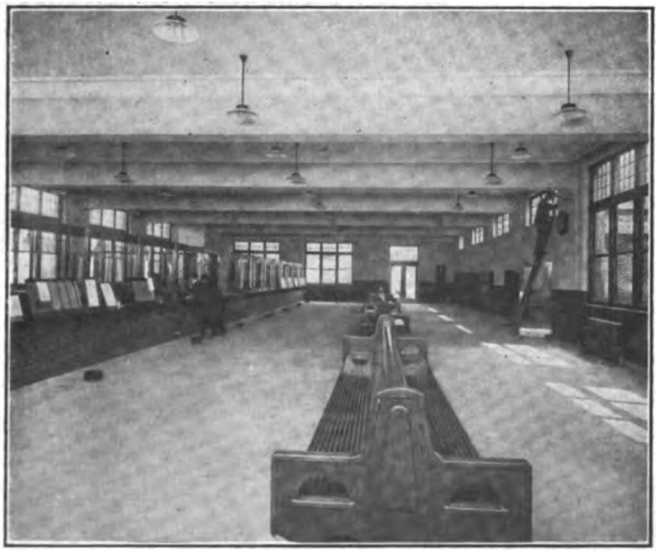
The tracks in the flush sections of the carhouse are mounted on chairs as shown, but the pit rails in the pit section are bolted through plates to 17-in. x 13-in. concrete stringers which were designed for loads of 4700 lb. per wheel. These stringers in turn are carried on concrete piers placed 9 ft. 3 in. centers. The pits are 3 ft. deep in the clear. The outer side of each pit rail is concreted flush with the head, while on the inner side the concrete slopes down to a point just below the head to prevent the accumulation of rubbish on the rail. In the shop bay the inner side of the rail was not grouted in order to permit planks to be placed between the rails.



Luzerne Carhouse—Typical Arch and Bay

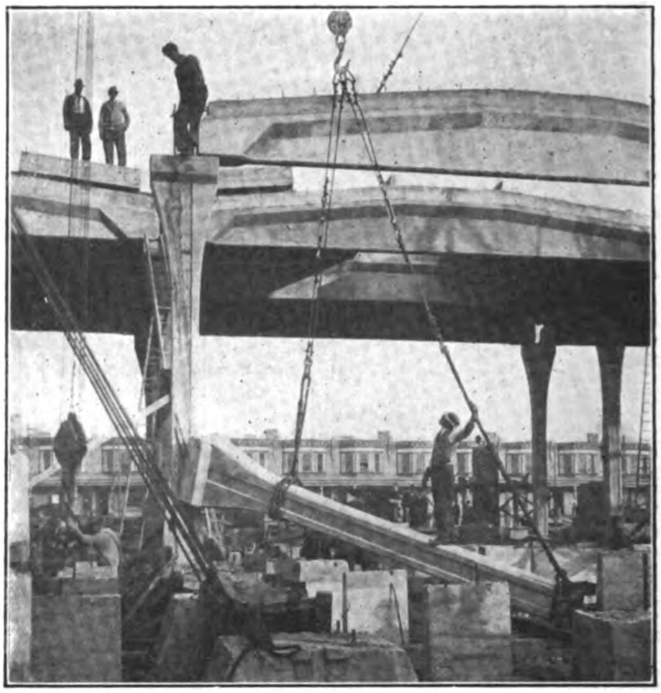
LIGHTING, VENTILATION, WASHING, SHOPS, FIRE PROTECTION, ETC.

Each bay is well lighted by a centrally placed wired-glass unit skylight 7 ft. 6 in. wide and extending the entire length with steel-sash ventilating monitors at regular intervals. The light appearance of the interior has been greatly enhanced by whitewashing the ceiling and also the walls above a black wainscoting 5 ft. 6 in. high. The artificial lighting for each bay is furnished by ten magnetite 600-cp arc lamps. These lamps operate 110 hours on one trimming. The pit lighting consists of incandescent lamps under the devil-strips in addition to emergency sockets. All lighting wires are in conduit.



Luzerne Carhouse—Men's Reporting Room

As previously noted, the inspection bays have no doors and consequently they are not heated. It will, however, be a simple matter to wash cars in the coldest weather owing to the fact that warm water will be supplied by means of a pump in the basement of the stock building. The pipes terminate in covered outlets in the devil-strips. Ample drains have been installed, of course, to insure quick drainage of floors and pits.



Luzerne Carhouse—Placing a Column

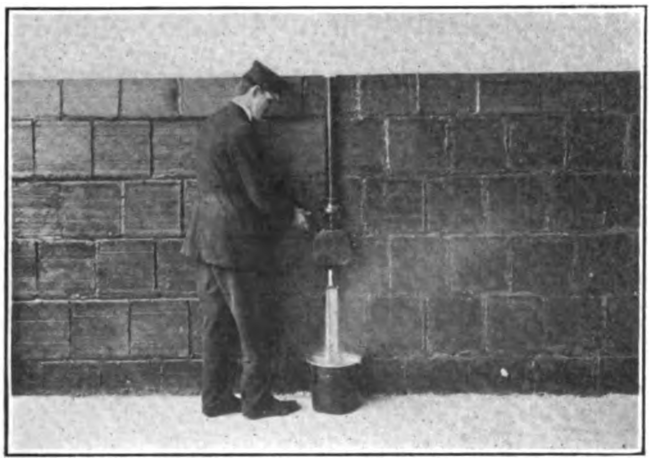
The three-track repair bay is furnished with girder rails for two 5-ton Sellers cranes. Cranes are required because the near-side cars are furnished with solid-frame interpole motors. An operating convenience which avoids frequent opening of the track doors and saves time in securing supplies is the supply tunnel between one of the tracks and the storeroom basement. Besides the track for the supply trucks, this tunnel serves for the water, sewer and steam lines. A much longer concrete tunnel is in service between

Luzerne Carhouse—Receivers' Office

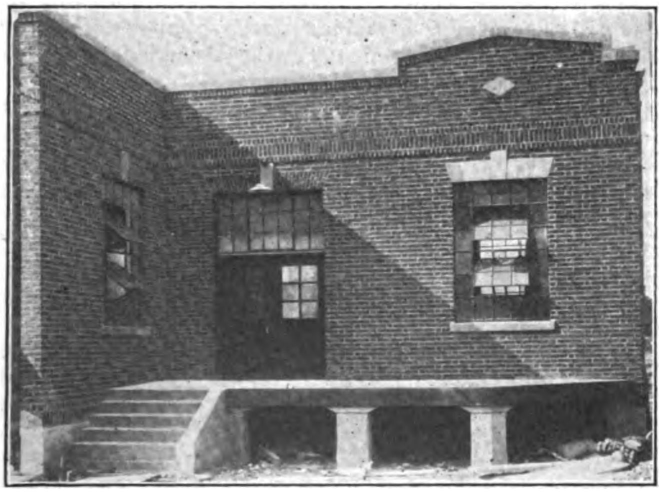
the stock building as indicated on one of the plans. These tunnels necessitated little excavation as they were constructed before the surfacing of the property.

SAND SUPPLY, FIRE PROTECTION, ETC.

An elaborate sand-storage and distributing equipment has been installed to make it easy for the crews to fill their boxes with clean sand in the shortest possible time and without placing cumbersome rubbish-gathering bins throughout the building. For this purpose the company built a sand house where the sand brought from the drying plant in hopper-bottomed cars is dumped and then raised by a motor-driven bucket elevator to a Robins belt conveyor which distributes its load throughout the sand-handling panel extending across the rear of the carhouse. This panel is 16 ft. wide and is lighted by means of steel-sash windows in the rear wall. Outlets from the bottom of the sand storage are provided at the partition walls with a supply pipe for each side of the partition. To obtain sand, it is necessary only to raise the weighted valve, as illustrated, and the sand receptacle will be filled almost instantly.


Luzerne Carhouse—Sand Spout Supplied from Storage Bin Above

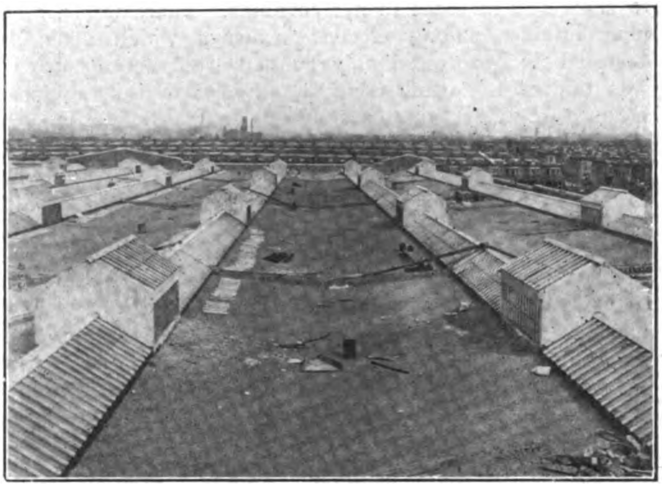
The fireproof construction of this carhouse, its division into sections storing a maximum of thirty-nine cars, and the possibility of taking cars out in either direction, made sprinklers and standpipes appear a needless expense. Such small fires as may occur will be cared for by means of Waggoner fire pails with non-freezing mixture and "Electrene" dwarf-type fire extinguishers. An alarm gong system has also been provided for calling the fire-fighting corps.


Luzerne Carhouse—Unloading Platform of Stock Building

UTILITY BUILDINGS

The utility buildings, except the boiler house, are of hollow-tile and steel construction, the latter being made of hollow blocks and a cement tile roof on steel trusses. In the stock building extensive use is made of steel-framed wire-glass sash and other fireproof fixtures. This one-story building is located directly behind the repair bay of the carhouse, and it is furnished with a platform on which supplies are delivered from cars. The basement now contains an air compressor, the warm-water pump previously mentioned and Darby individual ventilated lockers for the shop employees. These lockers have a sloped top so that they cannot be used as racks or for packages. The main floor has an oil storeroom, shop, stockroom, foreman's office and toilet.

The oil-room storage equipment is above ground level and consists of three 125-gal. and two 25-gal. tanks for handling barrels. The small shop now contains only the switchboard for this installation, but its walls carry crane rails and the floor has a trapdoor to permit the later installation of substation machinery in the basement. The stockroom is screened almost to the ceiling and its one door is readily seen from the foreman's office. The toilet fittings are of the best nickeled design with individual washstands instead of long troughs. Sanitary drinking fountains are used both here and in the office or transportation building.


Luzerne Carhouse—View of Roof Showing Skylights and Ventilating Monitors

The office building is a two-story structure directly in line with the stock building. The first floor is divided into an office for the clerks and receivers and a large room for the use of motormen and conductors. As it would be inconvenient to post the runs and schedules of so many lines on the walls, racks with swinging panels are used for that purpose. A barber shop and toilet room are installed in the one-story wing. The toilet is of the finest style with nickeled trimmings, marble barriers, etc., and with separate skylights and ventilators.

The heating plant is located at a considerable distance from the other utility buildings in order to be alongside the Philadelphia & Reading Railway. The steam-raising equipment consists of six water-tube boilers which were removed from one of the power houses. Hopper-bottom cars dump coal directly into the basement, while ashes are removed by wagons via a basement roadway.

The Nashville Railway & Light Company makes it a rule to bring old pole butts to its wood shop. Here they are cut into flooring or sheathing which may be utilized by the various departments of this property, thus affording a considerable saving.

Annual Meeting of the New York Electric Railway Association

The Convention at Brighton Beach on June 24-25 Was the Largest in the History of the Association—A Report Is Published of the Proceedings and of the Banquet

The thirty-first annual convention of the New York State Electric Railway Association was held at Brighton Beach, N. Y., on June 24 and 25. The attendance is believed to have been the greatest in the history of the association. Some 350 delegates registered, and of these more than 300 were at the banquet on Tuesday night, June 24.

TUESDAY'S SESSIONS

The session on Tuesday morning was called to order at 11.30 a.m. by President Collins, who stated that no annual meeting of the association had been held in the vicinity of New York City or even below Albany since 1899. The great attendance, however, vindicated the judgment of the executive committee in deciding to hold the 1913 convention at Brighton Beach. Although the past year had been one of general prosperity, the electric railways had failed to show any increase in net earnings. There was a common interest among electric railways which could be fostered and protected only by concerted action such as was offered by membership in an electric railway body. Despite the fact that the New York Association had started the past year handicapped by the loss of four of its larger companies, it had enjoyed a very prosperous and progressive year.

The secretary and treasurer's annual report, which was the next order of business, showed the following: Total receipts, $7,228.91; disbursements, $4,535.01; balance on hand, $2,693.90; active members, twenty-one; associate members, ten (a gain of four); allied members, eighty-nine (a gain of five). The chair then read a communication from W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, inviting the delegates to inspect the exhibit on the tracks behind the hotel, comprising various types of surface and elevated cars as well as of electric locomotives and freight cars used by the Brooklyn Rapid Transit System.

CONSTRUCTION OF TIMETABLES AND SCHEDULES

The only paper read at the morning session was that on "Construction of Timetables and Schedules," by J. J. Dempsey, superintendent of transportation New York Consolidated Railroad, Brooklyn. This paper is published on another page. After concluding his paper Mr. Dempsey spoke of the method of traffic tabulation followed in Brooklyn. Men were stationed to get the number of passengers on cars at the points of maximum loading and also in the sparsely settled sections, and these figures determine the kind of service that would avoid an unnecessary number of through cars. The company made it a practice never to have a run exceed fourteen hours.

J. K. Choate, vice-president The J. G. White Management Corporation, believed that Mr. Dempsey's analysis of schedules had saved the Brooklyn company $250,000 in one year. A great many interurban railroads wasted money by running a car a long distance without any passengers, the load being heavy only in the middle of the run.

J. F. Hamilton, general manager United Traction Company, Albany, thoroughly appreciated Mr. Dempsey's work and said that he was now rearranging his schedules on the same principles.

J. P. Barnes, manager Syracuse & Suburban Railroad, spoke from the shop end of the question. The difficulty most master mechanics found was to get the cars into the shop for the periodical overhauling at the right time. Perhaps a better analysis of schedule conditions would often permit the equipment, barring accidents, to be cared for between the morning and evening rush hours.

P. V. See, superintendent car equipment Hudson & Manhattan Railroad, said that on some of the systems with which he had been formerly connected the transportation department always wanted to keep the larger and newer cars on the road so that the only time left to inspect such equipment was under the disadvantageous conditions incident to night work.

Mr. Barnes, however, believed that the transportation department should not be blamed for favoring the best cars. The drawbacks of night inspection could be greatly minimized by liberal pit and carhouse lighting and also by making the working quarters more comfortable.

Mr. Dempsey said that his cars were inspected on a mileage basis and were turned over to the mechanical department in accordance with the shop schedules of the latter. The cars were so routed that they would be traveling toward the shop on completing the morning rush hour so that the time saved was enough to permit them to be ready for the evening rush hour of the same day.

J. H. Barnard, engineer The J. G. White Engineering Corporation, brought up the question of night schedules on outlying lines. Mr. Dempsey had mentioned the interest charges which come up on other equipment in connection with extra cars. In operating many lines it was customary to cut down the service on outlying lines very materially after some arbitrarily fixed time. Thus many people were discouraged from locating in the outer districts. The addition of a few cars to a line added practically no expense except platform labor and power. The point was overlooked that these additional car miles do not cost as much as the original car miles. In fact, if the "owl" car service paid for platform wages and power it could be considered profitable for it encouraged the settlement of people who would necessarily use the service much oftener than if they lived in or near town.

H. W. Blake, editor ELECTRIC RAILWAY JOURNAL, described the method of taking traffic counts worked out jointly by the Philadelphia Transit Commission and the Philadelphia Rapid Transit Company in connection with the new rapid transit plan. The city was divided into more than 100 districts, and to each a number was given. The purpose of the count was to show not only where the traffic originated but also where it was distributed—a problem which had never before been investigated. Passengers received blanks when they boarded the car on which they were asked to indicate their destination. The data thus secured were tabulated on machines according to many classifications, such as districts, routes, transfers, etc.

Mr. Barnes found that some interurban runs were so laid out that the longest layovers were at the terminals with the poorest inspection facilities. A heart-to-heart talk between the transportation and mechanical heads about such cases would often effect a betterment.

In reply to a question by John Sibbald, master mechanic Fonda, Johnstown & Gloversville Railroad, Mr. Dempsey said that car movements on heavy days were anticipated by records of past holiday business under given weather conditions and that a reasonable increase for growth of business was also made.

MISCELLANEOUS BUSINESS

B. Penoyer, engineer maintenance of way Schenectady

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

Railway, who is chairman of the committee on joint use of poles, said that this committee had held no meeting during the past year as the report made last year on this subject had been referred for further action to the American Electric Railway Association.

As chairman of the committee on membership, Mr. Choate reported that while the association had been unfortunate in losing the Buffalo & Lake Erie Traction Company, it had gained the Brooklyn Rapid Transit Company and hoped to have the Hudson & Manhattan Railroad enter the association in the near future. Some out-of-state railways adjacent to New York had also exhibited a desire to become members.

Secretary Dietz then announced the entertainment program for Tuesday and Wednesday as noted in last week's issue.

FREIGHT AND EXPRESS BUSINESS

The first order of business at the afternoon session was the paper on "Freight and Express Business on Electric Railways," by Frank Walsh, superintendent Electric Express Company, Schenectady. It is published herewith.

In discussing this paper, Mr. Barnes expressed the opinion that electric express waybills and other forms should be reviewed to obtain uniformity. Those who had tried to handle interline shipments realized the confusion due to different waybills and shipping contract conditions. Electric express and interline business would be greatly encouraged by improvements of this character.

Mr. Choate was very doubtful whether it would be possible to make an independent classification of freight business, but thought it was feasible for purely express business. On his former road, the Otsego & Herkimer Railroad, carload and less-than-carload business was handled as on a steam railroad while the express business was handled by the old-line company. Mr. Choate believed that even in cities with congested traffic a profitable express business could be carried on during the night hours. He suggested that it was within the province of the American Electric Railway Association to make a standard classification and inventory of shipping and billing forms.

Table I—Increased Earnings on the Interborough Rapid Transit Company Due to Introduction of Piece Work

Skilled Labor:	Average Day Rate	Number of Men	Piece Work Earning	Amount Increase	Per Cent Increase
Carpenters	$2.64	47	$3.34	$0.70	27
Painters	2.42	43	3.26	0.84	35
Machinists	2.53	58	3.27	0.74	29
Upholsterers	2.40	3	3.13	0.73	34
Boilermakers	2.50	3	3.64	1.14	49
Average increase for skilled labor, 29.3 per cent.					
Unskilled Labor:					
Carpenters' helpers	$2.00	12	$2.59	$0.59	29½
Painters' helpers	1.75	40	2.38	0.63	36
Wiremen's helpers	1.93	32	2.26	0.33	17
Machinists' helpers	1.90	58	2.26	0.36	19
Boilermakers' helpers	2.00	1	2.25	0.25	12
Shop helpers	1.85	15	2.33	0.48	26
Car cleaners	1.70	158	2.05	0.35	20
Laborers	1.75	6	2.25	0.50	28
Average increase for unskilled labor, 22.25 per cent.					

OPERATING ECONOMIES

The next order of business was a paper on "Operating Economies," prepared jointly by J. S. Doyle, superintendent car equipment Interborough Rapid Transit Company; W. G. Gove, superintendent equipment Brooklyn Rapid Transit Company, and J. S. McWhirter, superintendent car equipment Third Avenue Railway. The paper was read by Mr. Gove, who stated also that his company had modernized old machines at small expense to handle very heavy maintenance and renewals. Referring to brakeshoe records, he said that for the last eighteen months the brakeshoes on the Brooklyn system had shown very close to 80 per cent efficiency in wear.

Mr. Doyle said that the main point was to circulate knowledge of these and other operating economies among the members and particularly among the smaller companies which did not enjoy the advantages of statistical bureaus. He suggested that a statistician be appointed to devote, say, two months a year to gathering and analyzing operating data. He then presented the accompanying Tables I and II, which show the increased earnings of workmen on the Interborough and New York Railway systems due to the introduction of piece work. Mr. Doyle also mentioned that on the subway lines alone coasting recorders had made an energy saving of about 14 per cent, equivalent to $1,200 a day.

Table II—Increased Earnings on New York Railways Due to Introduction of Piece Work

Skilled Labor:	Average Daily Rate	Average No. of Men	Average Piece Work Rate	Amount Increase	Per Cent Increase
Carpenters	$2.53	31	$3.33	$0.80	32
Painters	2.39	17	3.09	0.70	29
Wiremen	2.51	8	3.13	0.62	26
Brakemen	2.25	2	2.46	0.21	9
Truckmen	2.42	6	2.50	0.08	3
Overhaulers	2.42	6	2.51	0.09	3.7
Machinists	2.63	6	2.98	0.35	13
Wheelguard repairers	2.08	3	2.55	0.47	22
Pipe fitters	2.50	10	3.10	0.60	24
Average					24
Unskilled Labor:					
Painters' helpers	$1.80	10	$2.36	$0.56	31
Carpenters' helpers	1.84	5	2.42	0.58	31.5
Truckmen's helpers	2.00	6	2.02	0.02	1
Shop helpers	1.60	2	1.97	0.37	23
Wiremen's helpers	1.69	4	2.46	0.77	45.5
Machinists' helpers	2.00	16	2.17	0.17	8.5
Pipe fitters' helpers	2.00	1	2.27	0.27	13.5
Car cleaners	1.60	67	1.86	0.26	16
Jackers	1.87	6	2.40	0.53	28
Controller men	1.79	12	2.14	0.35	19.5
Plowmen	1.78	3	1.83	0.05	2.8
Field repairers	1.43	8	1.73	0.30	21
Average increase for months of Sept., Oct. and Nov., 1912					18

Mr. McWhirter then briefly discussed the welding and prepayment figures given in the paper.

In reply to Mr. Barnes, Mr. Doyle said that the increases represented by the Interborough figures were about equal to increases in outside day rates, but although the Interborough rates were now seven years old the men appeared to be well satisfied. They realized that the continuity of inside work was a great advantage to them even if the daily earnings were about the same. Again, the employees had no carfare to pay, and company stores enabled them to buy their groceries at a great saving over retail prices. Replying to Mr. Sibbald, Mr. Doyle said that the choice as to piece-work or bonus systems depended upon the character of the work. If it was permanent, piece work should be used, but if of irregular character, as in construction jobs, the bonus system was preferable.

Referring to car design economies, C. G. Young, consulting engineer, New York, described the light-weight trolley cars which had been constructed by the Federal Storage Battery Car Company for the Panama Tramways, in accordance with his designs and those of the car builder. Each of the fifteen cars is 30 ft. over all, has four 10-hp motors, seats thirty people and weighs but 14,000 lb. There are four motors, each geared directly to a wheel, and these in turn have Rollway bearings. All guarantees of economies had been borne out by the tests made, and he was satisfied that the saving in energy would pay for the interest, depreciation and upkeep of the special features, even if energy was purchased at 2½ cents per kw-hr. instead of 3 cents per kw-hr. as was actually the case.

Mr. Choate indorsed Mr. Doyle's suggestion as to the distribution of information. He believed the coming year would inaugurate some systematic method of getting the committees to do more specialized work. As for his company, it desired to co-operate by every means in its power.

Mr. See suggested that comparisons of cost would be much more valuable if made on a common basis. Such a plan had already been worked out to advantage by the engineers of some large New York power stations. He had found the bonus system applicable to very small jobs, even where not more than forty to fifty operations were involved. One great advantage of bonus or piece-work systems was that since the foreman did not have to spend any time checking the men could give more attention to the quality of the work.

MAXIMUM TRACTION TRUCKS VERSUS M. C. B. TRUCKS

The next paper was on "Maximum Traction Trucks versus M. C. B. Trucks for City and Suburban Service," by H. A. Benedict, mechanical engineer Public Service Railway, Newark, N. J. This paper was read by the secretary, but there was no discussion as Mr. Benedict was not able to be on hand.

LINE CONSTRUCTION

Mr. Barnard then read a paper entitled "The Proper Location of Trolley Wires on Curves and Corresponding Location of Overhead Frogs." This paper is presented elsewhere in this issue. In concluding his paper, he said that while the method might seem theoretical, it had been applied to difficult conditions with a consequent elimination of much wheel and wire trouble. It should be as easy to teach a line foreman to lay out overhead construction along these scientific lines as it was to teach a track foreman the layout of spirals.

F. A. Bagg, chief engineer Fonda, Johnstown & Gloversville Railroad, stated that he was so much impressed with Mr. Barnard's clear analysis that he would be glad to follow his instructions in work on his own property. Much needless trouble and expense was caused by the improper location of line and frogs. The paper afforded another opportunity for operating economies.

In reply to a question, Mr. Barnard said that slight corrections might have to be made for the superelevation of the rails, but ordinarily the outside rail laid in city pavements did not have much elevation. One point which followed from his analysis was the angle of frog. He had seen advertised in various catalogs frogs of angles from 3 deg. to 20 deg., but with correct design it was not necessary to have a frog of more than 10 deg. for any kind of trolley work.

In concluding the discussion, Mr. Collins said that while many points brought up in the meetings of the association had been adopted by the members, additional good would follow from some system of checking up the adoption of operating economies. He then appointed as a nominating committee Past-presidents Choate, Allen, Shannahan, Peck, Fassett and Danforth. Upon this the meeting was adjourned, after a vote of thanks had been extended to the Brooklyn Rapid Transit Company for its courtesies in connection with the convention. At the suggestion of President Collins the members visited the company's car exhibit in a body.

WEDNESDAY'S SESSION

The session on Wednesday morning was called to order about 10.30 by President Collins, who announced that the first paper on the program was that by N. W. Bolen, superintendent of transportation Public Service Railway, and was entitled "Relations Which Should Exist Between the Railway Companies and Their Employees." The report was read by the secretary and will be found on another page in this issue.

The president opened the discussion by complimenting highly the author of the paper and said he hoped that it would be fully discussed.

John H. Barnard, engineer J. G. White Engineering Corporation, moved that the association tender a vote of thanks to the author of the paper for his contribution. He said that it was full of ideas and that the paper should be taken home, read, marked, learned and inwardly digested. He was particularly impressed with the suggestion made by the author that the general manager should impress his personality on those immediately subordinate to him and that they should do the same with others reporting to them in the service. He believed that the position of motorman was much more agreeable than that of a conductor who had to take all the criticisms of the public. After all, the public was made up simply of an aggregation of individuals, and if the conductors were courteous to their passengers he believed that this courtesy would be returned by the public to the company. He referred to the practice of the American Telegraph & Telephone Company in posting up in its exchanges for the instruction of the operators the words: "A smiling voice wins."

Mr. Bolen said he believed that a very important part of the relations between the management and the employees was the method of discharging men. His experience was that superintendents of divisions often acted very brusquely in this duty. He recalled that in 1903 when he first went over one of the lines which now constitute the Public Service Railway he was taken around by the man who was then superintendent of that line. They passed a number of trainmen in uniform, and the speaker noticed that the superintendent did not speak to them. He asked whether these men did not belong to the line being inspected, and the superintendent said that they did but that he did not speak to them because he believed in the policy of keeping the men where they belonged. During the course of the trip Mr. Bolen and the superintendent visited one carhouse, where the superintendent dismissed seven men with a curse and the statement that the company did not need their services any longer. It is needless to say that this treatment has been radically changed on the line in question. No one need expect employees to be courteous unless the management is courteous to them. Mr. Bolen cited instances where he had made strong friends even among men whom he had dismissed from the service by his treatment of them at that time. They had come to him later, saying that they appreciated the words which he said to them when he had dismissed them and that they were better men for his words of advice at that time.

William H. Hyland, claim agent Fonda, Johnstown & Gloversville Railway, said that before occupying his present position he had been a conductor and had served in that capacity for thirty years and that he appreciated the difficulties of the position. It was not sufficient simply to teach the conductor to do good work and be courteous. He believed that when a new man came on the line and was being broken in he should be taught above all things the value of honesty. The temptations to be dishonest were great, and often the men who succumbed to this temptation were most desirable in other ways, as in the avoidance of accidents. Very often the public urged the conductors to appropriate fares. The men often had to work seven days during a week, and this debarred them from attending any public religious services. The speaker said that many companies held smokers and other meetings for their men at which every topic was discusssed except that of ethics. This should also be considered. The fact should be borne in mind, also, that many of the new men enter the service after having left homes where there had been religious instruction and that they were thus suddenly transferred into an employment where the subject was never mentioned. He believed that it was desirable to talk about the matter occasionally and that no time was better than when the instructor was breaking in a new man.

Mr. Bolen agreed with the preceding speaker and went on to say that the supervisors of the carhouses of the Public Service Railway at least once a month talk with the instructors of new men and tell them what is needed. The question of the employees' honesty was an important one, and much depended on starting out with friendly relations with the man and giving him friendly answers to any question he might ask, instead of snapping out a command to see some one else. Since the general use of automobiles, officials do not have the same opportunity of inspecting the men at work as when they rode around the lines on the cars and were pointed out as the officers of the company.

E. T. Munger, formerly general manager Hudson &

Manhattan Railroad, stated that in his experience one thing that invariably made the men feel good was to give to them a sort of semi-military salute. He often talked to the men, also, and they showed their appreciation by their courtesy both to himself and to his wife, whom they took the trouble to learn to recognize. Mr. Munger believed that the men respond to right treatment. He also spoke of his practice in forming opinions of men coming before him, a practice taught by a banker, of looking at a man as he came into the office sideways. This gave him the first look, and this first opinion was helpful. Mr. Munger said that in the method followed when he was connected with the Hudson & Manhattan Railroad men seeking employment went first to the superintendent of transportation, who sent a record of the man to the general manager's office with a note of the findings. Most of the men came to see the general manager, and the speaker could usually tell in a minute whether he wanted them or not. If so, he gave them a few words of advice; if not, he wrote "no" on the record. The question of politics was never allowed to affect the hiring of men.

James F. Hamilton, general manager United Traction Company, Albany, congratulated Mr. Bolen on his paper, and President Collins said that he was impressed with its character and would appreciate a copy. He said that he would ask the new management to have the paper printed and sent to all members of the association.

STANDARD METHODS IN THE MECHANICAL DEPARTMENT

Following this discusssion a paper entitled "Standard Methods for the Mechanical Department," published elsewhere in this issue, was read by John Sibbald, master mechanic Fonda, Johnstown & Gloversville Railway, Gloversville, N. Y.

In commenting upon this J. P. Barnes, Syracuse & Suburban Railroad, said that he was extremely interested in the plan outlined. He thought the idea of foremen's meetings was generally followed. On his own road minutes were taken and the notes were distributed among those in attendance to aid in future discussion, but the method proposed by Mr. Sibbald of putting in the form of definite rules the results of the foremen's experience was a very good and practical way of getting the greatest good out of the meetings.

QUESTION BOX

The attention of the meeting was next turned to the Question Box. Several of the questions were passed over because of non-discussion, but from some of the others interesting information was evolved.

On the question of the value of having a steel wire, grounded at short intervals, carried on top of the pole line carrying a high-tension transmission line through a country that is subject to frequent electrical disturbances, C. G. Young stated that a great deal of trouble would be had with the steel wire rusting. Such a wire should be used, but it should be of heavy iron, phosphor-bronze or hard-drawn copper.

Mr. Barnard said that it was not the practice of his office to use steel wire, for although his firm was a great believer in this method of protection, yet he did not believe in steel. Galvanizing it, moreover, added not much to its usefulness. For such purposes they use a 7/32-in. copper-clad wire for 150-ft. spans, sometimes three No. 10 wires stranded together, and for long spans up to 500 ft. a 5/16-in. seven-strand copper-clad wire.

Mr. Barnes defended the use of a galvanized steel wire and stated that on the line from Niagara to Syracuse ⅜-in. double-galvanized steel cables, with spans from 100 ft. to 400 ft., have been in use since 1906 and that samples taken in 1912 showed no deterioration, although in some places they were taken from sections not more than 40 ft. away from blast furnaces.

In discussing the comparative values of leather and rattan coverings for seats in interurban cars, Mr. Sibbald thought leather prohibitive on account of the cost but that imitation leather was better than rattan. It was more sanitary, easier to apply and offered less temptation to penknife cutting. Mr. Barnes said that his company used leather in the smoking compartment and plush for the other sections of some cars in use for some six years. Recently he had examined the leather seats and had found that the leather needed renewal. Part of the wear had undoubtedly come from the feet of passengers. Rattan was objectionable for interurban use, especially in the case of seats with no outside arms, because it was slippery. On the whole, according to Mr. Barnes, imitation leather was the best covering.

In regard to whether the mechanical department or the operating department should be responsible for the work of cleaning the cars, Mr. Sibbald was in favor of the former, as was also Mr. Munger. The latter gave as his reason the fact that if the transportation department handles the cleaning it will not report complaints, but that if the mechanical department cleans, the operating department will very soon report any dereliction of duty.

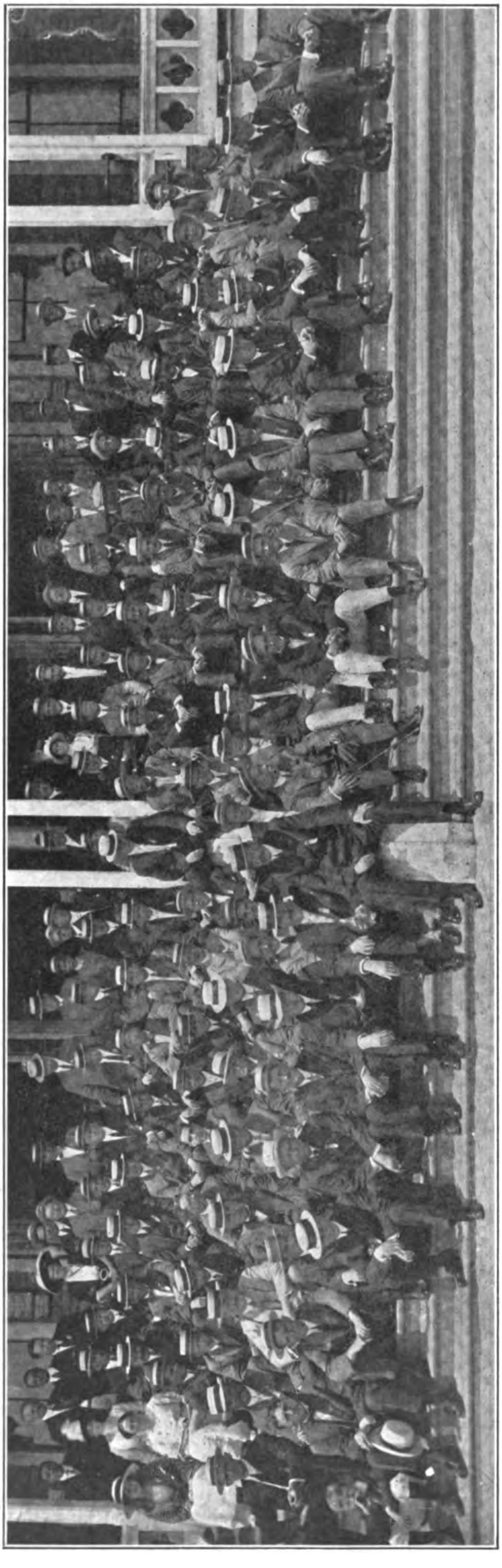
In discussing the question of the advisability of automatic switches F. A. Bagg, chief engineer Fonda, Johnstown & Gloversville Railway, pointed out that to the cost of the hand switch should be added the cost of making the stop. Recent investigations had shown that this could be given a definite value. Mr. Barnes pointed out that with the automatic switch the motorman might have a tendency to enter the switch section with both current and brakes on, to be sure to throw the switch, and that the wear and tear might be more than the cost of the stop. In his opinion the chief value of the automatic switch was that it did not require either trainman to leave the car.

The use of spar varnish as a paint preservative next provoked discussion, and Mr. Barnes pointed out that in the total cost of painting the cost of material was a very small part and therefore the best material was advisable. Cheap material was not only costly in the long run itself, but it detracted from the appearance of the cars and thus lowered the advertising efficiency of the rolling stock. Mr. Sibbald had had no experience with spar varnish, but thought that one application a year ought to be enough, and frequently one in eighteen months. Mr. Fassett stated that if cars had to be varnished twice a year the roads would have to charge a 6-cent fare.

In discussing question No. 11 Mr. Callaghan stated that with twenty-five cars in Rochester with maximum traction trucks with the pony wheels on the outside no derailments due to snow had occurred. The rest of the discussion was to the effect that each method of placing maximum traction trucks had certain advantages.

F. A. Bagg, chief engineer of the Fonda, Johnstown & Gloversville Railway, in discussing a fair maintenance cost per mile of line for the distribution system, said that from $110 to $150 a mile was proper. Mr. Young said that it all depended on the efficiency of the upkeep, the number of wires, kind of poles, etc., but that generally the cost was within $150 a mile. Mr. Fassett submitted a word of advice to the effect that the reports of the Public Service Commission, compiled, he said, at great cost to the companies, might be of use on this question.

Harlow C. Clark, of the American Association office, the first speaker on the desirability of publicity work, stated that the public has a right to know about all changes and that it is very proper and important to notify them. The manner of so doing varies with the case, but Mr. Clark thought that one good way of making announcements was in the company's own cars, to be followed later by any other announcements if necessary. Mr. Barnes thought that all changes should be explained to the conductors, so that they could courteously explain them to the public if inquiries were made of them.



Group View of Delegates at the Convention of the New York Electric Railway Association

ELECTION OF OFFICERS

At this point in the meeting the discussion was closed, and Mr. Fassett, for the nominating committee, presented the following ticket for the ensuing year:

For president, Frank Hedley, vice-president and general manager Interborough Rapid Transit Company, New York City.

For first vice-president, James F. Hamilton, general manager United Traction Company, Albany, and Schenectady Railway Company, Schenectady.

For second vice-president, Stuart Wilder, vice-president and general manager Peekskill Lighting & Railroad Company, Mount Vernon.

For members of executive committee, James P. Barnes, general manager Syracuse & Suburban Railroad Company; J. J. Dempsey, superintendent of transportation Brooklyn Rapid Transit Company; S. W. Mower, general manager, Otsego & Herkimer Railroad Company, Cooperstown; Wilbur C. Fisk, president Hudson & Manhattan Railroad, New York City.

For secretary and treasurer, Charles C. Dietz, Albany.

Before calling for a vote President Collins acknowledged the assistance he had received this year from both the members of the association and the allied manufacturers. Thanks were expressed to the Brooklyn Rapid Transit Company for its exhibition and to the hotel management for the accommodations received. In reviewing the year's work President Collins said that the large delegation, the increased interest shown and the new companies enrolled during the year were promising of increased success during the next year, and also that the association was glad to have the increasing support of the engineering associate members.

On a motion the secretary was instructed to cast a unanimous ballot for the ticket as nominated. In the absence of Mr. Hedley, who had been called to Chicago, Mr. Hamilton was conducted to the chair and, after a resolution of thanks by Mr. Barnard to the outgoing administration, the meeting was adjourned.

THE BANQUET

The banquet was held Tuesday evening in the main dining room of the Brighton Beach Hotel and proved a highly enjoyable affair. The entertainment committee, in particular, distinguished itself by providing an elaborate vaudeville entertainment as well as orchestral music.

ADDRESS OF JUDGE M'CALL

The first speaker was Hon. Edward E. McCall, chairman Public Service Commission, First District, New York. who made a short address early in the evening because he was obliged to leave. He said that his conception of the duty of the Public Service Commission was that it was organized as much to secure the rights of the companies as to secure the rights of the public and that if the companies felt that they were right in any matter they should not hesitate to express their opinion. He believed that the public service commission form of government would help the railways not only in securing their rights but in increasing the faith of the public in the corporations, both as to their financial matters and the correctness of their operating methods. On behalf of the Public Service Commission, First District, he wished the electric railway companies of the state every success.

ADDRESS OF COLONEL WILLIAMS

The next speaker was Colonel T. S. Williams, president of the Brooklyn Rapid Transit Company, who spoke on conditions which confront the electric railways to-day. These were troublous times for public service corporations. In the past an Alexander Hamilton could say, "The people is a great beast," and later a great railroad operator could say, "The public be damned!" Those times had passed, for the people were determined to come into their own. As for himself, he sympathized with the spirit of democracy which was permeating our entire civilization, but he resented the spurious democracy which was bringing so much harm upon the country to-day. The atmosphere of the last few years had brought a great many invertebrates into business and politics. What was needed to-day was more red blood in both of these fields. No matter what evils of the past had attached themselves to politics and business, he could safely say that corporation and other business men to-day were imbued generally with a high idea of honor in their dealings between themselves, with the government and with the public. Judge McCall had uttered an encouraging sentiment when he said, "When you are right do not be afraid to come out and express yourself."

Imbued as electric railway men were with the honesty of their intentions, they should not be afraid to express them both to the public and to public officials. His hope in democracy was such that he felt that if the public was taken into the confidence of the companies and made acquainted with the conditions pertaining to their business, its sympathy would be on the side of the railways instead of on that of the politicians.

ADDRESS OF MR. ALLEN

In the unavoidable absence of President Harries of the American Electric Railway Association, C. Loomis Allen spoke on co-operation. The unfortunate conditions in the industry were apparent from the record of new construction, which shows a falling off of 56.4 per cent in the last five years through the practical impossibility of financing new enterprises and the difficulty of securing funds to carry out improvements in properties already existing. The reason for this was found in the attitude of municipal and state governments and of the public toward the railroad—an attitude that was refusing not only to allow legitimate profits to investors but was responsible for the actual confiscation of property rights under pleas which only those of socialistic tendencies could allow to be just. The electric railway industry was under an attack which was not a mere spasmodic expression of unrest but was persistent, almost universal, well-directed and threatened the very existence of the industry. Unless this attack could be met and overcome disaster and ruin were inevitable.

Now, because this warfare was unjust, because it did not rest upon any basis of right and fairness, he was convinced that it could be resisted successfully by intelligent, earnest and indefatigable opposition. This opposition must come from the men whose lifework was involved in the industry. The feeling of the public toward public utilities was evident. A long campaign of misrepresentation had been carried on by men in love with their own sociological and economic ideas, who found in public utility companies, impersonal as they must be, an enemy so supine that arguments went unanswered, that false statements passed without contradiction, that fallacious arguments went unrefuted. It was only through organized effort that the flood of socialistic thought could be stemmed. The executive who though because his particular property was free from attack that it was going to be immune always was shortsighted. It was his duty not only to the industry but to his particular company to enlist in the army of the opposition. What applied to the executive also applied to every man down the line. It was through bodies like the New York Association, which taught the spirit of co-operation, that much could be accomplished toward organizing the opposition. Back of this association and of all similar bodies stood the American Electric Railway Association. In its membership 76 per cent of the electric railway mileage of the country was already represented and it had more than 2500 individual members. It should have 90 or more per cent of the mileage, and its individual membership should increase until it embraced every worker in the electric railway field.

Education of the public in the real facts of the situation was the back-fire that must be started if the conflagration which threatened the industry was to be overcome. No man need fear the verdict of the American people if that people had before it all the facts in the case. In conclusion, Mr. Allen said that the American Electric Railway Association intended to assist in the education of the public by publishing in sheet form for newspaper use extracts from articles in *Aera*, and that the local electric railways would be asked to assist in the distribution of this material.

SPEECH OF MR. VREELAND

In the absence of T. P. Shonts, president Interborough Rapid Transit Company, H. H. Vreeland extended a cordial invitation to the members of the association to take full advantage of that company's records and other data.

ADDRESS OF COMMISSIONER DECKER

The next speaker was Martin S. Decker, Public Service Commission, Second District, New York. Mr. Decker spoke of the pleasant relations which existed between his commission and the electric railways under its jurisdiction. He believed that the operation and management of these roads had greatly improved during the past six years. A number had been reorganized, but always to the advantage of the public and the property, although sometimes those in control had first objected. He had no sympathy for the man who attacked a corporation because it was a corporation and little more patience with the corporation manager who resented a complaint merely because a complaint had been made.

There were too many men of the former class still in existence, and he was glad to say that those of the latter were rapidly diminishing in number. Relative to some of the difficulties which confront a public service commission, he mentioned the proposed construction of a 28-mile line which would permit all-electric operation from Albany to Buffalo. Despite favorable traffic possibilities this work had to be postponed on account of the present unfortunate financial situation. In former days the money would have been raised at any cost and the line built, with the resulting impoverishment of its owners. Here then was a case where capital was being protected against itself while the public remained without a much desired transportation facility. He agreed with Mr. Allen that it was incumbent upon electric railways to let the public understand the conditions of the industry so that it would not only realize what has been done for its benefit but would also refrain from asking for unreasonable things.

SPEECH OF MR. DUFFY

The banquet was pleasantly concluded by some good stories by C. N. Duffy, vice-president Milwaukee Electric Railway & Light Company.

HIGH-VOLTAGE LINES IN EUROPE

The March souvenir number of *Elektrotechnik und Maschinenbau*, Vienna, commemorating the twentieth anniversary of that paper, contains the latest tabulation of high-tension electric railways in Europe in addition to a series of historical articles on different branches of electrical development. The table of high-tension d.c. lines shows twenty-one roads, the total length of the seventeen lines whose mileage is given being 438 miles. The line potential ranges from 1000 volts on the Cologne-Bonn line, built in 1906, to 1650 volts on the Arad Hegyalja Railway, built in 1912. The three-phase lines number eight, total 320 miles of track and range from 750 volts, forty cycles, on the Burgdof-Thun Railway, built in 1899, to 7000 voltts, fifteen cycles, on lines of the Italian State Railways, built in 1911. The length of the Valtellina three-phase line, Italy, is about 63 miles, and the three-phase lines of the Italian State Railways are 193 miles long. The single-phase lines number forty-two, the total length of the thirty-phase lines whose mileage is given being 738 miles.

Papers at the New York Convention

Among the Subjects Considered Were Freight and Express on Electric Roads, Relations Between Employees and Managements, Operating Economies, Alignment of Trolley Wire and Placing of Frogs, Construction of Timetables and Schedules and Choice of Trucks for City and Suburban Service

OPERATING ECONOMIES

BY J. S. DOYLE, SUPERINTENDENT CAR EQUIPMENT INTERBOROUGH RAPID TRANSIT COMPANY; W. G. GOVE, SUPERINTENDENT EQUIPMENT BROOKLYN RAPID TRANSIT COMPANY, AND J. S. MCWHIRTER, SUPERINTENDENT CAR EQUIPMENT THIRD AVENUE RAILWAY, NEW YORK

Railway association work has contributed its share to the phenomenal development of electric traction throughout the country, and it is confidently expected that this good work will continue for some time to come. Meanwhile, are we taking advantage of the various developments and methods of economical operation? A recapitulation of this all-important subject may be considered the text of this paper.

Is it not quite possible that some of our member companies have methods of operation that produce not only reliable and satisfactory service but also economies that through some concerted effort of this association may be participated in by member companies generally? If such is the case, what is the most simple method of accomplishing this result? With this object in view specific methods and practices employed by member companies will be briefly reviewed with the hope that such an effort may result in stimulating interest in this very important subject, thus possibly improving the value of the New York Electric Railway Association as a medium for the interchange of railway practices, ideas and economies.

SHOP ORGANIZATION

Various railway association standing committees have accomplished invaluable results, and many papers have been written on shop organization, but have we all taken advantage of such practices as are known to be highly efficient and economical? Among this long list of endeavors are the now well-known bonus and piecework systems, which are generally acknowledged as economy producers of the first order and for railway shop work more desirable than the unsatisfactory day-wage system. It can safely be stated that when once these systems are well organized and installed the results obtained will prove so satisfactory to employees that strenuous objections will be raised when any attempt is made to restore the day-rate methods. Moderate and small-sized railways, however, will raise the objection that such methods, however satisfactorily applied to large systems, are not so valuable for them. Likewise it is frequently stated that the system of accounting and the methods of determining prices are difficult and intricate. With regard to the size of the department the point may be well taken, but in view of the fact that economies of from 20 per cent to 30 per cent in reduction of expenditures are now realized in any number of railway and manufacturing companies, it would seem that this phase of the subject should not only receive careful consideration but should also have a fair trial. It has been asserted that one of the principal objections to the introduction of these methods on moderate-sized properties was that the several items constituting the volume of work were insufficient to obtain the desired results. If this was found to be true, would it not be possible to schedule the year's requirements in items of sufficient volume to overcome the difficulty? For instance, a year's supply of bearings or standard forged repair parts, etc., might be got out at one continuous period, thus overcoming the deficit in the continuity of work. The main thing to be borne in mind is that the economical reward is high and that a little intelligent analysis is very likely to overcome all obstacles.

Both efficient and economical operation of shop tools should also be considered in this day of rapid development in the use of alloy steels for cutting tools. The character of work to be performed, whether of brass or steel, should be duly considered and the proper selection of the cutting tool made. In this way the output of tools is frequently increased from 20 per cent to 30 per cent.

Manufacturing institutions have gone even a step further by installing recording systems for measuring the continuity of tool operation, which in some instances have increased the total shop output 40 per cent. It is questionable, however, if these latter developments have proceeded far enough to warrant their consideration in railway shops because of the variable operations involved.

In the maintenance of railways many parts of car renewals are home-made, apparently through necessity, but it frequently occurs that a carefully designed purchasing schedule demonstrates the outside manufacturers' prices to be much more economical and, at the same time, affords a means of determining the parts most economical to manufacture. Therefore, the systems for performing this work should be designed with a view of always maintaining live competition so that certain hobbies in which some of us are inclined to indulge may be avoided to the profit of our employers—the railway companies.

UNIT COSTS AND RELIABILITY OF SERVICE

We all know the value of comparative expenditure sheets, but do we go far enough in comparing the achievements of our neighbor companies? Such comparisons on brakeshoe wear, methods of performing welding repairs to motor and truck parts, etc., frequently unearth practices that more than repay the effort of investigation. For instance, the composition or shape of brakeshoes or the method of accounting for the full wearing weight of the shoes may easily lower or raise the cost of this production from 10 per cent to 30 per cent. Likewise the method of oiling bearings and the resultant wear of bearings usually show big differences. Methods and practices in painting cars, while an old subject, cover a wide range of possibilities and, when fully considered, usually reduce costs.

Over and above all other economies, however, is the reliability of equipment. The maintenance of an uninterrupted car movement, which is afforded only by highly efficient equipment, produces the most important saving of all, for it results in getting the waiting nickels of the profitable short riders and aids materially in obtaining the much desired good will of our critical public. Careful analyses of car performances are of material assistance in this problem. There are a number of instances where earnest study and efforts have reduced the run-in failures as much as 60 per cent and the cost of operation 12 per cent. Are such methods worth while? The answer is, just try them and decide for yourselves. Looking at this problem from another angle, it should be observed that high efficiency means low costs.

CAR DESIGN AND EQUIPMENT

The design of a car structure contains many possibilities for economy, as is evidenced by recent developments in a number of our large cities. The present standard form of car structure is an inheritance of the pioneer period of horse and steam railroading. Considered in its elementary form it is a rectangular box at each end of which are trucks and stairways for the loading and unloading of passengers.

This particular form of car construction, even unto this day, is satisfactory for steam railway and suburban service where distances of sufficient length do not warrant minimizing the physical difficulty of entrance and exit. Steam railways, suburban roads and elevated lines in many instances have recognized this burden to passengers by constructing the station platforms on a level with the car platforms. Little or nothing, however, has been done in street car service in this respect. Since the distances to be traversed by cars are extremely short, primitive steam railway methods and their types of car structures are not so well suited for city work. Endeavors to overcome this particular phase of our problem have, as you know, resulted in introducing in different cities center-entrance cars of various types, which, from experience thus far obtained, apparently solve this and other vexing features of our complex transportation problem in a highly satisfactory manner. Hence it is now no exaggeration to say that center-entrance types of cars are here to stay. Many of our operators may be justified in doubting and questioning this contention, and if so it may not be amiss to start a little missionary work on this subject.

Our present standard types of cars require passengers to clamber from the ground over the tops of motors and other apparatus, not infrequently for a vertical distance of 40 in., which operation in this character of service is not only unnecessary and burdensome but is a constant hazard to life and limb. Compare this, if you please, with the safe, simple and logical method of entering such a type of car at the center merely by raising the foot the height of a curb or an ordinary house step and then traversing a minimum distance, and you have at once the difference. Add to this the further striking fact that boarding and alighting accidents can and have been eliminated by this particular design of car and you begin to appreciate that there is some real pleasure and value in store, not only for ourselves, but most important of all for our street railway patrons. Go a step further and duly consider the size and weight of this apparatus called a car and make it suitable for the particular purpose for which it is intended and you will be inclined to believe that there is room for economy even in a subject as old as Methuselah, biblically speaking.

In these center-entrance cars the weight question both for seated and standing loads has been minimized to a degree never dreamed of before. In car design, also, there is such a thing as making a car too large, for its size is usually determined by the requirements of the rush-hour service. It should be borne in mind, however, that the rush-hour service period is the smallest portion of the operating day and that the non-rush-hour period deserves some consideration. The size of the car, therefore, should receive careful attention, for in the light of past events the hit-and-miss methods once in vogue for designing cars are being dearly paid for by many railway operators. Whether a car be of the center-entrance, prepayment or standard type, the all-day passenger load factor should receive due consideration, and the economical medium, with respect to the size, weight, etc., of the car, be determined. The two-motor versus four-motor phase of the question also needs resurrection. The reduction in weights of cars and equipments has, of course, correspondingly reduced horse-power requirements. The combination of reduced weights and horse-power therefore has opened up economical possibilities in the use of maximum traction trucks.

In addition to the safety of entering and leaving center-door types of cars, there is also the vitally important feature of comfort to your traveling public. To understand public appreciation of this phase of the problem, it is only necessary to witness the satisfaction shown in communities where such cars are used. In addition to the elimination of boarding and alighting accidents, attention has also been given to minimizing front-end pedestrian accidents. Improvements in fender design have been made that will reduce very materially the number and seriousness of these accidents, which is not only desirable from a humanitarian point of view through safeguarding the lives of your passengers but in addition produces economy through reducing the legal liability of the railway.

Car ventilation, heating and lighting are also items that are progressing rapidly. When your patrons begin to appreciate the value of adequate car ventilation, public relations are bound to improve. Economical heating is being obtained through the use of thermostats, but how many ot us know the value of this apparatus? The recent rapid development of the tungsten lamp has resulted in reducing this item of expenditure 23 per cent and has at the same time wonderfully improved the lighting effect. What type of lamps are you using?

As a general rule, motor gear ratios should be inventoried from time to time, for it has been found that such records not infrequently produce large economies by showing that the gear ratios should be changed to decrease energy consumption. Likewise, the qualities of the materials with which gears and pinions are now being manufactured should be thoroughly understood, for wonderful results are now obtained with improved metals. When new motors are to be installed field tap control is now the order of the day.

To summarize this subject, new car designs of to-day are admittedly radically different from those of other days, but every difference has a reason, and each reason has an economy. In other words, the problem is apparently now being more thoroughly analyzed, after which the most suitable design of equipment is selected to meet the conditions.

PREPAYMENT OPERATION

Methods of fare collection are receiving more attention than ever before, and it is now only a question of how valuable prepayment may prove to be. A notable demonstration of its value has just been made by the introduction of prepayment cars on the Fifty-ninth Street line of the Third Avenue Railway, New York. The change from the ordinary non-prepayment car, which was made overnight, resulted in a revenue increase of 9½ per cent, notwithstanding the fact that the car mileage was reduced 4½ per cent. The annual report of the Chicago Railways Company for the year ended Jan. 31, 1912, shows an increase in gross receipts of 63 per cent for the past four years. There are some 1500 pay-as-you-enter cars in that company's service, and while this increase in receipts can partly be accounted for through the normal growth of Chicago, and the railway's business, a considerable margin can still be attributed to improvement in fare collection. The importance of fare collection is, of course, appreciated by all, but what have we done to take prompt advantage of the methods that are now known to be entirely satisfactory?

The fare box has been extensively introduced as an adjunct to prepayment operation. The value of this apparatus is contained in its moral influence on the conductor, and when it fails mechanically its influence and many nickels are lost at the same time. Fortunately, the remarkable development of the fare box indicates that mechanical failures and general cost of upkeep are becoming very low. On the Third Avenue Railway, for instance, two men suffice to maintain about 550 boxes.

PLATFORM ECONOMIES IN ENERGY CONSUMPTION

Bonus and piecework systems have been mentioned as means for rewarding the workingman who helps to produce economies in the shops. There is also the question of extending this reward to the efficient train operators who fulfil the schedule requirements in the most economical way through minimizing the consumption of electrical energy with its coincident saving in brakeshoe and wheel wear, etc. Different methods of doing this have been followed both here and abroad. Investigation will demonstrate that any number of companies are now obtaining savings of from 7 per cent to 15 per cent in energy consumption, 30 per cent to 40 per cent in brakeshoe wear and 20 per cent to 30 per cent in wheel wear. Good economy, you will probably agree, but what does it mean to you?

CONCLUSION

Some of the foregoing economies have long been established, while others are of very recent date. The question which each member of the New York State Electric Railway Association should ask himself is: "Of what value are they to me?" Another pertinent question is: "What can this association do to further the introduction of these economies?" We would suggest that means be provided by this association to conduct a thorough investigation of an assigned number of topics during the ensuing year so that costs and methods may be compared and considered by those who find that they are not using the best methods after all. Such an investigation will bring an equitable reward to the association and its member companies, for it will serve as a general round-up to show us where we are.

TABLE I—COMPARATIVE STATEMENT SHOWING RECEIPTS FOR THIRTY DAYS PREVIOUS AND THIRTY DAYS AFTER MARCH 25, 1913. ORDINARY CARS OPERATED PREVIOUS TO MARCH 26, AND P. A. Y. E. CARS AFTER MARCH 26

	Receipts	Average Receipts Per Day	Mileage	Average Miles Per Day	Average Receipts Per Car Mile
With ordinary cars from Feb. 24 to March 25, inclusive	$39,718.35	$1,323.94	78,553	2,618	$0.5057
With P. A. Y. E. cars from March 26 to April 24, inclusive	43,408.70	1,446.96	74,769	2,492	0.5806
Increase	$3,690.35	$123.02			$0.0749
Decrease			3,784	126	
Percentage	9.3	9.3	4.8	4.8	14.8

APPENDIX A—MECHANICAL AND ELECTRICAL ECONOMIES

The following statement of mechanical and electrical economies is of particular interest in proving that many of the betterments made on one system are applicable to others even where there is an appreciable difference in operating conditions.

TABLE II—DETAILS OF DAILY OPERATION, SHOWING RECEIPTS, CAR MILES AND RECEIPTS PER CAR MILE FOR THIRTY DAYS' OPERATION WITH ORDINARY CLOSED CARS FROM FEB. 24, 1913, TO MARCH 25, 1913

	Receipts	Car Miles	Receipts Per Car Mile
Feb. 24	$1,281.55	2,628	$0,4876
Feb. 25	1,304.10	2,600	0.5015
Feb. 26	1,350.15	2,610	0.5172
Feb. 27	1,340.75	2,601	0.5154
Feb. 28	1,316.95	2,685	0.4904
March 1	1,438.70	2,829	0.5085
March 2	1,123.85	2,215	0.5073
March 3	1,317.30	2,734	0.4818
March 4	1,301.65	2,720	0.4875
March 5	1,349.85	2,698	0.5003
March 6	1,373.20	2,727	0.5035
March 7	1,370.05	2,650	0.5170
March 8	1,364.40	2,752	0.4957
March 9	1,056.05	2,092	0.5048
March 10	1,427.65	2,526	0.5651
March 11	1,329.20	2,666	0.4985
March 12	1,355.60	2,613	0.5187
March 13	1,348.70	2,705	0.4985
March 14	1,329.30	2,734	0.4898
March 15	1,491.30	2,762	0.5399
March 16	1,029.40	2,142	0.4805
March 17	1,402.45	2,569	0.5459
March 18	1,340.35	2,606	0.5143
March 19	1,327.10	2,704	0.4907
March 20	1,360.70	2,661	0.5113
March 21	1,286.10	2,619	0.4910
March 22	1,431.60	2,814	0.5087
March 23	1,183.40	2,340	0.5057
March 24	1,363.40	2,754	0.4950
March 25	1,423.55	2,797	0.5089
Total	$39,718.35	78,553	$0.5057

Reference has been made in the foregoing paper to welding. Here are some figures from the practice of the Third Avenue Railway as described at length in the ELECTRIC RAILWAY JOURNAL for June 21 in an article entitled "Electric Welding and Motor Rejuvenation." In one week $354.90 was saved by welding instead of scrapping axle lugs, controller frames, pony axles and shafts, and in the week following three men avoided the expenditure of at least $500 more. The work of this company not only includes the items mentioned but a great many others such as filling dowel holes, renewing brakeshoe heads, welding journal boxes, patching gear cases and, most striking of all, converting an inefficient split-frame motor to a practically modern solid-frame type. Perhaps the most illuminating fact of this company's experience is that it has trained its own men to do the work instead of relying upon outside contractors, and that it has secured consistently good work, not by use of magical formulas, but by enabling its men to labor under the best surroundings. After reading the record of this performance, we might well ask ourselves, "Why should there be a scrap pile after all?"

The Brooklyn Rapid Transit Company has carefully tabulated some of its improvements as follows*:

Old-type commutators were slotted at an approximate cost of 35 cents each with a consequent saving in motor maintenance cost, due to fewer flash-overs and less brush wear, coil overheating and commutator flatting, of approximately $0.29 per 1000 car miles.

TABLE III—DETAILS OF DAILY OPERATION, SHOWING THE RECEIPTS, CAR MILES AND RECEIPTS PER CAR MILE FOR THIRTY DAYS' OPERATION WITH P. A. Y. E. CARS FROM MARCH 26, 1913, TO APRIL 25, 1913

	Receipts	Car Miles	Receipts Per Car Mile
March 26	$1,532.45	2,131	$0.7191
March 27	1,507.50	2,476	0.6098
March 28	1,561.50	2,533	0.6116
March 29	1,528.90	2,643	0.5785
March 30	1,116.95	2,040	0.5475
March 31	1,447.75	2,542	0.5695
April 1	1,435.25	2,543	0.5644
April 2	1,444.70	2,404	0.6011
April 3	1,454.65	2,501	0.5818
April 4	1,425.55	2,519	0.5660
April 5	1,536.65	2,756	0.5576
April 6	1,119.25	2,132	0.5250
April 7	1,440.25	2,374	0.6067
April 8	1,448.35	2,609	0.5551
April 9	1,458.65	2,647	0.5511
April 10	1,466.95	2,509	0.5846
April 11	1,576.65	2,534	0.6222
April 12	1,594.05	2,603	0.6124
April 13	1,095.00	2,153	0.5086
April 14	1,441.55	2,532	0.5693
April 15	1,604.60	2,574	0.6234
April 16	1,520.95	2,641	0.5759
April 17	1,530.90	2,569	0.5959
April 18	1,496.50	2,526	0.5924
April 19	1,590.50	2,627	0.6054
April 20	1,195.75	2,213	0.5403
April 21	1,461.90	2,633	0.5552
April 22	1,427.85	2,573	0.5549
April 23	1,470.30	2,536	0.5798
April 24	1,476.90	2,676	0.5519
Total	$43,408.70	74,769	$0.5806

All old field coils were impregnated with an insulating compound for approximately $1.84 per motor. Experience indicates that it is worth while to install a vacuum impregnation plant at home if the company has at least 2800 coils. If the property is too small to operate such a plant, it would still be worth while to send the coils for treatment to an outside company.

Oil channels of elevated motors were reconstructed at an approximate cost of 20 cents per motor, thereby reducing the cost of lubrication from approximately 15 cents to 10 cents per 1000 car miles.

Lead-base bearing metal was changed to high-grade tin-base bearing metal at an increased cost of 10 cents to 49 cents per lb., but the actual saving was a decrease of 5 cents per 1000 car miles. The change also reduced the number of hot bearings, not only saving the average replacement cost of 10 cents per journal, but avoiding the accompanying and more costly loss of one and a half hours' car time and road delays to traffic.

Improved brake rigging was installed at the cost of $10 per car; different types of brakeshoe heads were reduced from twenty-nine to three on a great variety of elevated and surface rolling stock (including maximum traction trucks), thus saving 15 cents per 1000 car miles in brakeshoe costs.

Controller improvements were made at an average cost of $4.84 each and periodical overhauls at $3 each have reduced the cost of maintenance on surface lines by approximately 10 cents per 1000 car miles in addition to decreasing controller flashes and burn-outs.

Older type motors have been rebored for new bearing fits and fitted with bearing caps and oil cups at an approximate cost of $60 per motor, the work being done with a horizontal boring machine which had been rebuilt at a cost of $496. The maintenance cost of these old motors due to these improvements has been lowered to 44 cents per 1000 car miles, and the purchase of new motors costing $400 to $600 each has been postponed for years. The saving for the first eleven months of the fiscal year ended June 30, 1913, was $80,000.

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*See ELECTRIC RAILWAY JOURNAL, Nov. 9 and Dec. 7, 1912, and Jan. 18 and March 15, 1913.

Manganese bronze check plates for older types of trucks have decreased the cost of maintaining journal bearings and check plates by approximately 50 cents per 1000 car miles.

APPENDIX B—TRANSPORTATION ECONOMIES

The accompanying tables covering the operation of the Fifty-ninth Street Crosstown Line, New York, show the receipts, car miles and receipts per car mile from Feb. 24 to April 24, 1913, inclusive. For the thirty days from Feb. 24 to March 25 this line was operated with standard closed cars of double-truck type; from March 26 to April 24, the following thirty days, double-truck closed cars with prepayment platforms and fare boxes were used.

STANDARD METHODS FOR MECHANICAL DEPARTMENT

BY JOHN SIBBALD, MASTER MECHANIC FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD

The mechanical departments of railways have for a long time been directing their efforts toward the standardization of apparatus. Now we are occupied with the problem of standardizing the methods used in inspecting and repairing apparatus. The day of crafts is fast passing. When the present generation of craftsmen are gone it will be difficult to fill their places. Machinists, carpenters, blacksmiths, men who have learned their trades in a broad way by apprenticeship are no longer in the process of making. The machinist of to-day makes of his son a lawyer, a doctor or an engineer. As a result it is difficult to hire men, at the wages we can afford to pay, who can do the work required without close supervision.

The typical employee of to-day is one who was hired for an unimportant position and has gradually worked up through the more difficult positions as they became vacant. His methods at any time are a composite of the methods he has seen used and the methods suggested by his own ingenuity. The satisfaction which he gives depends upon his opportunities for seeing work properly done, the acuteness of his observation and his natural cleverness. The resulting methods seldom represent the best way to do the work. The class of workmen we are able to employ seldom possess enough of the science underlying their art to plan it in the best way.

We believe that to make our workmen effective it is desirable to furnish them with written instructions for various operations. A short time ago the company with which the writer is connected undertook to do something along this line. We have taken up one item at a time. Our foremen are informed what subjects are to be considered, and they collect what data they can. A foremen's meeting, presided over by the head of the department, is then held. The subject is analyzed and discussed, and if possible a standard practice is outlined. If this is not possible, the subject is put over for further investigation. Consideration is given to the materials and tools used and to the sequence of operations.

It is surprising the amount of thought that can be given with profit to comparatively simple operations. As an example, take the familiar instructions for lubricating axle journals. There is one method of packing a journal box that is used everywhere. It is one of the most effective operations that have been developed by railroads. We believe that the almost universal use of this particular method is due to the wide circulation of printed instructions. These instructions have been furnished by the companies selling lubricating oils, the magazines read by railroad men and, in some cases, by the railroad companies themselves. We think that the idea illustrated by this example can be extended to other unit operations of maintenance.

When, in our foremen's meetings, we find it possible to decide upon a method as standard practice, it is incorporated in a loose leaf bulletin. To insure the bulletins being practical, the men who supervise the work are given a voice in its discussion. Instructions are to be simple. They are written in terms understood by the workmen. Where illustrations are required photographs are if possible used. Bulletins are issued to the foremen in loose-leaf binders and are at once put into use by them. After a bulletin has been in use by the foremen for about six months it is our intention to revise it in the light of this experience, print it and furnish copies to the workmen.

Of course, this idea can be made ridiculous by its application to operations which are seldom repeated or which are of little importance from the standpoint of reliability or cost, but within its legitimate field it can be used to advantage. We do not wish to be understood as thinking that an art can be taught entirely by printed instructions, but we do think that even where high manual skill is necessary a man can be aided in acquiring the technic of an operation by instructions which point out the best methods and the common cause of failure.

CONSTRUCTION OF CREW AND CAR SCHEDULES

BY JOHN J. DEMPSEY, SUPERINTENDENT OF TRANSPORTATION NEW YORK CONSOLIDATED RAILROAD, BROOKLYN

The construction of crew and car schedules is considered one of the most important features in the operation of a railroad, but in spite of the care which is usually devoted to this work, it is possible for most of us to attain an even greater degree of efficiency in this direction. While it is impossible to lay down hard and fast rules for the construction of schedules, as the schedules must conform closely to the characteristics of the traffic moving, there are certain cardinal principles which will insure economy and, at the same time, render possible the greatest efficiency in operation.

The first point to determine is "Where does the traffic on this line originate and where does it go?"

Careful observations by competent inspectors and checking of station accounts should make this perfectly plain in a short time. It may develop that the traffic fluctuates but little and originates principally at either end of the line and rides all the way through; however, this is an exceptional condition. If that is true, the superintendent's problem is a comparatively simple one. But if the conditions are similar to those on some of the lines in Brooklyn, where the line is partly in a business section, partly in a well-settled residential section and partly in a sparsely settled suburb, the problem is complicated by reason of the varying volume of traffic in the different sections and the possibility of waste mileage. Under these conditions, it is proper to schedule a reasonable interval between terminals during all hours of the day. In determining what a reasonable interval is we should not confine ourselves solely to a consideration of the volume of traffic but should operate a headway that is short enough to offer an inducement to ride. This through service will probably not make adequate provision for the traffic at the point of maximum loading, to care for which short-line service must be operated within reasonable limits. For instance, suppose a line 10 miles long with a 4-mile section in which the density of traffic is considerably greater than on either side. A four-minute interval from terminal to terminal will furnish good service for the line as a whole, but on the lighter sections a six-minute headway would be reasonable, and in the middle section, even with a four-minute headway, overloads occur. If we operate a six-minute headway through and a six-minute headway on the 4-mile section, we shall then give perfectly adequate service on the entire line with a three-minute headway on the 4-mile section. But we are accomplishing more than this. We reduce the car mileage, which means a reduction in platform cost, in power consumption, in maintenance of way and structure and of equipment, and we are able to do this with a smaller number of cars. This point is one which deserves most careful analysis by a superintendent who thinks he is short of equipment.

COST OF RUSH-HOUR SERVICE

It must always be borne in mind, when the relation of the earnings of a road to the capital invested in cars is considered, that it is the additional equipment required exclusively for rush-hour service that constitutes the heavy burden in the way of motive power interest charges per car, as its earnings are confined to four hours. The equipment required for non-rush hours is a fixed quantity, and its cost bears a proper proportion to its use; or, to put it another way, it is out on the road practically all the time and under normal conditions its earning capacity is such as to make the interest a reasonable proportion of the receipts. But on most roads this non-rush equipment is only about 40 per cent of the total. This means that 60 per cent of the cars are making only about four hours a day, five and one-half days in the week, or, to be more exact, only forty-six full days of work, less than 13 per cent, during the year. Then we must also not lose sight of the fact that the cost of car equipment represents only about two-fifths of the entire capital investment in connection with that equipment. Power houses, transmission lines, car storage, additional tracks, all follow in natural sequence, and the interest on these capital charges must be earned from the transportation of passengers. When the maintenance and operation of these additional facilities soon show up in the debit column, the superintendent is asked, "Where is your increase in receipts? What is the explanation of these cost percentages?" and his dilemma is due largely to loosely constructed schedules.

It seems to me that excess equipment is undesirable because I know that if it is a question of getting every possible mile out of every car, the company will receive the greatest possible return on its capital investment. Furthermore, every conscientious man (and we are all conscientious men) wants to have enough work to keep him busy, else his interest in his work wanes. If a man has to scratch to make both ends of his schedule meet, if he has to devote hours and days of hard study to solve his operating problems, his measure of success has all the more gratification in it. But if he has a yardful of empty cars and a hundred idle crews hanging around, and it is only a question of putting the trains out on the road, he feels that about 4 o'clock in the afternoon is the proper time to adjourn to the club or take some other form of recreation, and I hesitate to dwell upon the picture that follows.

CONSTRUCTION OF CREW SCHEDULES

Let us pass to the second point—"the construction of crew schedules."

After determining the proper car schedules for the line, it is not simply a question of putting a crew on each car and letting it go at that. We must so construct our crew schedules as to give every man a reasonable day's wages within reasonable hours. Probably by neglecting this point we could crew our cars more cheaply, but it would be at the expense of ultimate efficiency. At the same time, the company must receive fair treatment, and to this end the crew schedules should be built so as to give the company a reasonable percentage for hours worked to hours paid. On a line which has rush-hour traffic morning and night it is necessary to make many runs swing. This invariably involves a time allowance. The superintendent should carefully consider the possibilities of using in some other branch of the service crews who would otherwise draw time allowance. There are many such ways. Usually the operation of work trains and shifting of equipment is confined to non-rush periods; these trains can generally be crewed with men on swing. It is nowadays not considered necessary by the large companies which operate many lines to have a repair shop on every line. Concentration of shop facilities makes for economy in maintenance. So it can generally be arranged to operate the car light to the shop to which it is assigned, to pull it in after the rush-hour periods and with the same crews and to put these cars into service again direct from the shop. This means a saving in car mileage and no additional cost for crews. Other means, incidental to the situation, will occur to the superintendent who watches these things closely, and it is possible only by constant study and careful scrutiny to catch up all the loose ends which, though individually small, collectively mean many thousands of dollars each year.

ANALYSIS OF ACCOUNTS

I have referred several times to the necessity for close study of operating conditions, with a view to increasing efficiency and, at the same time, reducing costs. This study must not, however, be limited to the operating conditions. The general manager of the road has no time to go into details. That is what the superintendent is employed for. The manager looks only at the results. If complaints against the service come in, he will call the superintendent to account, but the careful man will see well to it that such complaints are scarce. Every month, however, the manager analyzes carefully the official statement of the preceding month's operations and he is apt to look at the "cents per car mile" column perhaps a little longer than at any other. He measures to a certain degree the success of operation and the superintendent's efficiency by the results shown there, but he cannot measure the adequacy of the service by those figures. It, therefore, becomes the superintendent's task to keep up his car-mile earnings and give the public proper accommodations.

The next column generally regarded as of importance is the "cost per car mile," the difference between which and the receipts per car mile is called "operating income," or, in other words, what the superintendent is earning for his company. I think that most people have a misconception of the exact importance of this unit. Many factors enter into its make-up, and it is well-nigh impossible to detect from even a most exacting dissection of this unit whether there is waste or not, and it is quite difficult to locate it if you make, perhaps, a good guess that there is waste. But take the cost per car hour, divide it into its component parts and you will find what you seek. Platform cost bears a certain definite relation to car hours. Platform cost consists of the wage hours paid to motormen and conductors while actually operating cars, plus lay-over time and time allowances. If your schedule calls for 100,000 car hours a month and the average platform rate per hour is 47 cents, you would figure the normal cost at $47,000, exclusive of lay-over time and any special concessions. These items may amount to 10 per cent or 15 per cent; but when the monthly statement comes in you find your car hours cost $56,000. Here is the telltale. You immediately go on a still hunt for the difference and probably will find that an appreciable percentage can be saved either by reconstruction of the train schedules or reassignment of crews.

CAR LAY-OVERS AND CREW LAY-OVERS

Generally an arbitrary lay-over is granted crews; this lay-over in rush hours is almost invariably longer than the interval operated. If the car lay-over is scheduled the same as the crew lay-over, some equipment is lying idle during the busiest part of the day. More cars are then needed than would be required if the car lay-over were only long enough to afford reasonable leeway to assure the starting of the car on its next trip on scheduled time. In order to do this, we have found it economy to employ relay crews during rush hours. The relation of the arbitrary lay-over to the length of the run should be carefully figured out and the percentage of lay-over time reduced to the consistent minimum. If a five-minute lay-over is the standard, and the length of run is only twenty minutes, the lay-over time amounts to 20 per cent of the total time paid. It is often possible by "looping" or by combining trips over two lines, one of which is long and the other short, to make reasonable run lengths and effect a substantial reduction in the lay-over percentage. Frequently the lay-over time on the short line can be entirely eliminated.

RELATIONS THAT SHOULD EXIST BETWEEN RAILWAY EMPLOYEES AND THE SUPERVISORY FORCE.

BY N. W. BOLEN, SUPERINTENDENT OF TRANSPORTATION PUBLIC SERVICE RAILWAY, NEWARK, N. J.

The introduction of the word "should" into the subject assigned was a happy thought. It makes the task a pleasant one and permits contemplation of ideal conditions, rather than compelling adherence to conditions as they are. It may be reasoned that the discussion of ideals is of little value in these intensely practical days, nevertheless the setting up of standards above those followed in everyday operation will tend to bring the actual nearer the ideal.

Responsibility for the character of relationship existing between the employee and the official rests primarily with the official. He is the leader, and to a large extent his attitude determines whether the dominant note in the rank and file shall be loyalty, with its attendant blessings of co-operation and team work, or disloyalty, with its consequent evils of friction and discord. Instances may be cited where the official has tried faithfully to create a spirit of mutual confidence and esteem only to fail completely owing to outside influences. While such cases do exist, it does not alter the situation so far as the duty of the official is concerned, namely, to foster and encourage proper relationship with his employees.

The employee's attitude in the matter is governed to a large extent by his environment. If he is surrounded by influences opposed to the corporation he is expected to serve, and his daily reading is confined to literature which steeps the public mind in suspicion and distrust, his attitude probably will be passive, if he is not entirely arrayed against the policy of the official. If there be added to these surroundings those influences which are constantly at work to create and widen a breach between the employee and the employer, the establishment of mutual confidence becomes very difficult. But if an optimistic view is taken of the problem, and the officials concerned possess a real desire to create cordial relations, the men can be reached.

The busy official of a big system, whose many duties leave but scant time for planning personal interest campaigns, is prone to dismiss the subject with the statement that close relations with the employee may be possible on a small road but are out of the question on a large property. It is an unfortunate view to take. The operating head of a large system, who out of the very nature of things cannot come into intimate touch with many of the employees, should imbue his subordinate officials with a lively interest in the personal welfare of every man coming under their direction. A supervisory force which catches the personal interest spirit will prove a formidable defense against the attacks of the devil of unrest. The question of relations is one entirely distinct from welfare work. The establishing of mutual good will and co-operation may or may not involve participation in the latter, but in any event it is essential to securing the best service.

It is, I think, of the utmost importance to inculcate the idea of what, for lack of a better word, I shall call co-operation, although that fails to give full significance to what is intended. What is meant is the firm establishment in the minds of every one on the property, from the head down, that he is engaged in a big work; that no matter whether the part he plays in it is great or small, nevertheless it is of importance; that he has the right to expect co-operation, encouragement and good will from all of his fellow workers whether they occupy positions superior, equal or subordinate to his own.

The idea that each man has a stated stint to do, that when he does it he has earned his wage, and that there is no reason why he should interest himself further in the affairs of the company or the affairs of his fellow workers, means ineffective service.

The work of eradicating this attitude on the part of employees must begin with the supervisory force. You can never expect an employee really to interest himself in company affairs until the company takes some interest in his affairs; until it makes it evident that it regards the employee as a human being, made of the same clay as the man in power, with the same desires, the same needs, the same motives and the same attributes—not a mere cog in a piece of machinery, expected to do a certain work, to receive no credit for superior performance and to be cast aside for failure.

Again, the effort must start at the top. The spirit of humanity must be transmitted from the highest official to his immediate subordinates and from them down through the intermediate steps until it reaches the man on the platform or in the shop. You know how it is in any organization. The president calls down the manager; the manager roasts the superintendent; the superintendent berates the bookkeeper, and the bookkeeper takes it out on the office boy.

It works contrariwise as well. The spirit that pervades any organization is the spirit of its head. While human nature is human nature, you are never going to get the right kind of service out of men who are made surly, obstinate and disobedient because they are convinced that their superiors have no sympathy with them but desire only to get every possible bit of work out of them and at the lowest cost.

How much better it is if the attitude of all alike is this: "Here we are, 600, or 1000, or 4000 men—directors, president, vice-presidents, managers, superintendents, supervisors, engineers, foremen, motormen, conductors, shopmen and others—all trying to work this railway in the best possible way to secure proper returns to the investors, to furnish good service and to secure the best conditions for ourselves. At bottom we are all men of much the same kind. By reason of education or experience or some other circumstance we are occupying different positions, but we all have our work to do and the thing is to do it right.

"Rules are necessary, discipline is necessary, obedience to orders is necessary, stern measures to secure these things are necessary, if the work is to be done well—but we don't have to cease to be human beings to accomplish this; we can still have sympathy with each other; we can still treat each other with courtesy and consideration, and we can still recognize that, after all is said and done, we are all simply men entitled to receive fair treatment from our fellow men and obligated to give it."

A word of greeting to a subordinate does not cost anything, but it may make that man a friend, and, moreover, and this is as important a consideration as is connected with the subject, it may instil the idea of courtesy in that employee's mind, may teach him that courteous treatment of others is worth while, and so affect his dealings with the public with whom he is in touch and who are apt to judge the company by his actions.

The subject assigned is one which must necessarily be treated in generalities, but there is one rule for men in authority which I think so vital that I am going to come down to particulars and give it here. It is: "Never discharge any man in a spirit of anger."

There is only one real reason for discharge, and that is that the usefulness to the company of the man discharged has ceased. You are in no position to determine that if you are angry. It is a matter for calm deliberation. You must always remember that experience in employees is a thing to be conserved as having actual value, which can be shown in dollars and cents if necessary. Make your men see the circumstances from your viewpoint. The successful operation of the property is the aim of your efforts and should be of theirs. Rules and regulations are necessary to such successful operation. Violations of those rules must be prevented. Punishment for violation is requisite for this. The employee is not the victim of your dislike or anger, but must stand the brunt of his own misdeeds because the successful operation of the property, your business and his, demands it.

My experience has been that this attitude has accomplished results, that dismissals and suspensions are fewer, and that the men themselves better appreciate the true meanings of rules and discipline and increase their efforts to obey.

Be reasonable—that is the first rule for the supervisory force.

Be courteous—that is the second, and always consider that you are dealing with men and not machinery.

The property with which the writer is connected has for a number of years been directed by men heartily in sympathy with the promotion and maintenance of pleasant relations with the employees. The application of the policy indicated has taken a number of forms. The first attempt to establish mutual confidence started with Christmas entertainments, which were followed by the formation of social clubs among the transportation employees. Here the value of co-operation was recognized and accepted, and the management of the social organizations was turned over to the employees. The wisdom of this arrangement has since been fully demonstrated.

Following rapidly came the ladies' auxiliaries, which provide social features for the wives and mothers of the employees. Such gatherings are of much value and exemplify the truth of the old adage that "The hand that rocks the cradle rules the world." Fishing trips, shore dinners and pool tournaments have done much to encourage closer relationship between officials and employees, while the fascination of the great American game has resulted in a baseball league of twenty-three teams, playing in two sections on account of the size of the circuit. This aggregation of 250 players, with their following of some 3000 enthusiastic fellow employees, comprises a force which does much in the interest of harmony.

In early years carhouse plans were drawn with careful regard for the protection and proper housing of the rolling stock, while the men, the most important asset of the company, were left without shelter or convenience of any description. Times have changed, and one of the omens of good that can be noted is the importance attached to providing cheerful and comfortable quarters for employees in the up-to-date carhouse. Carhouses of recent design on this property provide assembly rooms, complete with stage and piano, reading and pool rooms, together with first-class sanitary arrangements. A recent addition to the comfort of employees consists of restaurants, conducted not by the company directly but sufficiently under its supervision to insure wholesome food at all times at reasonable prices.

What is known as the company's welfare plan became effective Jan. 1, 1911. This plan provides, without a cent of cost to the employees, a sick benefit of $1 a day after the first week's illness and continuing at this rate to a maximum of ninety days in any one year. It provides also for an insurance of $300 upon the life of the employee, payable to his beneficiaries, and for the veteran, who has yielded his best years to the service, it provides a comfortable pension. That this plan has done much to promote pleasant relations between employee and employer is shown by the larger number of men remaining in the service and the better spirit manifested by all in the performance of their daily tasks.

FREIGHT AND EXPRESS ON ELECTRIC ROADS

BY FRANK WALSH, GENERAL MANAGER ELECTRIC EXPRESS COMPANY, SCHENECTADY, N. Y.

The purpose of this paper is to call attention to the differences in the freight and express methods of electric lines. The practice of the steam roads is practically uniform with the exception of the classification of freight, and even that is divided into only three groups, the official, Western and Southern classification territories. However, in looking over some twenty electric freight and express tariffs, I find the following variations in the classifications:

Four companies use individual classifications, naming rates per package or per 100 lb.

Three companies use official classification with certain exceptions.

Three companies use straight official classification.

Three companies use part of the official classification, using only first, second and third-class rates and some commodity rates.

Seven companies use a classification based on the old-line express companies' classification, with a flat rate per 100 lb., with certain exceptions.

Out of these twenty tariffs, we find that fourteen companies either make deliveries direct from car to consignee or from their warehouses, while six companies maintain a wagon service. This shows that there is a big difference in operating methods of electric lines, and they cannot all be right. The classification of freight also needs careful consideration. The official classification used by the steam roads is the product of years of scientific study for their needs, but in my judgment is not just what is needed for electric roads. Our proposition in handling freight is different from that of the steam roads. If we get a lot of coarse, bulky freight, we must put on extra car service, while the steam road only puts another freight car on its train. Only a small percentage of the freight moving over steam road lines takes higher than a third-class rate, and unless we can run trains or trailers, it is the high-class freight that we must seek.

The territory of most electric lines is limited. In very few cases are terminals of the roads 100 miles apart, and in a territory no larger than that there is not enough of what is termed express matter to pay for operation. The success of the old-line express companies is to a large extent due to the vast mileage they cover. Electric roads, then, must do a business which is a combination of express and freight business, so there is no reason why operating and classification of freight should not be nearly uniform. Variations in local conditions would no doubt, in some instances, change operating conditions, but this would be the exception and not the rule.

There is much difference between the official freight classification and the express classification. The express classification rates articles as merchandise and general specials, while the official freight classification rates articles in some six or eight different classes. Some articles which are rated by the steam roads as first class are rated by the express companies as general specials, which is cheaper than their merchandise rate. On the other hand, some articles rated by steam roads at third, fourth or fifth classes are rated by the express companies at double their merchandise rate. These are quoted as just one or two instances of the difference between the two classifications, and I think are an argument in favor of getting out an electric freight and express classification which would be to some extent a combination of the two, at least that part of them that would cover our needs. There are some classes of freight that take low rates on steam roads that it would not pay the electric roads to handle, even if rated at first-class rates. Hence, in making up an electric classification, this is one of the things that would have to be considered.

A properly managed and well-developed freight and express department is a valuable addition to any road. When the merchant gets good service by the electric line he generally has a good word to say for it, and he will patronize it when he wants to travel.

The great question is: Does it pay? In most cases it does. Every freight department should pay its proportion of the operating expenses of the road. I have seen reports where proper charges had not been made against the department, and it showed big profits. I have seen others where deficits were shown by the freight department, but how they had exaggerated the operating and maintenance charges! Of course, freight and express is not all profit. The item of loss and damage must be watched closely, or it will become excessive. In any event, some uniform method of operating and of classifying freight should be adopted. I would urge that the managers of the different properties get together and look into it carefully, for it is a subject worthy of consideration.

PROPER LOCATION FOR TROLLEY WIRE ON CURVES AND CORRESPONDING LOCATION OF OVERHEAD FROGS

BY JOHN H. BARNARD, J. G. WHITE ENGINEERING CORPORATION

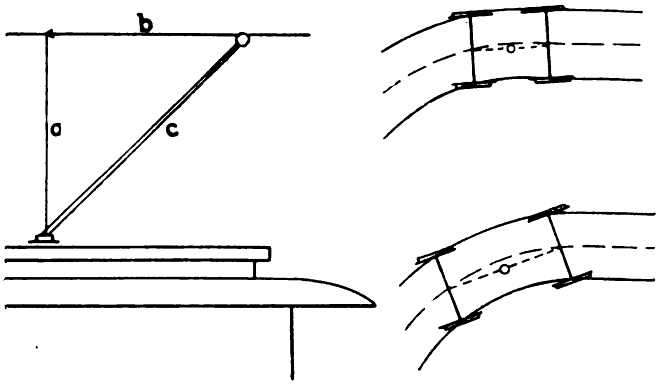
There are two ways of expressing the proper location of an overhead trolley wire. It may be said either that the wire should form no angle with the trailing trolley wheel or that the plane of the latter should be perpendicular to the radius of the wire at the point of contact. While the former may be the view usually taken upon this matter, and it answers sufficiently well for tangent track, the latter idea leads to a clearer conception of where the trolley wire should be located through curves and in the approach to and departure from them.

A fair analogy to the curve desired is the track of the rear wheels of a wagon turning a corner. In that case the plane of either rear wheel is always at right angles to the momentary radius of the curve that it is tracing. So it should be with the trolley wheel and the wire which it is following.

To plot the track of the rear wheels of a wagon it is necessary to know not only the path of the front wheels but the length of the coupling between the front and rear axles, and similarly, in plotting the analogous curve to represent the position of the wire to be followed by the trolley wheel, it is equally necessary to know how far it trails behind the spindle of the trolley stand.

As shown in Fig. 1, this depends, first, upon the difference in height between the trolley stand and the trolley wire, and, second, upon the length of the trolley pole. This resulting distance, shown as the side *b* in Fig. 1, may well be expressed as the "trailing distance" and as such will hereafter be designated. In passing, however, it will be remarked that this distance is not always constant for the same car and pole but will vary with differences in the height of the trolley wire along the route traversed. Again, while not strictly true, the statement is sufficiently correct for all practical purposes that the trailing distance for all cars traversing a given route should be approximately the same. In other words, the cars with a higher roof should have correspondingly shorter trolley poles than those with a lower roof.

Besides ascertaining the trailing distance, it is also necessary to the plotting of the desired curve to trace the path which will be followed by the trolley base. There are three possible locations upon the car for this device and, as shown in Figs. 2, 3 and 4, the path traced by the base will differ accordingly. If it is directly over the center of the comparatively short wheelbase of the rear one of two double trucks, its path will be a close approximation to the center line of the track. If it is over the center of the wheelbase of a single-truck car this path will be further removed from the line of the track. If it should be over the center of the body of a double-truck car, its path will be traced by the center point of a line joining the paths described by the center pins of the two trucks and so will be still further removed from the center line of the track.



Figs. 1, 2 and 3—Diagrams of Position of Trolley

Were all track curves circular and all trolleys similarly mounted on like cars, it would not be difficult to derive a more or less accurate rule for determining how far the theoretical position of a trolley wire should vary from the center line of the track so that the plane of a passing trolley wheel might always be perpendicular to the momentary radius of the wire at the point of contact, but the cases most affected are those of short-radius curves, which are rarely circular, and a great majority of tracks are traversed by various classes of cars, so that any sufficiently accurate formula would be entirely too cumbersome for ready application. Fortunately, in practically all curves sharp enough to require other than a cut-and-dry method, the track work is usually a matter of special construction, of which there are invariably at hand the large-scale prints furnished with the special work.

Upon a piece of tracing paper laid over such print it is not a particularly difficult task to plot the paths of the variously mounted trolley bases, and then, with a couple of triangles, to plot the number of points described by the several trolley wheels. Thanks, however, to the ingenuity of an office mate, there has been devised a little template, shown in Fig. 5, representing the mounting of a particular trolley base laid off to a given trailing distance. With such a device it is only a few moments' work to plot many

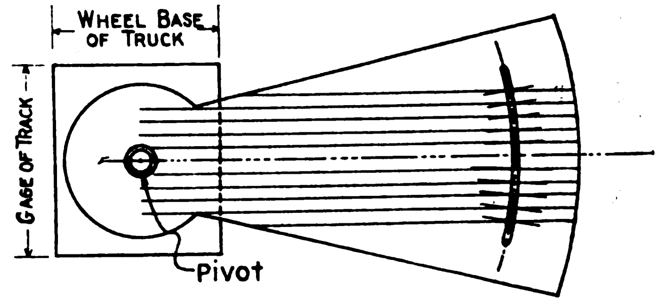


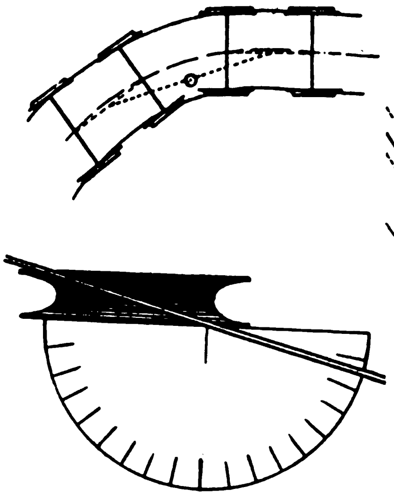
Fig. 5—Template for Laying Out Curves

points, and the device is so simple that one may easily be made for each of the various classes of cars operating over any given line. With several of these there can in a few moments be laid out plenty of points to show the compromise curve best adapted to all classes of cars operated.

Only in the exceptional cases where a bar conductor may be used is it possible to form the conductor to an exact curve, and from Fig. 6 it will be seen that the entrances and departures are not even regular curves. Instead, the conductor forms almost invariably a series of chords only approximating the best location. Instead, therefore, of plotting the ideal curve, it is much more practicable to plot the outside limits beyond which it is not permissible to locate the wire. The shorter and more numerous the chords into which the conductor is broken, the more truly will it approximate the ideal location, but too numerous deflections are not only more costly by reason of the additional pull-offs required, but are less sightly by reason of this quantity of material, and the weight of it tends to pull the poles out of position, slacking the wires and rendering it less accurate as an approximation than one of fewer and longer chords.

This reasoning necessitates the determining of how much the angle of the trolley wheel may differ from perpendicularity with the momentary radius of the wire at the point of contact and how this may readily be ascertained for any particular diameter of trolley wire in combination with any style of trolley wheel which may be used in the manner shown in Fig. 7.

By this simple experiment, with a 2-ft. length of trolley wire and sample of the wheel to be used and an ordinary celluloid protractor, it will be discovered why trolley wheels may, with rare failures, follow a trolley wire which varies considerably from the best location, but it will also be noticed that there is a very sharply defined limit beyond which the wheel cannot be forced to remain in contact with the wire. With small sized trolley wire and wheels with wide U-shaped grooves, it will be found that the wire and wheel may form a rather large angle before disengagement results, but, regardless of the size of wire or form of the groove, the difference between maintained contact and certain disengagement is very sharply defined, and no strength of spring will maintain engagement after the "critical angle" has been reached.



Figs. 4 and 7—Positions of Trolley on Curve

Where there are several forms of wheel running under a given stretch of wire, the "critical angle" which should rule is, of course, that which is the smallest, and to prevent it being exceeded through the giving of poles or slacking of pull-offs, it is well to work to a "critical angle" not much greater than two-thirds of that which may seem allowable.

On the template shown in Fig. 5 there will be noticed a number of lines parallel to the axial line and upon each side of it. Each of these represents a certain "critical angle" for this particular trolley and wire and, according to circumstances, their intersection with the arc *AB* shows a divergence on either side of the theoretical location which it may be desired to allow. So, instead of using the template to plot the ideal location, it may be used to plot the outside limits, and when these limits have been plotted for all classes of cars the chords into which the trolley wire is broken should cross none of these limiting lines. Fig. 9 shows such limiting lines laid out for a single class of car and the arrangement of chords chosen to conform therewith. In Fig. 8 there is shown a rather exaggerated case of a double-track reverse curve designed to permit the passing of rather long double-truck cars, in which it may be seen that for the cars in each direction the trolley wire twice crosses the inner rail and indeed is at points as far as 7 in. or 8 in. inside of the inner gage line.

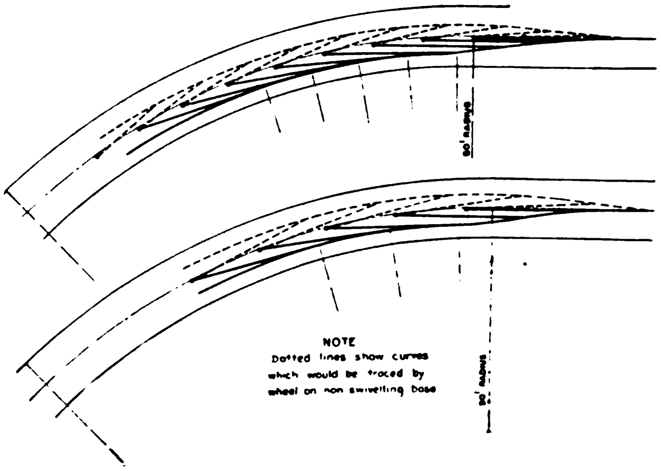

50' Radius
NOTE
Dotted lines show curves which would be traced by wheel on non swivelling base
80' Radius

Fig. 6—Positions of Trolley on Curves

Besides the above facts there is needed one other in the study of the proper location of an overhead frog. This is, that the trolleys of cars following the through line tend to keep the main line wire, and that the only means available for causing the trolley of a car taking the branch-off to select the branch-off wire is the side pull due to the divergence of the car in following the branch-off rails. From this it follows that the further this car is advanced along the branch-off before its trolley wheel has reached the overhead frog, the more positively will its trolley tend to take the branch-off wire. It likewise follows, however, that the further the position of this car's trolley base de-

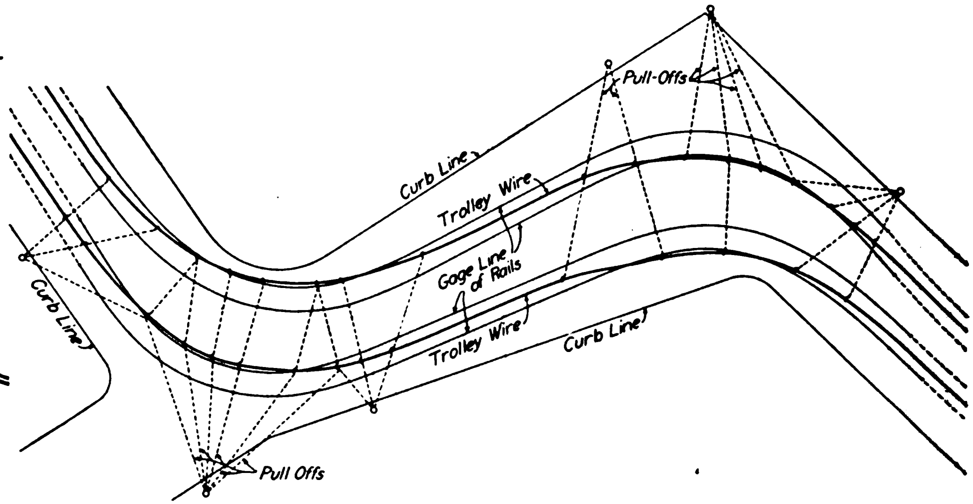


Fig. 8—Double-Track Reverse Curve, Showing Proper Position of Trolley Wire

parts from the center line of the through track, the larger angle its trolley wheel is forming with the main line wire, and if the frog is advanced too far along the main line wire the trolley wheel will have exceeded the "critical angle" and will have jumped the main line wire before it has reached the frog.

On the track plan of the branch-off we should, therefore, plot the limits of the several classes of trolleys which may have to take the branch-off and locate the frog as far beyond the points of the track switch as will not be beyond the limits of the most exacting of the trolleys.

In the case shown in Fig. 9 it happens that the branch-off is from a curved main line so that the theoretical location of the line wire should be laid out as well as the limits for the cars taking the branch-off, as it is upon this line that the overhead frog should be located instead of upon the center line of the track as in the case of a branch-off from a tangent main line.

It may be argued that all this is entirely beyond the capacity of the ordinary line foreman. This is true enough, but not more so than are spiral curves beyond that of most track foremen. Within a comparatively limited number of years all track foremen worthy of the designation have learned to follow points set for them, and for locating overhead lines to exact position the foreman lineman can easily plumb down to points set for him in the pavement or which he can set himself from data furnished by the drafting room. In point of fact, the lines shown in Fig. 8 were dressed to points given as being definite distances beyond the preceding point and a definite number of inches inside or outside of the inner gage line.

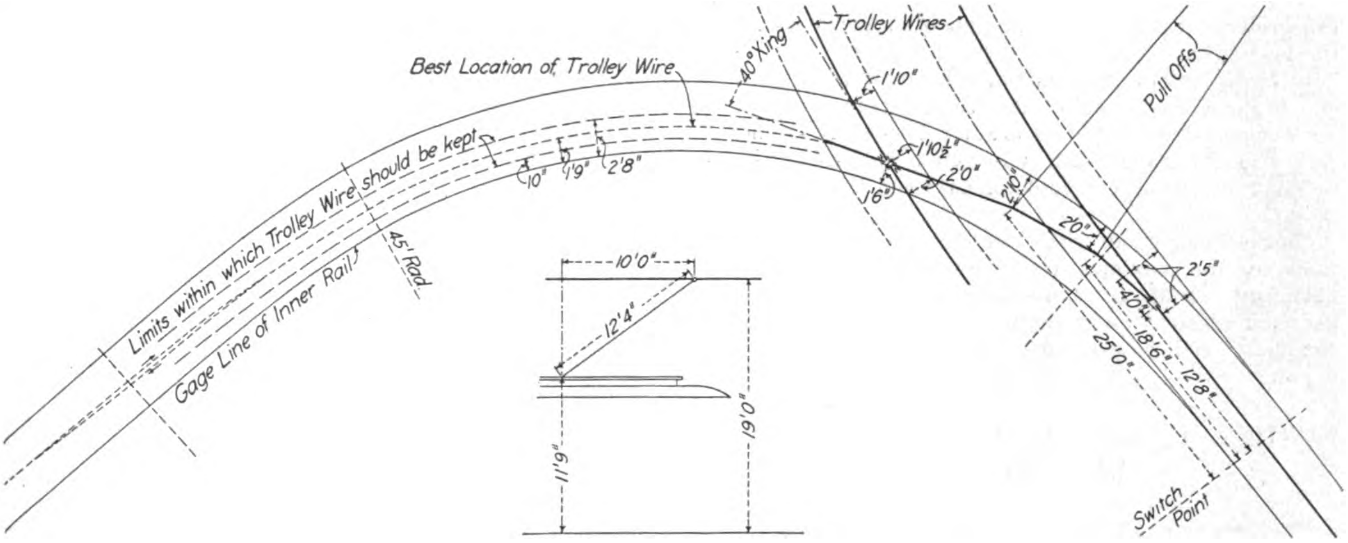


Fig. 9—Limiting Lines of Position of Trolley on Curves

MAXIMUM-TRACTION TRUCKS VERSUS M. C. B. TRUCKS FOR CITY AND SUBURBAN SERVICE

BY H. A. BENEDICT, MECHANICAL ENGINEER PUBLIC SERVICE RAILWAY

Naturally, the maximum-traction type of truck preceded the M. C. B. type in the electric railway field, being a single-motor truck and of lighter design. It derives its name from the fact that approximately from 65 per cent to 75 per cent of the tractive effort is on the driving or large diameter wheels on the axle supporting the motor. On the M. C. B. truck we get 100 per cent tractive effort.

The first factor which should be considered is that of safety. It is of interest to note that in the recent compilation by the Interstate Commerce Commission of accidents on railroads from failure of equipment causes wheel failures lead the list, and of the wheel failures the leading subdivision was flange failures. Safety demands adequate strength and a speed consistent with the design of the trucks. The maximum-traction truck, considering both safety and easy riding, should not be operated at a speed exceeding 25 m.p.h. Owing to less available tractive effort the truck is not suited for operation on grades, especially under bad rail conditions.

Passenger trucks should be easy-riding, so that on unfavorable track conditions the shock may be taken up by the springs rather than transmitted directly to the car body. Simplicity of construction combined with acessibility of parts is what the railway man demands. Not only the first cost but also the maintenance cost of any particular truck should influence the purchaser. Needless to say, the maximum-traction trucks should be cheaper to maintain than the M. C. B. type, owing to the fewer parts, lighter weight and easier conditions of service. The power consumption should also be less.

As regards the relative position of the driving and pony wheels of a maximum-traction truck, there exists a wide divergence of views, based on the results to be obtained. I believe that on a single-end car the driving wheels should come first, because of the fact that the greater weight is on them, thereby tending to hold the truck on the rails more than if the leading wheels were the pony wheels. On a double-end car, if the large wheels are placed at the ends of the car on the leading truck, the large wheel will always lead, followed by the rear truck with the small wheel leading. By this method there is probably less likelihood of derailment.

On the other hand, on a double-end car, by placing the pony wheels at the end, we reverse conditions; that is, on the leading truck the pony wheels lead, while on the rear truck the driving wheel leads. However, in this way we obtain less overhang, longer truck centers and lower steps, also a possible reduction of weight of underframing. On a center-entrance car with maximum-traction trucks we find the small wheels toward the center to allow for clearances and make possible the low step.

The short-wheelbase trucks with outside-hung motor on closed double-truck cars are being superseded by the M. C. B. type with longer wheelbase and inside-hung motors, which is an easier riding truck at high speed. The result is that on the longer lines where a higher speed is demanded the M. C. B. type is used, whereas the short-wheelbase trucks are found in the short, slow-speed routes.

The third annual report of the Board of Supervising Engineers, Chicago Traction, says: "The continued use of standard truck and four-motor equipment conforms to former practice established by the board, as noted in the previous report. However, maximum-traction trucks have received consideration, together with the two-motor equipment.

While it is a fact that the two-motor maximum-traction truck equipment has been greatly improved since its introduction several years ago and possesses unquestionable advantages for certain conditions of operation and to meet certain limitations in street capacity, the four-motor equipment, with its greater margin of tractive capacity and insurance against break-downs, still appears to approximate better the high standard established for the city of Chicago, especially in view of the wide streets available."

I have not yet received a copy of its fourth report, but I note from the trade papers that the Chicago Railways Company has recently drawn up specifications for 200 double-end semi-steel cars to be mounted on maximum-traction trucks.

In this age of consolidation and centralization it would be well if the purchaser and the manufacturer could act more in unison as regards the question of standardization of truck parts and reduction in truck weights. The modern pressed-steel truck contains no iron, except as regards the brakeshoes and possibly the car wheels.

In large centers of population where there are no severe climatic conditions, the grades are not steep, high speed is not demanded and the lines are not long, there is undoubtedly a field for the maximum-traction type of truck; also in small centers where both the cars and the earnings are light.

On the other hand, where there are not favorable conditions for the maximum-traction truck the proper type is obviously the M. C. B. two-motor truck, possessing 100 per cent tractive effort, high-speed possibilities, strength, simplicity and easy-riding characteristics to a marked degree.

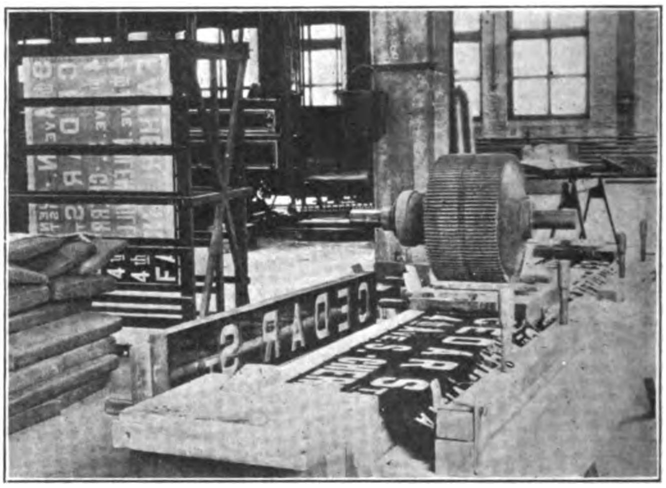
PAINTING ILLUMINATED DESTINATION SIGNS AT NASHVILLE, TENN.

The largest single item in the cost of maintaining illuminated car destination signs is found in keeping the lettered panels in legible condition. The usual custom is to retouch the letters by hand, but when it becomes necessary to renew a section of canvas to replace the names of the destinations by hand, painting is quite expensive. To reduce this cost of renewal to a minimum, G. W. Swint, master mechanic of the Nashville Railway & Light Company, Nashville, Tenn., has devised a scheme whereby a thirty-six-name sign may be replaced with a new one at a cost of $1.50 for material and labor. Instead of doing the work by hand it is printed on the canvas by wooden blocks of the hollow-letter type. The blocks were made in the company's shops, and as many were prepared as there were destinations. The cost of carving the letters in the white pine blocks was comparatively low, and the useful life is, of course, unlimited.

The complete printing outfit comprises, in addition to the hollow-letter blocks, a section of plate glass by means of which a composition of printer's ink is evenly applied to an ordinary rubber roller, a padded table with clamps to hold the canvas firmly in position and an old armature core which is used to press the wooden block type against the cloth.

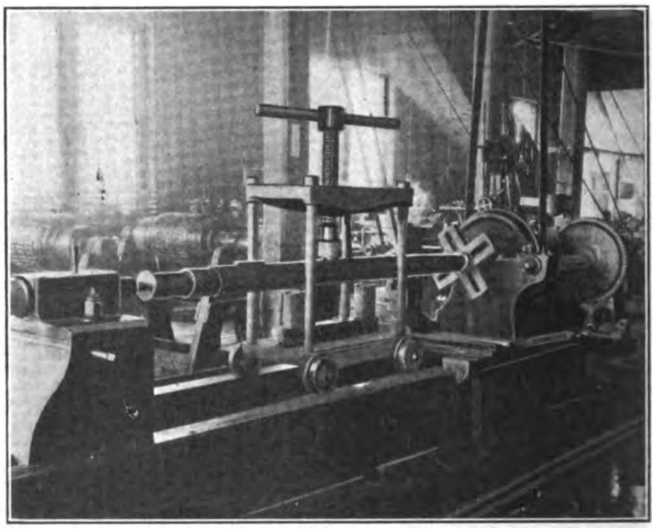
A view of the printing outfit is shown in the illustration. The ink is applied to the block by passing the rubber roller across it, and the block is then laid upon the white canvas, the armature core being rolled once or twice across it.

The quality of printing ink applied to the hollow-lettered panels and the weight of the old armature core cause the ink to penetrate the canvas, giving a longer life than when applied by hand. The names making up a complete set of destinations are printed in series of five to a canvas panel. These panels are sewed together in one long strip for the car signs. In case only a portion of this lettered canvas becomes badly soiled, it may be ripped from the rest of the roll and a new panel supplied. The work of printing these signs is so simple that an expert is not required nor even a man specially detailed to do the work. Two men familiar with the operation, however, easily make eight five-name panels in an hour.


Illuminated-Sign-Painting Outfit at Nashville

A NOVEL AXLE STRAIGHTENER

The mechanical department of the Little Rock (Ark.) Railway & Electric Company has had in service for some time a home-made axle straightener which is used for either hot or cold straightening of bent axles and shafts. As shown in the illustration, the device consists of a substantially built carriage mounted on an ordinary lathe bed, two bearing blocks which may be raised or lowered by a set of shims and a 3½-in. screw which passes through the upper casting of the carriage. A swivel bearing at the foot of the screw comes in contact with the axle between the two bearing blocks so that kinks may be taken out of the axle without putting a strain on the lathe centers. The device is light enough to be readily removed from the lathe bed whenever it is desired to use the lathe for other purposes.


Axle Straightener in Little Rock Shops

Decision of Board of Arbitration in the Cleveland Case

Full Text of the Finding Which Upholds the Right of the Company to Operating Expenses in Excess of the Ordinance Allowance, Wipes Out the Deficits and Settles Other Matters of Difference with the City

The decision of the board of arbitration in the Cleveland Railway case was rendered on June 19, as stated in the ELECTRIC RAILWAY JOURNAL of June 21, 1913, in which an abstract of the finding of the board was published. The decision of the board in full is as follows:

"The undersigned, arbitrators appointed under the provisions of amended ordinance No. 16238-A of the City of Cleveland, and upon the demand of the Cleveland Railway Company made April 14, 1913, beg leave to report our conclusions.

RESERVE FUNDS FOR INSURANCE AND ACCIDENT CLAIMS

"In our deliberations we considered first question No. 3 propounded by the city, namely: 'Has the Cleveland Railway Company a legal right to maintain other reserve or surplus than those specifically provided for in amended ordinance No. 16238-A?'

"The board is unanimous in the opinion that the policy of maintaining an insurance reserve to stand for the hazard above the percentage of value protected by insurance sought is not sustainable by any provision in the ordinance.

"A majority (Messrs. Killits and du Pont—Mr. Duffy dissenting) of the board determine likewise that no reserve other than those specifically provided for in the ordinance may be created and maintained beyond the expiration of an ordinance year (the last day of February) to meet damage claims, under any proper construction of the measure.

"While it is entirely plain that safe business policy demands such practice by a company acting under a franchise of the character in general operation—allowing all profits to go to stockholders—to the end that current business and present capital may not be affected by the liquidation of damage claims originating in previous periods of operation, the majority see, in provisions peculiar to the ordinance before us, controlling reasons why such practice is here not only unnecessary but is practically forbidden and that the requirement in the expression of Section 21, 'any surplus in the hands of the company at the expiration of any period of one year remaining unexpended for operating expenses shall be placed to the credit of the interest fund,' should be literally construed with application to an unexpended balance of such a reserve as that now questioned.

"It is easily seen that ordinarily a failure to maintain such a reserve tends to impair capital. However, in the opinion of the majority, there are provisions in Sections 21, 23 and 22, operating in the order named, which in combination provide an effective substitute for the reserve which good business judgment suggests to be necessary to companies not protected by such franchise provisions.

"Section 21 provides for a way to increase the allowances for operating expenses. If such expenses grow substantially, because of unusually large liquidated damage claims necessitating an increased allowance, the first effect will be to diminish contributions to the interest fund. By Section 23 a lessening of the flow into this fund to the extent of reducing it below the minimum of $300,000 will work automatically a rise in the scale of fare charges outlined in Section 22. Thus it is plain that an unusual expense for damages charged to the company, if it disturbs at all the present character of the company's business, operates to enlarge revenues and not to lessen or impair capital or security. To the argument based upon the fact that damage claims are often not adjusted for several years after their accrual and that the absence of a reserve to meet such potential liquidations in future involves a burden upon car-riders to pay for expenses of operation which accrued not at all to their benefit, it is a sufficient answer, it seems, to suggest that, whatever burden there may be in this fact, it is, when divided among individual car-riders, so infinitesimal as not to be ponderable. This, after all, would be but the difference between an extraordinary year in the amount of demands to pay liquidated claims and the average. Experience in the business suggests that year by year such elements of expense average proportionately about the same. On the basis of business done in 1912, an increase in another year of 100 per cent in liquidated claims over the amount paid in that year would distribute less than one-eighth of a cent to the paid ride. Besides, such imponderable burden would be carried only by that comparatively small number of car-riders who happen not to have sustained that relation at the time, sustained by most a few years previously, when occurred the events fundamental to the delayed liquidations; the vast majority of car-riders would be but carrying their own loads.

"Provisions in Sections 10, 15 and 21 of the ordinance, which are urged as, inferentially at least, suggesting the maintenance of such a reserve, the majority regard as simply definitive of the duties and powers of the city street railroad commissioner and of the duty of the company relative to a full exposition of all matters affecting its business and of the scope and application of an increase in operating allowance, respectively, and as having no effect either to put a special or peculiar meaning upon the expression of Section 21, 'surplus . . . remaining unexpended,' or even by remote inference to furnish excuse for such a reserve. The majority is aided in the interpretation of this part of the ordinance both by the consideration that if the maintenance of such a reserve over an expiring ordinance year was intended, it would have been an easy task for the experienced street railway men who participated in the framing of the measure to have made provision therefor in a few plain words, and by the fact shown in evidence that a definite attempt to incorporate such a provision was as definitely repelled by the Council.

"The answer of the majority to the question, therefore, is in the negative, and its recommendation is that the sums, as of March 1, 1913, in these two reserves be placed forthwith to the credit of the interest fund.

BALANCE IN THE INTEREST FUND

"The question propounded as No. 1 by the city, and next considered by the board, namely, 'Was there $700,000 or more in the interest fund as of April 1, 1913?' presents some difficulty in the way of a categorical answer, at least as to the exact amount in the fund at that date. Apparently there was then in the fund, or should have been, an excess of the amount named.

"A practical and grave difficulty occurs in an attempt to follow the provisions of the last two paragraphs of Section 23 in determining the state of the fund at any month. The method of computing the deductions for 'accrued monthly payments,' as prescribed in the ordinance, is found to be not only unnecessarily intricate, but somewhat defective in its failure to suggest a basis to which the scale of deductions may be applied. We are assured that the reasons actuating the framing of these provisions no longer exist and we see in them now clear opportunities for vexatious and fruitless controversy. Some of the differences now obtaining between the city and the company respecting the state of this fund have arisen because of the impracticability of these provisions.

"While the method respecting deductions used in the present instance by the company does not approach as nearly to the ordinance method as that followed by the city's computators, the former is in reality fairer and more nearly approximates the condition in which the interest fund should be found. After deductions from it which this board recommends are made, the interest fund will be less than $700,000.

ORDINANCE ALLOWANCES FOR OPERATING EXPENSES AND MAINTENANCE

"The second question of the city reads: 'Has the Cleveland Railway Company a legal right to exceed the allowance for operation and maintenance and renewal stipulated in amended ordinance No. 16238-A, without the consent of the city or the award of a board of arbitration?' It appears that there is an apparent over-expenditure (which, in the opinion of the board, is a better term than the ordinance expression 'deficit') in the operating fund of $286,834.31, and in the maintenance, renewal and depreciation fund of $349,462.42, each as of April 1, 1913, and the question strikes at the legitimacy of this situation.

"Considering the operating fund first, the question must be answered in the affirmative. Section 21 provides in terms that an increase of the operating allowance may be agreed to or ordered through arbitration 'to make good any deficit.' We do not feel, however, that in this provision may be found warrant for any over-expenditure which the business judgment of the company's officers alone may justify. The spirit of the ordinance, as an attempt at the fullest public regulation, and one which we think underlies especially the provisions for a stated allowance for operation, necessitates the view that, when once the company, tacitly at least, accepts an allowance by appearing to act under it, the same should be by it regarded as a substantial curb upon its expenditures for operation; that the discretion of its officers to exceed this limitation should not exist except where emergencies arise or conditions come about which were clearly and reasonably not in contemplation when the allowance was made. When either of these situations obtain, and a justifiable demand for expenditure beyond the allowance confronts the company, the latter should acquaint the city with the facts and then charge the city with responsibility either under an agreement or through an award for an increase.

"While the ordinance reserves to the company the right to manage its affairs respecting operating details unhampered by veto in the city, the fact that an allowance limitation is provided for at all suggests a clear duty upon the company to keep actually within it, when once fixed, until it can carry the burden of proving that it should be increased. Any other construction tends to weaken the measure and make of that feature which appeals to public confidence a sham and idle word.

"When some emergent condition confronts the company, as a public calamity, a great accident, a strike, or some other contingency, from which extraordinary increased expense results, some situation whose approach no sign foretells, the fact itself is the company's justification to over-expend its allowance in the interest of the good service which the ordinance requires it to give the public, and of this fact and its responsibility to treat the company fairly respecting the consequences the city has full notice. The burden of proof of the necessity to over-expend is easily sustained by the company.

"Whenever the company, on the other hand, sees impending a change of conditions which makes operation, in its judgment, more expensive, a duty, it seems to us, under this ordinance devolves upon it to give the city timely notice thereof, which notice should particularize the items or range of enlarging expenses. Such a specific setting forth of the impending particular increase would afford a highly desirable and convenient issue in clear and specific terms, facilitating either an agreement with the city respecting the same or an arbitration, which should be promptly demanded in case of disagreement. The company's diligence in this respect, if it makes a case, will entitle it to an allowance to operate retroactively, covering the period of incurrence of the increased expenses, and thus to make good a deficit; but it is intolerable that this ordinance should be interpreted, based on the one expression only in Section 21 that an allowance might be increased to 'make good a deficit,' to justify the company in continuing over a substantial period a course of over-expenditure, and after the fact, although carrying the apparent burden of justification, to put the city to the trouble and embarrassment of questioning a multitude of minute details in transactions, perhaps long past and involved with other matters, out of which such over-expenditure occurs. Such a situation casts the real burden of proof upon the city, where it does not belong.

"It is believed that a better situation would have obtained in the arbitration now concluding, acting as it is upon controversies respecting over-expenditures which were foreshadowed, according to the company, as early as February, 1912, and which have continued increasingly since that time, had it been instituted at the company's instance many months prior to its initiation on April 14, 1913.

"With regard to the suggestion that to hold the company bound to keep within the allowance which it accepts, except under the conditions considered above, will impair the confidence of investors in the company's securities, this ordinance, taken as a whole, so fully safeguards the company's invested capital, when the provisions of the instrument are fairly considered, that it seems to us that any construction upon it which places unequivocally and emphatically upon either party in active interest, the city government or the company, the obligation to deal fairly with the other and the ordinance provisions and its spirit, and thus to avoid embarrassing controversies, will increase rather than diminish the confidence of investors in the company.

"Section 21, in its last sentence, reads: 'No renewal or replacement charged to maintenance, depreciation and renewal account shall be made by the company until it has been approved by the City Council or by the city street railroad commissioner when thereunto duly authorized by the Council to act.' A limited power of supervision and control over the expenditure of the allowance for maintenance, renewal and depreciation thus appears to be in the Council or its duly authorized agent. So far as the Council may be charged with consent for renewal expenditures which, added to necessary maintenance outlay, produce an over-expenditure of the gross allowance, the city's question No. 2 is unnecessary. Otherwise, the consideration which we give to the question, so far as it relates to over-expenditure in the operating fund, applies to the maintenance, renewal and depreciation fund when the company, having knowledge of the expenditures approved by the Council which it proposes to make for renewal or replacement, undertakes to expend for ordinary maintenance a sum which produces, added to the renewal or replacement expenditures, an over-expenditure in the gross fund, and the company, under these circumstances, should exercise the same diligence in seeking the city's consent or an award as we suggest the ordinance imposes upon it with reference to the operating fund, when it deems the allowance insufficient for present conditions.

TRUSTEE STOCK

"The fourth question submitted by the city is: 'Shall the capital stock of the Cleveland Railway Company held in the name of Horace E. Andrews, trustee, be sold and the amount realized therefrom be used in the purchase of such extensions, betterments or permanent improvements as may be mutually agreed upon between the company and the city, and shall the dividends on said stock from March 1, 1910, to date be placed to the credit of the interest fund?'

"In the judgment of the board, this stock in the hands of Trustee Andrews is part of the company's property, and should, through a sale or other disposition of it, be exchanged for that which enhances the physical condition of the company without adding to capital value. The earnings of these securities should be put to the credit of the interest fund.

SURPLUS OF OLD COMPANIES

"By stipulation of the parties to this controversy, the fifth question of the city, 'Shall the surplus set up on the company's balance sheet as "old companies" be disposed of by writing down the capital value of the company to the extent of the amount of said surplus?' is answered. We embody the stipulation in this award and make its terms our conclusions as follows:

"Question 5 submitted by the city. Agreed statement re surplus, old company, Jan. 1, 1913, $323,340.34. Credit balance. (Indorsed: O. K. Baker, H. J. Crawford.)

"This is the balance remaining of the balances which were brought over from the old companies at the time the books of the Cleveland Railway Company were opened about March 1, 1910, and which represented the difference between the assets ascertained at said date and the known liabilities at the same date, plus the capital value as fixed by Judge Tayler.

"There were, however, certain assets and certain liabilities having their origin prior to March 1, 1910, which had not been ascertained, and this amount was left open to take care of future bookkeeping adjustments necessary to be made when such additional assets and liabilities, existing March 1, 1910, had been finally determined.

"There have been charged against this balance payments made on account of a final liquidation of old injury and damage suits and other expenses and claims which antedated March 1, 1910, but which had not been settled at said date. There are still pending certain liabilities and old injury and damage suits, tax claims, etc., which may have to be paid at some future date when definitely adjudicated, and said payments will then be charged against the above balance.

"If, after the final determination of all pending claims and liabilities of every kind and character antedating March 1, 1910, this account shows a credit balance, said credit balance will represent the excess of assets over liabilities plus the capital value as determined in the ordinance, and if this account shows a debit balance, after all liabilities as of March 1, 1910, have been liquidated, then said debit balance will represent a deficiency between the assets and all liabilities, plus capital value as of March 1, 1910.

"We agree, as disposing of this question, that on March 1, 1916, or as soon thereafter as all cases then pending against the company involving taxes or claims having their origin prior to March 1, 1910, shall have been finally determined, the balance then remaining, whether debit or credit, shall be written off by writing up or down the book value of the property of the company without affecting the capital value as defined by the ordinance.

CHARGES FOR SCRAPPING POWER EQUIPMENT

"Question 6 of the city reads: 'Shall the charges against the maintenance and renewal fund, due to the scrapping of part of the company's power equipment, when such scrapping has been authorized by the city, be equally distributed over the entire period of time defined by the contract between the Cleveland Railway Company and the Cleveland Electric Illuminating Company for the purchase of power?'

"The board unanimously answers this question in the negative.

INCREASE IN OPERATING ALLOWANCE

"Dealing with the first question submitted by the company—'Should the present allowance for operating expenses as defined by the ordinance be increased, and, if so, in what amount?'—we unanimously determine that there should be an increase of 0.6 cent per car-mile, making an allowance of 12.1 cents per car-mile, effective March 1, 1913.

"This increase seems necessary, due to enhanced cost of labor and other considerations.

"By a recommendation hereinafter made we provide for the so-called deficit in the operating allowance in another way.

ALLOWANCE FOR MAINTENANCE, RENEWAL AND DEPRECIATION

"We now reach the last question considered by the board, the second propounded by the company: 'Should the present allowance for maintenance, renewal and depreciation be increased, and, if so, in what amount?'

"The board realizes the vital relation of the maintenance, renewal and depreciation fund to those provisions of the ordinance which demand that the securities and capital of the company shall be maintained without impairment, but we are unable from the evidence at hand to answer satisfactorily the question presented.

"The provision from Section 21 which we have quoted heretofore is an amendment to the ordinance of date July 10, 1911. Of the alleged over-expenditure for maintenance, renewal and depreciation, amounting, according to the company's books, to $323,597.04, March 1, 1913, and increased by $25,865.38 during the ensuing month, by far the greater amount, doubtless reaching $300,000 (the exact figure not being presented, but the amount was $295,818.77 during the first six months of the measure's operation), occurred when the city did not have the supervision over outlays for renewal or replacement now enjoyed by it. It may be argued that since the amendment the additions to the over-expenditure out of the fund were with the constructive consent of the city, because, having knowledge of the expenditures out of the gross fund for maintenance, it consented to replacement and renewal outlays which, added to known maintenance expense, over-expended the allowance, wherefore the results since the amendment indicate that the allowance is possibly too small.

"It is the opinion of the majority of the board (Mr. Duffy dissenting) that we start, however, with the presumption that the average allowance will provide an adequate maintenance, renewal and depreciation fund, because officers of the company, having long experience, accepted this appropriation in the framing of the measure.

"We have in evidence uncontradicted opinion testimony, from ocular consideration only, that the present physical condition of the company's property is not under 70 per cent of its reproduction value, which is the condition the ordinance seeks to maintain through the allowance in question. Against this we are shown a series of computations, based on the application of an assumed rate of depreciation, which may or may not be accurate, and upon the company's method of bookkeeping in distributing expenditures between so-called ordinary maintenance and renewals, which computations exhibit apparently a very large depreciation below the minimum of 70 per cent in physical condition. Without at all questioning the accuracy of these figures, upon their assumed bases, a majority of the board is of the opinion that they do not constitute satisfactory evidence of the necessity for an increase, and that, in presenting them alone, the company does not sustain the burden of proof upon it on this proposition. The majority, therefore, answer the question in the negative.

DEFICITS AND A CLEAN SLATE

"As to both of the so-called deficits, it appears to be highly desirable that as soon as possible a clean slate should be started, even through the application of some extraordinary remedy. It was to be expected that the first years of the operation of so unique a measure as this ordinance would produce real differences of opinion in its meaning and friction between the parties thereto, which are not necessarily referable to a failure to attempt to meet its spirit as understood. Wherefore the suggestion for bringing about a new start, now to be made, if adopted, should not establish a precedent.

"We unanimously recommend that, because this arbitration may be clearing up at least some uncertainties of construction through which over-expenditures have come into being, the Council authorize the transfer forthwith from the interest fund to the operating fund of the amount necessary to balance the over-expenditure therein, as of March 1, 1913, and also authorize the transfer from the interest fund to the maintenance, renewal and depreciation fund of the amount necessary to balance the over-expenditure therein, as of March 1, 1913, making said second transfer in such amounts, from time to time, as may be possible without reducing the interest fund below the sum of $400,000. And we further unanimously decide and award, as an alternative to the action of the Council on the above recommendation, that, each, the operating and maintenance, renewal and depreciation allowances, be, and they shall be, increased, in default of such action by the Council, to such amounts respectively as will balance said over-expenditures in said funds, respectively, by Feb. 28, 1914. This action may be taken for this one time only without, in our judgment, doing violence to the ordinance, which in terms charges to the interest fund some of the burdens of an arbitration, and without affecting the stability of that fund as fundamental to the rate of fare now in force. Only the extraordinary situation now existing, however, justifies this expedient.

NO OVERHEAD EXPENSE IN RENEWALS

"Theoretically, some overhead expenses should be apportioned to renewal and replacement, and to capital, to the relief of operating and maintenance expense. In the unique circumstances which result from the ordinance before us, however, we believe the practice of the company, not to attempt such apportionment, to be favorable to the car-riding public, for other considerations than that, in addition to the fact that to do so but an arbitrary rule could be followed, its application would entail additional clerical labor and afford a chance for perhaps vexatious disputes.

CONCLUDING INJUNCTION

"We have approached the consideration of the questions submitted to us with an appreciation of the important relation our duty bore to the working of the ordinance and to the welfare of both the company and the public. We have endeavored to construe the provisions relating to these questions with reference to the mutuality of interest on the part of the city, representing the car-riders, and the company, and with the feeling that to secure to the public the largest power 'of regulation in the interest of good service and the best street railroad transportation at cost,' on the one hand, and safeguarding to 'the owners of property invested in street railroads security as to the property and a fair and fixed rate of return thereon,' on the other hand, were of equal consideration, neither having a preponderating importance over the other. We can only hope that some obstacles against the interest of both public and company have been removed as a result of this arbitration, and that as this ordinance, in a way, takes a fresh start, the concluding injunction upon the company, the public, the press and present and future city officials, to treat it and each other fairly, so eloquently laid down by Judge Tayler, in his Chamber of Commerce speech, on the eve of the initial operation of the measure, may govern its application in the future."

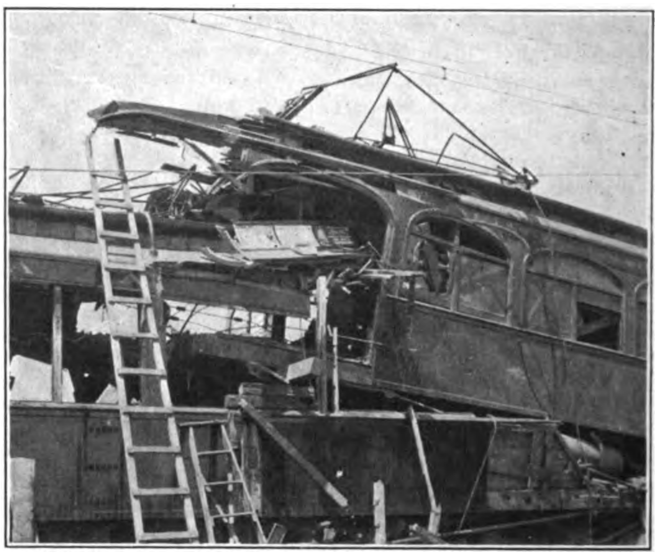
The decision is signed by the three members of the board, Judge John M. Killits, C. Nesbitt Duffy and A. B. du Pont.

ACCIDENT ON CALIFORNIA ROAD

Brief mention was made in the ELECTRIC RAILWAY JOURNAL of June 21, 1913, page 1125, of the accident on the San Francisco, Napa & Calistoga Railway, Napa, Cal., on June 19. A two-car train from Vallejo running at high speed collided head on with an electric car from Napa on a curve a mile north of Vallejo. The train of two cars tore half way through the single car. Thirteen persons were killed and two were severely injured. Others received minor hurts.

The collision occurred at a point where there is a long wide curve and the view is obscured by a clump of trees which breaks the flatness of the country. The motorman of the train and P. F. Herbert, roadmaster of the company, were among those who are reported to have succumbed at once to the injuries which they received in the wreck of the train.

The accompanying illustration shows the extent of the damage to the cars which were in collision. Conflicting statements were made by the two conductors and the train dispatcher at Napa following the collision. The conductor of the northbound Calistoga flier is reported to have made a statement substantially as follows:



Wrecked Cars Shortly After Collision

"My train was delayed because of loading freight. Before starting, however, I went into the 'phone booth and called the dispatcher at Napa, asking for orders. The dispatcher told me 'All right, go ahead.' I naturally supposed we were to pass the southbound at Collins, and signaled the motorman to go ahead. The dispatcher did not tell me to sidetrack at Hatch."

The conductor of the southbound train is quoted as follows:

"We were on time when we reached Collins. Following a rule of the company, I 'phoned the dispatcher at Napa. He told me to proceed to Hatch and pass the northbound there. I repeated the order back to him and he said 'All right,' so I gave the motorman the signal to proceed, thinking, of course, that the northbound would receive similar orders."

The statement attributed to the dispatcher at Napa follows:

"I gave Conductor Patten of the southbound his orders when he 'phoned me from Collins, telling him to meet the northbound at Hatch. The conductor of the northbound should have 'phoned me before starting from Vallejo for orders. He neglected to do so. I had the orders ready for him. His neglect was manifestly the cause of the wreck."

Papers at the Central Electric Railway Association Meeting

A Meeting of the C. E. R. A. Was Held June 25-27 on Board a Steamer on the Great Lakes—Abstracts of Two of the Papers Are Published, Together with the Question Box of the Central Electric Railway Accountants' Association

The Central Electric Railway Association and the Central Electric Railway Accountants' Association held their June meeting on board the steamer *City of St. Ignace* on June 26-27, the steamer leaving Toledo, Ohio, on the afternoon of June 25. Abstracts of two of the papers which were presented during the meeting are given in the following paragraphs.

SOMETHING ALONG THE LINE OF PHYSICAL AND INTANGIBLE VALUATION AS COVERED BY RECENT LEGISLATION

BY ROBERT B. RIFENBERICK, CONSULTING ENGINEER DETROIT UNITED RAILWAY

Mr. Whitney, the chairman of your subjects committee, asked me to prepare a paper on "Valuations" to be read at this meeting. He said: "In regard to the subject of 'Valuations,' my thought was for something along the line of physical valuation as covered by the recent legislation," and added, "This will be quite an important subject for the various transportation lines in the near future."

If I should take literally Mr. Whitney's suggestion—"Physical Valuation"—for my text, the subject could reasonably be exhausted with a few words or definitions, for Webster defines physical as "relating to material things," and valuation as "the act of setting a price." Thus physical valuation is merely "the act of setting a price on material things."

To illustrate: Assume that a physical valuation is to be made of your transportation utility. What does such a valuation imply? It implies only "the setting a price on the material things" of which your utility is composed and on the labor necessary to assemble such material into a completed whole ready to perform the functions for which it was brought into being. Thus any one so charged with the making of such a valuation of your property must necessarily and logically direct his efforts to accomplish this specific aim, regardless of whatever other values there may be in the property. I prefer, rather, to believe that Mr. Whitney, in common with many others, has fallen into an error of expression as to what was really running in his mind when he made his suggestion. I am glad, though, that he so expressed his thoughts, as the opportunity is thus afforded to call your serious attention to the fact that there is a far reach between the mere physical value and the full fair value of your several properties.

Many times in the near future some or possibly all of you may have occasion, in conferences, discussions and in public expression, to refer to the valuation or value of the utilities, or departments of the same, in your charge; therefore in order that there may be no misunderstanding as to what you mean, particularly in the public mind and in the minds of public officials, when you refer to the valuation or value of your property, be explicit, direct and to the point and speak of such as the "physical and intangible valuation or value." For surely this is what you will expect, and if necessary demand, that any valuation made, under authority of "recent legislation," shall include.

With apology to Mr. Whitney, we will express his thought and this text as "something along the line of physical and intangible valuation as covered by recent legislation"; though I question if some, at least, of the "recent legislation" does, or was really intended to, cover and include the intangible values, which are as much a part of the value of every existing utility as are the material and labor values of same. In fact, it is some of this intangible expense first made that later makes possible the physical expense.

REPRODUCTION COST

Several so-called methods of valuation have been advanced, and some used, by which to ascertain, for the purpose of "rate-making" or "rate regulation," taxation and for municipal purchase, the "fair value" of public utilities; but the one method almost universally used by the leading engineers engaged on valuation work is the reproduction cost method. This method has also received the stamp of authority from the United States Supreme Court, United States District and Circuit Courts, state courts and state railroad and public service commissions generally, as the determining factor of value for "rate-making" or "rate regulation," so I will confine myself to a description of this method of valuation and to some of the values necessary to be recognized and used to produce the reproduction cost of your several utilities.

The reproduction cost method may be defined as an estimate of the cost that would be incurred in constructing entirely new a property, identical with an existing property, based on the physical conditions existing at the time of the original construction, in so far as such conditions can be determined or judged.

The first thing necessary in making an estimate of such cost is to take an inventory of the existing physical property, after which it is assumed that such property does not exist, but that one is to be constructed in accord with this bill of materials, i. e., this inventory. In taking an inventory considerable care and judgment should be exercised to make it as full, clear and complete as possible, for this inventory is the foundation on which the whole valuation must rest and from which the many items of material units are made on which to apply so-called unit prices.

DETROIT APPRAISAL

While testifying early last fall, in the United States District Court at Detroit, relative to the inventory and appraisal of the Detroit street railway system, I was asked the following question: "State now the plans and methods which you formed for taking the inventory of these several departments and the way in which the force was organized to carry out that plan?"

I found that the organization of the company consisted of five main or general departments, viz., the executive department, the operating department, track department, mechanical department and the power department. The track, mechanical and power departments are the ones which would have particularly to do with an inventory, as the physical property is in the direct charge of these departments. Under the track department the track and structures are inventoried, under the mechanical department the rolling stock, car shops, air charging and air compressor plants, and under the power department the overhead construction, transmission and distribution lines, power plants, battery and substations. Therefore the inventory was divided into the three general headings of "inventory track department," "inventory mechanical department" and "inventory power department," to which I added "inventory general" to take care of real estate and buildings.

In the organization of the large force that would be necessary to take an inventory of this magnitude, I had free rein from the management to engage as many and any whom I thought necessary for this work, and I concluded that the men who were in constant every day connection with the property itself would be more capable than anyone whom I could secure from the outside, as such outside assistance could not possibly be as familiar with the property as must be the men in the regular employ of the company who had in many cases been with the property for years. I took this subject up with each of the heads of the general departments and had them assign men out of their departments who were most familiar with the different schedules of property to be inventoried, and they were put to work inventorying every item of physical property that they could ascertain. These men went into every schedule in as great detail as they could and were instructed to be sure and get everything that they could see and to be very careful not to put anything in their inventories that they could not at any time put their hands on and say, "There is that item in the inventory." These men listed only the property comprised in the particular sub-department or branch of the work of which they had charge and had had for long years past.

This work has been spoken of as being "noteworthy for the completeness of its inventory, which goes into the minutest detail, and for the excellence of the maps and drawings which accompany it and show, not only every standard type of track, rail, all buildings and machinery, but every piece of track and overhead work on the entire system." That such an inventory was made possible is due to these employees of the company, who worked with great energy and loyalty, and sometimes to the limit of their physical endurance.

Necessarily in all inventories there will be some omissions of property, for some of it is bound to be overlooked, as it is impossible to make a thorough examination of buried structures, but to this day no one has pointed out or found any item listed in this inventory that did not actually exist at the time of the inventory. Our experience in this work fully confirms the conclusion I reached before getting up the organization for the purpose of taking the inventory, and I know of no better plan or organization that could be provided.

Owing to a local situation or condition that arose during the time our inventory was being taken, it was necessary shortly after it was started to attach to the same the several prices of materials and unit values. The work of placing the material price was put in charge of the purchasing department, and the prices used were the market prices of material as of the date of the inventory, except in the case of copper and cement, two items which fluctuated frequently in price, and for these the average price for five years preceding 1908 was taken. The materials were priced f.o.b. cars Detroit, to which was added, where applicable, the haul and labor necessary to construct same into a composite whole or unit.

Unit prices were studied in great detail and were applied in every case where the material and labor items entering into same could be determined. In this study I had most material assistance from, and many discussions and arguments with, the heads of the three physical departments, namely, Mr. Kerwin, of the track department; Mr. Potter, of the mechanical department, and Mr. Burdick, of the power and overhead department. These gentlemen also called in and advised with their assistants relative to the kind and amount of labor necessary to accomplish a particular unit of construction. Thus every unit price was thoroughly analyzed and discussed before any final conclusion was reached and the price adopted.

In making up specifications for unit prices, for instance, of the track construction, a great deal of the data was obtained from the records of the track department, but in every case where there was a question as to the character of any of this construction the fact as to what it consisted of was determined by going out on the ground and opening it up to see what was actually there.

The present street railway system of Detroit is made up of numerous constituent properties that were originally built as separate and independent units, and it was found that a great many of the plans of the buildings were not on record; therefore, in order to take care of this situation, there was added a general department. This department was placed in charge of one of the most prominent building contractors in the city and he engaged five of the leading architects to assist him, and they measured up all of the buildings inventoried and from such measurements made detailed plans and bills of material, making these schedules of the inventory as exhaustive as the others.

OTHER PHYSICAL VALUES AND VALUES OTHER THAN PHYSICAL

After arriving at the material and labor cost of the property inventoried there should be added:

(1) A "contingency" item (generally applied in the form of a percentage) to provide for necessarily incomplete inventories, for it is impossible to include each and every item of physical property, as some of it is bound to be overlooked, and further it is impossible to make a full and complete examination of buried structures.

(2) An "incidental of construction" item (generally applied in the form of a percentage) to provide for unforeseen difficulties in executing the work of construction, as the material and labor estimates are based on certain conditions and, almost without exception, difficulties are encountered which could not possibly be foreseen that often change the entire character of the construction and thus increase its cost above that estimated; also to provide for the extra cost of piecemeal construction, i.e., making extensions and additions to the original construction at numerous different times, the original construction of the utility being assumed to have been built in one continuous operation; also to provide for adverse weather conditions and delays in receiving and handling material and to provide for maintenance and depreciation of property during construction.

(3) An "employer's and public liability insurance" item to provide for the liability in case of accident to labor employed on construction, and in case of accident to the public during such construction. Where the labor cost has been separately computed from that of material the amount of this item is based on the premiums paid, per every $100 of labor pay roll, to insurance companies handling this character of insurance; otherwise it is applied in the form of a percentage. The liability exists and must be provided for either by the utility carrying it itself, or by having it underwritten by a responsible insurance company.

(4) A "builder's risk or casualty insurance" item to provide against the loss of buildings by fire, wind or otherwise during their construction. This item is generally based on a cost of so much per $100 of labor pay roll.

(5) An "architect's fee" to provide for the cost of plans and specifications and for the superintendence of the buildings during their construction. This item is generally applied as a percentage of the cost of the buildings, based on the usual rates charged by architects in the territory in which such buildings are erected.

(6) An "appreciation" item to provide for the solidification of the roadbed, which becomes more and more solidified with time. The embankments and slopes become settled and better able to resist the action of the elements and also the ordinary surface drainage. Without question

a roadbed, the longer it is in use, becomes more valuable than when it is first constructed.

(7) An "acquiring land" item to provide for the expense of juries, commissioners or arbitrators in condemnation cases; to provide for the cost of removing buildings not included in property purchased; to provide for the cost of plats, abstracts, notorial fees, recording deeds and examination of titles; to provide for the cost of abutting damages, surveying land and for agents' commission. This item is generally applied to the cost of real estate and land in the form of a percentage of such cost.

(8) A "contractor's profit" item to provide for a general contractor's profit for properly assembling and constructing the vast number of elements of property into a homogeneous whole, to do which the experienced general contractor's method is reasonably considered the cheaper in the end, for such a contractor is fully equipped with plant, machinery and tools for such construction, whereas the utility in embryo has not the experience necessary to successful economical construction, and further it would have to make an investment in a contractor's plant, machinery and tools for which it would have no use after such construction was finished. Thus the expense to the utility for this inexperience, plant, etc., would be greater than what it would have to pay an experienced contractor to do the same work. This item is generally applied in the form of a percentage of the cost of such construction.

The foregoing several items of expense are as much a part of the physical property cost as the bare labor and material cost to which these expenses must be added to reach a physical reproduction cost.

OVERHEAD CHARGES

Having obtained the physical reproduction cost of the utility, the next and final step necessary to arrive at the total reproduction cost is to apply the so-called overhead charges or intangible values.

(1) A "brokerage" charge to provide for the expense necessary to be paid to a responsible bond broker, firm or banking house for an investigation and report on the proposed utility and for underwriting the securities of such utility, i.e., for securing investors in such securities.

(2) A "discount on bonds" charge to provide for taking care of the amount of the difference between what the bonds are sold for and the face value of such bonds. It has been contended that this item of discount on bonds is not a proper capital charge. Against this contention I have no argument to make except to say that until such time as provision can be made for the amortization of such discount, it must remain as a capital charge, and that it can only be amortized when the earnings of the utility are adequate to provide an amount yearly that will, at the maturity of the bonds, have entirely wiped out this discount. If such a provision is not so made, the integrity of the investment will be lessened by the amount of such discount. It is necessary to make this discount on bonds charge in order to show the total amount of the same, so that the yearly sums to be set aside to provide for this original capital expense can be ascertained. This charge is usually stated in the form of a percentage which represents the difference between the face value and the amount less than face value for which such bonds can probably be sold.

(3) A "development cost" charge to provide for the losses entailed during the years that intervened to bring the utility to a self-sustaining basis—i.e., a paying basis. Properly to bring out and show this cost requires that the early financial history of the utility be known, but as the records of the early days of such properties were at best very meager, especially as compared with those required of us to-day, and as the present-day public service utility is usually composed of several of these early enterprises, it is often very hard to determine this charge from actual accounts.

In cases where the records necessary to establish this development cost charge are not available it is safe to assume that it existed and to provide for it hypothetically or with reference to a similar utility of which such history existed.

One of the early pioneers of the street railway industry once told me that the only records he ever had were kept in his hat in the shape of bills, which he paid in their order when enough money finally came in to enable him to pay one; then he destroyed the bill to make room for another. He said: "It was fortunate for my creditors that I wore a big plug hat in those days or some of them would probably have lost out, as the bills accumulated faster than an ordinary hat could hold them; for my income was always several years behind my expenses." He also told me that the way he acquired his street railway property was that he sold to the company then owning it horses with which to run the road and eventually had to take the road to pay for the horses, and when he found out what he was up against he tried to give the whole "shootin' match" away but could find no one willing to relieve him of it so he just had to hold on until finally after eight or ten years the tide turned and he was at last able to wear a more modern hat.

(4) An "engineering" charge to provide for the cost of the engineering necessary to the proper design and construction of the utility, i.e., consultations, determining the character of the work and the manner in which or methods by which it shall be done, preliminary and final surveys, general and detailed working plans, specifications and contracts, supervision of construction, field work during construction, monthly and final estimates and such other items of engineering as would naturally come within the sphere of the general duties of an engineering department.

(5) A "franchise value" charge to provide for the remainder value of the net earnings that the utility would produce at the rates fixed in the franchise between the date of the appraisal and the maturity of its franchise.

(6) A "going concern value" charge to provide for the value that is in any existing utility by reason of its being self-sustaining and in a successful and efficient operating condition. This represents the cost to get the business to bring the utility to the condition of having such a value.

(7) A "hazard" charge to provide for the extra and often extraordinary expense imposed on a utility by political shysters, yellow journals, anarchistic, socialistic and public ownership demagogues, who in this unsane day and date seem to have the evil power to make it cost a utility from 10 to 30 per cent or more to raise the money necessary for the betterments and extensions to its property that are for the benefit and convenience of the public, when such money in more sane times would be forthcoming for 100 cents on the dollar instead of only at the large discounts that are demanded in these troublesome and unsettled times.

(8) An "interest during construction" charge to provide for the interest on the capital required for the construction of a utility, which is necessarily idle during such construction period but drawing interest. This interest charge is usually computed for the length of time it is assumed it will take to construct the utility complete. Full interest, at the prevailing rates, may be allowed for half this period or half interest for all the period on the assumption that all the capital will be in use half the time or half the capital during all the time of the construction period.

(9) A "legal expense" charge to provide for the legal expense incurred during construction, such as the paying of general counsel and attorneys, cost of printing briefs, legal forms, testimony, reports, etc., special attorney fees, notary fees, witness fees, expense of taking depositions and all other legal and court expenses.

(10) An "organization and administration" charge to provide for the expenses involved in the organization and

administration of the construction of a utility, which would include incorporation fees, salaries and expenses of executive officers, clerks in the general offices engaged on construction accounts or work, surety bond premiums, upkeep of the general offices, purchase of materials, printing, stationery, etc.

(11) A "promotion" charge to provide for the cost of promoting and the preliminary expenses necessarily entailed in the pioneering of the utility.

(12) A "taxes during construction" charge to provide for the cost of taxes and licenses levied and paid on property belonging to the utility during the construction period.

(13) A "working capital" charge to provide for the purchase of materials and supplies, pay rolls and such other expenses of operation necessary to render service in advance of the payment for such service. An amount for this purpose must originally be provided from capital though later it is kept uniform from earnings when such earnings are adequate for this purpose.

As some of the above charges are more or less correlated, it may be consistent and proper for the more practical application of same to condense them into the accompanying table of general intangible or overhead charges.

GENERAL INTANGIBLE OVERHEAD CHARGES

(A) Engineering (4)	
(B) Organization and administration	Promotion (11) Organization and administration (10) Legal expenses (9) Taxes during construction (12) Development cost (3) Going concern value (6)
(C) Carrying charges—Interest during construction (8)	
(D) Financing	Brokerage (1) Discount on bonds (2) Hazard (7) Working capital (13)
E) Franchise value (5)	

With the foregoing thirteen overhead or intangible charges I have endeavored in a general way at least to cover as best I could the range of intangible values, but it is quite possible that in the short time I have had to write this paper several items of intangible value have been overlooked.

DEPRECIATION

Depreciation does not enter into this discussion of physical and intangible valuation, inasmuch as it should not fairly have any part in the lessening of the value of a utility for rate-making or rate regulation purposes.

It is true that in the valuation of all public service industries, made to date, except in one or two rare instances, depreciation of physical property, and in some instances of overhead charges, has been used to determine the so-called present value of such utilities.

Depreciation of investment is a parody on the word reasonable as used in this sense in connection with rates. It is wrong in principle and unjust in application.

Depreciating property investment to determine reasonable rates (?) is in fact confiscation of property, and not only this but it actually penalizes the very existence of the utility.

To illustrate: Assume that the utility which you are representing here to-day does not exist but that it is about to be constructed, and you appeal to your rate-making power for the schedule of rates to prevail when your utility is ready to furnish service. In such a case would not the rates, for the service proposed to be rendered, be necessarily based on 100 cents on the dollar of investment and not on any presumed future depreciated value? In fact, would not a rate have to be made adequate enough to take care of and thus protect the investment against any such future depreciation? If this is logical, then by what strength of reasoning can the so penalizing of existing property be justified? Is it not, rather, a self-evident fact that any utility which does not appreciate with time, rather than depreciate, must sooner or later cease to exist, otherwise it could no longer remain a factor for the purpose for which it was brought into existence?

The only excuse that can be offered in justification for such an arbitrary depreciation of investment is that such existing utility has been purposely allowed to deteriorate in order to pay excessive profits to speculators or stockholders. Such speculators may have had their day, but that day is past. Fortunately in very few instances have they been able to hit the electric railway industry.

Even if this has been the case in some few instances, does this depreciation of investment method of retaliation put the utility back into the condition it should be to render efficient service? Would not the more reasonable and just method be still to permit a fair return on the full 100 cents on the dollar of investment, with the provision that all of this return shall be used to put such deteriorated property back into its normal operating condition and efficiency before dividends shall be resumed on the investment?

Sober thought, it would seem, must reach the conclusion that depreciation of property investment, for the purpose of rate making, is wholly wrong in principle. That such depreciation has been applied in past valuations for rate-making purposes is not a necessary precedent to future like valuations. A continued wrong does not make a right.

I challenge anyone to show where in any valuation made to date, for the purpose of rate-making, and from which depreciation has been deducted, depreciation funds have been provided, from the rates so determined, in such amount as would restore to the investment this sum which has been so arbitrarily taken from such investment, by means of this first use of depreciation. In every case only enough has been allowed to keep the utility up to its thus determined so-called present value. Much of this theoretical depreciation is necessarily deferred maintenance, for as yet no one has been able to define satisfactorily where maintenance ends and depreciation begins.

Some day the public, the courts and possibly the valuators themselves will "get wise" to the fact that the more a utility is thus theoretically depreciated, the higher must be the rates to take care of such ill-advised and arbitrary depreciation in order to restore to the investment every dollar that is honestly in such investment. Some day they may also learn that interest on the full investment, plus an amount, spread over a long period of years, reasonably necessary to provide for what practical depreciation takes place over and above a high standard of maintenance, will produce lower rates for the service efficiently rendered than could be produced from rates that only provide interest on so-called present or depreciated value, plus the necessary larger amount yearly required to provide for this greater depreciation, for it is self-evident that a property maintained at only 60 or 70 per cent of its cost depreciates far more rapidly than one maintained to 85 or 90 per cent of its cost. It also costs considerably more to operate a property in a 60 or 70 per cent condition than it does one in an 85 or 90 per cent condition.

RECENT LEGISLATION

As to the closing part of my text—"the recent legislation"—I take it that Mr. Whitney refers more particularly to the Adamson-La Follette bill as passed by the present Congress and to the Shively-Spencer utility commission act recently passed by the General Assembly of Indiana, which went into effect on May 1 of this year.

The act of Congress purports to provide for "a valuation" of the several classes of property of the common carriers, but the purpose of such valuation is not disclosed either in the title of the act or in the act itself. I have a strong personal impression that this so-called valuation is for political purposes and endless litigation. It surely reads this way and any valuation carried out in accord with the directions as specified in this act surely means litigation, for such a value placed on the property of the common carrier is confiscation pure and simple.

The title of this act clearly provides for "a valuation," but in the body of the act itself there are three specific and distinct valuations provided for, namely: (1) a valuation of the original cost to date; (2) a valuation of the cost of reproduction new; (3) a valuation of the cost of reproduction less depreciation.

While it is true that the act states that "the commission shall in like manner ascertain and report separately other values, and elements of values, if any, of the property of such common carrier, and an analysis of the method of valuation employed, and of the reason for any difference between any such value, and each of the foregoing cost values," nevertheless a careful analytical study of the act must lead to the conclusion that any valuation made under the strict provisions of this act is still restricted to a physical valuation.

Again, any valuation made in strict accord with the provisions of this act penalizes an existing property, for it provides for the cost of reproduction less depreciation and does not provide for the replacement of such depreciation nor does it provide for any appreciation of such property.

The act also provides that "any aid, gift, grant of right-of-way or donation" shall be made note of and reported. The inference of this is that the same will be deducted from the valuation found, as this is the only use to which such information could be put, for otherwise it can have no bearing on the value of the property. Any reduction in value on such account is unjust, for it is no more than reasonable to presume that "any aid, gift, grant of right-of-way or donation" was made for value received or to be received in some form or other by the givers. In the case of free transportation by the common carrier, courts have universally held that such is given for value received.

The absolute power with which the commission is clothed by this act is too arbitrary and too severe to afford fair justice to the victims of the act, should the commission or any of its numerous agents be men politically inclined or men of not very broad mind or judgment. The act does not provide for embodying in the valuation anything more than physical value, and the other so-called values are merely side issues which will afford a great field for the politician to exploit his theories of watered stock and bonds.

Attention can be called to numerous other questionable features, which if valid may and will involve great unfairness and injustice to those utilities subjected to any such valuation as herein proposed. If the intention of this act was to make a fair, full and complete valuation of the physical and intangible values of the properties of the common carriers of this country, it would not have been difficult to make the act so read.

The act of the General Assembly of Indiana is one creating a public service commission and establishing the powers and duties of the same. It also provides for the valuation of property of public utilities. The section on the "valuation of properties" is short, concise and clear. It is reasonable and cannot do other than afford fairness and justice to a utility that is valued under its terms. This section provides that: "The commission shall value all the property of every public utility actually used and useful for the convenience of the public. As one of the elements in such valuation, the commission shall give weight to a reasonable cost of bringing the property to its then state of efficiency."

This, I believe, is broad enough to, and was intended to, include any or all of the physical and intangible values that I have just described. The provisions in this act made for the care of depreciation are fair, reasonable and just, and if observed by the utilities and required to be carried out by the commission will maintain the property in such a state of upkeep that the value of the same at any time, plus the amount of the depreciation fund, will make the investment 100 cents on the dollar. Can it be said that the Congress of this great republic has less ability than the General Assembly of Indiana? As far as a comparison of these two acts go, the question is answered in favor of Indiana.

VOUCHER INDEXING SIMPLIFIED

BY GEORGE L. FORD, AUDITOR EVANSVILLE (IND.) RAILWAYS

Taking up the position of auditor as an entirely different occupation from anything I had formerly been connected with, I found it required a great deal of time and study to systematize properly all of the office details. This duty was rendered doubly difficult in view of the fact that the road was five or six years old and the accounting end of the business had remained in the same place it was when the road started. Through the generosity of many of the members of this association, who supplied me promptly and liberally with their fund of information, we have been able to get the accounting department up to a grade of efficiency that will compare favorably with other departments of the road.

The system of voucher indexing which I am to explain is not original with me, as several of our members are using something similar to this at the present time, but I feel that many of our members would be more than pleased with the results if they would investigate its merits.

In order to accommodate our purchasing department we were compelled to file our vouchers alphabetically. This was very inconvenient to the auditing department, so we finally decided to file our vouchers numerically and card-index them alphabetically, which was a great improvement, but even this did not entirely prevent the possibility of passing a bill through the second time or overlooking a bill that had already been passed through. There was also another feature which the purchasing department desired, and that was to have all bills from one firm together.

In building up this new voucher system we have changed our voucher to a sheet 8½ in. by 14 in., the original sheet being perforated in the center. The lower portion of this voucher is used as a check, being printed for the signatures of the proper officials. The top portion of the original voucher is used for copying the distribution of the different accounts, from which postings are made to the detail ledger. An auditing record is also made on the top portion of the original voucher, such as the date and by whom the voucher is made, date received for audit and by whom examined, date entered in voucher record and by whom, date of postings and by whom.

The top portion of the original voucher is attached to the first carbon copy (for which we are using white paper) and filed numerically, without folding in one of the common paper arch files. These are left in this file until the end of the month, or till any time that may be desired, and then are bound in book form with one of the regular binding machines used for this purpose.

The third carbon copy, for which a different color paper is used, is alphabetically filed with the bills attached. We are filing these in a folder with two prongs, so that when the bills are punched they will fit down over these two prongs and be held securely in place. This, we consider, will reduce to a minimum the possibility of a bill being misplaced. In addition to this, we take the further precaution of going through our voucher record for the month and check against the bills filed alphabetically to see that none have been omitted.

In the event of cross-indexing being desired, we insert as many extra linen sheets as are needed, and note on the audit end of the original voucher what cross-indexing has been done. By making extra carbon copies as much cross-indexing can be done as is desired.

I think that one of the chief advantages to be gained in this system is the improbability of a possible duplication of any voucher escaping attention. I found that the card index filled a long-felt want, but in the event that a voucher is written up for the same amount as one already indexed, it is necessary to look in the files for the first voucher to see that it is not being duplicated. The above method will save the time spent in this work, for the copy of the first voucher will be quickly at hand and the full details of the two vouchers may be compared. This method will also prevent errors in transcribing, as the index will be composed of carbon copies of the vouchers with the bills attached, and there will no longer be errors in dates, numbers or amounts in the index.

CENTRAL ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION

BY A. F. ELKINS, CHAIRMAN; F. K. YOUNG AND F. PANTEL

Questions Nos. 1 to 19 inclusive were answered in our report of Nov. 26, 1912, copies of which were placed in the hands of our members.

Question No. 20. To what account should penny vending machines and sanitary drinking cups be charged when purchased? The penny vending machines are purchased at so much each, with a perpetual lease agreement, the same to be returned to the manufacturer whenever the use of the cups is discontinued. The cups are placed in the vending machines and distributed in the stations and on the cars by means of penny slot.

Answer: Expenses incident to the placing of drinking machines and cups on cars should be charged to account No. 63, "miscellaneous car service expenses." If the machines and cups are used in stations, this would be a proper charge to account No. 65, "station expenses."

Question No. 21. To what account should be credited the revenue received from these penny cup machines?

Answer: To account No. 10, "station and car privileges."

Question No. 22. How should paving assessments be treated on the books of an electric railway? That is, when notice is first given by the city, and the company desires to take advantage of the instalment plan. Also, when actual payments are made.

Answer: If the company desires to take advantage of the instalment plan, and this is not infrequently done, it would be proper to open up a special account, called "deferred paving assessments," and credit to this account the monthly proportion of the annual charge, as determined from the tax bills, charging the same to account No. 10, "paving," under road and equipment. When semi-annual payments are made, charge the amount to deferred paving assessments. A separate record may be made of the interest accrued, if desired, by charging the same to account No. 41, "interest," under road and equipment. The annual charge, with interest, covering paving assessments may be secured from the county treasurer and placed on the tax bills. All taxes and assessments may be paid by the issuance of one voucher to each county.

Question No. 23. What operating expense account should be charged for the repairs of a 6600-volt transformer stepped down to a voltage of 110, in order to furnish electric light for a rented station, the transformer being located outside on the poles?

Answer: When the current generated is changed from one voltage to another, by means of a transformer for outside purposes, expenses to and including the transformers should be charged to account No. 22, "transmission system."

Question No. 24. What operating expense account should be charged for labor and material in repairing meters, transformers and wiring in connection where the carrier furnishes a small amount of power to patrons along its line?

Answer: All expenses incident to the maintenance of a system where the current generated is unchanged in voltage should be charged to account No. 23, "distribution system." Note: It is generally understood that the present scheme of distribution of operating expenses provides that where the current is of any other than the operating kind, or voltage, this is a proper charge to No. 22. If, however, the current is sold unchanged in voltage or kind, then this would properly be classed as distribution and charged to No. 23.

Question No. 25. A company operates a light and power department and a railway department. The railway department has a plant of its own, but receives, from time to time, power from the light and power department plant. Should the light and power department credit these receipts from the railway department to its earnings or its operating expenses? State names of accounts credited and on what basis.

Answer: If the company owns and operates both a railway and light and power department, the cost of power furnished by the light and power department to the railway department should be charged on the books of the railway company under the various sub-heads as "other operations—dr." It would seem that this cost is a proportion of operating expenses chargeable to conducting transportation, in which case the debit would be to account No. 58. The amounts charged to the railway department should be credited in the books of the light and power department through "other operations—cr." to the accounts affected. If the system of accounting does not provide for the separation of operating expenses, then the entire charge should go to account No. 56, "power purchased." Note: This question is answered on the assumption that the company actually owns both departments.

Question No. 26. What disposition should be made of an amount of money ($25) found on car which was never claimed by the owner?

Answer: Credit should be given account No. 19, "miscellaneous," under operating revenues.

Question No. 26 concludes the list of questions submitted by our secretary to date. The answers given to the various questions reveal a keen knowledge of the classification as adopted to our local requirements. No general system of accounts will ever be devised that will be so elastic as to cover every condition.

ELECTRIC RAILWAYS OF HOLLAND FOR 1911

The statistics covering the electric railways of Holland for 1911 show nine street railways, four interurban railways and the 40-mile single-phase Rotterdam-Hague-Scheveningen Railway, which was described in the ELECTRIC RAILWAY JOURNAL Oct. 2, 1909. The statistics in the following table do not include this line.

HOLLAND ELECTRIC RAILWAY DATA

City	Passengers	Miles of Route	Annual Rides per Inhabitant	Gross Earnings
Amsterdam	78,520,000	84.5	135	$1,610,000
Arnheim	1,280,000	14.0	20	44,000
The Hague	33,320,000	62.5	114	860,000
Groningen	2,150,000	9.3	28	49,500
Haarlem	2,630,000	8.0	38	54,250
Leyden	....	13.9	...	....
Nymwegen	640,000	5.7	11	....
Rotterdam	29,860,000	67.3	64	677,500
Utrecht	4,740,000	18.9	39	100,500
Amsterdam-Haarlem-Zantvoort	2,460,000	34.6	...	225,000
Enschede-Glanerburg	590,000	9.2	...	19,000
Utrecht-de Bilt-Zeist	530,000	14.6	...	45,750
Zeist-Driebergen	140,000	6.4	...	3,500

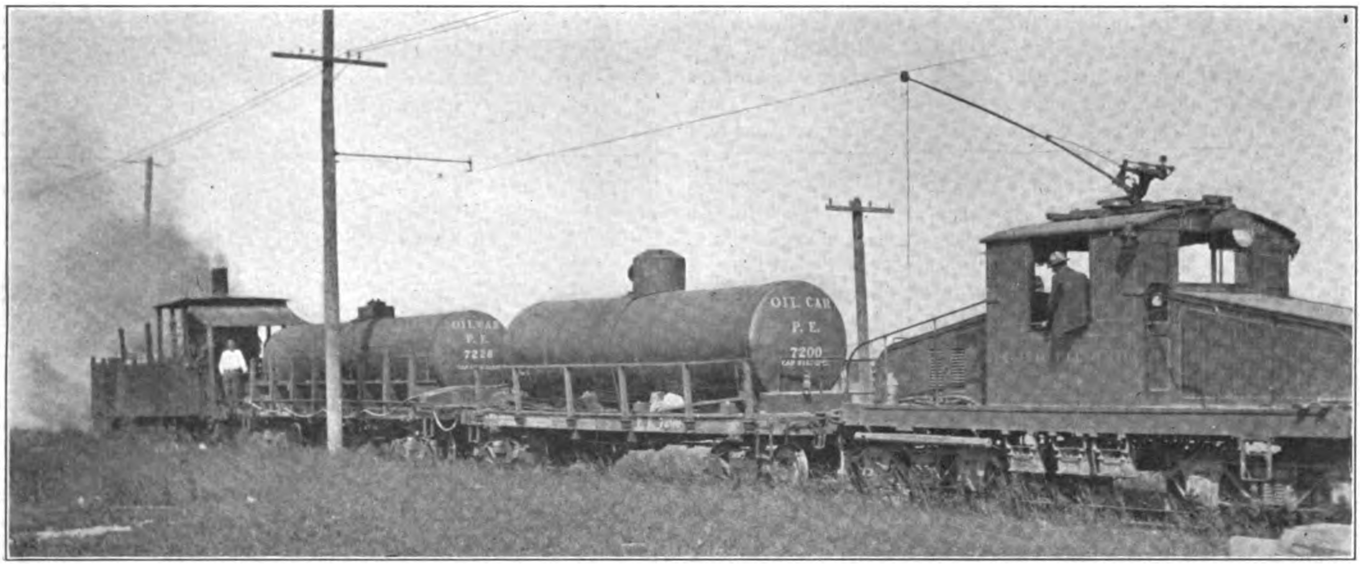
Meter (39.4 in.) gage is used by the Groningen, Haarlem, Nymwegen, Amsterdam-Haarlem-Zantvoort, Enschede-Glanerburg and Zeist-Driebergen lines. The others are standard gage.

WEED BURNER IN LOS ANGELES

The Pacific Electric Railway, which operates 972 miles of track in the district surrounding Los Angeles, Cal., has found the question of the removal of weeds on its right-of-way a serious one. Vegetation is luxuriant in Southern California, and various methods have been employed to dispose of the weeds which grow on and between the tracks.

The company is now using the burner illustrated in the accompanying engraving, in which the flame is produced from crude oil and steam, which are mixed before being admitted to the burners.

The burner occupies an entire flat car, 46 ft. in length, which is used as the last car of a four-car train consisting of a motor car or locomotive, a car to carry the water for producing the steam, a car to carry the oil used in the burner and the burner itself. The steam is generated in an upright boiler, and after being mixed with the oil in the mixer, which is about 1 ft. in length by 1 ft. in width, it is conducted to the burners which are set between the trucks. The bottom of the car is protected by a shield of metal covered with asbestos slab. This shield is carried under the axles and extends the entire width of the car and is provided with deflectors at each end to protect the wheels from the heat. At the same time a stream of water is kept playing on the car journals to keep them cool. Other streams of water are thrown from the rear of the car to put out any fire which may be generated by the heat.



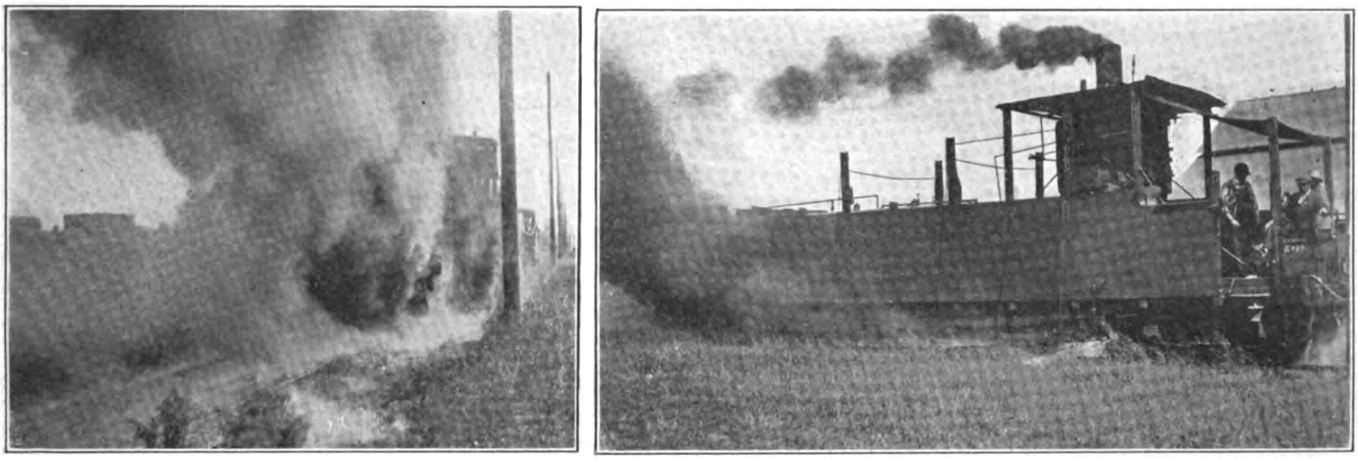
Los Angeles Weed Burner—Side View Showing Electric Locomotive, Tank Cars and Burner at End of Train

The burner car is provided also with wing burners and shields which can be raised or lowered and are designed for burning the weeds on the sides of the right-of-way. About twenty burners are used. It is found that the burner can do efficient work when hauled at a speed of from 4 m.p.h. to 5 m.p.h., and it does not damage either the ties or the center poles used on the center-pole double-track construction. Such slight charring as may be caused to the ties or the poles is rather a preservative than otherwise, and the flame makes an excellent detector for rotted wood in either poles or ties. The car is followed by two section gangs, which see that the fire does not spread to adjoining property.

The crew required on the train is as follows: motorman, conductor, two brakemen, one engineer, two helpers, one lookout, one fireman and one roadmaster of the division. In addition there are the two section gangs already mentioned.

The company burned last year about 300 miles of track at an operating cost of $4.65 per mile. This figure includes labor and materials but not depreciation or interest on the investment. Under the conditions existing on the Pacific Electric Railway, it has been found necessary, in order to keep the weeds down, to destroy them by burning four or five times during the year.

The operation of this burner is conducted under the direction of the way department of the Pacific Electric Railway, Los Angeles.



Los Angeles Weed Burner—Side and Rear Views of Burner in Operation

MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION THIS WEEK

The June meetings of the Central Electric Railway Association and the affiliated Central Electric Railway Accountants' Association were opened on the afternoon of Wednesday, June 25, under the most auspicious circumstances. As mentioned in previous issues of the Electric Railway Journal, the associations had inaugurated the novel procedure of holding the meeting on board a steamer on the Great Lakes, and the popularity of the idea was well demonstrated by the large number of individual members who had arranged to be present during the sessions. Many of the members were accompanied by their wives and families.

The steamer *St. Ignace*, of the D. & C. line, had been chartered for the trip and left the dock at the foot of Madison Street, Toledo, Ohio, at 3:30 p. m. on Wednesday. The weather was most propitious, and every circumstance, including the large attendance, pointed toward one of the most successful meetings ever held by the two associations, not only with regard to the interest in the technical papers, reports and discussions, but also with regard to the enjoyability of the leisure hours between the various business sessions.

The route was down the Maumee River to Lake Erie, thence past Put-in-Bay, across Lake Erie and through the Detroit River to Detroit, Mich. The steamer reached Detroit late on Wednesday evening, and a number of delegates came on board there as the stop had been arranged especially to pick up those who found it more convenient to commence the trip from that point. From Detroit the route extended into Lake Huron, a stop being arranged at Harbor Beach, Mich., in order to accommodate those who were unable to complete the entire trip. After the stop at Harbor Beach a sail up Lake Huron had been arranged for the major part of Thursday, the return trip commencing late Thursday afternoon, or in time to land the delegates at the starting point at some time during the evening of Friday, June 27.

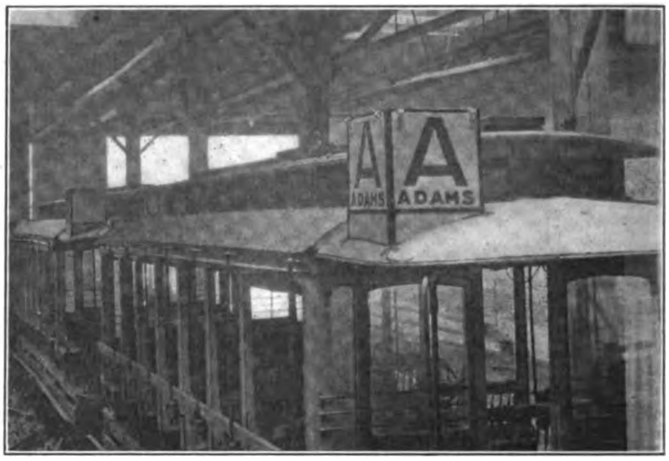
On Thursday morning at 9:30, with the steamer well out upon Lake Huron, the first business session of the Central Electric Railway Association was called to order by President A. W. Brady. R. N. Hemming, chairman of the committee on standardization, presented a report on the controlling dimensions of trolley wheels, a standard train signal system, the heating and ventilating of cars and the mounting of radial couplers. This report was accepted and will be sent to the various members for consideration and action at the next meeting.

On Thursday also papers were read on "Recent Developments in Car Control," by F. E. Wynne; "Valuation of Electric Railway Properties," by R. B. Rifenberick, and "The Claims Department," by E. F. Schneider. Mr. Rifenberick's paper and one on "Voucher Indexing," by G. L. Ford, are published in abstract elsewhere in this issue, together with the Query Box of the Central Electric Railway Accountants' Association. The other papers and an account of the proceedings will be published in the next issue of this paper.

The mechanical department of the Nashville Railway & Light Company, Nashville, Tenn., has installed an individual exhaust system in connection with its commutator slotting machine. The system has not only been found desirable for removing the dust from the slotting tool but has proved profitable because the dust is sold for 8 cents per lb. The amount of dust collected from the slotting necessary with the 150 cars owned by the company produces about $25 annually. The exhaust system is composed of a No. 0 Sturtevant centrifugal fan, direct-driven by a ½-hp motor. The exhaust duct extends from the slotting saw to a tank which serves for dust storage.

NOVEL ROUTE SIGNS ON THE PEORIA (ILL.) RAILWAY

The Peoria Railway Company has recently installed route signs of a novel design on the city cars in Peoria, Ill. To advise the public regarding the new system of car indications, a card map showing the various route lines of street railway drawn to an exaggerated scale and the sign indication applying to each was pasted in each car. A fac-simile copy of this card also was published in the daily papers for a period of several weeks. A reproduction of this card is shown in the accompanying illustration.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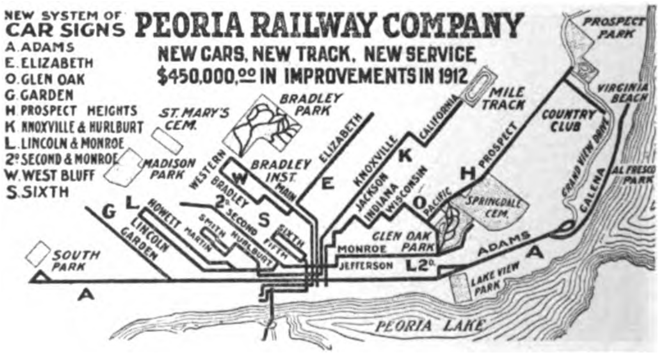
ADAMS
A
ADAMS

Peoria Route Signs—View of Signs in Place on Cars

The new sign is a triangular prism built of light structural angles and 18-gage sheet metal, the base being shaped to fit the contour of the car roof. Two signs are mounted at right-hand diagonal corners of each car, and the right-angle faces of the signs are set parallel to the front and sides of the car. These two faces are 17 in. x 18 in. in size and take a 12-in. initial letter and 3-in. letters in the printed destination. All letters are perforated with 5/16-in. holes which permit reflected light from a single 16-cp lamp installed between the letters on the sign front to illuminate them at night. The interior of the sign is painted white to intensify the indirect letter illumination, making it possible to read the sign easily at 500 ft. during either day or night. The lamps in the two signs are in series with the lamps in the car and are controlled by the same switches.

The lettered panels are interchangeable as guides in the sign frame permit them to be removed and replaced by any other destination sign, in case it becomes necessary to change a car's routing. A complete equipment of sign panels is kept at each carhouse, and each crew is required to see that the correct indications are in place before the car is taken for a regular run.


NEW SYSTEM OF CAR SIGNS
PEORIA RAILWAY COMPANY
NEW CARS, NEW TRACK, NEW SERVICE
$450,000.00 IN IMPROVEMENTS IN 1912
A. ADAMS
E. ELIZABETH
O. GLEN OAK
G. GARDEN
H. PROSPECT HEIGHTS
K. KNOXVILLE & HURLBURT
L. LINCOLN & MONROE
2º SECOND & MONROE
W. WEST BLUFF
S. SIXTH
PROSPECT PARK
MILE TRACK
VIRGINIA BEACH
COUNTRY CLUB
BRADLEY PARK
ST. MARY'S CEM.
MADISON PARK
BRADLEY INST.
WESTERN
BRADLEY
MAIN
ELIZABETH
KNOXVILLE
CALIFORNIA
PROSPECT
JACKSON
INDIANA
WISCONSIN
PACIFIC
SPRINGDALE CEM.
GRAND VIEW DRIVE
GALENA
AL FRESCO PARK
HOWETT
MARTIN
SMITH
SECOND
HURLBURT
FIFTH
SIXTH
LINCOLN
GARDEN
GLEN OAK PARK
MONROE
JEFFERSON
ADAMS
LAKE VIEW PARK
SOUTH PARK
PEORIA LAKE
G
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Peoria Route Signs—Card Map Posted in Cars

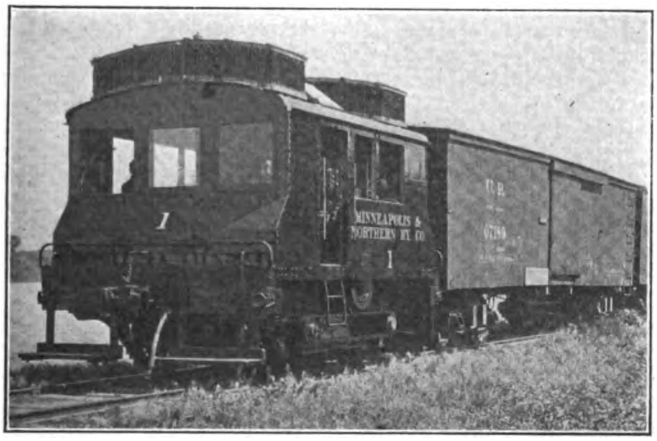
It is believed that these signs will be useful to residents as well as to strangers, as they will enable the destination of the car more easily to be identified.

GASOLINE FREIGHT AND SWITCHING LOCOMOTIVE

A gasoline freight and switching locomotive has been recently built and delivered by the McKeen Motor Car Company to the Minneapolis & Northern Railway, a line extending from Minneapolis northwest to Anoka, Minn. The maximum capacity of the locomotive is approximately twenty loaded freight cars. The power-generating apparatus is the McKeen standard 200-hp, six-cylinder, air-starting and reversible gasoline engine, with such modifications in the transmission as are necessary to adapt it to heavy-duty freight service.

The engine is water-cooled, the cooling system consisting of two radiators located on the cab roof and a pump driven from engine crank shaft by a Morse chain. The cast-steel frame which carries the engine is mounted transversely upon two cast-steel truck sides, to which it is so rigidly united as to produce practically an indestructible truck structure. The end sills or buffer beams are secured to the side frames and all couplers and air apparatus are M. C. B. standard material.

The power of the engine is transmitted by means of a sprocket on the crank shaft through a 5-in. Morse silent chain to a sleeve working free on the axle upon which is mounted a multiple-disk friction clutch. This friction clutch is of heavy design and large dimensions with suitable lubrication and acts as a means to ease the load on the engine. The power from the friction clutch is delivered to the forward driving axle by a jaw clutch. The power is either transmitted through a series of herringbone gears to produce heavy tractive effort and high torque for starting purposes or else is transferred direct to the driving wheels. By thus magnifying the torque of the engine great starting effort is obtained, but when the locomotive is once in motion higher economy can be obtained by cutting out the gears and using the direct connection. A sprocket is keyed to the end of each driving axle for a 4-in. Morse silent chain which connects the two pairs of drivers.


MINNEAPOLIS & NORTHERN RY. CO
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Gasoline Freight Locomotive Pulling Train

Changes of speed and reversing the locomotive are effected by means of air-actuated mechanism, controlled by small handles or levers in easy reach of the operator, and this affords considerable facility to the motorman in switching in congested yards as compared with the operation of an ordinary steam locomotive.

The air supply of the locomotive is a necessary and important feature. In addition to an air pump driven by an eccentric on the crank shaft of the main engine, a gasoline power air compressor is furnished entirely separate from the locomotive power. This is not only economical but simplifies operation of the driving mechanism for switching service. Air pressure is used for actuating the engine and transmission, for whistle signals, for the air brake, and for starting and reversing the engine. The gasoline tank is of 120 gal. capacity, enough fuel for at least ten hours' ordinary service.

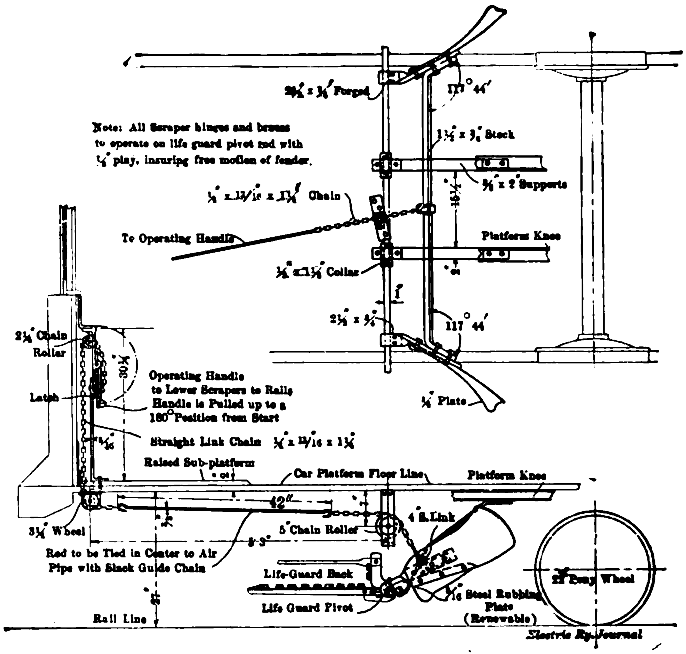
The principal dimensions of the locomotive are as follows:

Engine	Six cylinder, 10-in. bore, 12-in. stroke, variable speed, reversible, 200 hp.
Length of wheelbase	6 ft. 6 in.
Length over pulling face of couplers	17 ft. 1½ in.
Width over all	9 ft. 6 in.
Diameter, drivers	42 in
Weight on drivers	43,000 lb.
Speed with engine at 350 r.p.m.	Low, 8 m.p.h.; high, 22 m.p.h.

No fireman is required on the locomotive, and the single operator, on account of the air-operated control, is relieved from all fatigue incident to the handling of the heavy links of the steam locomotive. The short wheelbase and wide windows in the cab are also points which it is believed will add materially to the efficiency of the gasoline freight and switching locomotive.

SNOW SCRAPER FOR LIMITED CLEARANCE SPACE

The International Railway Company recently purchased nearly 300 near-side cars, which are being fitted with scrapers designed in the mechanical department of the company. The clearance between the pony wheels of the forward truck and the backs of the life guards is too small in these cars to accommodate the usual design of scraper. The one shown in the accompanying illustration was, therefore, manufactured in the company's shops, placed on all of the near-side cars and is giving excellent satisfaction. It will be noted that the foundation of the rigging is a 1½-in. x ¾-in. steel cross-bar with bent ends. To this are bolted the hinges, which are forged from 2½-in. x ¾-in. steel, and the renewable 5/16-in. steel rubbing plates. The hinges hook over the life-guard pivot rod and are held in place by cotter pins. The rubbing plates are raised and lowered by means of a chain attached to the middle of the cross-bar. After passing over idler pulleys, the chain terminates in an operating handle conveniently located back of the front dash.


2½" x ¾" Forged
117° 44'
Note: All Scraper hinges and braces to operate on life guard pivot rod with ⅛" play, insuring free motion of fender.
1½" x ¾" Stock
¾" x 2" Supports
¼" x 13/16 x 1¼" Chain
16½"
To Operating Handle
Platform Knee
¾" x 1¾" Collar
1"
2½" x ¾"
117° 44'
¼" Plate
2¼" Chain Roller
Latch
30¼"
Operating Handle to Lower Scrapers to Rails Handle is Pulled up to a 180° Position from Start
Straight Link Chain ¼" x 13/16 x 1¼"
Raised Sub-platform
Car Platform Floor Line
Platform Knee
42"
3¼" Wheel
5" Chain Roller
4" S. Link
5' 3"
Rod to be Tied in Center to Air Pipe with Slack Guide Chain
Life-Guard Back
Life Guard Pivot
5/16 Steel Rubbing Plate (Renewable)
Rail Line
26" Pony Wheel
Electric Ry. Journal

Buffalo Snow Scraper for Limited Clearance Space

The Berlin (Germany) Street Railway has recently installed its first fully vestibuled motor car. This car also differs from the previous standards in providing a separate entrance and exit. The car has twenty-six seats and according to the police provisions the permissible standing room is eight or ten persons on each platform and two inside the car.

News of Electric Railways

Provisions of Massachusetts Public Service Commission Measure

Under the Washburn bill, which has become law over the veto of Governor Foss, as reported in the Electric Railway Journal of June 7, 1913, and which goes into effect July 1 next, the powers of the Massachusetts Railroad Commission are expanded and its name is changed to the Public Service Commission. The features of the bill follow:

The commission is enlarged to five members, one to be appointed each year for a five-year term, by the Governor with the consent of the Council. The chairman's salary will be $8,500 per annum, and that of other members $8,000.

The commission will have jurisdiction over telephone and telegraph companies (instead of the highway commission as heretofore), and over railroads and street railways and steamship service within the Commonwealth, but not supervision over electric lighting and gas companies or municipalities supplying gas and electricity to their residents. The jurisdiction over these latter organizations is still retained by the present Board of Gas & Electric Light Commissioners.

Three members of the commission will constitute a quorum for transaction of business. Undiscriminatory and non-preferential charges by common carriers are provided for, and all free passes for transportation within the State are restricted or prohibited in a manner similar to that in which such passes have already been prohibited in interstate traffic.

The commission may appear before public tribunals and the interstate commerce commission to carry out authorized functions or when it believes a common carrier subject to its supervision is violating any provision of the interstate commerce law.

Section 15 provides that "a railroad corporation may issue shares of capital stock, bonds, notes or other evidences of indebtedness for the purpose of funding its floating debt or for any other lawful purpose," and then proceeds to state that it "may" mortgage any part of its property, including property afterward acquired. This, of course, permits the issue of plain bonds without mortgage. Any mortgage executed shall secure all indebtedness previously issued, and indebtedness may be issued to an amount not exceeding twice the capital stock actually paid in.

All issues of indebtedness of a maturity of over twelve months are subject to the commission's approval as to amount and issue price, but security issues for refunding or making of additions and improvements for property situated outside of Massachusetts, if authorized there, need not have the approval of the Massachusetts commission. A report, however, must be rendered to this commission before the issue can be made within the State.

The act prohibits the issuance of free passes or reduced transportation except to certain closely limited classes, such as employees, letter carriers, policemen, firemen and employees of the Legislature, the commission, etc. Authority to specify the number of men required to man trains is also included, and in general the act retains all the existing powers of the Railroad Commission, with broadening duties as above outlined.

All rates and charges of the common carriers must be filed with the commission and it may fix same. Its powers are mandatory. The Supreme Judicial Court is to have jurisdiction to review, amend or enforce rulings of the commission.

The new commission, which replaces the Railroad Commission, was appointed by Governor Foss on June 25. The membership of the board and the periods of service are: Frederick J. McLeod, Cambridge, five years; George W. Anderson, Boston, four years; George P. Lawrence, North Adams, three years; Clinton White, Melrose, two years; George W. Bishop, Newton, one year. Messrs. McLeod, White and Bishop were members of the Railroad Commission.

Mayor Marx Submits Temporary Settlement Plan

On June 24 Mayor Marx of Detroit, Mich., presented to the Common Council of that city the street railway ordinance proposing a plan of settlement with the Detroit United Railway. He feels that the measure will meet all needs until municipal ownership becomes possible. The plan provides that the company shall operate on a flat 3-cent fare and give universal transfers, make adequate extensions, pay back taxes and rentals amounting to $628,976 which are claimed to be due, pave the streets between all tracks, accept a revocation of all existing franchises and agree to sell the property to the city at a price to be approved by the people.

The agreement differs from the Lawson plan in that it will not be submitted to the people for approval. The Mayor has power to complete the negotiations. It is his intention to have public hearings on the proposition and to invite the officers of the company to be present and discuss each point. It is said the Mayor intends to cite the recent finding of the United States Supreme Court in the Fort Street case against the company.

Frederick F. Ingram, charter commissioner, has proposed two important changes to the municipal ownership section. One of them authorizes the city treasurer and controller to establish a savings account system to encourage the sale of street railway bonds. He believes that people will take advantage of this to accumulate sufficient money to buy bonds. The other gives the street railway commission power, when acting in conjunction with the Common Council, to enforce all ordinances and rules relative to privately or municipally owned lines. It is intended as an aid to the Council in enforcing the ordinances.

The Detroit, Jackson & Chicago Railway will have until June 23 to begin paving between its rails on West Huron Street. In the event of its failure to do so, the city threatens to stop the operation of cars through the city and prevent the operation of the remainder of the road between that point and Jackson and Kalamazoo, as this is a portion of the main line. It is claimed that the ordinance provides for paving and that the company has failed to carry out this part of the requirement.

The Cleveland Aftermath

H. J. Davies, secretary of the Cleveland (Ohio) Railway, is preparing figures showing the expense of operation since March 1, 1913, the date to which the board of arbitration completed its investigation. J. J. Stanley, president of the company, stated on June 20 that the expense has been in excess of 12.1 cents per car mile, the new allowance made by the arbitrators. It is expected that the company will present the figures to the City Council and ask an additional increase. Peter Witt, street railway commissioner, and E. B. Haserodt, chairman of the street railway committee of the City Council, both assert that such a request will be refused. Mayor Baker has refused to comment on the matter. The portion of the report of the board of arbitration under which a demand of this kind can be made is as follows:

"The company at any time seeing an impending change of conditions which makes operation, in its judgment, more expensive, a duty devolves upon the company to give the city timely notice."

F. H. Goff, president of the Cleveland Trust Company, who was prominent in the settlement of the dispute during the Johnson administration, was quoted by the Cleveland *Plain Dealer* of June 21 to the effect that the board of arbitrators could have reached no other decision as to the company's exceeding the ordinance allowances for operation and maintenance. He said that it was Judge Tayler's intention that these allowances should be exceeded only in emergencies.

A resolution calling upon A. B. duPont to return to the Cleveland Railway the $5,000 which he received as a fee for serving on the board of arbitration was defeated by the City Council on June 23. Mayor Baker, who addressed the Council in behalf of Mr. duPont, declared that Mr. duPont rendered no service to the city as consulting engineer for the light plants while serving on the board of arbitration. He explained that the sum involved in the proceeding was equal to $1,000,000 to the people of Cleveland and that the expense of arbitration was small compared with the service rendered.

New Chicago Elevated Relief Plan

An ordinance has been introduced before the transportation committee of the City Council of Chicago, Ill., to give authority for an extension of elevated railroad platforms to accommodate more trains and longer ones. The elevated companies thus abandon their plan of lengthening the platforms to accommodate two six-car trains, which would have accommodated 1224 cars an hour. Under the plan submitted the capacity will be 1110 cars an hour.

On account of the passage of the utilities measure by the Legislature the Council is at a loss how to proceed regarding rerouting and other problems relating to the betterment of transportation facilities. If Governor Dunne vetoes the bill all arrangement for improvements, including subways and through routing of elevated lines and consolidation of surface lines, will be pushed rapidly. If he signs the measure, which places all public utilities in the hands of a commission, it will be futile for the Council to take any step to alleviate present conditions.

J. J. Reynolds, of the Harbor and Subway Commission, has reported that the commission had submitted to engineers for the railroads figures on the proposed subways to replace the elevated loop structure. He said the estimates of the commission were that the subways would cost about $17,000,000.

Newark Terminal Offer Open Until Oct. 1

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., has stated that the offer made by the company in regard to the construction of an extensive terminal in Newark, holds good only until October. Mr. McCarter is quoted as follows in regard to the project, which has been reviewed at length in the Electric Railway Journal:

"When the members of the Board of Works said it was ready to grant the thirteen franchises application was made, but the board does not seem to want us to build the lines as it has not taken the first step toward the granting of the franchises. We will build these lines as soon as the franchises are granted and an understanding reached regarding the terms. We have laid out the most important project since the water supply. I have $5,000,000 ready. I have used $2,000,000 to acquire the necessary property. The rest of the money will be furnished by the bankers as soon as the franchises are granted. I cannot hold the offer open beyond Oct. 1."

Decision in Dallas Fare Case

Chief Justice Anson J. Rainey, of the Court of Civil Appeals for the Fifth District, sitting at Dallas, has handed down a decision in the case of the appeal of the city of Dallas, sustaining the ruling of Judge Kenneth Foree of the Fourteenth District Court in granting an injunction on behalf of the Dallas Consolidated Electric Street Railway to restrain the city of Dallas and the City Commissioners from enforcing the initiative ordinance voted on April 3, 1912, providing for the sale of seven street car tickets for 25 cents and for the charging of only a 3-cent fare in cases where passengers are forced to stand.

The Court of Appeals held that the ordinance was invalid because the charter of the city of Dallas grants to the Commissioners of the city and not to the people the right to regulate fares and charges and service of the public utility corporations, and that only after serving notice and giving a hearing. The holding of the Superior Court is that power is granted to the voters of the city to vote on initiative ordinances of a general nature, but that provision does not say anything as to the regulation of public service corporations, and another provision of the charter expressly grants that power to the City Commissioners. The fact that the criminal ordinance to provide for penalties has never been passed, it was held, does not keep the ordinance from being a law, even though an invalid law, and an injunction was necessary to protect the interests of the street railway against injuries from civil ordinance.

The case came up to the Court of Civil Appeals on appeal of the city of Dallas against the injunction issued and perpetuated by Judge Foree on application of the street railway as plaintiff. The injunction was originally sued out to enjoin the City Commissioners and City Secretary from declaring the vote on the election. On appeal, it was held that that injunction was premature and the City Commissioners immediately canvassed the vote and declared the ordinance carried, about the middle of November, whereupon the company again entered court, praying for an injunction to prevent enforcement of the ordinance, which was granted to the company on Nov. 23.

After quoting certain portions of the original petition of the company or appellee, together with Judge Foree's decision, Judge Rainey's decision, approved by the other two members of the court, holds that the initiative ordinance, if it was a valid ordinance, became effective upon the Board of Commissioners ascertaining and declaring the result of the election. But under the charter, the decision holds, the people had no right to initiate any ordinance having to do with the regulation of the rates of street railways, the general initiative and referendum provisions of the city charter not mentioning the regulation of rates of public service corporations. The decision further points out that paragraph 7, Section 8, Article 2, delegates that duty to the City Commissioners, providing, however, for a hearing, and that no change shall be made except after due notice and hearing. The Board of Commissioners is the only tribunal having such power, it is held, and as there was also no hearing, nor could have been, on the matter of regulation, the adoption of the ordinance in the manner it was adopted makes it invalid. To sustain this holding, the decision quotes from the ruling of the Texas Supreme Court in the case of the Southwestern Telegraph & Telephone Company vs. City of Dallas, 134 S. W., page 321, by Chief Justice Brown.

The decision further holds that although the ordinance passed by initiative vote is void and its enforcement may never be attempted, still it stands on the minutes of the city of Dallas as a law and is therefore a menace to the company. The fact that no criminal ordinance has been passed is held to make no difference. The appellee is entitled to be relieved of the civil injuries under the civil ordinance. These injuries, the decision holds, were sufficiently and fully specified in appellee's original petition for injunction, and the plaintiff did not seek to enjoin the Board of Commissioners from the passage of any ordinance or to interfere with the legal function to legislate for the city, but only to prevent the enforcement of one in existence already and against which the street railway company had no adequate remedy for the injuries to property rights.

Tentative Proposition for Sale of Kansas City Viaduct

The bondholders' protective committee of the Kansas City Viaduct & Terminal Railway has submitted a tentative proposition for the sale of the inter-city viaduct to the cities of Kansas City, Mo., and Kansas City, Kan., in return for 4 per cent interest on the bonds. The issue of bonds against the structure is $3,500,000, and the committee offered to stand a loss of $1,000,000 in bonds if the two cities would pay interest on $2,500,000. The offer involves the negotiations for a new Metropolitan Street Railway franchise in the two cities. The interest on the $2,500,000 bonds at 4 per cent would be $100,000 a year. The Metropolitan line would be required to use the viaduct and pay $150,000 a year rental, out of which revenue the two cities would pay the annual interest and divert the remaining $50,000 a year to an amortization fund to retire the bonds finally. The roadway would be free to all other traffic. The Metropolitan Street Railway formerly used the viaduct for its Minnesota Avenue cars and paid the viaduct company $60,000, at the rate of 1 cent a passenger. If the Metropolitan Street Railway were to send the Quindaro Boulevard and the Chelsea Park cars also over the structure, the viaduct officials say that the rental should be $150,000 a year. The revenue of the viaduct from vehicle tolls has been about $20,000 a year, which has been absorbed by taxes and operating expenses. In good weather the daily revenue is about $90. If the viaduct were thrown open to the public and the collecting of tolls and the administration expense obviated, the cost of maintenance and operation would probably be reduced to $5,000 a year. Then if the two cities took over the viaduct without providing the annual amortization fund of $50,000 they would have to meet the annual interest charge of $100,000 and operating and maintenance expense of $5,000, or a total of $105,000 each year.

Finance Committee for 1913 Convention

The American Electric Railway Manufacturers' Association has announced through H. G. McConnaughy, secretary-treasurer, the following list of names of the members of the finance committee for the convention of the American Electric Railway Association to be held at Atlantic City in October:

Scott H. Blewett, vice-president in charge of finance, American Car & Foundry Company, St. Louis, Mo.

Waldo E. Berry, chairman finance committee, Carnegie Steel Company, New York.

John W. Ackley, Thayer & Company, Inc., New York.

Edwin A. Amaden, Carnegie Steel Company, Waverly, N. Y.

C. B. Arthur, Universal Lubricating Company, Cleveland.

M. G. Baker, Cambria Steel Company, Johnstown, Pa.

C. A. Babtiste, ELECTRIC RAILWAY JOURNAL, New York.

R. H. Beach, Federal Storage Battery Car Company, Silver Lake, N. J.

C. H. Billings, Westinghouse Traction Brake Company, Pittsburgh, Pa.

W. L. Boyer, Bemis Car Truck Company, Springfield, Mass.

W. C. Cory, Standard Motor Truck Company, Pittsburgh, Pa.

W. C. Dickerman, American Car & Foundry Company, New York.

F. A. Elmquist, Sherwin-Williams Company, New York.

W. H. Forsyth, The Curtain Supply Company, Chicago.

R. H. Harper, Western Electric Company, New York.

H. L. Hawley, Consolidated Car Heating Company, New York.

E. B. Meissner, St. Louis Car Company, St. Louis, Mo.

Will I. Ohmer, Dayton Fare Recorder Company, Dayton, Ohio.

M. J. Phelan, Peter Smith Heater Company, Detroit.

C. J. Record, Galena-Signal Oil Company, Boston, Mass.

J. E. Slimp, Ohio Brass Company, New York, N. Y.

H. E. Smith, *Electric Traction,* New York, N. Y.

E. A. Stillman, Watson-Stillman Company, Aldene, N. J.

W. A. Woolford, General Electric Company, Baltimore.

Strike in Birmingham

About a month ago the union carpenters in Birmingham, Ala., went on strike. The strike continued for about two weeks. The master builders declined to grant any demands made by the carpenters and refused to arbitrate their demands. A sympathetic strike of all allied trades was called off after a few days, and at the same time the strike of the carpenters was called off. The master builders then refused to re-employ a small number of the striking carpenters. The unemployed striking carpenters became active in attempting to organize the motormen and conductors of the Birmingham Railway, Light & Power Company, and succeeded in enlisting about thirty-five men. A little more than two weeks ago, an outside organizer succeeded in enlisting about forty additional motormen and conductors. The Birmingham Railway, Light & Power Company discharged all the conductors who joined the union as rapidly as the fact was discovered. On June 20 the motormen and conductors who had been dismissed demanded that the company recognize the union and reinstate all discharged employees. Both demands were refused. Thereupon a strike was called. The city authorities furnished the necessary police protection promptly in anticipation of trouble. The strike has been conducted free from all assaults or injury to or destruction of property, and the cars of the company have been operated continuously and normal service has been maintained. The company now has more motormen and conductors in its employ than it actually needs to conduct its business, and has not employed any one to take the place of the strikers. The company employs altogether about 600 motormen and conductors. Fewer than 100 were involved in the strike.

Extension Agreement in Minneapolis.—The Council of Minneapolis, Minn., has approved a compromise agreement with the Twin City Rapid Transit Company which provides for the construction of more than 15 miles of new line during 1914.

Committee on Interurban Development at Atlanta.—The Chamber of Commerce of Atlanta, Ga., has appointed Wilmer L. Moore, Hollins N. Randolph, M. R. Wilkinson, F. J. Paxton, P. S. Arkwright and Fred Lewis a committee to encourage the construction of interurban electric railways out of Atlanta.

Strike in Phoenix.—The motormen and conductors in the employ of the Phoenix (Ariz.) Railway went on strike on June 22 to enforce their demands for the reinstatement of a motorman who had been discharged. Three women who volunteered their services were used for a period of several hours to keep the cars in operation immediately following the strike.

Meeting of Buffalo Arbitration.—It was announced on June 23 that the members of the board of arbitration which is to adjust the differences between the International Railway, Buffalo, N. Y., and its employees would not meet until June 26, owing to the fact that Assemblyman Edward D. Jackson, who is a member of the board, was at the special session of the Legislature at Albany.

Milwaukee Company to Appeal to the United States Supreme Court.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has decided to appeal to the Supreme Court of the United States from the decision of the Wisconsin Supreme Court in the case involving the ticket rate of fare within the city of Milwaukee fixed by order of the Railroad Commission of Wisconsin.

Action Against Canadian Autobus Company Dismissed.—An action by D. Robertson, purchasing agent of the Montreal (Que.) Tramways, to prevent the contract between the Canadian Autobus Company, Ltd., and the city of Montreal from being carried out has been dismissed. An appeal, however, is to be made against the judgment of Justice Demers in the Supreme Court. The action was to stop the running of autobuses.

Electric Railway at Colon.—The construction of the electric railway in Colon, Panama, was begun on May 23. It will be operated by the Colon Electric Tramway. R. S. Arcia is president of the company, H. Hellinger manager, and Charles Albert engineer. The ties for the roadbed will be obtained from Chepo, Republic of Panama, the rails from the Isthmian Canal Commission and the United States, and the cars and all electrical appliances from the United States. Five cars have already been ordered.

Sundry Civil Bill with Labor Rider Approved.—President Wilson signed the sundry civil appropriation bill on June 23, but attached to it a statement explanatory of his action in the face of the fact that the bill contained the provision forbidding the use of any part of a specified appropriation for the prosecution of violations of the Sherman anti-trust law by combinations of farmers and labor unions. The last sundry civil bill was vetoed by President Taft because it contained a clause granting a similar exemption from prosecution to such organizations.

Abandonment of Route Approved in New York.—The Public Service Commission of the First District of New York on June 18, 1913, approved the application of the Central Crosstown Railroad to abandon the portion of its route which was formerly operated by horse cars on Seventeenth and Eighteenth Streets between Broadway and Avenue A which was part of the line from the East Twenty-third Street ferry to the Christopher Street ferry. The company is to remove the tracks and restore the pavements at its own expense within three months.

Examination for Position of Examiner of Accounts.—The United States Civil Service Commission has announced an open competitive examination for examiner of accounts, for men only, to fill vacancies as they may occur in this position in the Interstate Commerce Commission in the division of valuation and in the division of carriers' accounts. The examination will be held on July 28 and two grades of eligibles will be established with salaries ranging from $2,20c to $3,000 and from $1,860 to $2,100 per annum respectively. All persons who desire to take this examination should apply for Form 2039 to the United States Civil Service Commission, Washington, D. C.

Decision in St. Paul Extension Case.—The Minnesota Supreme Court has reversed the decision of the Ramsey County District Court holding that the St. Paul City Railway must build a line on St. Clair Street. Chief Justice C. L. Brown wrote the opinion. The action was one in mandamus, instituted by the city to compel the company to construct the line in accordance with an ordinance passed on May 7, 1910. The company's answer set forth that no public necessity for the line had been shown, that the order was unreasonable and a violation of its contract with the city and that the action of the Council was arbitrary. To this answer the city demurred and was sustained by the lower court.

Bids Opened for New York Subway Section.—Bids were opened on June 24, 1913, by the Public Service Commission for the First District of New York for the construction of the section of the Brooklyn Rapid Transit Broadway subway between Houston and Bleecker Streets and the southern end of Union Square. This subway is already under construction from Trinity Place and Morris Street to half way between Houston and Bleecker Streets, and the section for which bids were received on June 24 was the first on any of the main lines of the dual system to be advertised for competition since the operating contracts were signed. The Dock Contractor Company, New York, N. Y., was the lowest bidder. It bid $2,578,000.

House Caucus Against Commerce Court.—On June 25 the House Democratic caucus voted in favor of the abolition of the Commerce Court and defeated a motion by Representative Broussard of Louisiana providing for its continuance. The resolution adopted by the caucus reads in part: "That it is the sense of this caucus that the Commerce Court be immediately abolished during the present session, due care being taken at the same time to protect and provide for the jurisdiction now exercised by that court over pending and future litigation; and that the committee on rules is directed to bring into the House a rule making in order appropriate legislation for such purpose on any appropriation bill during the present session."

Action of Commission to Be Contested—The Public Service Commission for the First District of New York has been served with a writ of certiorari issued by Supreme Court Justice L. A. Giegerich on the application of the Richmond Light & Railroad Company. The application asks for a review of the commission's orders of March 5, 1913, and March 15, 1913, requiring the completion of the double track on the company's street railroad known as the Castleton Avenue or Brighton Heights line, between St. George, New Brighton and Broadway, West New Brighton, Staten Island. The writ is returnable in twenty days. In its application to the court the company alleges that its franchise permits it to operate either a single-track or a double-track line.

Income Tax Exemptions.—To meet the protests of representatives of New York City, Chicago, and other municipalities where electric railways and other public utilities pay part of their profits to the municipality, an amendment has been inserted in the income tax section of the tariff bill exempting the incomes of corporations profits of which accrue to a state, municipality, or other local government. Another important exemption permits corporations to exclude from their returns interest on their indebtedness, even when in excess of their capitalization, in cases where the indebtedness is secured by collateral and is incident to the business of the corporation. By another amendment the undivided profits of corporations and partnerships are included in the income subject to the tax.

Report Submitted in Montreal.—G. Janin, engineer to the Montreal City Council, has submitted a report on the tramway congestion to the Board of Control. He has under consideration various schemes submitted by Duncan McDonald, J. P. Fox and others, and states that immediate steps should be taken to procure increased facilities in almost every part of the city. His recommendations include the elimination of all unnecessary stops, placing switchmen at every important junction point, teaching passengers to have their fare ready, the installation of larger signs on cars, relief of congestion on the rear of cars, the prohibition of the hauling of freight in daytime, better supervision of traffic at junction points, the prevention of "short-turning" of cars at the option of the conductor, and the installation of autobus lines to supplement the railway service.

Decision in Wisconsin Trespass Suit.—Judge Belden, of the Circuit Court at Kenosha, Wis., decided on June 21 that the Milwaukee Light, Heat & Traction Company had no right to operate interurban cars on the streets of Kenosha. The decision came in a suit brought by the property owners on Milwaukee Avenue, which sought to have the franchise rights of the company declared invalid. The court held that the franchise ordinance under which the city lines were being operated was valid, but that the action of the Council in attempting to confer rights for interurban cars was invalid. He also denied the right of the interurban company to condemn right-of-way for its tracks on the streets of the city, holding that before such an action may be maintained the company must secure a franchise from the Common Council. It is stated that the company will appeal from the decision.

San Francisco Supervisors Approve Extension of Municipal Lines.—The Supervisors of San Francisco, Cal., have passed the ordinance committing the city government to the construction of the municipal railway lines and extensions recommended by the city engineer. The routes outlined in the ordinance have their principal terminals at the ferries and the exposition grounds. The cross lines and the extensions include the proposed Stockton Street and Van Ness Avenue routes, the acquisition and improvement of the Union Street line, the extension from Van Ness Avenue and Market Street into the Potrero, through the South Market district, and the Church Street and California Street extensions. An appropriation of $5,000 to defray the cost of preparing plans and specifications for the proposed lines has been provided by the Supervisors. The ordinance providing for the extensions will be submitted to the voters at an election to be held on Aug. 26, 1913. Approximately 14 miles of double-track road are provided for by the ordinance.

Subway Construction in Brooklyn.—The Public Service Commission for the First District has come to an agreement with the Long Island Railroad in regard to the easement rights for the St. Felix Street branch of the Fourth Avenue subway, which passes under the Long Island Railroad station in Brooklyn. The city will pay the railroad $200,000 for the right to build the subway under the station, and the patrons of the subway will have free use of the stairways, etc., in the railroad station. All that remains to be done now to legalize this route is to get the consent of the Brooklyn Academy of Music. This branch leaves the Fourth Avenue subway at Fulton Street and runs through St. Felix Street and Flatbush Avenue to a connection with the Brighton Beach elevated railroad at Malbone Street. When completed it will be operated by the New York Municipal Railway Corporation in accordance with the provisions of the dual system contract. The proposal to use the right-of-way of the Evergreen branch of the Long Island Railroad instead of Wyckoff Avenue for the Eastern District elevated railroad is under consideration.

Washington Tax Commission Assessments.—The State Tax Commission of Washington has completed its assessment for the year of all the operating electric railways in the State. The only changes made are to increase the Pacific Northwest Traction Company from $1,473,109 to $2,445,822, because of opening the new line between Bellingham and Mount Vernon, and the increase of the Willapa Harbor Railway from $50,800 last year to $124,830 because of new construction. The board decided that the assessments made in the past by the Railroad Commission and the Public Service Commission of the properties of the Puget Sound Electric Railway and Inland Empire Railroad were excessive, but as the law which makes these findings binding on the board will remain in force until June 13, when the new law giving the tax commission full power goes into effect, nothing can be done this year except to recommend that the State Board of Equalization reduce the assessments in August. The tax board valuations must be made prior to June 1. The Puget Sound Electric Railway valuation, made by the Railroad Commission, is $4,240,000, and the Inland Empire Railroad assessment, made by the Public Service Commission, is $12,500,000.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

The passage of the public utilities measure was one of the last acts of the Illinois Legislature. The Senate restored to the bill the "home rule" feature, which was stricken out in the House. The House refused to concur in this amendment and the Senate voted to recede from its amendments. This bill, as passed, provides for a state commission to regulate rates and service and supervise issues of stocks and bonds by utility companies.

Other bills passed at the closing session were Senator Waage's bill, to permit municipalities to own and operate public utilities, and the semi-monthly pay bill which will require interurban and street railways to pay twice a month and to hold back only eighteen days' pay. Governor Dunne signed this bill on June 23. The anti-pass bill was not called up for passage in the House. The Beall bill, to require interurban railways to install toilets on cars, perished in the House.

The bill designed to limit the hours of labor of employees of street and interurban railways in Illinois was before the House on June 19. An amendment to the bill was adopted providing that no employee of such a railway should work more than ten out of fourteen consecutive hours. The original provision of the bill was that the employee should not work more than ten out of twelve hours. Another amendment to the bill was offered, designed to exempt interurban lines from the operation of the proposed law, and this was also adopted.

The Senate has passed the bill which provides that children between six and twelve years of age who get on railroad trains without tickets shall be charged not more than 1½ cents a mile.

NEW YORK

At the regular session of the Legislature Governor Sulzer signed a bill providing for the improvement of the Brooklyn water front by New York City, including the Bush Terminal property, but vetoed a companion bill permitting railroad corporations to be joint owners of a terminal railroad corporation which was to operate a terminal railroad to be used by all railroad corporations not only on the Brooklyn water front but on the North River. At the instance of the New York City authorities Governor Sulzer sent a message to the Legislature on June 25 recommending the passage of a law which would permit railroad corporations to own stock in a terminal railroad on the Brooklyn water front.

PENNSYLVANIA

On June 25 within forty-eight hours of final adjournment of the General Assembly nearly all the important administration measures were in danger of failure of passage, owing to the action of the Senate in amending the bills as they came from the House. When the public utilities bill emerged from the Senate committee it was loaded with many amendments and it was predicted that even if the bill thus amended passed the Senate the joint conference committee of both houses would be unable to reach an agreement on the points at issue, thus bringing about the defeat of the bill. Dean Lewis emphasized that it was vital to the bill that the commission receive power to approve or disapprove contracts made between municipalities and public service corporations. He stated that under existing conditions many corporations could make contracts with municipalities which would debar the commission from effective control of such corporations, because a contract once made cannot be abrogated. The Senate committee struck out the clause giving the commission supervision over such contracts. The committee inserted an amendment providing that the amount in market value of a company's bonds and stocks should be an element in determining the value of the property of the company. The clause which provides that the "certificate of valuation" to be issued by the commission shall not be used to affect the manner in which the commission shall subsequently determine the valuation of the property was partly eliminated. Other most striking amendments made to the bill by the Senate committee related to grade crossings and their abolition, the wiping out of treble damages for rebating, the interchange of facilities between similar corporations, etc.

The McNichol bill to permit self-propelled omnibuses to be operated in connection with railways with the consent of local authorities, a measure believed to have been introduced in behalf of the Philadelphia Rapid Transit Company, was not reported from committee, and Senator McNichol stated to the correspondent of the ELECTRIC RAILWAY JOURNAL that the measure was dead for this session at least.

The House bill to require electric railways to establish waiting stations and to equip interurban cars with toilets was defeated in the Senate.

The bill to prohibit operation of electric railway cars having outside running boards was defeated in the House. This bill also provides that all electric railway cars operated between Nov. 1 and April 1 must have inclosed platforms. The final vote was sixty-eight to forty-eight, less than a majority of the body voting for the bill.

The bill to require fenders on all electric railway cars has been passed in the House.

After meeting with defeat the Martin bill appropriating $100,000 for a bridge over the Susquehanna River at Middletown, Dauphin County, provided the county pays half the cost, was reconsidered and placed on the postponed calendar. It will hardly get through to final passage. In the event of the construction of this bridge it would have been used by the electric railway between Middletown and York County, connecting with the Harrisburg and York electric railway systems.

Two bills, completing the all-Philadelphia program for improved transit facilities, which had previously passed the Senate, have been passed by the House and go to the Governor, by whom they will probably be approved. The first of these measures restricts the use of money to be realized from the sale of bonds under the revenue producing measure of the all-Philadelphia group to the building of subways, wharves, docks and other permanent improvements. This bill was at first inserted in the revenue-producing measure, but was taken out because of the fear that it would render that bill unconstitutional as containing two distinct objects. The revenue-producing measure is the one which makes the personal property tax a county instead of state tax, and thereby raises the borrowing capacity of Philadelphia by about $45,000,000. The bill limits the expenditure of this money to the specific objects set forth. The other bill provides that as soon as the people have approved the issuance of bonds for subway building, the city may proceed to make contracts without first waiting for the bonds to be sold.

On June 25 the Senate passed the amended public utilities bill. The measure then went to the joint conference committee. At 2 a. m. on June 26 the joint conference committee reached an agreement on the public utilities bill restoring the original clauses on supervision of contracts between municipalities and corporations, affecting certificates of valuation, giving the right to make schedules and leaving the division of cost of abolishing grade crossings in the hands of the commission. The clause in regard to the issuance of stock in excess of value as placed in the amended bill was not disturbed. The bill now goes to the Governor.

WISCONSIN

Legislative action on matters concerning electric railways did not enter on the program of the Wisconsin Legislature for the week ended June 21. The Assembly and the Senate are starting on their final work, although adjournment has been fixed for July 15. The drastic measure to compel street railways to seat passengers or not collect fares was killed.

Financial and Corporate

Stock and Money Markets

June 25, 1913.

Trading on the New York Stock Exchange to-day reacted, but in only a few issues did the declines run to any length and these were offset largely by exceptional gains in other parts of the list. Stocks were in light demand in the last hour and when efforts were made to realize profits by early buyers substantial concessions were recorded. Rates in the money market to-day were: Call, 1¾@2½ per cent; sixty days, 4@4¼ per cent; ninety days, 4¼@4½ per cent; four months, 4½@4¾ per cent; five months, 4¾@5 per cent; six months, 5@5½ per cent.

In the Philadelphia market prices showed very little change at the opening. A strong undertone was maintained during the last hour, but the market was very narrow.

The market for stocks in Chicago to-day was strong, with Chicago Railways issues the leaders.

The Boston market to-day was generally quiet and irregular. The general list was without special feature with the general tone rather easy.

Dullness ruled on the stock exchange in Baltimore today. The demand for bonds was good.

Quotations of traction and manufacturing securities as compared with last week follow:

	June 18	June 25
American Brake Shoe & Foundry (common)	91	87½
American Brake Shoe & Foundry (preferred)	128½	126½
American Cities Company (common)	35	36¾
American Cities Company (preferred	72¼	69¼
American Light & Traction Company (common)	365	*365
American Light & Traction Company (preferred)	106	*106
American Railways Company	37¾	38
Aurora, Elgin & Chicago Railroad (common)	38½	42
Aurora, Elgin & Chicago Railroad (preferred)	*82	*82
Boston Elevated Railway	87¾	86¼
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	*66	*66
Boston & Worcester Electric Companies (common)	a8	a8
Boston & Worcester Electric Companies (preferred)	40	42
Brooklyn Rapid Transit Company	87¾	87¼
Capital Traction Company, Washington	117⅛	117
Chicago City Railway	*150	*150
Chicago Elevated Railways (common)	*24½	*24½
Chicago Elevated Railways (preferred)	*75	*75
Chicago Railways, ptcptg., ctf. 1	91½	100
Chicago Railways, ptcptg., ctf. 2	18½	22¾
Chicago Railways, ptcptg., ctf. 3	6½	6¾
Chicago Railways, ptcptg., ctf. 4	2¾	2¾
Cincinnati Street Railway	110	106
Cleveland Railway	102½	102¾
Cleveland, Southwestern & Columbus Ry. (common)	6	6
Cleveland, Southwestern & Columbus Ry. (preferred)	29	29
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	69½
Columbus Railway (preferred)	88	88
Denver & Northwestern Railway	*107	*107
Detroit United Railway	70	70
General Electric Company	136	136½
Georgia Railway & Electric Company (common)	115	115⅜
Georgia Railway & Electric Company (preferred)	83½	83¾
Interborough Metropolitan Company (common)	16¼	15¼
Interborough Metropolitan Company (preferred)	59⅝	55⅝
International Traction Company (common)	30	30
International Traction Company (preferred)	95	95
Kansas City Railway & Light Company (common)	18	18
Kansas City Railway & Light Company (preferred)	36	36
Lake Shore Electric Railway (common)	6	6
Lake Shore Electric Railway (1st preferred)	92	92
Lake Shore Electric Railway (2d preferred)	25	25
Manhattan Railway	125	127
Massachusetts Electric Companies (common)	12½	12⅞
Massachusetts Electric Companies (preferred)	68	67
Milwaukee Electric Railway & Light Co. (preferred)	100	100
Norfolk Railway & Light Company	25	25
North American Company	65	66
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	40⅛	40⅝
Philadelphia Company, Pittsburgh (preferred)	39	39
Philadelphia Rapid Transit Company	21	22½
Portland Railway, Light & Power Company	62	62
Public Service Corporation	111	111
Third Avenue Railway, New York	33	31½
Toledo Railways & Light Company	2	2
Twin City Rapid Transit Co., Minneapolis (common)	103½	102¾
Union Traction Company of Indiana (common)	4½	4½
Union Traction Company of Indiana (1st preferred)	80	80
Union Traction Company of Indiana (2d preferred)	30	30
United Rys. & Electric Company (Baltimore)	26	25⅞
United Rys. Inv. Company (common)	19	20½
United Rys. Inv. Company (preferred)	35½	34
Virginia Railway & Power Company (common)	52	56
Virginia Railway & Power Company (preferred)	87½	87½
Washington Ry. & Electric Company (common)	85⅝	90¼
Washington Ry. & Electric Company (preferred)	87½	88⅜
West End Street Railway, Boston (common)	71	71
West End Street Railway, Boston (preferred)	88	87½
Westinghouse Elec. & Mfg. Company	60	59½
Westinghouse Elec. & Mfg. Company (1st preferred)	106	106

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*Last sale. a Asked.

ANNUAL REPORT

American Water Works & Guarantee Company

The balance sheet of the American Water Works & Guarantee Company, Pittsburgh, Pa., which controls the West Penn Traction Company, Pittsburgh, Pa., on May 1, 1913, was as follows:

ASSETS		
Stocks of subsidiary companies (par value, $46,481,050.00), book value		$10,433,363
Stocks for sale		35,511
Bonds for sale		934,140
City warrants		38,626
Notes and accounts receivable		10,736,751
Other assets		3,500
Cash in banks and on hand		1,850,914
		$24,032,805
LIABILITIES		
Capital stock:		
Common authorized and issued	$10,000,000	
6 per cent. cumulative participating preferred—authorized and issued	10,000,000	$20,000,000
Accounts payable, including accounts payable of all subsidiary water companies		67,872
Operating and maintenance reserve		2,182,228
Surplus		1,782,705
		$24,032,805

The earnings of the company for the fiscal year ended April 30, 1913, are shown by the following statement:

Gross earnings of water plants owned and controlled by the company and dividends received by the company from traction and light properties		$3,977,551
Other income and profits, less operating expenses		912,172
		$4,889,723
Operating expenses of subsidiary companies	$1,505,084	
Coupon interest on outstanding bonds of operating companies	1,680,139	3,185,223
Net surplus earnings for year, applicable to dividends		$1,704,500

James S. Kuhn, president, says in part:

"For the fiscal year ended April 30, 1913, the net earnings were $1,704,500. This is an increase of $613,439 over net earnings in the preceding fiscal year and compares with an estimate of $1,500,000 made in May, 1912, when application to list the $10,000,000 6 per cent cumulative participating preferred stock on the New York Stock Exchange was pending. As the company had the benefit of the proceeds of the preferred stock issue only for a portion of the year, financial results do not reflect the maximum probabilities therefrom. We feel justified in estimating that net earnings for the period ending April 30, 1914, will exceed $2,000,000. For further purposes of comparison, net earnings, after all deductions, for the past five years are shown as follows: 1909, $680,210; 1910, $780,634; 1911, $823,133; 1912, $1,091,061; 1913, $1,704,500.

"The company, which had its inception in 1882 as an individual partnership, was originally incorporated in 1886 as the American Water Works & Guarantee Company, Ltd., with a capital of $500,000 and owning and operating six water-works and two glass plants. This limited partnership was reincorporated on Jan. 27, 1891, as the American Water Works & Guarantee Company of New Jersey, with the same officers and stockholders and with a capital of $1,000,000. The company now owns, controls and operates constituent companies in seventeen states. Gross earnings of $4,889,723 indicate the growth and development of the communities in which your company's subsidiaries operate.

"A consistent policy of providing for present requirements and future growth has been adhered to. A steady expansion in population and the character of the service rendered, as furnished by water-works, hydroelectric, electric railway and irrigation companies, and also by the mining of bituminous coal, practically assures a rising ratio of earnings from year to year."

The directors, recognizing that a large proportion of the stockholders had only a superficial knowledge of the varied interests of the American Water Works and Guarantee Company, presented in their report brief descriptions of their different properties, accompanied by excellent maps and illustrations. Aside from affording additional information about the various operations conducted by the company, the booklet deserves commendation from the purely artistic standpoint. It is divided into five sections: waterworks, electric railway and power, irrigation, hydroelectric, and industrial, in the order named.

Columbus Railway & Light Company Consolidation

A committee of ten, representing the Columbus Railway & Light Company and allied corporations, Columbus, Ohio, submitted the consolidation plans which had been approved by the Public Service Commission to the boards of directors of the various companies on June 19 and they were accepted. A statement was then sent to all the stockholders, with recommendations from the board of directors of each company that their stock be deposited by July 2, 1913, with local banks, for which negotiable receipts will be given, preparatory to consolidation.

The common stock of the new company, the Columbus Railway, Power & Light Company, will be placed on a 5 per cent basis according to a statement sent to stockholders. It is estimated that the surplus earnings, after payment of all charges and dividends on preferred stock, will amount to $500,000 the first year.

For the purpose of fixing a basis for the adjustment of fractional shares in the exchange, the reorganization committee has appraised the new preferred stock, series A, at $102 a share; new preferred, series B at $90, and new common at $75. Fractional shares will not be issued, but stockholders will be permitted to make their holdings into full shares on the basis mentioned or they may sell their fractional shares on the same basis. The details of the financing plan were published in the Electric Railway Journal of June 21, 1913, page 1121.

Beaumont (Tex.) Traction Company.—The City Council of Beaumont, under date of June 17, passed the amended franchise of the Beaumont Traction Company, and it is understood that Stone & Webster, Boston, Mass., will exercise their option on the property and merge the company with the Jefferson County Traction Company in accordance with the plan outlined briefly in the Electric Railway Journal of May 31, 1913, page 983.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—A dividend of 3 per cent has been declared by the Birmingham Railway, Light & Power Company, payable on June 30 to holders of record of June 25, on the $3,500,000 of common stock, along with the usual semi-annual distribution of 3 per cent on the $3,500,000 of preferred stock. This compares with 4 per cent each on Dec. 30 and July 1, 1912, and Dec. 30, 1911; 3 per cent in July, 1911, and 2½ per cent in January, 1911, and July, 1910, and 2 per cent in January, 1910.

Chicago City & Connecting Railways, Chicago, Ill.—A semi-annual dividend of $2.25 has been declared on the $250,000 of preferred participation shares of the Chicago City & Connecting Railways, payable on July 1 to holders of record of June 16. No payment will be made on the $150,000 of common participation shares, on which $1 per share was paid regularly to July, 1912, but on which no distribution was made last January, owing to the fact that the payment in July, 1912, exhausted the surplus from which payments were made.

Chicago (Ill.) Railways.—A circular letter has been received by the holders of Chicago Railways participation certificates asking them for proxies to be voted at the annual meeting in October. The communication explains that if a shareholder has already sent a proxy to the so-called protective committee, he may now send one to the company and cancel the effect of the other, as the proxy of the latest date will hold good at the meeting.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.—On application of its president, J. C. Hooven, the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad was placed in the hands of F. B. Shutts, as receiver, by Insolvency Judge Warner on June 23. This step was taken as a result of a meeting of the stockholders and directors on June 12 and the cause assigned is the heavy losses sustained during the flood in March. The branch between Valley Junction and Harrison was almost completely destroyed, while the destruction of the county bridge spanning the Big Miami at Cleves and the company bridge across the Whitewater River at Valley Junction has prevented the operation of a large part of the main line. Cars are being run only between Anderson's Ferry and Cleves. The company was organized in 1899 with $750,000 of common stock and $250,000 of 6 per cent preferred stock. All of the common stock has been issued, but $191,000 of the preferred stock is still in the treasury. The company has outstanding $750,000 of 5 per cent gold bonds. The petition states that the company had always paid the interest and dividends on its securities promptly prior to March 25, 1913. The semi-annual interest on the bonds will be due on July 1, and the company stated that it would not be able to meet its fixed charges because it has not been able to operate its road properly since the flood. Mr. Hooven stated that he owned 4000 shares of the common stock and that he was a creditor to the extent of $125,000 which he advanced to meet expenses. The claims of houses which have furnished supplies and materials to the road during the past six months are mostly unpaid. The Union Savings Bank & Trust Company, trustee for the bonds, was made a party defendant in the suit. The company, through C. E. Hooven, vice-president, admitted the allegations made in the petition. Mr. Shutts, the receiver, resides in Florida. He was in Cincinnati when the petition was filed and qualified by giving bond in the sum of $25,000.

Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio.—It is reported that the Pittsburgh-Cincinnati Traction Company is negotiating through A. O. Kirshner for the purchase of the Cincinnati, Georgetown & Portsmouth Railroad. The new company has acquired leases on the right-of-way along the Ohio River through Clermont County and has secured the rights-of-way at other points along the river.

Cities Service Company, New York, N. Y.—Henry E. Doherty & Company, New York, N. Y., are offering for sale at part and accrued interest 7 per cent five-year coupon convertible gold notes of the Cities Service Company, dated May 15, 1913, in denominations of $100, $500 and $1,000. Of the $5,000,000 to be issued at this time from the $1,000,000 authorized, $3,000,000 has been sold in London, and a large portion of the remainder already taken by the company's American stockholders. These notes are subject to call at 102 and interest on thirty days' notice and are convertible at any time prior to redemption or maturity into Cities Service Company preferred stock at par.

Cleveland & Eastern Traction Company, Cleveland, Ohio.—On June 17 the Public Service Commission of Ohio refused to grant its consent to the Cleveland & Eastern Traction Company for the issuance of first mortgage 5 per cent bonds of the principal sum of $54,000, preferred capital stock of the par value of $32,400 and common capital stock of the par value of $27,000, mention of which application was made in the Electric Railway Journal of May 10, 1913, page 868. The new issues were to have been devoted to reimbursing the income account of the Cleveland & Eastern Traction Company for moneys expended for the construction and installation of substation apparatus and high-tension transmission lines to replace obsolete generating apparatus formerly in use by the company.

Duluth-Superior Traction Company, Duluth, Minn.—A quarterly dividend of 1 per cent has been declared on the $3,500,000 of common stock, along with the usual quarterly disbursement of 1 per cent on the $1,500,000 of 4 per cent cumulative preferred stock, both payable on July 1 to holders of record of June 21. This is a reduction from the 1¼ per cent dividend declared quarterly from October, 1910, to April, 1913, inclusive. C. G. Goodrich, president of the company, states that the dividend has been reduced "to fortify the company's cash position, which suffered from last year's strike of two months' duration."

Interborough-Metropolitan Company, New York, N. Y.—The $2,039,520 of 6 per cent collateral trust notes of the Interborough-Metropolitan Company which mature on July 1, 1913, have been extended to Jan. 1, 1914, with the privilege of retiring the issue at any time between July 1 and Jan. 1, 1914. The company has sufficient funds in its treasury at the present time to pay off these bonds if it so desires on July 1 next, but it has been decided to utilize the treasury bonds for other purposes.

Lehigh Valley Transit Company, Allentown, Pa.—The acquisition of the Easton Consolidated Electric Company by the Lehigh Valley Transit Company, which was ratified at the stockholders' meeting of the latter company held on

June 19 at Allentown, increases the Lehigh Valley Transit system to 209.8 miles of track.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The Railroad Commission of California has authorized the Los Angeles & San Diego Beach Railway to issue $28,000 of notes.

Middle West Utilities Company, Chicago, Ill.—The Middle West Utilities Company reports earnings of $911,969 for the last eleven and a half months. Out of this income the company paid total charges of $212,948, leaving a net of $699,021 for the year. Dividends to the extent of $353,417 on the preferred stock left a balance of $345,603 for the $7,356,200 of common stock, or 4.6 per cent on the outstanding issue.

New Orleans Railway & Light Company, New Orleans, La.—A dividend of 1 per cent has been declared by the New Orleans Railway & Light Company on its $20,000,000 common stock, payable June 30 to holders of record June 20, comparing with one-half of 1 per cent paid Dec. 31, 1912, and an initial payment of 1 per cent on July 1, 1912.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission for the First District of New York held a hearing on June 26 on the application of the New York Municipal Railway Corporation for permission to issue $400,000 of its capital stock. The company last January applied for permission to issue $1,000,000 in capital stock, and the commission at that time authorized an issue of $100,000. The company now asks for leave to issue $400,000 of the remaining $900,000 of such stock, to provide working capital for the performance of its obligations under the dual system contract. This company was organized for the construction and operation of rapid transit lines allotted to the Brooklyn Rapid Transit under the dual system.

Northern Massachusetts Street Railway, Athol, Mass.—The Railroad Commission of Massachusetts on June 20 approved the petition of the Northern Massachusetts Street Railway for authority to issue bonds to the amount of $500,000 maturing in thirty years and bearing interest at the rate of 5 per cent. Of this amount $245,000 is for refunding purposes and $255,000 to pay a floating debt.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The Oakland, Antioch & Eastern Railway has applied to the Railroad Commission for authority to issue $1,000,000 of 5 per cent bonds. The proceeds are to be used to complete the road from Bay Point to Sacramento.

Ocean Shore Railroad, San Francisco, Cal.—The Ocean Shore Railroad has applied to the Railroad Commission for authority to execute its promissory notes in the sum of $22,986 to make rental payments upon locomotives which it uses, and to execute notes in the sum of $29,615 as part payment upon forty freight cars.

Ohio Electric Railway, Cincinnati, Ohio.—The Ohio Electric Railway has given a second and general mortgage to the Fidelity Trust Company, Philadelphia, as trustee to secure an issue of $5,000,000 of bonds. The bonds are all dated June 2, 1913, and to bear interest at 5 per cent. The proceeds of the bonds will be used to repair flood damage, to retire other bonds and to pay for general improvements.

Omaha Traction & Power Company, Omaha, Neb.—W. B. McKinley, president of the Illinois Traction System, Peoria, Ill., has purchased at receiver's sale the property of the Omaha Traction & Power Company, which operates an electric railway from South Omaha to Papillion, a distance of 9 miles. The price paid was $110,000.

Public Service Company of Oklahoma, Tulsa, Okla.—The Public Service Company of Oklahoma has been incorporated in that State with a capital stock of $3,000,000 to take over a number of public utility properties. The company is being promoted in behalf of the Insull interests and will take over, it is said, the Tulsa Corporation, which is now included among the properties of the Middle West Utilities Company, and other public service plants in Oklahoma. The officers of the new concern are: Fred W. Insull, president; Martin J. Insull, vice-president; Burton French, secretary, and B. F. Frank, treasurer. The directors are Samuel Insull and Martin J. Insull, Chicago; Fred W. Insull, Oklahoma City; Paul M. Galloway, Tulsa, and Galen Crow, Guthrie, Okla.

Republic Railway & Light Company, New York, N. Y.—White, Weld & Company, New York, N. Y., are offering privately, at a price to yield 6 per cent, $600,000 of secured 5 per cent gold notes of the Republic Railway & Light Company, dated April 1, 1912, and due Jan. 1, 1916, but redeemable, all or in part, on thirty days' notice at 100 and interest. Of an authorized issue of $5,000,000 there is $2,600,000 outstanding. These notes are secured by: (1) unencumbered first lien on the property of the Pennsylvania Power Company at Elwood City, Pa. (acquired at a cost of $320,000), through deposit of all the first mortgage bonds and all the stock of that company; (2) unencumbered first lien on all the property now owned or to be acquired by the Republic Construction Company (estimated cost, $1,250,000), through deposit of all the first mortgage bonds and all the stock of the company, and (3) deposit of over 98.55 per cent ($10,592,500 par value) of the outstanding stock of the Mahoning & Shenango Railway & Light Company. The proceeds of the $600,000 of notes now issued will be used to reimburse the company for advances made to subsidiary companies on account of betterments and improvements already made or to be made, and to retire floating debts incurred directly by subsidiary companies on account of such betterments.

San Antonio (Tex.) Traction Company.—The San Antonio Traction Company has secured an amendment to its charter which provides for an increase in the capital stock of the company from $1,120,000 to $1,400,000.

Toledo & Indiana Railway, Toledo, Ohio.—D. H. Schenck, treasurer of the Toledo & Indiana Railroad, has been elected president of the company to succeed his father, the late S. C. Schenck. Louis R. Schenck, New York, has been elected a director of the company.

West Penn Traction & Water Power Company, Wheeling, W. Va.—The West Penn Traction & Water Power Company, Pittsburgh, Pa., a subsidiary of the American Water Works & Guarantee Company, has called a special meeting of its stockholders at Wheeling, W. Va., June 30, to adopt a new agreement of incorporation.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—The Wilmington & Philadelphia Traction Company, as lessee, announces that the $64,000 of Delaware County & Philadelphia Electric Railway first mortgage 6 per cent bonds of 1893 and the $175,000 of Chester, Darby & Philadelphia Railway first mortgage 5 per cent bonds of 1893 will be paid on and after July 1 upon presentation, the former at the office of Newburger, Henderson & Loeb, Philadelphia, and the latter at the office of the Delaware County Trust, Safe Deposit & Title Insurance Company, Chester, Pa. The holders have the privilege of exchanging the same not later than June 25 for new first mortgage 5 per cent bonds of the respective companies dated July 1, 1913, issued for like aggregate amounts, to refund the above loans, interest free of tax in Pennsylvania, secured on the same properties, respectively, with the same guaranties under lease, for principal and interest, and to mature in thirty years, with option on the part of the obligor to redeem at 103 and interest after 1914. Holders exercising this privilege will be entitled to receive the sum of $10 per $1,000 bond on depositing their holdings with H. B. Hollins & Company, New York, or Newburger, Henderson & Loeb, Philadelphia.

Dividends Declared

Augusta-Aiken Railway & Electric Company, Augusta, Ga., quarterly, 1½ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, three-quarters of 1 per cent, common.

Birmingham Railway, Light & Power Company, Birmingham, Ala., 3 per cent, preferred; 3 per cent, common.

Chicago City & Connecting Railways, Chicago, Ill., $2.25 preferred.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus (Ga.) Electric Company, 3 per cent, preferred.

Germantown Passenger Railway, Philadelphia, Pa., quarterly, $1.31¼.

Halifax (N. S.) Electric Tramways, Ltd., quarterly, 2 per cent.

Illinois Traction Company, Peoria, Ill., quarterly, 1½ per cent, preferred.

Inter-State Railways, Philadelphia, Pa., quarterly, 30 cents, preferred.

London (Ont.) Street Railway, 3 per cent.

New England Investment & Security Company, Springfield, Mass., 2 per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1½ per cent, preferred; 1 per cent, common.

Porto Rico Railways, Ltd., San Juan, P. R., quarterly, 1¾ per cent, preferred; quarterly, 1 per cent, common.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Reading (Pa.) Traction Company, 1½ per cent.

Republic Railway & Light Company, Youngstown, Ohio, quarterly, 1½ per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., quarterly, 1½ per cent, preferred.

Union Passenger Railway, Philadelphia, Pa., $4.75.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred; quarterly, 1½ per cent, second preferred.

West Philadelphia Passenger Railway, Philadelphia, Pa., $5.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	May	'13	$433,589	....	....	....	....
1 "	"	'12	309,642	....	....	....	....
11 "	"	'13	4,672,222	....	....	....	....
11 "	"	'12	4,441,890	....	....	....	....

ATLANTIC SHORE RAILWAY, SANFORD, MAINE

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	May	'13	$28,927	$23,655	$5,272	$615	$4,657
1 "	"	'12	25,207	22,286	2,921	581	2,340

BATON ROUGE (LA.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	April	'13	$12,240	*$7,416	$4,824	$2,083	$2,741
1 "	"	'12	11,129	*7,071	4,058	1,730	2,328
12 "	"	'13	152,007	*92,477	59,530	21,817	37,714
12 "	"	'12	128,469	*78,366	50,104	20,745	29,359

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	April	'13	$8,354	*$7,413	$941	$1,131	$190
1 "	"	'12	8,286	*6,517	1,768	1,050	718
12 "	"	'13	121,248	*93,334	27,914	12,755	15,159
12 "	"	'12	119,575	*90,229	29,346	12,693	16,653

CAPE BRETON ELECTRIC COMPANY, SYDNEY, N. S.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	April	'13	$27,917	*$15,858	$12,059	$6,082	$5,703
1 "	"	'12	26,559	*16,064	10,495	5,703	4,792
12 "	"	'13	371,180	*196,699	174,482	69,553	104,929
12 "	"	'12	343,489	*189,471	154,018	67,823	86,195

COLUMBUS (GA.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	April	'13	$54,348	*$26,678	$27,670	$20,314	$7,536
1 "	"	'12	49,354	*24,691	24,662	19,062	5,601
12 "	"	'13	638,473	*287,867	350,606	232,413	118,192
12 "	"	'12	578,906	*256,407	322,599	210,822	111,778

DALLAS (TEX.) ELECTRIC CORPORATION

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	April	'13	$166,008	*$99,185	$66,823	$24,635	$42,188
1 "	"	'12	141,098	*92,417	48,681	24,672	24,009
12 "	"	'13	1,947,360	*1,142,779	804,581	295,787	508,794
12 "	"	'12	1,671,308	*1,114,172	557,136	253,286	303,850

EL PASO (TEX.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	April	'13	$70,658	*$40,093	$30,565	$4,176	$26,389
1 "	"	'12	58,110	*33,617	24,493	6,681	17,812
12 "	"	'13	844,778	*455,217	389,560	56,245	333,315
12 "	"	'12	716,788	*407,026	309,761	82,417	227,344

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	May	'13	$2,914,334	$1,161,673	$1,752,266	$1,105,357	$647,304
1 "	"	'12	2,796,990	1,113,737	1,683,253	1,088,284	594,969
11 "	"	'13	30,335,801	12,172,940	18,162,861	12,086,248	6,076,612
11 "	"	'12	29,097,199	11,980,563	17,116,636	11,885,524	5,231,112

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*Includes taxes.

Traffic and Transportation

Accidents on Interstate Railways

The Interstate Commerce Commission, Washington, D. C., has issued a summary for the three months ended Sept. 30, 1912, of the casualties to persons on railways under its jurisdiction.

The total number of casualties of all classes reported to the commission amounted to 3109 for persons killed and 51,331 for persons injured. This statement includes 288 passengers killed and 4598 passengers injured and 2707 employees killed and 17,849 employees injured. The casualties were sustained by employees at work, by passengers getting on or off cars, by persons at highway crossings, by persons doing business at stations, etc., as well as by trespassers and others. In addition 114 persons were killed and 28,884 persons injured in "industrial accidents," which term covers accidents not involved in train operation but occurring to railway employees, other than trainmen, on railway premises. The report for interstate electric railways in particular shows that the list of those killed during the three months was 107, or 3.4 per cent of the total, and the list of injured 1362, or 2.6 per cent.

From the statement of the commission, which is appended, the columns have been eliminated which show casualties to employees not on duty and to trespassers. None of the former class was killed and only two were injured, while of trespassers thirty-nine were killed and thirty-three injured. The summary as given by the commission with the above eliminations follows:

Causes.	Number of Accidents.	Passengers Killed.	Passengers Injured.	Employees on Duty Killed.	Employees on Duty Injured.	Other Persons Not Trespassing Killed.	Other Persons Not Trespassing Injured.	Total Persons Killed.	Total Persons Injured.
Collisions	52	1	207	2	22	...	1	3	230
Derailments	25	3	85	2	20	..	..	5	105
Accidents to trains, cars or engines, except collisions, derailments and boiler explosions	..	..	..	..	..	..	..	..	...
Bursting of, or defects in, locomotive boilers or boiler attachments	..	..	..	..	..	..	..	..	...
Total train accidents	77	4	292	4	42	..	1	8	335
Accidents to roadway or bridges not causing derailment, such as fires, floods, landslides, explosions, etc.	1	..	..	..	..	..	..	..	...
Coupling or uncoupling cars (does not include accidents with air or steam hose)	..	..	..	..	1	..	..	..	1
While doing other work about trains (not in shops or engine houses) or while attending switches	..	..	..	2	43	..	..	2	43
Coming in contact while riding on cars with overhead bridges, tunnels, or any signal apparatus or fixed structure above or at side of track	..	2	4	2	11	..	..	4	15
Falling from cars or engines	..	2	23	1	26	..	2	3	53
Getting on or off cars or engines	..	1	356	..	20	2	8	3	392
Other accidents on or around trains not here named	..	..	72	2	7	..	1	2	83
Being struck or run over by engines or cars at stations or yards	..	..	..	..	2	4	6	11	15
Being struck or run over by engines or cars at highway grade crossings	..	..	..	..	..	21	157	23	157
Being struck or run over by engines or cars at other places	..	1	1	1	3	11	60	42	77
Other causes	..	..	22	1	1	1	9	3	34
Total, other than train accidents	..	6	478	9	114	39	243	93	870
Grand total, exclusive of industrial accidents	..	10	770	13	156	39	244	101	1,205
Industrial accidents to employees	..	..	..	6	157	..	..	6	157
Grand total	..	10	770	19	313	39	244	107	1,362

The bulletin of the commission also contains the following statement of the collisions and derailments on the electric railways during July, August and September, 1912:

Classes	Number	Damage to Road and Equipment and Cost of Clearing Wrecks	Number of Persons Killed	Number of Persons Injured
Collisions, rear	30	$5,061	..	144
Collisions, butting	9	4,380	2	46
Collisions, train separating	..	....	..	..
Collisions, miscellaneous	13	33,638	1	40
Total	52	43,079	3	230
Derailments due to defects of roadway	8	225	..	18
Derailments due to defects of equipment	2	1,900	1	8
Derailments due to negligence of trainmen, signalmen, etc	6	4,650	2	45
Derailments due to unforeseen obstructions of track	3	3,021	..	4
Derailments due to malicious obstruction of track, etc	..	....	..	..
Derailments due to miscellaneous causes	6	1,134	2	30
Total	25	10,930	5	105
Total collisions and derailments	77	54,009	8	335
Total for same quarter of—				
1911	62	21,905	3	459
1910	78	36,355	46	458

The Joliet Safety Campaign

The Chicago & Joliet Electric Railway, Joliet, Ill., presented the principle of "safety first" with telling emphasis to the people of Joliet, at the efficiency show given by the business men of that city from June 10 to 14 at Adams Arcade. The company installed a moving picture machine in the big lecture room at the Arcade and twice a day gave a two-reel show with films that portrayed all of the common forms of street accidents against which the company has been campaigning in the newspapers. As the public had been put into a receptive mood by reading the series of "safety talks" that had been run twice a week in each of the local papers, the moving pictures made a distinct impression upon it. One of the reels which was shown had been taken only the week previous for the Chicago (Ill.) Railways and will be used by the latter in the "safety first" campaign which it is preparing to carry out in Chicago. Through the courtesy of the film company and the Chicago Railways, the Chicago & Joliet Electric Railway was enabled to secure the use of the film for the exhibit at the efficiency show. The work of developing and printing this film was finished on noon of the day that the efficiency show opened, and the pictures had to be rushed to Joliet without the titles of the scenes. A representative of the railway explained each of the pictures as it was presented. The reel shows twenty-seven different types of street accidents, from the person who falls while attempting to board or alight from a moving car to the one who walks from behind one car directly in front of another. Several wagons and other vehicles shattered to bits are also shown in this film as a lesson to drivers who are inclined to dispute the right of way with a street car or who while driving parallel with a car suddenly swerve across the tracks in front of it. Since the Chicago & Joliet Electric Railway started its "public safety" campaign last April there have been only a few minor accidents on its city lines As reported before in the Electric Railway Journal, this company began its campaign by co-operating with the safety department of the Illinois Steel Works and having lectures illustrated by slides and moving pictures presented to all the school children of Joliet. It has supplemented these lectures by newspaper talks and moving-picture shows to adults.

Hearing Concerning Transfers in Brooklyn

On June 19 the Public Service Commission of the First District of New York held a hearing in regard to ordering the exchange of transfers between the Coney Island & Brooklyn Railroad and certain intersecting lines of the Brooklyn Rapid Transit System. According to instructions from the commission, only statements were taken from the interested parties present.

A. L. Perkins, appearing for the Central Board of Trade, stated that transfers are desired between Franklin Avenue and Fulton Avenue, discrimination being claimed against his district on the ground that the Franklin Avenue line is the only one which does not transfer to Fulton Street.

Counsel for the Allied Boards of Trade of Brooklyn said that there was no opposition to the purchase of the stock or the Coney Island & Brooklyn Railroad by the Coney Island & Gravesend Railway, one of the Brooklyn Rapid Transit companies, provided the purchase was made contingent upon the enlargement of transfer privileges in Brooklyn. Evidence was offered to show that the Brooklyn Rapid Transit System disregards the arbitrary operating divisions into which the system has been split. It was cited in one instance that of 229 cars observed as being operated under the name of the Nassau Electric Railroad eighty-five were found on its own line, 157 on the Brooklyn Heights Railroad and twenty-two on the Brooklyn, Queens County & Suburban lines; of the 170 belonging to the Brooklyn City Railroad eighty-five were operated by the Nassau Electric Railroad, seventy-seven by the Brooklyn Heights Railroad and eight by the Brooklyn, Queens County & Suburban lines; and of the 475 cars owned by the Traction Development Company, a non-operating company, sixty-six were found on the lines of the Nassau Electric Railroad, 272 on the Brooklyn Heights Railroad and 137 on the Brooklyn, Queens County & Suburban Railroad.

Counsel Woody, for the Brooklyn Rapid Transit Company, objected to the above statements on the ground that the commission had exhaustive evidence in its own files regarding the effectiveness of the 1907 dissolution and that it would necessitate a needless waste of time to review the voluminous evidence that would be offered by the Allied Boards of Trade and the rebutting evidence of the transit company. Chairman McCall decided, however, that such evidence could be submitted, and the hearing was postponed until such a date as counsel for the commission and the other parties can agree upon for the presentation of proof. A motion just prior to adjournment to eliminate the New York Consolidated Company from the companies coming under the order was temporarily denied.

Near-Side Stop in Kewanee.—The Galesburg & Kewanee Electric Railway, Kewanee, Ill., has put into effect a "near-side" stop order in Kewanee.

Near-Side Stops in Dubuque.—The city traffic ordinance of Dubuque, Ia., has been amended so as to require street cars to stop on the "near side" of the street.

Freight Rights Granted in Montreal.—The Montreal (Que.) City Council has voted the Montreal Tramways permission, until further notice, to haul freight on its lines in the city.

New Automobile Law in New York.—The new automobile law which came into force on June 1, 1913, in New York City forbids motor cars to pass street cars that have stopped to take on or let off passengers until the cars have been started again.

Fare Complaint in Kentucky.—Citizens of Shelbyville, Ky., the terminus of the Louisville & Interurban Railroad, have complained to the State Railroad Commission that the rates charged by the company for passenger service favor Louisville as against Shelbyville.

New Color Scheme for Lincoln Transfers.—The Lincoln (Neb.) Traction Company has adopted a new color scheme for its transfers. On Sunday the color of the transfer slips will be cherry; on Monday, orange; on Tuesday, white; on Wednesday, pink; on Thursday, yellow; on Friday, magenta, and on Saturday, green.

Fare and Service Order Sought in Toronto.—The City Council has instructed the Board of Control to apply under the general railway act for an order to require a single fare on Yonge Street, on the Toronto & York Radial Railway, instead of two fares from the Canadian Pacific Railway track to Bedford Park, and for an order directing the company to improve its service.

"The How and Why of Safe Railroading" Reprinted.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has published in pamphlet form the address, "The How and Why of Safe Railroading," delivered to employees of that company on Jan. 13, 1913, by E. F.

Schneider, general manager of the Cleveland, Southwestern & Columbus Railway.

Increase in Wages on New Jersey Road.—The Morris County Traction Company, Morristown, N. J., has increased wages as follows: For first six months, 20 cents an hour; second six months, 21 cents; third six months, 22 cents; two years and over, 24 cents. The men have been receiving from 19 cents for the first six months to 22 cents for two years and over.

Philadelphia Transit Commissioner Appoints Staff.—Director Taylor of the Department of City Transit of Philadelphia, Pa., appointed the working staff of his office on June 26 and announced that the department would at once begin active work planning for the improved transportation system for the city. Every one of the twenty men who have been appointed is a resident of Philadelphia.

Appeal from Commission's Order for Extra Train.—A petition has been filed with the Public Service Commission of Ohio asking that the order by which the Cincinnati, Georgetown & Portsmouth Railroad was required to put on an extra train leaving Cincinnati at 8:25 p. m. and arriving at Batavia at 10 a. m. be rescinded. The train has now been in operation for some time and the company claims that the patronage is not sufficient to warrant its continuance.

Northern Ohio Company Answers Complaint.—In an answer filed with the Public Service Commission recently to the complaint made by City Solicitor John C. Davis, of Massillon, the Northern Ohio Traction & Light Company states that the operation of the local road in that town is not profitable. In a reply filed on June 20 Mr. Davis claims that if proper service is maintained the company will make money. He denies that the company has built 5 miles of new track during the last eight years.

Report Requested on Traffic Matters in Toronto.—The transportation committee of the City Council of Toronto, Ont., has been instructed to report what officers of the city are responsible for the traffic conditions in Ward No. 7, whether an application should be made to the Dominion Railway Board for an order for suburban railway service from Toronto, Parkdale, Toronto Junction, Lambton, Weston, Davenport, East Toronto and Little York, on the advisability of establishing a motor bus line for the Junction, North Toronto, Earlscourt, Avenue Road and Rosedale, and what additional civic lines ought to be built.

Cincinnati Transfer Ordinance.—The street railway committee of the City Council of Cincinnati, Ohio, has in its hands an ordinance to require the Cincinnati Traction Company to issue universal transfers. At the request of Walter A. Draper, secretary of the company, action on the ordinance will be postponed until the work of re-routing cars has been completed. The resolution to regulate the capacity of street cars has been laid on the table indefinitely. Councilman Joseph White is preparing a resolution intended to compel the company to extend one of its lines so as to furnish increased service to Winton Place. Action on the proposed twenty-five-year franchise to the South Covington & Cincinnati Railway has been postponed until information can be secured as to the expiration of franchises in the Kentucky towns which the road reaches.

Transfer Compromise in St. Louis.—It is stated that under the terms of a proposed compromise with the city the United Railways, St. Louis, Mo., will install a system of transfers under which it will be possible for passengers to travel from any point on the system to any other point for one fare. The passenger is to make known his destination when he pays his fare and the conductor to whom the passenger pays his fare is to fix the route through to the destination. H. S. Priest, counsel for the company, is reported to have said: "I do not believe the city wants this company to allow the public to have the whole say in the matter of getting from one point to another. There is some justice in the statement that the company at least should have the right to name the route to be taken, and any other system would work a hardship on the company that would be neither just nor reasonable. The company is willing to give the city everything that it asks for in the matter of transfers, but demands in return that it be protected against fraud in the use of transfers."

Personal Mention

Mr. George Westinghouse was awarded the Grashoff gold medal of the Society of German Engineers at the annual meeting of the society at Leipzig on June 23.

Mr. D. D. Schenck, treasurer of the Toledo & Indiana Railroad, Toledo, Ohio, has been elected president of the company, to succeed his father, the late S. C. Schenck.

Mr. E. W. Samuel, president of the Shamokin & Mt. Carmel Transit Company, Mt. Carmel, Pa., has been elected president of the I. S. Van Loan Railway Equipment Company, New York, N. Y.

Mr. George W. Ravert, who has been general freight and express agent of the Lehigh Valley Transit Company, Allentown, Pa., has been appointed freight superintendent of the Philadelphia (Pa.) Rapid Transit Company.

Mr. A. L. Linn, Jr., was elected on June 17 a director of the Republic Railway & Light Company, Youngstown, Ohio, which is controlled by the Williams syndicate, with which Mr. Linn became associated in March, 1913.

Mr. David W. Henry has been elected president of the Terre Haute Traction & Light Company, Terre Haute, Ind., the property of which is leased to the Terre Haute, Indianapolis & Eastern Traction Company. Mr. Henry succeeds the late William R. McKeen.

Mr. E. C. Allen, formerly assistant superintendent of the Detroit, Jackson & Chicago Railway, Detroit (Mich.) United Lines, has been appointed general manager of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., to succeed Mr. H. V. Ferguson, resigned.

Mr. J. T. Young, president and general manager of the Muskegon Traction & Lighting Company, Muskegon, Mich., has been appointed manager of the Grand Rapids (Mich.) Gas Light Company, which is also one of the properties of the American Light & Traction Company.

Mr. M. J. Kehoe has been appointed electrical engineer of the Ohio Electric Railway in charge of power houses and substations, with offices at Springfield, Ohio. Mr. Kehoe was formerly connected with the Fort Wayne & Northern Indiana Traction Company in a similar capacity for thirteen years. Prior to that he was with the St. Paul (Minn.) Street Railway from the time work was begun electrifying the line until 1893.

Mr. Frank B. Lasher, who has been connected with the organization of Mr. Harrison Williams, New York, N. Y., has been appointed auditor of the Republic Railway & Light Company, Youngstown, Ohio, which is controlled by the Williams syndicate. A biography and a portrait of Mr. Lasher were published in the ELECTRIC RAILWAY JOURNAL of April 5, 1913, at the time of his appointment as auditor of the New York State Railways and the Mohawk Valley Company. Mr. Lasher subsequently became connected with the organization of Mr. Harrison Williams.

Mr. D. C. MacKenzie, who has been with the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., since the beginning of operation, has resigned to become secretary and treasurer of a manufacturing company in Toronto, Ont. Mr. MacKenzie was assistant auditor of the Buffalo, Lockport & Rochester Railway under Mr. W. W. Foster, Syracuse, which position he held since the merger of the company into the Beebe syndicate. On June 18, 1913, the officers of that company and the employees of Mr. MacKenzie's department tendered a farewell reception to him and presented him with a traveling bag and accessories.

Mr. George W. Anderson, Boston, has been appointed to the Public Service Commission of Massachusetts by Governor Foss. Mr. Anderson has practised law in Boston since 1890. He is a Democrat and in 1912 was the party candidate for Attorney-General of Massachusetts. Mr. Anderson is a native of Ackworth, N. H., and was educated at Cushing Academy, Ashburnham, Mass.; Williams College and the Boston University Law School. He has often appeared before state commissions and has been of counsel for the city of Haverhill in the litigation against the Haverhill Gas Light Company interests growing out of the refusal of the company to alter its rates as ordered by the Massachusetts Gas & Electric Light Commission.

Mr. William B. McKinley, president of the Illinois Traction System, Peoria, Ill., had a "good-will" dinner tendered to him at the Illini Country Club at Springfield, Ill., recently by business and professional men of the latter city. Mr. George M. Mattis, vice-president and general manager of the Illinois Traction System, and Mr. C. F. Handshy, assistant general manager of the company, were among the other officers of the company who were present. Mr. McKinley has been elected president of the Oskaloosa Traction & Light Company and the Oskaloosa & Buxton Electric Railway, Oskaloosa, Ia., which were taken over on June 1, 1913, by him and his associates.

Mr. George P. Lawrence, North Adams, Congressman from the First Massachusetts District, has been appointed a member of the Public Service Commission of Massachusetts. Mr. Lawrence is a native of North Adams and is a life-long Republican, having served continuously in Congress since 1899 and having been elected in 1897 to fill the unexpired term of A. B. Wright, deceased. He was educated at Amherst College and Columbia Law School. He received an honorary A. M. at Williams College in 1899, and an LL.D. at Amherst in 1910. He was at one time judge of the district court of Northern Berkshire and was president of the Massachusetts Senate in 1896-7.

Frank Hedley

Mr. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y., was elected president of the New York Electric Railway Association at the meeting of that association held at Brighton Beach on June 24 and 25. Mr. Hedley was born at Maidstone, Kent, England, in 1864. His father, James Hedley, was master mechanic of the Southeastern Railway, and his great-granduncle, William Hedley, designed and built the original locomotive traction engine, in 1813, from which Stephenson obtained his ideas for his first locomotive, built in 1825. Mr. Hedley received a common-school education and learned the trade of machinist at Maidstone. He came to this country in 1882, and the first two years was a machinist in the Jersey City shops of the Erie Railroad, following which he was employed in the same capacity in the shops of the New York Central & Hudson River Railroad for a few months. He next became a machinist with the Manhattan Elevated Railway, New York, and in 1885 became assistant general foreman in the locomotive department. In 1889 he was appointed master mechanic of the Kings County Elevated Railroad, Brooklyn, resigning in 1893 to become general superintendent of motive power and rolling stock for the Lake Street Elevated Railroad, Chicago. A few months later he was appointed general superintendent of the Lake Street Elevated Railroad, which was the first elevated railway to adopt electricity as motive power. Less than two years after going to Chicago he was appointed consulting engineer by the late Charles T. Yerkes, in addition to the duties of the other offices, and retained this position throughout the construction of the Northwestern Elevated and Chicago Union Loop. He organized the operating forces of these three elevated systems, and had charge of their operation as general superintendent. In January, 1903, he was appointed general superintendent of the Interborough Rapid Transit Company, New York, and the following year became general manager. On July 1, 1908, he was elected vice-president and general manager, being responsible for the operation of all elevated and subway lines in the boroughs of Manhattan and Bronx, and partly in Brooklyn. He is also vice-president and general manager of the New York Railways, operating surface lines in New York; vice-president of the Subway Construction Company, and manager for the trustees of the New York & Long Island Railroad. Mr. Hedley is a member of the Engineers' Club and the Western Railroad Club, and served as president of the New York Railroad Club in 1911.

E. E. Strong

Mr. Elmer E. Strong, whose appointment as superintendent of transportation of the New York State Railways, Rochester Lines, was noted in the ELECTRIC RAILWAY JOURNAL of June 14, 1913, page 1092, was graduated from Syracure University in 1908 and immediately entered railroad work with the Syracuse Rapid Transit Company. He was advanced by the company to the position of chief inspector and occupied this position when he was promoted to the Utica & Mohawk Valley Railway. In July, 1912, Mr. Strong was appointed superintendent of transportation of the Syracuse Rapid Transit Railway to succeed Mr. F. A. Scripture, resigned. He continued in the last-mentioned capacity until his recent appointment to the New York State Railways, Rochester Lines, to succeed Mr. W. C. Callaghan, resigned. The system at Syracuse with which Mr. Strong was connected comprised 90.5 miles of line, while the system at Rochester over which he now has jurisdiction comprises more than 280 miles of track.

Mr. C. F. Handshy, whose appointment as assistant general manager of the Illinois Traction System, Peoria, Ill., was referred to in the ELECTRIC RAILWAY JOURNAL of June 21, 1913, began his railroad career as a telegraph operator with the Wabash Railroad in 1884. In 1890 he was promoted to the position of train dispatcher and continued in that capacity until 1902, when he was promoted to be assistant chief dispatcher at Decatur, Ill. In 1904 he was appointed chief dispatcher and in 1905 he was made trainmaster. Mr. Handshy resigned from the Wabash Railroad in September, 1907, to become general superintendent of transportation of the interurban lines of the Illinois Traction System. He was appointed to the position of general superintendent of the interurban lines of the Illinois Traction System in January, 1910, and was promoted to be assistant general manager of the company on June 1, 1913.

OBITUARY

Leon Fender, secretary and treasurer of the Knoxville Railway & Light Company, Knoxville, Tenn., is dead. Mr. Fender was born in Strassburg, Alsace-Lorraine, now part of the German Empire, then a part of France. He came to this country with his parents when only three years of age, the family going to Cincinnati to reside. He entered street railway work in Cincinnati when only fifteen years old, and worked his way up through the accounting department. From Cincinnati he went to Baltimore in the early eighties, and when Hambleton & Company bought the street railway and light interests of Knoxville in April, 1898, he was appointed secretary and treasurer. Mr. Fender is survived by his widow and two sons.

George B. Francis, formerly chief engineer of the street railways now included in the system of the Rhode Island Company, at Providence, R. I., is dead. Mr. Francis was born in West Hartford, Conn., in 1857. He entered the engineering department of the city of Providence in 1874, and spent nearly eight years there on municipal work. Subsequently he served the West Shore Railroad in the operating department and was also connected with the Oregon Railway & Navigation Company, Northern Pacific Railroad, Northern Pacific Terminal Company and several other steam railroads. In 1896 he was appointed resident and acting chief engineer of the South Terminal station work in Boston. Upon completion of this work in January, 1900, he became chief engineer of the street railway system at Providence, R. I. In 1902 he became connected with Westinghouse, Church, Kerr & Company, New York, N. Y.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Appalachian Electric Power & Trust Company, Wilkesboro, N. C.**—Chartered in North Carolina to build a 20-mile electric railway from Wilkesboro to Taylorville. Officers: T. B. Finley, Wilkesboro:, president; J. C. Smoot, vice-president; C. H. Cowles, secretary, and R. W. Gwyn, treasurer.

***Public Service Company of Oklahoma, Tulsa, Okla.**—Incorporated in Oklahoma to take over several public utilities properties. The company is being promoted in behalf of the Insull interests and will take over, it is said, the Tulsa Corporation, which is now included among the properties of the Middle West Utilities Company, and other public service plants in Oklahoma. Capital stock, $3,000,000. Officers: Frederick W. Insull, president; Martin J. Insull, vice-president; Burton French, secretary, and B. F. Frank, treasurer.

FRANCHISES

Birmingham, Ala.—The East Lake Land Company, Birmingham, has asked for a franchise to build an electric railway on First Avenue, where the Birmingham Railway, Light & Power Company's line now ends, to Roebuck Springs and the Golf & Country Club, and has asked the Birmingham Railway, Light & Power Company to operate the new line.

Tucson, Ariz.—The Tucson Rapid Transit Company will ask for a new twenty-five-year franchise in Tucson.

Santa Barbara, Cal.—The Santa Barbara & Suburban Railway has received a franchise to extend its lines to the State Normal School in Santa Barbara.

Stanton, Cal.—The Pacific Electric Railway has received a franchise from the Council in Stanton.

Augusta, Ga.—The Augusta-Aiken Railway & Electric Company has received a franchise from the Council in August to extend its line on Central Avenue to the site of the new St. Joseph's College.

Peoria, Ill.—The Illinois Traction System has asked the Council for a franchise over Hamilton Boulevard and Jefferson Street into its new terminal station in Peoria.

Peoria, Ill.—The Peoria, Canton & Galesburg Railroad has received a franchise from the Board of Supervisors in Peoria. This line will connect Peoria, Canton and Galesburg. Horace Clark, president. [E. R. J., June 7, '13.]

Peoria, Ill.—The Peoria Railway has asked the Council for a franchise to extend its lines in Peoria to the new interurban station to be erected at Hamilton and Jefferson Streets in Peoria.

Springfield, Ill.—The Springfield & Central Illinois Traction Company has asked the Council for a fifty-year franchise in Springfield. [E. R. J., June 14, '13.]

Union, Ill.—The Decatur, Sullivan & Mattoon Transit Company has received a fifty-year franchise through Union. The line will extend from Mattoon to Casey.

Cedar Rapids, Ia.—The Iowa Railway & Light Company, Cedar Rapids, has asked the Council for a franchise to extends its Central Park line out on Seventeenth Street in Cedar Rapids.

Mount Vernon, Ia.—The Iowa Railway & Light Company has received a franchise over Main Street in Mount Vernon.

Newport, Ky.—The city of Newport, Ky., has announced that it will create a new electric railway franchise in Newport. The line has already been surveyed. It is expected that the franchise will be purchased by the Cincinnati, Newport & Covington Light & Traction Company, which will also purchase a franchise covering its Monmouth Street line in Newport, the privilege being about to expire.

Bangor, Maine.—The Bangor Railway & Electric Company has asked for a franchise to double-track its tracks on Union Street between Main and Fourth Street in Bangor.

Baltimore, Md.—The United Railways & Electric Company has accepted the franchise authorizing the extension of its Monument Street line to Orangeville.

Morrisburg, Ont.—The Ottawa & St. Lawrence Electric Railway will ask for a franchise in Morrisburg. This line will connect Ottawa and Morrisburg. F. Iveson, Toronto, secretary. [E. R. J., June 21, '13.]

Philadelphia, Pa.—The Philadelphia Rapid Transit Company has received a franchise for the construction of a loop at Front Street and Market Street, Philadelphia.

Newport, R. I.—The Newport & Fall River Street Railroad has accepted the two franchises granted by the city to extend its line in Newport. The double-tracking of the Bath road has been begun. Work on the Morton Avenue and Carroll Avenue extension will be begun at once.

Beaumont, Tex.—Stone & Webster, representing the Jefferson County Traction Company, have asked the County Commissioners for a franchise to enter Beaumont over the Park Street line. This railway will connect Beaumont and Port Arthur. [E. R. J.., April 5, '13.]

Jefferson, Tex.—The Texas-Louisiana Traction Company has received a franchise in Jefferson. It will connect Shreveport, La., and Jefferson and Longview, Tex. A. B. Blevins, Jefferson, Tex., president. [E. R. J., Jan 11, '13.]

Tyler, Tex.—Daniel Hewitt, president of the Corpus Christi Street & Interurban Railway, has received a fifty-year franchise in Tyler.

Milwaukee, Wis.—The Milwaukee Western Electric Railway has received a franchise from the Council in Milwaukee.

TRACK AND ROADWAY

Northern Electric Railway, Chico, Cal.—Right-of-way is being obtained by this company for a branch between Meridian and Woodland to pass through the Fair ranch and along the west bank of the Sacramento River through Grimes and Sycamore, connecting with the Colusa branch at the Meridian bridge.

Los Angeles (Cal.) Railway.—This company has been asked by the Board of Public Utilities to double-track its West Jefferson Street line at the westerly end and also to extend the line to the westerly city limits of Los Angeles.

Pacific Electric Railway, Los Angeles, Cal.—This company has confirmed the report that an immediate extension is planned that will make San Diego the southern terminal and the northern at San Francisco.

San Francisco, Napa & Calistoga Railway, Napa, Cal.—This company plans to reconstruct its line through Georgia Street in Vallejo.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The company is asked to consider plans to build an extension in the Dimond section of Fruitvale.

Big Four Electric Railway, Tulare, Cal.—Contracts will be awarded at once by this company for rails and ties for its line between Porterville, Lindsay, Tulare and Visalia. Grading has been completed between Woodville and Tulare, 17 miles, and it will now be begun between Woodville and Poplar. John C. Hays is interested. [E. R. J., June 21, '13.]

Florida Interurban Railway & Tunnel Company, Jacksonville, Fla.—This company has been completely reorganized with new officers and financial backing. It has been decided to abandon the proposition to build a reinforced concrete tube under the St. John's River for the present, and a ferry service will be installed until conditions warrant the building of the tunnel. It is planned to begin work soon on this line to connect Jacksonville, Pablo Beach and St. Augustine. R. B. Harrison, 201 Realty Building, Jacksonville, president. [E. R. J., Jan. 25, '13.]

***Carlyle, Ill.**—Plans have been made to build an electric railway to enter St. Louis over the new municipal bridge. The plans provide for a line from East St. Louis to Belleville, thence to New Baden, Trenton, Aviston, Breese, Beckemeyer, Carlyle and Hoffman, making Centralia the terminus. Application for a charter will soon be made. Among those interested are: L. C. Riemann, Trenton; J. O. Koch, Breese; John Engelke, New Baden; G. Brefeld, Aviston; Frank C. Mahlandt, Beckemeyer; E. A. Kahlert, Carlyle, and Theodore Husman, Hoffman.

Peoria, Canton & Galesburg Interurban Railway, Peoria, Ill.—This company plans to begin work about July 15 on its 51.58-mile line to connect Galesburg and Peoria, with a branch to Canton. Power will be purchased. The contract has not yet been awarded. Capital stock authorized, $2,000,000; issued, $2,000,000. Bonds authorized, $2,000,000; issued, $1,000,000. Officers: Horace Clark, Peoria, president; C. B. Coffeen, vice-president; J. A. Fenelon, Peoria, secretary; J. A. Lyon, 528 National Life Building, Chicago, Ill., treasurer, and L. L. Summers & Company, First National Bank Building, Chicago, chief engineers. [E. R. J., June 7, '13.]

Chicago, Peoria & Quincy Traction Company, Quincy, Ill.—At a special meeting of the stockholders of this company, held June 20, 1913, at Quincy, Ill., the capital stock of the company was increased from $200,000 to $3,000,000 and provision also was made for an issue of $3,000,000 of bonds. The proceeds of the bond issue will be used to construct and equip the proposed electric railway from Quincy to Peoria and a branch line from Siloan Springs to connect with the main line in Clayton, Adams County. J. L. Soebbing is president and E. A. Van Ness, secretary.

Rock Island (Ill.) Southern Railway.—This company and the Illinois Traction System have filed with the Illinois State Railroad & Warehouse Commission an agreement giving the Rock Island Southern Railway the right to cross the tracks of the People's Traction Company at Galesburg.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company's new extension of the College Avenue line from Thirtieth Street to the State Fair Grounds has been placed in operation.

Hutchinson & Northern Railway, Hutchinson, Kan.—The Public Utilities Commission has granted this company authority to begin work on its interurban line between Hutchinson, Kan., and Fairbury, Neb. The company plans to build 14 miles between Hutchinson and Burrton this summer. It has also received permission to issue $25,000 in common stock and preferred stock. W. S. Thompson, Hutchinson, is interested. [E. R. J., April 6, '13.]

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—At a meeting of the stockholders of this company it was voted to authorize an increase in the bond issue from $1,500,000 to $2,500,000. The bonds have been underwritten, it was stated, at 80 per cent, which will enable the company to pay the cost of the construction of the first division of the line, from Paducah to Murray, via Mayfield, which is $1,300,000, and leave $300,000 for working capital. F. Smith, general manager.

Bangor Railway & Electric Company, Bangor, Maine.—Among the extensions under consideration by this company is one to Northern Maine Junction, in Hermon, 5 miles west of Bangor; an extension of the present Hampden line from its terminus in Hampden to Winterport, 7 miles, and possibly to Frankfort, making the line 15 miles; an extension of the Brewer division to Orrington, and some new loops within the Bangor city limits.

North Beach Railway, Baltimore, Md.—This company has received permission from the Public Service Commission to exercise its franchises and build a 2½-mile electric railway through North Beach and into Anne Arundel County through the section known as Holland Point, the terminus to be at Herring Bay. Permission was also granted for the sale of $10,000 in first mortgage 5 per cent twenty-year bonds at not less than $9,000 as gross proceeds, and to sell $35,000 stock at par. The company has asked permission to sell $10,000 in bonds and $50,000 in stock. John C. Shaw is interested. [E. R. J., April 19, '13.]

Berkshire Street Railway, Pittsfield, Mass.—New rails will be laid and many curves eliminated by this company on its line between North Adams and Williamstown during the summer.

Laurel Electric Light & Power Company, Laurel, Miss.—This company has completed its new line from Laurel to the Wausau mill. Grading has been completed and track-laying will be begun at once on the extension from Laurel to Ellisville.

Southern Railway & Light Company, Natchez, Miss.—Plans are being considered by this company to rebuild part of its line with 60-ft., 60 lb. T-rails and patent joints.

Metropolitan Street Railway, Kansas City, Mo.—Plans are being made by this company to build a short line between the business section of Kansas City, Kan., and Argentine.

Nebraska Transportation Company, Omaha, Neb.—Right-of-way has been secured and construction has been begun on the electric railway between Omaha and Sioux City, via Thurston, West Point, Benson, Stanton, Norfolk, Pierce and Antelope. C. W. Baker, Omaha, president. [E. R. J., July 20, '12.]

***Fredonia, N. Y.**—J. H. Digby, Dunkirk, and associates are considering plans to build an electric railway from Fredonia to South Dayton along the old Erie right-of-way.

Frontier Electric Railway, Niagara Falls, N. Y.—Work will soon be begun by this company on its line to connect Niagara Falls, Buffalo, Tonawanda and North Tonawanda. James S. Simons, Niagara Falls, general manager. [E. R. J., April 26, '13.]

New York State Railways, Rochester, N. Y.—Work has been begun by this company on the improvements in South Salina Street in Rochester. The entire trackage is to be renewed and upon a concrete foundation new ties and rails will be laid and the pavement replaced.

Blue Ridge & Interurban Railway, Hendersonville, N. C.—This company, which proposes to build a line to connect Spartanburg, S. C., and Saluda and Hendersonville, N. C., with extensions to Rutherfordton and Asheville, will obtain power from a proposed power plant to be built on the Green River near Hendersonville. Among those interested are: John Law, Walter Montgomery, Horace Bomar, Alexander White, George Ladshaw and Joseph Lee, all of Spartanburg, and William A. Law, vice-president of the First National Bank of Philadelphia. George Ladshaw is the engineer in charge of the plans.

Salisbury-Spencer Electric Company, Salisbury, N. C.—It is reported that this company plans to build an extension into Belmont Park.

Waynesville & Canton Electric Railway, Waynesville, N. C.—Preliminary arrangements are being made by this company to build a 12-mile line from Hazlewood to Canton, via White Sulphur Springs and Lake Junaluska. It will require several trestles. Henry T. Sharp, Waynesville, is interested. [E. R. J., June 14, '13.]

Columbus Railway & Light Company, Columbus, Ohio.—This company has decided to lay grooved rails on Livingston Avenue, between Parsons Avenue and the driving park, in Columbus. The rails are being rolled by the Lorain Steel Company.

Middletown, Reading & Cincinnati Interurban Railway, Middletown, Ohio.—At a meeting of the board of directors of this company at West Chester on June 23 E. H. McKnight was chosen general manager of the company. [E. R. J., June 21, '13.]

Toledo Railways & Light Company, Toledo, Ohio.—This company announces that the Toledo, Ottawa Beach & Northern Railroad will be extended to Monroe, Mich., next year, where it will connect with the Detroit, Monroe & Toledo line, thus giving it a through route between Toledo and Detroit.

Poland Street Railway, Youngstown, Ohio.—This company has awarded the contracts for the construction of its line to Youngstown as follows: Kane & Smith Company, Youngstown, for grading; Hunter Construction Company, Youngstown, for strengthening bridges, and Henderson Lumber Company, Pittsburgh, for lumber, ties and poles. George E. Rose, promoter. [E. R. J., June 27, '13.]

Ardmore Western Interurban Railway, Ardmore, Okla.—The citizens of Marietta have offered this company a bonus and right-of-way if it will build a line from Ardmore to Marietta, a distance of 30 miles. This is part of a plan to build an electric railway to connect Ardmore, Springer, Glenn, Woodford, Milo, Oil City, Cornish, Orr and Brock. John Owens, president. [E. R. J., Oct. 26, '12.]

Terminal Electric Railway, Marshfield, Ore.—This company announces that the contract for extending the line from the cold storage plant to the city limits has been awarded to Hugh McLain, Marshfield, and that work will be begun at once. The company will extend the lines to Bunker Hill and the plant of the C. A. Smith Lumber Company and to the Fair Grounds in the future.

Portland, Eugene & Eastern Electric Railway, Portland, Ore.—This company will soon rebuild the College Crest loop of the local line in Eugene.

Erie & Central Pennsylvania Railway, Titusville, Pa.—Work has been begun by this company on its 36-mile line between Titusville and Cambridge Springs.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—This company has requested the city to revise the contract made three years ago in regard to the route of the lines in Sherbrooke. Owing to the growth of the city the company states that to meet the requirements of the contract certain changes not previously contemplated will have to be made.

Bryan & Central Texas Interurban Railroad, Bryan, Tex.—Grading has been begun by this company on its 25-mile line from West Stone City down through the Brazos section. The line extends from Bryan to West Stone City and from there down the Brazos section. Grading has been completed from Bryan to the Brazos River at Stone City. The line will use the new railroad bridge of the Houston & Texas Central Railroad across the river.

Dallas-Denton Interurban Railway, Dallas, Tex.—Surveys are being made by this company from Carrollton along the west bank of Elm Fork southeast of Lewisville. This line will connect Dallas and Denton, via Carrollton, Lewisville, Grapevine and Irving. Alvin C. Owsley, Denton, is interested. [E. R. J., May 20, '11.]

Blue Ridge Interurban Railway, Greenville, Tex.—Plans are being made by this company to make surveys between Blue Ridge and Merit and from Blue Ridge to Bonham. A. R. Nicholson, Greenville, is interested.

Guadalupe Traction Company, Seguin, Tex.—Surveys are being made by this company on its line to connect Austin, Lockhart and San Antonio. A. B. Axtell, chief engineer. [E. R. J., June 14, '13.]

***Richmond, Va.**—A company is being formed to build an electric railway from Richmond to West Point, via Henrico, Hanover, King William, King and Queen Counties. The proposed company, it is understood, will be a bidder for the property of the Richmond & Henrico Railway.

***Winchester, Va.**—Plans are being considered to build an electric railway to connect Williamsport, Martinsburg, Winchester, Shepherdstown, Charlestown, Barryville and eastward to Bluemont, Va. Power is to be obtained from the plant of the Northern Virginia Power Company. Clarence W. Watson is interested.

Northwestern Electric Company, Vancouver, Wash.—This company plans the expenditure of a large sum in Portland upon the approval of the Mayor of the franchise granted the company by the Council.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—In order to give temporary facilities until the Bay Street line is completed this company will soon build a new carhouse at the end of the Cloverdale line in Victoria.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Work will be begun at once by this company on its new passenger station at Third Street and I Street in Sacramento. The cost is estimated to be about $8,000.

Southern Pacific Company, San Francisco, Cal.—Plans are being considered by this company to enlarge its depot and terminals at Third Street and Townsend Street in San Francisco.

Peoria (Ill.) Railway.—This company plans to build a new interurban passenger station on Hamilton Street and Jefferson Street in Peoria.

Louisville (Ky.) Railway.—This company is preparing to equip its new repair shops at Twenty-ninth Street and Broadway, Louisville, which will adjoin the carhouses of the company, now under construction, with machinery to enable it to build its own cars. This will be the policy of the company hereafter according to President T. J. Minery.

Hattiesburg (Miss.) Traction Company.—Work has been begun by this company on its new office building on West Pine Street in Hattiesburg.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—This company has nearly completed its new carhouse, repair shops and other buildings on a tract of 25 acres at Greenville. The machine shop is 160 x 75 ft., of white pressed brick, with a steel roof. It contains a storeroom 20 ft. x 120 ft., and there are two tracks for repairing cars. A considerable amount of machinery is to be installed for wood and metal working. The carhouse is 200 ft. x 65 ft. and is constructed of the same material as the machine shop. The freight yards cover 20 acres, and there will be 2 miles of storage tracks. An equal amount of trackage can be constructed if required. The entire cost of these improvements is estimated at about $200,000.

Southwestern Traction Company, Temple, Tex.—This company has opened general offices in the Bentley-Smith Building on Main Street in Temple.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—This company will build a new carhouse at Electric Park. The building, which will be constructed of reinforced concrete, will contain all the equipment necessary for handling and repairing the rolling stock including a traveling crane. The structure will also include a club room for employees.

POWER HOUSES AND SUBSTATIONS

Pacific Gas & Electric Company, Sacramento, Cal.—This company will install three 1000-kw synchronous motor-generator sets consisting of 11,000-volt, three-phase, 60-cycle motor and 600-volt D.C. generator. The apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

Berkshire Street Railway, Pittsfield, Mass.—This company has placed an order with the General Electric Company for new substation equipment consisting of three 300-kw rotary converters, six 110-kva and one 330-kva transformer and switchboard.

Southern Power Company, Charlotte, N. C.—Announcement has been made by this company that in the near future it will begin the construction of a new substation near Saxon Mills, which will supply the power to operate the cars of the Greenville, Spartanburg & Anderson Railway between Spartanburg and Greenville. The company will install a 2000-hp station, containing three transformers and two motor-generators. Alternating current from the company's 100,000-volt transmission line will be transformed in the substation into direct current at a voltage of 750 volts.

Blue Ridge & Interurban Railway, Hendersonville, N. C.—Plans are being considered by this company to build a new power plant on the Green River near Hendersonville, George Ladshaw, chief engineer.

Lehigh Valley Transit Company, Allentown, Pa.—This company will install two 500-kw, 600-volt D.C., six-phase, 60-cycle, 900-r.p.m. self-starting rotary converters and six 185-kva, 13,200-volt, single-phase O.I.S.C. transformers. The order has been placed with the Westinghouse Electric & Manufacturing Company.

Pittsburgh (Pa.) Railways.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 500-kw, 600-volt, D.C., six-phase, 60-cycle, self-starting rotary converter and one 500-kva, 22,000-volt, three-phase O.I.S.C. outdoor-type transformer complete with one two-panel switchboard for its plant in Pittsburgh, Pa.

Southern Traction Company, Dallas, Tex.—Work has been begun by this company for its new substation in Hillsboro.

El Paso (Tex.) Electric Railway.—This company will install two 400-kva, 6600-to-2300-volt, single-phase, 60-cycle O.I.S.C. transformers and one switchboard. The apparatus has been ordered from the Westinghouse Electric & Manufactiuring Company and will be installed in the plant in El Paso.

Manufactures and Supplies

ROLLING STOCK

Portland (Me.) Railway is reported as expecting to purchase ten cars.

Cincinnati (Ohio) Traction Company is in the market for 100 cars.

Springfield & Xenia Railway, Springfield, Ohio, is building a number of cars in its own shops.

San Francisco-Oakland Terminal Railways, Oakland, Cal., is in the market for sixty passenger cars.

York (Pa.) Railways has ordered three 34-ft. semi-convertible passenger smoking cars from The J. G. Brill Company.

Cleveland (Ohio) Railway is in the market for 100 trail cars, in addition to the fifty motor cars mentioned recently in the Electric Railway Journal.

Belt Line Railway Corporation, New York, N. Y., has ordered thirty-nine 18-ft. storage battery car bodies, mounted on special storage battery trucks, from The J. G. Brill Company.

United Railways & Electric Company, Baltimore, Md., has placed an order with The J. G. Brill Company for sixty 30-ft. 8-in. semi-convertible pay-as-you-enter car bodies, mounted on 27-GE-1 trucks.

Louisville (Ky.) Railway has begun the construction of ten cars of a new type at its shops at Eighteenth and Walnut Streets. The cars are standard as to length and width, with entrance and exits at the center. A space 6 ft. in length and running the width of the car takes the place of the platform. This space is sunk to the level of the lower step on the ordinary car, so that no outside steps are necessary.

Michigan United Traction Company, Jackson, Mich., recently noted in the Electric Railway Journal as having ordered six closed cars from the St. Louis Car Company, St. Louis, Mo., has specified the following details for these cars:

Seating capacity	56
Bolster centers, length	36 ft.
Length of body	61 ft.
Length over vestibule	59 ft.
Width over sills	8 ft. 2 in.
Width over all	8 ft. 11 in.
Height, rail to sills	43 in.
Sill to trolley base	9 ft. 4⅝ in.
Body	composite
Headlining	Agasote
Roof, type	turtle-back
Underframe	steel
Bumpers	Hedley
Car trimmings	St. L.
Couplers	Tomlinson
Conduits and junction boxes	St. L.
Curtain fixtures	Forsyth
Curtain material	pantasote
Hand brakes	Peacock
Heaters	Smith
Headlights	GE
Sanders	Ohio Brass
Sash fixtures	Edwards
Seats, style	H. & K.
Seating material	green plush and black leather
Varnish	Murphy's
Ventilators	Globe
Trap doors	Edwards

Ohio Valley Electric Railway, Huntington, W. Va., which recently ordered eight closed pay-within cars from the St. Louis Car Company, has specified the following details for these cars:

Seating capacity	48
Bolster centers, length	18 ft. 6 in.
Length of body	30 ft. 8 in.
Length over vestibule	41 ft. 8 in.
Width over sills	8 ft. 4⅞ in.
Width over all	8 ft. 8 in.
Height, rail to sills	35 in.
Sill to top of roof	11 ft. 5⅛ in.
Body	composite posts, steel girder, balance wood
Interior trim	mahogany
Headlining	Agasote
Roof	arch
Underframe	steel
Bumpers	Hedley
Car trimmings	St. L.
Couplers	St. L.
Curtain fixtures	Cur. Sup. Co.
Curtain material	pantasote
Destination signs	St. L.
Fenders or wheelguards	H. B.
Gongs	Dedenda
Hand brakes	St. L.
Heaters	Smith
Headlights	Hinds
Paint	St. L.
Registers	New Haven
Sash fixtures	Edwards
Seats, style	St. L.
Seating material	rattan
Step treads	Universal
Trolley catchers	Keystone
Varnish	St. L.
Ventilators	St. L.

TRADE NOTES

Detroit Lubricator Company, Detroit, Mich., has appointed John V. Higinbotham assistant treasurer of the company.

Siemund Wenzel Electric Company, New York, N. Y., has moved its offices from 29 Broadway to 30 Church Street.

American Car & Foundry Company, St. Louis, Mo., expects to build a one-story power plant at its works in Chicago, Ill.

The J. G. Brill Company, Philadelphia, Pa., has received an order from the Philadelphia (Pa.) Rapid Transit Company for two 39-E trucks.

Orenstein-Arthur Koppel Company, Koppel, Pa., has given the agency for its Canadian business to the Canadian Fairbanks-Morse Company.

General Electric Company, Schenectady, N. Y., has received an order from the Third Avenue Railroad, New York, N. Y., for thirty-nine additional storage battery car equipments.

De Laval Steam Turbine Company, Trenton, N. J., has appointed H. L. Watson sales manager of the company. Mr. Watson was formerly sales engineer of the Allis-Chalmers Manufacturing Company.

Perry Ventilator Corporation, New Bedford, Mass., has received an order for ventilators for the new cars of the Montreal Street Railway which are now being built by the Canadian Car & Foundry Company.

Roller-Smith Company, New York, N. Y., reports considerable activity in bond testing, this being the best time of year for that work, causing an unusually large demand for its direct-reading bond-testing sets.

Col. B. W. Dunn, New York, N. Y., chief inspector of the Bureau of Explosives and Combustibles of the American Railway Association, has been elected to membership in the council of Underwriters' Laboratories.

Pyrene Manufacturing Company, New York, N. Y., has received recent orders for its fire extinguishers from the following companies: New York Central Railroad, Public Service Railway, Atlantic City & Shore Railroad, Au Sable Electric Company, Philadelphia Rapid Transit Company and New York Edison Company.

American Engineering Company, Philadelphia, Pa., has recently received large orders for its Taylor stokers from the following companies: New York, New Haven & Hartford Railroad, Montreal Electric Light & Power Company, Bay State Street Railway, Elmira Water, Light & Railway, Philadelphia Electric Company, Detroit Edison Company, American Brass Company and the General Electric Company.

American Car & Foundry Company, St. Louis, Mo., has issued its report for the fiscal year ended April 30, 1913. The gross earnings amounted to $5,539,000, which was an increase of $1,346,000 over 1912. Renewals were increased by $857,000, so that the surplus for dividends showed a gain of $499,000. After paying 7 per cent on the $30,000,000 preferred stock and 2 per cent on the $30,000,000 common stock, a surplus remained of $628,000, compared with $139,000 for 1912, $1,534,000 for 1911 and $1,389,000 for 1910.

Electric Service Supplies Company, Philadelphia, Pa., reports a substantial increase in its export sales of Garton-Daniels lightning arresters, together with an increase of 50 per cent in the sale of this apparatus in the United States and Canada. The company has also found it necessary to install in its factory an additional large electrical spot-welder to care for its rapidly increasing business in Keystone steel gear cases. In the construction of these gear cases both riveting and spot-welding is employed, which assures a tight, rigid gear case.

I. S. Van Loan Railway Equipment Company, New York, N. Y., has been recently incorporated for the manufacture of railway motor supplies and controllers, the supplying of complete equipments for generating stations and electric railways, either new or second hand, and the financing of railway and lighting properties, new or reorganized. The company's officers are E. W. Samuel (president of the Shamokin & Mount Carmel Transit Company), president; I. S. Van Loan, of New York City, vice-president, and A. C. Case, of New York City, secretary-treasurer.

General Electric Company, Schenectady, N. Y., held the annual outing of employees of its New York office at Midland Park, Grant City, S. I., on June 21, 1913. There were 165 present. All kinds of sports were indulged in, the most important event being the annual baseball game between the "Old Boys" under Capt. S. W. Trawick and the "Young Men" under Capt. M. F. Reardon. Captain Trawick's team won, thereby regaining possession of the trophy which was won last year by Captain Reardon's team. A feature of the game was the battery work of Messrs. Keyes and Scott.

Union Switch & Signal Company, Swissvale, Pa., which recently received a contract from the Public Service Railway, Newark, N. J., for signaling its Trenton Railroad division, between Bayway (Elizabeth) and Borhamtown Junction, now has the installation nearly completed. This division, which has 9.2 miles of single track, contains seven blocks, using fourteen semaphore signals and fourteen light signals. This system is for high-speed service. The signaling system on this division is similar to the system on the Washington, Baltimore & Annapolis Electric Railway, which was installed last year.

Barney & Smith Car Company, Dayton, Ohio, went into the hands of receivers in the Common Pleas Court, Dayton, Ohio, on June 23, 1913. The chief petitioner was a Cincinnati concern which claims $11,000 due on contracts. The plaintiffs alleged that because of heavy losses in the flood the defendant concern was not prepared to meet its debts at the present time. Judge Snediker appointed Charles L. Harrison receiver and H. M. Estabrook coreceiver. Mr. Estabrook is president of the car company. The receivership petition says the assets of the firm are in excess of the liabilities and "consist of $7,000,000 of contracts, $2,000,000 in raw material, seventy factory and office buildings, fifty-six acres of ground and much valuable machinery." W. T. Irwin, E. L. Heinsheimer and Joseph F. Graydon have agreed to act as a committee for the protection of the interests of the stockholders of the company.

The Warner International and Overseas Engineering Company, Ltd., London, England, reports a new development of the Warner non-parallel axle, in the partcular form of suspension, which is somewhat remarkable from the fact that side frames are eliminated, thus giving a considerable reduction in weight, while in appearance the car resembles one of the ordinary double-truck type and provides a simple four-wheeled device which allows the Warner trucks to adjust themselves to every curvature and irregularity of the track and the car body to ride smoothly because the axles are free to move within limits relative to one another and are controlled or steered by the car body with absolute simplicity and certainty. The St. Louis Car Company, which is the American licensee for this company, has already supplied the Warner equipment to ten United States railway systems and has received many repeat orders from these companies.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has announced through the committee of which James N. Wallace is chairman that voting trust certificates representing the preferred and common stock of the company are now ready for delivery on presentation and surrender of the certificates of deposit at the office of the Central Trust Company. Holders of stamped certificates of deposit for first mortgage bonds of Allis-Chalmers upon which the amount of the coupon of Jan. 1, 1912, has been advanced will be required on presentation to pay interest on the amount so advanced at the rate of 5 per cent from the date of the advance as noted on the certificates to June 23, 1913. Holders of certificates of bonds should designate the names in which they desire the voting trust certificates issued. The distribution will be made as follows against certificates of deposit: Voting trust certificates representing $1,000 par value of preferred stock and $350 of common stock of the Allis-Chalmers Manufacturing Company will be given for each first mortgage bond of the Allis-Chalmers Company. Holders of unstamped certificates of deposit will further be entitled to receive $25 in cash per bond for the coupon of Jan. 1, 1912. Voting trust certificates in the amount of $20 par value of preferred stock and $90 par value of common stock of the new company will be given for each share of preferred stock of the old corporation on which the assessment has been paid in full. Certificates for $10 of preferred stock and $35 of common stock will be exchanged for each share of common stock of the old company on which the assessment has been paid. The committee will accept payment of overdue assessments on stock up to the close of business on July 7, 1913. In accordance with the terms of the reorganization agreement, any depositor who shall have failed to pay his assessments on or before that date shall cease to have any rights under it and any payments made on account of assessments will be forfeited.

ADVERTISING LITERATURE

Nachod Signal Company, Philadelphia, Pa., has issued a catalog illustrating and describing its signals.

H. M. Byllesby & Company, Chicago, Ill., has issued Department Bulletin No. 5, entitled "The Valuation Problem."

C. F. Pease Company, Chicago, Ill., has issued a catalog entitled "Everything for Blue-Printing." The catalog embraces everything from the latest and most improved automatic machines down to the smallest item required.

O. M. Edwards Company, Inc., Syracuse, N. Y., has issued Catalog H, fully describing its all-metal trap door and containing numerous illustrations showing the trap doors applied to all types of cars; also views showing locks, adjusting mechanism, etc.

Pyrene Manufacturing Company, New York, N. Y., has issued the *Pyrene Bulletin* for June, 1913. Among the leading articles in this issue are the following: "Pyrene in the Power House" and "United Railways of St. Louis." The issue also contains a list of 100 electric railways and power plants under Pyrene protection.

Clark Electric & Manufacturing Company, New York, N. Y., has recently issued Bulletins Nos. 18 and 19 and revised copies of Bulletins Nos. 8 and 12. Bulletin No. 12 shows a protective clamping set for use at power, telephone and telegraph crossings and also at railway right-of-way; Bulletin No. 18 shows a recent development in suspension clamps, and Bulletin No. 19 describes a copper protective sleeve or bushing used with different types of clamp.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Descriptive Leaflet No. 3679, covering electric vehicle battery-charging switchboards and motor-generator sets, which are described and illustrated in detail. The company has also issued Folder 4255, covering Westinghouse Type PG porcelain insulators. These are insulators with high mechanical strength, suitable for use on 1500-volt d. c. railway work and 2200-volt transmission lines.

Railway Improvement Company, New York, N. Y., has issued a very attractive folder on its coasting time recorder entitled "Are Your Motormen Using Power on the Flat Rate?" which calls attention to how much power each man is using on each car and to whether or not each motorman operates efficiently. The folder also describes the company's five booklets, which are issued semi-monthly and contain valuable operating data in regard to its coasting time recorder on interurban, city, subway and elevated cars.

Fairbanks, Morse & Company, Chicago, Ill., have issued a booklet entitled "Catechism on Alternating-Current Apparatus." It deals with the construction and application of generators, motors and auxiliary equipment, giving in a condensed question and answer form a great amount of practical information. From a short description of how alternating current is produced arguments are given not only on general points of construction and operating characteristics of a.c. equipment but also on various points under such heads as "Advantages of Alternating Current," "Advantages of Direct Current," "Choice of A.C. or D.C.," "Electrical Characteristics That Must Be Considered in Comparing Alternators," and "Advantages and Limitations of Synchronous Motors and Split-Phase Motors."

MR. PRESIDENT

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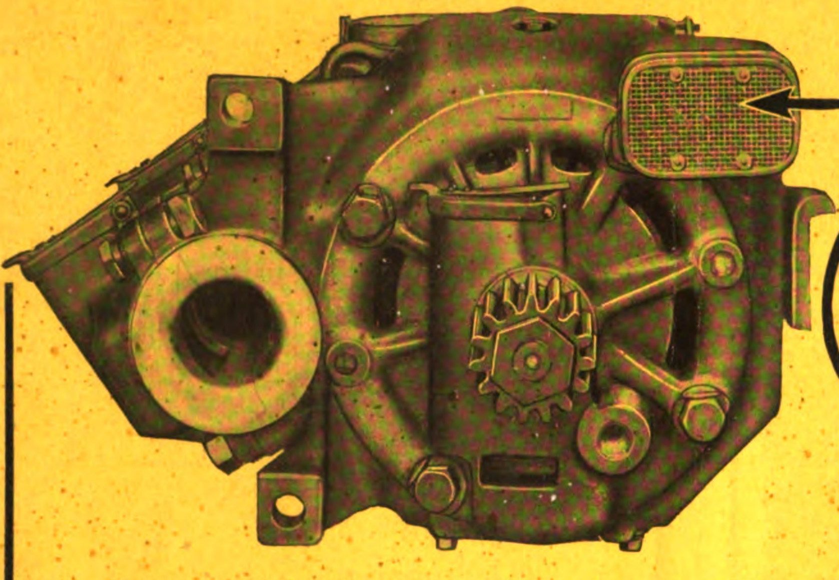

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